Piha's volcanic past

The electrics were dodgy, and the rain intermittently poured down, but that did not stop the people of Piha and further afield pouring through the door of the Barnett Hall to hear geologist Dr Bruce Hayward talk about Piha and the Waitakere Volcano. The event was the second in a series organised by Protect Piha Heritage Society.

Who would have thought the little known subject of geology would have drawn over 120 people? They came away immensely satisfied, Dr Hayward drawing rapturous applause. The consummate teacher, he made the landscapes of Piha, the West Coast and the wider Auckland region come alive as he explained the fiery and watery formative processes that explain our unique beaches, cliffs, sand-dunes and craggy ranges.

The Waitakere Volcano lay underwater off today's West Coast, before the landmass of the Auckland isthmus existed. Auckland as we know it was submerged in a deep marine basin, the Waitemata Basin. A profile of the volcano has been gained by geophysics using measurements of gravity, the magnetic field and seismic surveys, tracing the extent and size of the volcano.

This shows the volcano was 60 kilometers across and 40 kilometers from north to south, making it the second largest volcano that has ever erupted in New Zealand. This massive volcano was four to five times the combined size of Tongariro, Ngaruahoe and Ruapehu. Today's Waitakere Ranges are the eastern flank of the Waitakere Volcano.

The Waitakere Volcano was continually erupting under the sea creating a submarine landscape that eventually became visible when the volcano was uplifted. Examples of this were given by Dr Hayward as far away as Parnell (grit visible in the cliffs above Parnell Baths), Motuihe and Cape Colville. Dr Hayward used spectacular photos to explain the formation of the rocky cliffs of the West Coast, including deposits of pumice at Farley Point, Karekare, major slumps and slides from the upper levels of the volcano to be seen on cliffs near Tunnel Point at Pararaha, and the world-renowned pillow lava formations of Maori Bay, Muriwai.

Twenty million years ago the Australia and Pacific tectonic plates collided. The Waitakere Volcano was pushed out of the sea, and two lines of volcanic vents began erupting on the uplifted eastern flanks, one of these on the West Coast. This line of explosions created many of the bays of the West Coast as explosion craters, for example, White's Bay. Other formations are the eroded volcanic necks such as The Watchman at Karekare and Lion Rock. There were lava flows all along the top of the Waitakere Ranges, seen today in the weathered red and purple clays in road cuttings along Piha Road and Lone Kauri Road.

Following the end of these eruptions, there was a quiet period of 10 million years when the volcano was subjected to erosion from the forces of the Tasman Sea, so that eventually it became a low-lying plain. Then three to five million years ago, there was renewed tectonic activity and the remains of the Waitakere Volcano were pushed upwards along a block fault and tipped to the west. The coastal plain became the flat planes of the Waitakere Ranges that can be seen in its profile from Auckland City and the Manukau Harbour.

Over the last three to five million years, global temperatures have fluctuated dramatically, with cold periods coinciding with the retreat of the sea. When the sea level was low, there was a large coastal plain; when high, it came into the cliffs. It was startling to hear that during the last ice Age, 18,000 years ago, the Piha coastline was 50 kms from where it is today. As global temperatures warmed, the sea level rose reaching today's level about 7000 years ago, the surf accelerating the erosion of the coastal cliffs.

The rocky shore platforms with their distinctive hollowed out backing above are caused by erosion, the cliffs above the sea level eroding at a faster rate than those that are continually wet. When salt spray dries, grains of salt crystallize between the grains of sediment and push them out, an effect that can be seen at the Green Rock at Piha and at Mercer Bay.

Dr Hayward explained the formation of the guts and crevices of the Blowhole, Gap and Keyhole at the south end of Piha. The Keyhole in Taitomo Island (Camel Rock) was created when a dike of hardened rock fractured and blocks successively broke away under the relentless action of the sea.

The straight edge of the West Coast is a relatively recent phenomenon, using Dr Hayward's immense timeframe. Three million years ago there were two huge bays, the Manukau Bay and the Kaipara Bay. Huge sand-barriers formed at Awhitu and the South Head of the Kaipara creating the harbours, and similar processes on a smaller scale occurred at Piha, Te Henga and Karekare. Piha's bay would once have washed right up the Piha Valley to the foot of the rocky bluffs along Glen Esk Road. Glen Esk valley would have been an estuary.

It had previously been thought that the black iron sand of Piha arrived from the eruption of Mt Taranaki, but Dr Hayward displayed diagrams of recent work showing that the sand supply of the West Coast is titano-magnetite sand primarily from the eruption of Taupo, brought our way by the Waikato River. This sand moves up the coast in pulses. One large slug created a huge wetland on the Awhitu coast which was used by Maori as a food resource. It moved offshore into the Manukau Harbour entrance and then between the 1930s and 1950s was deposited at Whatipu. That sand is moving north and explains recent deposits opposite Taitomo Island, now covering Dr Finlay's boatshed. In time, Dr Hayward predicted, people will be able to walk from Karekare to Piha along the sand, or even to Te Henga.

On that note, the audience went off into the Piha night, contemplating the dramatic changes that still might occur at this lovely place, though possibly not in our lifetimes.

If you would like to be on our email list to hear about future events send an email to susan@davis-nicholas.com.

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