

Hardware Cladogram Justification

At the start, organisms had plastic teeth, which were weak, and not very durable (1,2,3). As plants evolved tougher materials, such as bark, the herbivores had to evolve stronger teeth to be able to consume them. The first metal teeth to develop were flat, with many ridges that could be used to grate off bark (4). The next step was to put those ridges on a protruding spike of metal, which allowed the herbivores to puncture the trees, and then drink the sap (5). The end of the protrusion had a circular piece, with a small separation, that was used to grind up any plant matter it could find. Some variants evolved without the protruding spike, but with a more pronounced edge, which allowed it to grind tougher plant matter (6). In some environments, there were softer plants, and so the edge wasn't needed (7,8). In one of these environments, the plant life was so plentiful that the herbivore could afford to become a megafauna (7). In another environment, the plants had some very tough seeds, so instead of grinding them, the herbivores developed teeth that were slightly more flexible, so that they wouldn't be broken by the seeds, which they could then spit out (9). Another type of tooth evolved from the original grinders (8). It was more pointed, and hollow, adapted to grind up certain nuts in a more efficient manner (10). Another group of herbivores developed a separate way to eat tough nuts: protrusions to pierce the shell, then a flat surface to grind up the insides (11). As the herbivores moved into the desert, they evolved longer teeth, with less smooth edges, to eat the thicker plants (13,14). One species developed teeth that could store water inside of them, to be used at a later date (12). Meanwhile, back at the jungle, some herbivores developed teeth that allowed them to burrow into the ground, and eat bugs (15,16,17,18). They became omnivores, as some of them evolved to burrow even deeper (15), or camouflage (16). Others evolved to make bigger holes (17). As herbivores became more prevalent, Some evolved into carnivores, developing their current teeth into two sharp points, suited for piercing the skin (19, 20). This was not suited to chewing, and was relatively inaccurate, so the carnivores evolved smaller teeth, with large roots, so they wouldn't be torn out (19,20). It became apparent that the large roots weren't necessary, so the carnivore's teeth thickened, and the roots got smaller (23,24,25). The teeth gradually became longer, to deal with thicker skin (26,27,28). Some animals had continued to prey on those with thinner skin (23), and they gradually developed a tooth with a curve, to be able to tear out chunks of flesh more efficiently (29). These teeth needed larger roots. As the carnivore's continued to evolve longer teeth, they also needed more roots (30,31,32,33). Gradually, it became necessary for the carnivores to be able to eat more efficiently, or they might have their food stolen from them. So, some of them evolved a tooth with inlaid grooves, which let them eat more effectively (34). Seeing as how the inlaid grooves worked so well, the carnivores developed teeth with outer grooved, and rounded roots (35,36,37,38). This allowed them to process meat even more quickly, but the rounded roots didn't secure the teeth very well, so they fell out often, and had to be regrown constantly. Grooved teeth of different lengths were developed in different areas, to deal with the region's fauna (35,36,37). In one of these regions, the fauna had extremely thick skin, so the predators evolved a tooth that was more suited to piercing it (38). Since the teeth with the rounded roots fell out often, some species evolved triangular roots which were better at staying in place (39,40,41,42). Some of these teeth had a gold hue, which was flashy, and impractical for

ambush-style predators (39,40). So the ambush-style predators developed less bright teeth, so that they wouldn't alert their prey (41,42). The new teeth still had a problem, though, in that they could still get stuck inside the prey, and since they didn't fall out, it was very painful. One group of predators got around this by having grooves only on the ends of their teeth, which still helped them eat, but didn't get stuck as much (43,44,45). At this point, some of the carnivores began hunting at night, to catch their prey unawares. They evolved a different shade of tooth, which let them be more sneaky (45). However, at this point, the overpopulation of predators made prey scarcer. Some predators combatted this by becoming smaller, and therefore needing less food. They ran into the problem that their mouths were too small to hold long enough teeth to be able to kill effectively. So, they evolved a tooth with an extremely specialized type of root, which allowed it to lay flat against the roof of the mouth when the mouth was closed, and rotate into position for biting when the mouth opened (46,47).