Our Beaumaris Fossil Heritage

RAYMOND LEWIS: This video is part of the Summer by the Sea program, being a delivery by Coastcare Victoria and Parks Victoria, in partnership with MESAC, which is our Marine Education Science and Community centre. We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, and their unique ability to care for Country and their deep spiritual connection to it. We honour Elders past and present, whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

(MUSIC PLAYS)

RAYMOND LEWIS:
Welcome to our Summer by the Sea event, a very special event sponsored by Coastcare. An event in which we're going to talk about the wonderful fossils around Port Phillip Bay, and taking a special interest in those here in the Beaumaris and Mentone cliffs. So, I'd like to introduce you to Professor Emeritus John Buckeridge on my right.

JOHN BUCKERIDGE:
How do you do?

RAYMOND LEWIS:
And Murray Orr, who's the President of the Bayside Earth Sciences Society.

MURRAY ORR:
How you going?

RAYMOND LEWIS:
So firstly, I'd like to ask John to tell us something about the nature of these cliffs and why this area is so important. John, over to you.

JOHN BUCKERIDGE:
The rocks that form these cliffs are the Beaumaris sandstone, and they were deposited around about 5.6 million years ago. Now, you may think that 5.6 million years is a long time ago. But in fact, as far as the age of the earth is concerned, then that's not so old at all, because the earth is around about 4.6 billion years. Nonetheless, 5.6 million years ago, this area was marine. And in it we had whales, turtles, many different sorts of fish, and particular sharks, as well as clams and other invertebrates living in the water.

And it's these that are so exciting for us to find when they're worn out, weathered out of the cliff face. When we're talking about fossils that get washed out of the cliff, sometimes they, in fact, more often than not, they're going to be molluscs. And here's a typical bivalve or clam, and the shell of the clam is made up of calcium carbonate. Now, this one was taken out of the cliff face before it had a chance to be part of the sort of eroding environment.

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As a consequence, the shell is all there still. But after a short period of time, when it does get worn out, here's another mollusc, this is a gastropod, we find that all the actual calcium carbonate has disappeared, it's gone. It's quite a soft mineral. As a consequence, after a little while, this won't be recognisable really as much at all. However, with teeth, it's quite a different situation altogether. Now, when a tooth first comes out of the cliff face, they can look rather like this. And here is a tooth of a shark. And it's made up of this mineral we call apatite, which is significantly harder than the calcite. If it's lucky enough to be picked up quickly and go into a collection somewhere, it would probably look a bit like this. But two things can happen to it.

One, it can stay on the sea floor, perhaps lodged under or near a rock, and it gets covered in Coralline algae. And this is an example of one that's been preserved, I suppose by Coralline algae, it's not moved around very much at all. And compare it with this one, I picked this one up literally about ten metres away from where we are now. This one is highly worn and eroded. And in a short period of time, you won't recognise it as a tooth. So, this has been in the cliff face for around about, in the rocks of the cliff face, for around about 5.6 million years. It's come out, it's been eroded out, in probably only about ten years. And it's like this, just weathered and tossed around by the waves. So, that's the sequence of events.

Every now and then we find something particularly exciting. And perhaps Murray, you would tell us a little bit about one of the most exciting fossils that you've found here.

MURRAY ORR:
Yeah, thanks, John. A good day on the beach. I was walking along looking for some sand dollars, which are a type of echinoid, and it was a long day coming back. I noticed something just poking out under a rock and it looked like the bottom rim of a Coca-Cola can or a lemonade can. And I thought, I won't bother. And then I realised that the rim of it had a bone-like surface to it. So, reaching under the rock, I pulled out what has become known as the Beaumaris tooth, which is a whale tooth, a sperm whale tooth.

The whale weighed about forty tonnes, it was about eighteen metres long. So, the size of a small bus. And this particular tooth is about a third of a metre in length and weighs three kilograms. The original tooth is now in the museum. It comes to a point when you find something good on the beach, that you realise that it's too good to keep for yourself. So, I gave it to a museum and they produced this replica for me. It was announced all around the world because prior to finding this, the only type of finds from this whale were in America, California and down in South America, and they are in strata, which was about twelve million years old.

Now, this strata is about five to six million years old. So, we bought it around the world, and screening through history by many millions of years. And we now have proof that this whale existed here at Beaumaris. And you too could find something like this, I'd encourage you if you did find something important to present it to the museum as a gift. And they will note that you are the

contributor. And that goes down as part of its history, so that in two hundred, three hundred years' time, the person who is studying this, perhaps at the museum, they know that you actually donated it to the museum.

So, good luck in your searching, and I hope you find the other one. There were about forty of these in the whale's mouth. And it's different to today's sperm whales in that these were in the upper and lower jaw. And this whale fed on anything it felt like eating. Whereas today, sperm whales have teeth in the lower jaw only. And they feed by sucking in giant squid. So, very different type of predation from this whale to the ones that are here today.

JOHN BUCKERIDGE:
And it's kind of interesting when we talk about whales because the killer whale is a very well-known animal. And it's quite a large animal. And here, the comparison is a tooth from a killer whale. And if we compare that with this one here, now the killer whale also had teeth in the upper and lower jaws. And we get an idea of the incredible size of this one here. Compared with today's living killer whales.

MURRAY ORR:
There are a lot of whale bones that you can find along the foreshore here. And this is one. You recognise it just looks like a piece of rock from the cliff. But this was found again on the foreshore and it has a sort of a grain in it like you'd see in timber. And you can see that this has a depression around the edge. This is, in fact, an intervertebral disc. If you've ever been to the chiropractor with a bad back, and he starts pushing and prodding your back, this is what a slipped disc looks like, it slips out of place. And you could say that this whale here has a very bad back. And it really gives you a good description. Once you know the size of the vertebrae, you can have a fair guess at the size of the whale.

The other types of fossils, which are fairly common on this foreshore are crabs. And here's an example, this is the underside of it, which you can see the crab claws. And as I turn it over on top, there's the top shell of the crab which have little sharp points on both ends, and its arms coming around and going underneath for its main front nippers. These come in a variety of sizes. The smallest one I've found is probably a centimetre long. And this would be one of the larger ones that are around this foreshore. But the variety of fossils that you find here is extraordinary.

And the other reason this site is important is that there are both land-based and sea-based animals found. They have found parts of diprotodon, which is like a five hundred kilogram wombat, which would have roamed this area. They've found parts of seal and penguin, and the penguins were almost the size of the large emperor penguins in the Antarctic. This bay used to extend inland quite some kilometres and over the millions of years has been filled in. And the sandstone has developed and then been thrust up out of the rock, and it's what is eroding into the water that releases fossils like this.

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JOHN BUCKERIDGE:
One of the things that we haven't mentioned, is that we've talked about the invertebrates in other words, the things like molluscs and echinoderms and things. And there are some beautiful examples of echinoderm that are found here. This is a thing called Lovenia, which is particularly common. And in fact, this is the type location of *Lovenia woodsii*. Now this thing here is extremely common in the rocks around the foreshore here when they're worn out.

MURRAY ORR:
It's a sea urchin, is it, John?

JOHN BUCKERIDGE:
It is a sea urchin or a sea egg. One thing that is here that's perhaps rather intriguing is that we haven't mentioned plants. And there are not fossil plants on the whole, but there are tree trunks, extensive tree trunks that were washed out during floods, a tree would be washed down a stream, and it settled and become waterlogged in the beach, sands and muds, and they sink to the bottom of the ocean. And over a period of time, they are compressed and their outline, effectively, their structure or their shape is left behind.

But that's the only thing that remains. And these moulds or casts of trees are remarkably common around here. Once you get your eye in, you can see that you walk along the stretch of the beach in the Beaumaris sandstone and you will see the impression of a large tree. On rare, and I say that specifically, rare occasions, we can find the remains of plants, land plants, as well as this wide plethora of land animals and marine animals. So, it is one of the most significant and important fossil locations in Australia.

RAYMOND LEWIS:
We're now going to walk around the Beaumaris Yacht Club, the Beaumaris Motor Yacht Squadron, and past the jetties and things to a very special little beach. Much safer for you and your children if you come down, it's called Fossil Beach, and we'll have a little chat about some of the fossils there as we wind up this session. So, join us for the walk.

(INAUDIBLE CONVERSATION)

JOHN BUCKERIDGE:
What's really interesting about this car park is that probably underneath the car park are the remains of probably large animals that were living here, maybe skeletal remains. Who knows what's beneath this car park?

(CROSSTALK)

What's important here is the fact that the sea is eroding. If we compare this rock outcrop with what we may find in Central Australia, for example, even though the rocks are perhaps very, very

fossiliferous, the sea actually cleans the cliff face and cleans the fossils. And it's the act of erosional process that brings stuff out. And in a way it's a two-edged sword. It's eroding, it's making fossils come out on the foreshore, but it's also ultimately destroying them. And that's why it's important if you see something that's really useful, interesting, at least, it's worthwhile picking it up and conserving it.

MURRAY ORR:
The other important thing is, we're the last generation, in my view, that will be able to collect here without scuba diving, because at the rate of the rising sea water, the difference between high and low tide here is probably less than half a metre. So, with the rising sea levels, this site will be inundated by the end of our lifetime.

JOHN BUCKERIDGE:
Not a worry for climate change.

(MUSIC PLAYS)

This sign is something that both DELWP and Bayside Council work with us on to produce and just gives you a demonstration of what you can find on the foreshore and also the warnings from Bayside and DELWP as to the penalties for digging on the beach.

RAYMOND LEWIS:
One important thing we want to tell you before you go finding fossils is that you need to wear the correct footwear. These small rocks behind me on the foreshore are slippery, particularly in summer when the algae grows on them. So, thongs are no good. You want proper sandals or waterproof boots. Again, don't stand under the cliffs. Because if one of those rocks falls, it will kill you. So, stand back from the cliffs. Even if you think you've found a good spot to look for fossils, don't go in too close to the cliffs.

There's blue-ringed octopus everywhere in Port Phillip Bay, particularly in rocky areas. So, don't put your hand into a hollow that you can't see. If lightning starts, get off the beach, and that's a general rule even if you're swimming. Don't stand on the beach when there's lightning. And the other thing, very occasionally there can be a freak wave. So, you've heard about fishermen getting washed off the rocks. That can happen here too. So, take it easy, take a lot of care. Wear a hat and slip slop slap.

JOHN BUCKERIDGE:
One of the most common fossils around here is the *Lovenia woodsii*, and here's quite a nice specimen here on this fossil beach. And we can see that it is a remarkably well-preserved specimen indeed. So, this little fellow here, *Lovenia woodsii,* burrowed into the sand at the bottom of the ocean down to perhaps five centimetres or so. And it would come out at high tide. So, it was a fossicker for food. And they're also called sea mice, because when they were alive, they had numerous fine spines over the entire body. So, they look like, a bit like a little mouse.

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RAYMOND LEWIS:
John, is that a fossil? It looks like something's hip bone.

JOHN BUCKERIDGE:
No, no, this is a nodule of phosphate.

RAYMOND LEWIS:
OK.

JOHN BUCKERIDGE:
No, it's actually quite important because these phosphate nodules only formed during periods of quiescence or low sediment inputs. So, it would have been a relatively stable environment with hardly any sediment coming into it. And it would have been shallow, warm waters. So, this is a phosphate nodule. And there are many, many of these in certain horizons.

RAYMOND LEWIS:
It was an amateur fossil hunter who dug this hole. He has since been identified and the Bayside Council, and together with DELWP have made this area stable. But this shows you what you shouldn't be doing. You should not be digging into the cliff and destroying the cliff. They closed the beach for several months while that was being done. And destruction like that could cause the closure of all beaches in Victoria.

It also shows that the person digging doesn't understand this area, because all you're likely to find in here are degraded shells. The fossil beds that are yielding the most fossils are out under the water, and they're washing in onto the foreshore.

MURRAY ORR:
OK. Thanks for coming here today. Hope you've had an informative event. Hope to see you down here sometime. We're always on the beach, or some of us are on the beach most sunny days and at low tide. So, thank you and see you soon.

JOHN BUCKERIDGE:
And remember, except for the odd loose fossil you may find lying around in the sand strand at the bottom of the cliff face, take nothing away from the beach except photographs and leave nothing behind but your footprints. Great seeing you here, thanks.