Kia ora, gday and welcome to the History of Aotearoa New Zealand. Episode 60: Captain Hook. This podcast is supported by our amazing Patrons, such as RandomStardust. If you want to support HANZ go to patreon.com/historyaotearoa. Last time, we covered a bit of an introductory hodgepodge of information into the world of Māori marine fishing. This time we are going to get more into the nitty gritty of things as we talk about matau, fish hooks!

Matau had to be quite clever in their design since they obviously weren't made from a malleable material such as metal. As you might expect, they were usually made with the Big 3, stone, bone and wood as well as shell from species like paua, or a combination of those. When a hook was made of a combination of materials usually harakeke, kiekie and tī were used to tie it all together and for the fishing line as well. In fact, Polack, an early European explorer, said that the rope, nets and lines made from these materials were "infinietly stronger and fitted to bear a heavier strain than any made from European materials." Though the downside to this was that it took a while to make and could be considered rather tedious to do so. If you remember from our weaving episodes, this was done by taking some muka and rolling it together with the palm of your hand on the thigh.

As we mentioned last week, hooks were split into two categories, circular bait hooks for benthic fish (sometimes called C shaped and U shaped hooks) and trolled lures for pelagic fish. From these they could be split into two further groups, one piece hooks and composite hooks. One piece hooks are made from a single piece material carved into the shape of a hook, so there wasn't any tying together needed compared to composite hooks which took advantage of multiple materials which needed to be bound. One piece hooks were generally made from either bone or shell, it was pretty rare that they were made from stone. Shell was actually a pretty popular material all across the Pacific, although in most other areas it tended to be pearl oyster shell rather than what was used here. You would think that the shell used in Aotearoa was paua, and you would be partly right. Paua was usually used in a decorative fashion or as a visual lure as it wasn't strong enough to be used as the main structure, which would be expected to bear weight, with some exceptions. For that the kāeo shell was used, *Cookia sulcata*, also known as Cook's Turban, among a couple other sea snail species. These tended to be quite small though with shanks rarely exceeding 50mm in length.

In terms of bone, since there weren't any large mammals like on other continents, the source for large bones to make hooks were moa, seals, stranded whales, dogs and other humans. As we already know, moa gradually became more and more rare until there were none of them left but whales provided a fairly steady supply of bone from the semi-frequent strandings that occured. Some of these whale bone hooks were even traded around the country. They couldn't just use any old whale bone though, they did have to be a bit picky cause not all bones are maed equal. The bones of deep diving whales, such as the sperm whale, aren't as dense as the bones of terrestrial animals, meaning that they couldn't bear as much weight and generally just weren't as strong. So usually the only parts that were suitable were the lower jaw, atlas vertabrae and the back of the skull. On the other hand, the rostral or snout bone of some beaked whales is one of the densest bones of any animal, but we aren't actually sure if Māori used them. Although I did mention seal and dog bones as being used, it wasn't all that often as it was pretty rare that they would be of a size needed to make a one piece hook, despite being of similar strength to human bones. Human bone was prized for its density and strength, with the bones of enemies naturally holding a lot of sentimental value as a sort of utu, as we have discussed in the past. Sometimes hooks made from human bone could be given names and lead to inter-hapū conflict if the person's whanau wanted the hook back. Overall, using a single piece of bone to make a hook was rather limiting and they rarely exceed 75-80mm in length. The size would also be influenced by the type of bone that was used, depending on it's strength and density as well as the size of the fish you wanted to catch.

Obviously bigger fish need a stronger hook however larger bones, such as moa which has rather porous bones, didn't always mean better. A lot of this also came down to the way that the hooks worked, which will discuss in a bit.

In general, the shape of the one piece bone hooks was the C shaped hook, which helped spread the load more across the entirety of the hook, rather than concentrating it in a small points making it liable to break. They were the most popular hook used by Māori, a 14th century settlement called Houhora had 84% of the hooks found there being circle hooks. Part of this popularity was likely that although J shaped hooks actually hook more fish, the circle hooks actually land fish more often. OR in other words, although J hooks get in the mouth of the fish more often, C hooks resulted in more fish making it into the boats. This was in part due to how they worked, which also reduced fish mortality if it was returned to the water. Interestingly, we find the opposite trend with freshwater species, C hooks actually increase mortality, potentially due to the different feeding methods of those species. Unlike modern J hooks or U shaped hooks (the other type that Māori used), circle hooks were used with a handline rather than a rod. Even when a rod was used, the line would be pulled in by hand as the rod was laid down in the waka. U hooks were designed to be used with a rod to flick the fish out of the water rather than gradually pull them in. This type wasn't very abundant on the Aotearoa mainland, though they were popular in the Chatham Islands. They were most commonly used in shallow water where the tension could be matained more easily and were even sometimes used as a jig without bait or with a tuft of feathers.

Speaking of bait, since these hooks were usually quite thick to ensure they maintained their strength, it wasn't really possible to thread the bait onto the hook like is done with hooks today. So instead, the little piece of meat would be tied to the lower bend of the hook. The bait that was favoured the most may actually surprise given how expensive it is to just be able to eat it today. Crayfish was very abundant in intertidel pools and it was very popular to be ground up and used as berley (tāruru). Wheke, octopus were also quite popular as bait too but they were a bit harder to find and catch. Mussels and pipi, another type of mollusc, were used a lot as well, pipi especially when targeting tarakihi.

Before how these hooks work we should probably talk about the anatomy of a hook, cause you would have heard me mention the word shank and may be thinking what a prison blade has to do with fish. I'll put up a labelled diagram on the website if you would like to follow along or get lost. So, if we take our 'standard' C shaped hook and work our way down and around from line to tip, the line or rope itself is called the snood, the back supporting part and the part that is often the thickest is the shank, then we have the bend so named for the fact it is a bend from the shank, Just after the bend is often where the bait is tied and then we go round one more bend to the point, which is the actual pointy bit of the hook. As you might expect there is a gap between the point and roughly where the snood is called, well, the gap. Sometimes you would also find there is a bit of artistic flourish carved onto the hooks as well, such as manaia, which could serve a totally decorative function or part of the snood could be tied around it. If the hook was a composite hook, that is made from more than one material, sometimes there would be some lashing after the bend tying the bone point to the wooden C of the hook. You may also find that depending on the hook, the shank and bend tend to blend together a bit, so the lines between each section can be a bit blurry.

So, how did these hooks actually work? Especially given we know that they don't operate in quite the same way as our hooks do today. Well, as you are probably aware, modern hooks work by piercing the cheek of the fish, allowing the person wileding the rod to bring it in. Circular and U shaped hooks don't really work by piercing, they more like grabbing the fish's jaw so that it can't escape. There have been a few theories on how they actually set in the fish's mouth rendering them

hooked, such as being trapped in the jaw of the fish as the hook rotates in the mouth or as the fish tried to spit out bait that it didn't want to eat or that the fish was hooked as it tried to swim away and the hook kinda levering in its mouth. All of these don't quite tell the whole story but they all have elements of how it happens, which is rather complicated so I won't go into the deep details here. But the basic idea is that when the hook is taken, the point would direct the fish's jawbone through the narrow gap between itself and the shank. By this action the hook acts as a sort of trap or snare for the fish's jaw, ready to be sprung. This required the fish to bite the hook in a particular way which was encouraged by the placement of the bait a bit further down near the bend of the hook, rather than the on the point. Once the jaw was in position between the point and the shank, the hook would be pulled to the side of the mouth as the fish swam away or as the fisherman applied gentle pressure. The point would then catch on the jaw and once enough pressure was applied the hook would rotate so that the shank was now parallel to the jawbone and lock into the corner of the mouth where the size of the jawbone would hold it in place, since it was so big and now jammed into a small hook. This would mean that the snood is now facing in the opposite direction of the point, which by now was facing towards the opening of the mouth. This would put all of the tension in the opposite direction of the hook when the line is pulled, stopping the hook from being spit out and allowing the fisherman to pull their catch in. Given that the hooks work in this way, there wasn't much need for the fisherman to set the hook in the way that modern hooks recquire. So the lines were handled a lot less and usually just left to do their own thing, as trying to set them yourself can actually cause the hooks to fall out sometimes. Usually about 10 hooks would be used on a single line with pekapeka, wood spreaders, used to stop them from getting tangled. I'll put up a diagram of how the hooks work on historyaotearoa.com if that didn't make sense.

The interesting thing about the design of Māori hooks and how they operated is that, in a bit of a twist compared to other Māori material culture we have talked about, these weren't unique to Aotearoa, or even to the rest of Polynesia, who also used them. Cultures from the Neolithic and Mesolithic eras that predated Māori by thousands of years also had hooks made of the same materials and following the same design and functional principles. What this means is that these cultures all had access to similar materials, that is to say a lack of access to metal and lots of access to the Big 3. As such, when faced with the challenges that these materials present when trying to solve the problem of how to catch fish, all of these cultures came to similar conclusions of the size and shape of the hook individually because it is simply just the most effecient way of doing it when taking into account strength and durability. We actually see circle hooks from all across the world from Polynesia to the Americas and Europe with only minor variations such as the addition of barbs on the point.

A hook that was similar to the circular hook was the internal barb or shank barb hook. These were usually quite small but very thick and had two blunt barbs that would create a narrow gap that performed the same function as that of a circular hook and overall it seems it functioned in roughly the same way. This design is also quite old and quite popular all across the world, with one archealogical site digging one up in a dried up lake in the Sahara Desert, dating to around 7000BCE and another in Norway to 2000-5000BCE. Others in the Americas have been dated to 1000CE as well. This type of hook also has a universal presence in the Pacific and has been used as a indicator for long distance contact between cultures, such as with America and Polynesia, so it seems that this design has arisen independantly in a few different areas across the globe. Again, this is probably because all these different cultures were trying to solve the same problem with similar materials, so it makes sense that they all arrived at the same conclusion given it was the best one. In Aotearoa, these hooks were probably used to catch large benthic fish where the hooks had a better chance of catching onto the larger gill arches, rather than jam between the upper and lower jaw. The way this

worked is the fish would try to eject random debris, like sand through the gill arches, and any small bits of food would be caught by some structures called gill rakers. The interesting thing about this is that the hook wouldn't be swallowed, instead it would be sucked in when the fish is cruising past and the operculum, that's the gill flap, opens to eject the debris and accidentally sucks it in. In these larger fish species, the rakers are so large that the hook can slip through and latch onto the gill arches. The areas that we find these hooks are ones where it would be possible to take a waka offshore and target large reef fish. That is to say, mostly the east coast, as the west coast just generally doesn't have the sort of whether conditions that would allow for that to occur.

For composite hooks, they are a bit more rare as ones that contain wood and flax don't tend to survive too well in the archealogical record, given they are plant matter and all that. Though we do find that bone points that were attached wooden shanks do survive quite often. The sort of plants that were being used to make composite hooks are ones that we have talked about before, such as tauhinu, which was heat treated in a fire to toughen the wood. Others that were used were plants like mangemange, climbing fern, tānekaha, celery pine and the root of the pohutukawa, which would be lashed to a bone or shell point with kiekie or harakeke. Tī fibres would be used on occasion as well but this was more often favoured for nets. Sometimes resin or gum from plants like pukapuke would be applied to the lashings to help them last longer but not many of the hooks that have been found are treated in this way. In fact, it looks like European collectors may have done this at a later date, so it seems the historical record may have been messed with in some way here. Although wooden hooks didn't tend to exceed 120mm in size, they were actually quite large in comparison to the species that they were targeting so that they weren't able to swallow the whole hook, as it operated in a similar fashion to that of the circular hooks. The obvious problem that wooden hooks had was the fact that wood doesn't sink, it floats, which is not a great property for a fish catching device to have! So a stone sinker would be attached to the line that would make it drop in the water. Additionally, it seems that the hooks were tied and floated in the water upside down compared to modern hooks. That is to say that the point would face down in the water rather than up towards the surface. This would apparently aid in the hooking process. Interestingly, these hooks were sometimes used to target sharks, though not often cause Māori had a slightly different method for trying to catch them.

The reason they didn't use hooks to catch sharks was because once it was in the shark's mouth the teeth would damage the hook, which was difficult to make, as well as the shark's teeth themselves, which is what Māori were primarily interested in, rather than their meat. This is possibly because when a shark becomes stressed its body secretes a whole bunch of ammonia into the muscles making it not super good for human consumption. And given the method of how Māori caught them, they would have likely been fairly stressed before the shark was brought on board the waka. The method was described by a rangatira to a missionary called William Colenso in the 1840s. Fun fact, Colenso was one of the key figures present at the signing of the Treaty of Waitangi. Usually sharks would begin swimming around a waka if there was a lot of fish activity. Once a shark was spotted, a lure would be dropped deep into the water, prompting the shark to dive for it and in the process, lift its tail out of the water. Some madlads would then wrap a noose around the tail and make it tight, holding on as the shark struggled until it became too tired and gave up, allowing them to pull the shark on board. In an interesting twist of fate, the shark's head would be cut off with a saw made of wood with inset teeth of seven gilled sharks. Once the head was removed, the body would be tossed overboard, again Māori were mostly interested in the teeth as they could be used for saws as we just mentioned as well as earrings and other jewellry which would signify that someone was of chiefly rank.

There has also been a bit of evidence to suggest gorges were used. These are small pointed lengths of bone, stone or shell that were hidden in bait and designed to get caught in the gill rakers of the fish. However the archealogical evidence is few and far between and when Best asked about their use, those he spoke to didn't know much about them. This isn't to say that they weren't used at all but it seems like there hasn't been much time spent looking into them so that may be reducing the amount of evidence available to us.

Another type of hook that we see examples of the archealogical record is long, slender hooks that don't really look like they could be capable of taking on any decently sized fish. They kinda just look like a slightly bent twig with a barbed bone point tied onto the bottom. Instead it is thought that these hooks were used to catch seabirds, though I wasn't able to find how the method of hooking them on worked. Presumably a piece of bait was attached and the bird scooped it up? Then was of course the matter of getting the bird pulled back into the waka. I find this to be an interesting idea as it is suggested that the hooks were important for catching petrels and albatross, the latter being extremely large birds, with a wingspan of around 3m depending on the specific species. So the hooks don't seem too suited for catching them either, but perhaps it was all down in the method of using the hooks that made it easier. Either way, the seabirds were caught for their meat as well as feathers, another mportant signifier of chiefly authority.

Next time, we continue looking at hooks such as the trolling lure and how these were used differently to the circular hooks. We will also talk a bit about what Europeans thought of Māori hooks and how these old designs are influencing the modern fishing industry today.

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