

NATURE'S HYPODERMICS

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Introduction

Humans use hypodermic needles for several purposes but mainly medical. Nature too has its own version of needles which were 'developed' long before those of humans. Presented here are a few of Nature's hypodermics compared with that of humans.

The Human model

Often a fine metal tube with a sharply pointed end apparently manufactured by cutting the end of the tube at an angle. This leaves a pointed tip immediately in front of the hollow (canal) inside (Fig. 1).

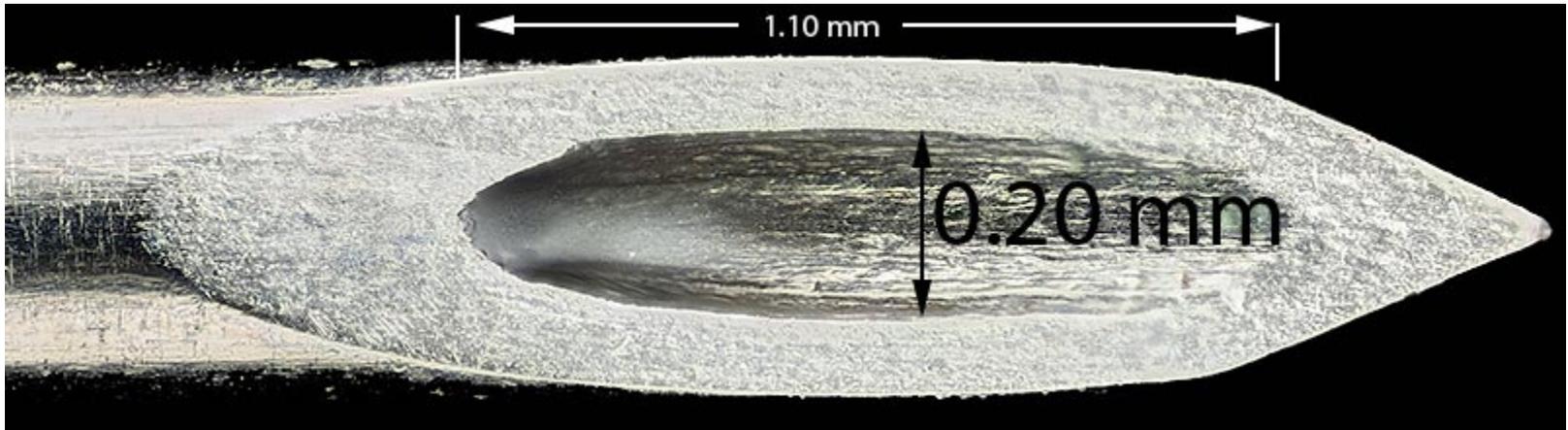


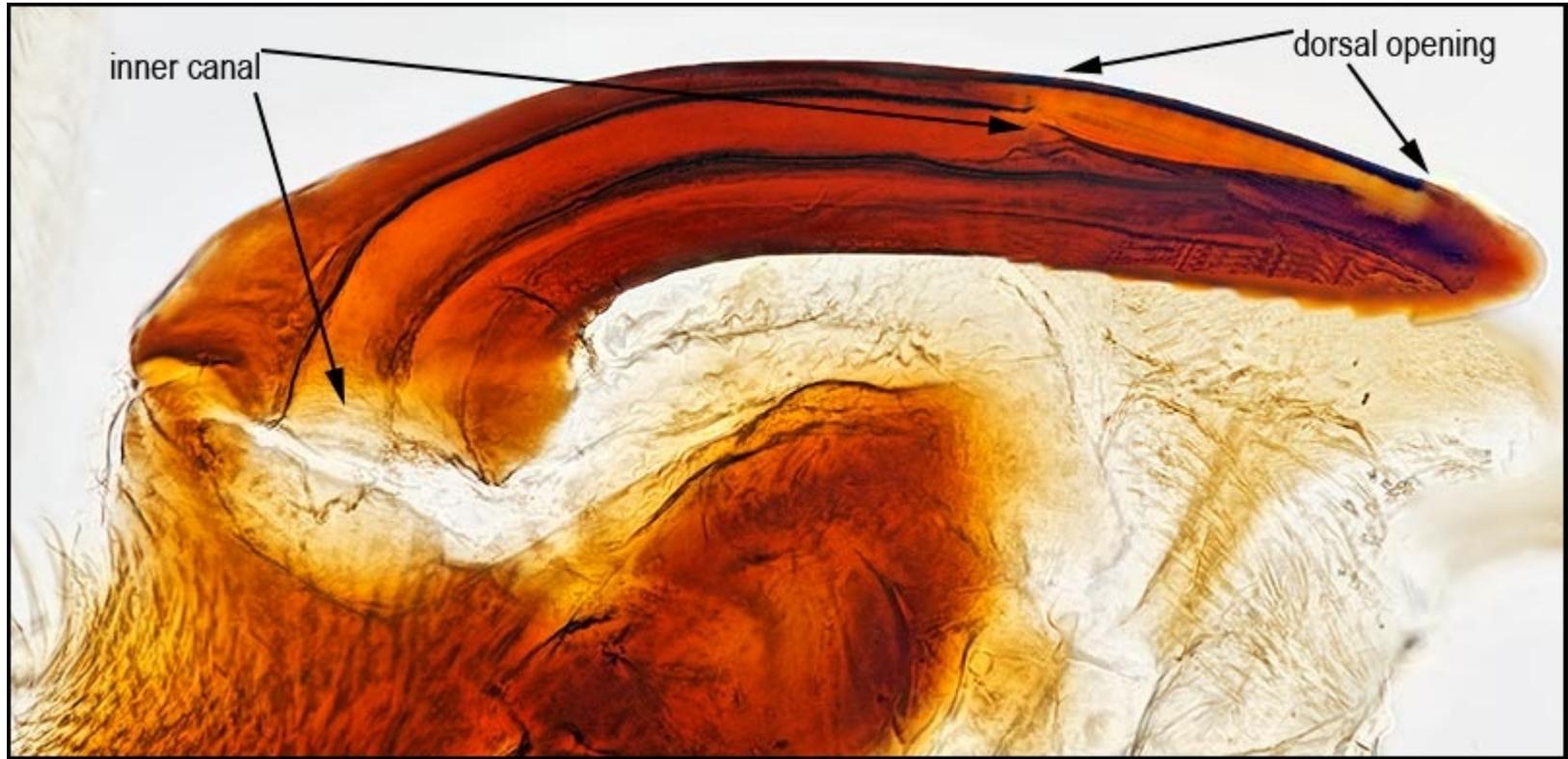
Fig. 1. Tip of a hypodermic needle.

Nature's models

These too are hollow tubes (fangs) although the fang walls are often relatively thicker and the inner canal relatively narrower than the human design. But perhaps the major difference is the position of the canal's opening, it is much further back in the fang than the opening in the human model. I suspect this is to protect the injection apparatus from damage; the human model is for a 'one-time-use' and can afford to be less resistant to damage/wear. Nature's models are for multiple uses – cannot afford to have the tip damaged.

1] Horse Fly larva

The larvae (maggots) of horse flies are predacious in that they feed on small live animals in the soil, including moss habitats. They paralyze their prey using two fang-like mandibles which are forced into the prey and are held there by backward pointing barbs on their lower surface (Fig. 2). Paralyzing fluid is then pumped from the modified salivary glands through the inner canal where it floods into the tissue of the prey via a large dorsal opening. Note the rather solid tip of the mandible which protects the dorsal opening from damage (Fig. 2).



2]] Centipedes

Centipedes have a pair of poison fangs on their heads (Fig. 3).

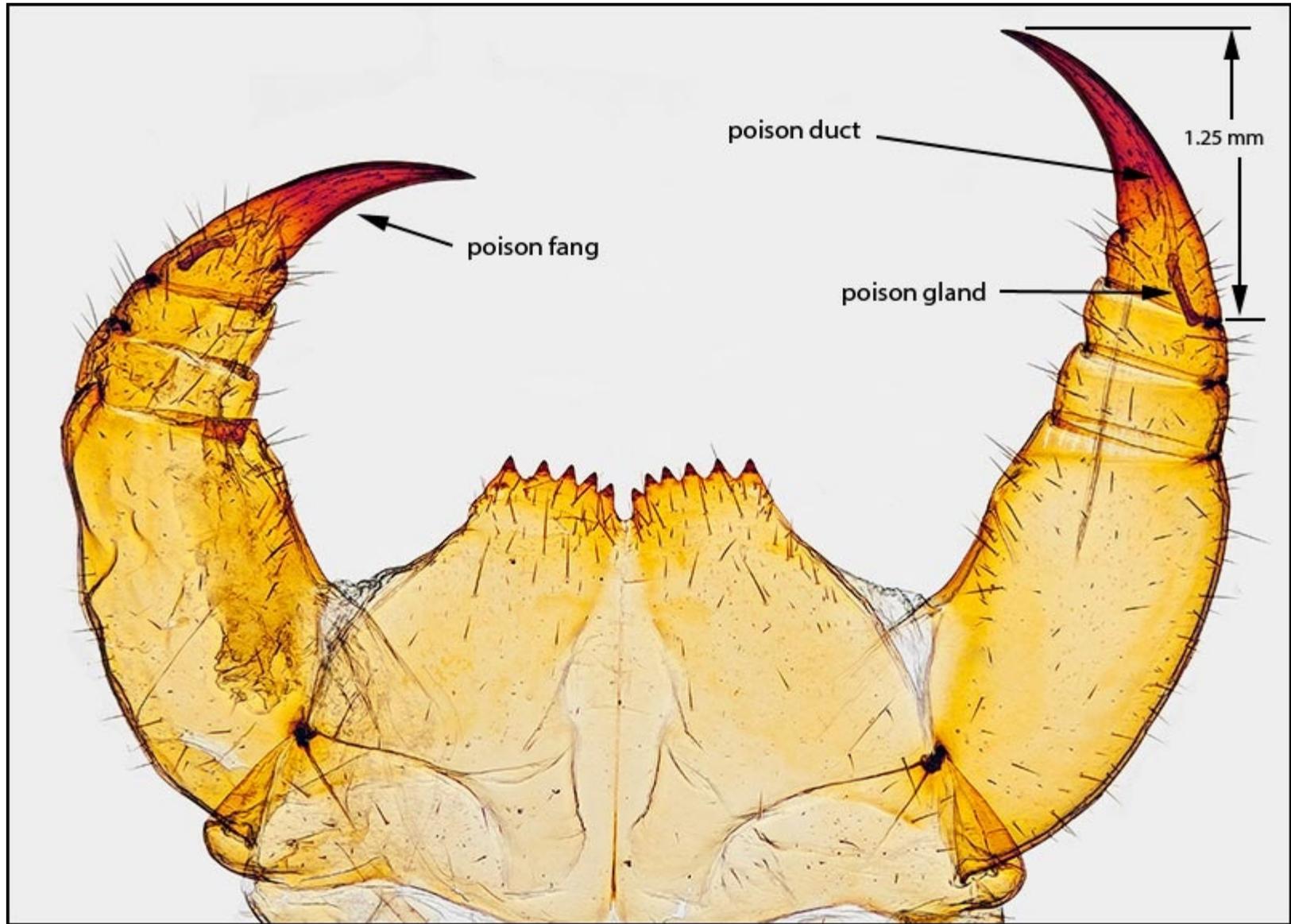


Fig. 3. Poison fangs on ventral surface of a centipede's head

These fangs are very similar to those of the horse fly larva, a solid tip with a dorsal opening of the poison duct, set back from the tip (Fig. 4).

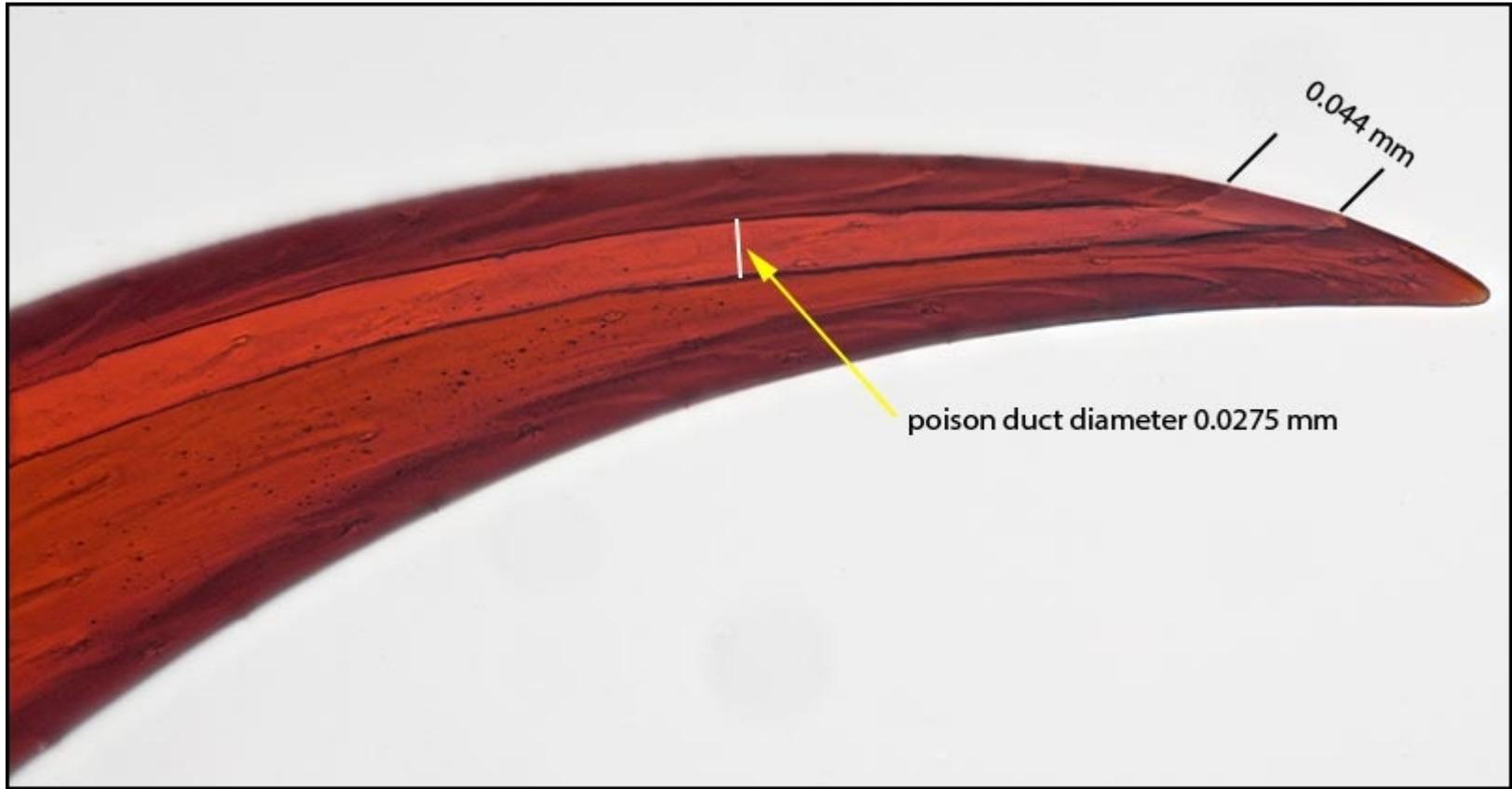


Fig. 4. Centipede fang showing dorsal opening set back from a robust tip

4] Spiders

Spiders have a pair of poison fangs on their head through which they inject a poison to incapacitate their prey (Fig.5)



Fig. 5. Poison fangs of a spider

The structure of the fangs (Fig. 6) is essentially identical to the mandibles of a horse fly larva and the fangs of a centipede. If one was to see a slide of the fangs it would likely be impossible to know from which animal .

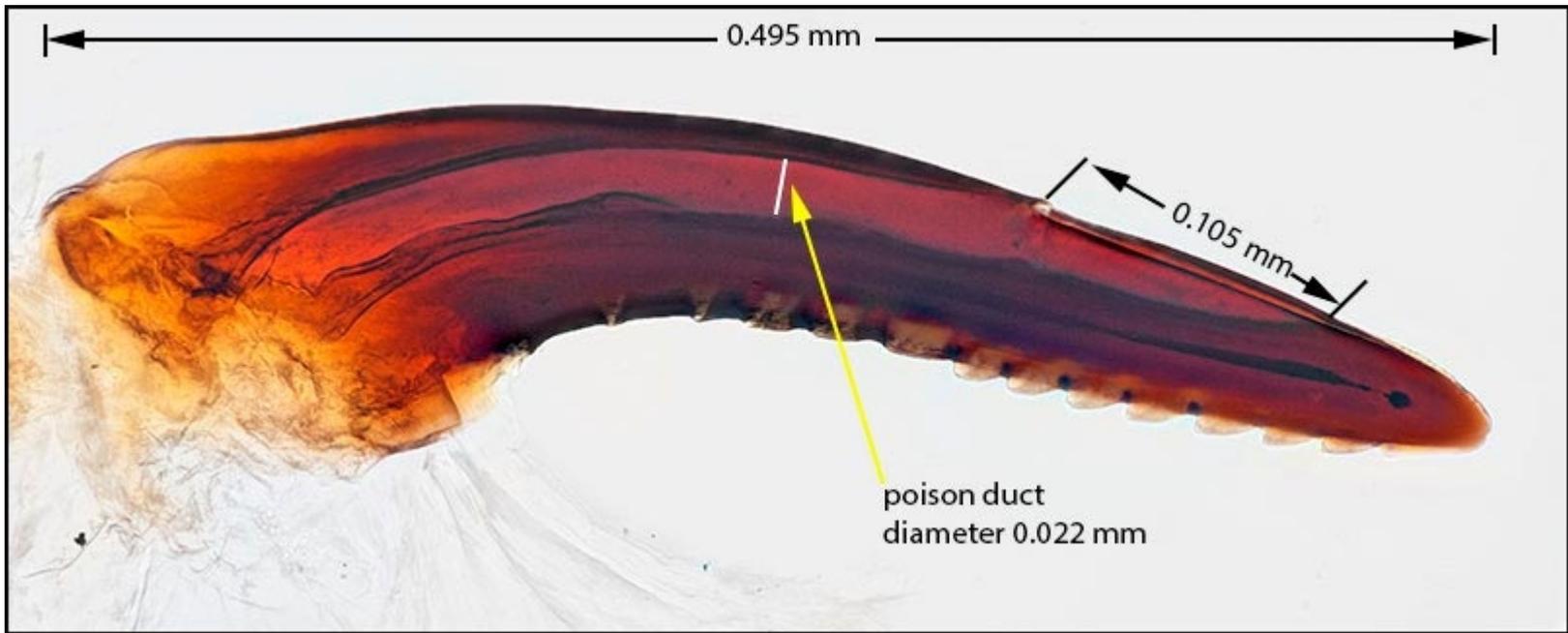


Fig. 6. Poison fang of a spider; note dorsal opening set back from the tip and the recurved ventral teeth.

6] Rattlesnakes

Rattlesnakes use a poison to kill their prey, often mammals. The poison is administered by means of two hollow fangs which are of the same basic design as that used by insects, spiders, and centipedes. A sharp-pointed tip with the poison duct opening on the dorsal surface and set back from the tip (Fig. 7).

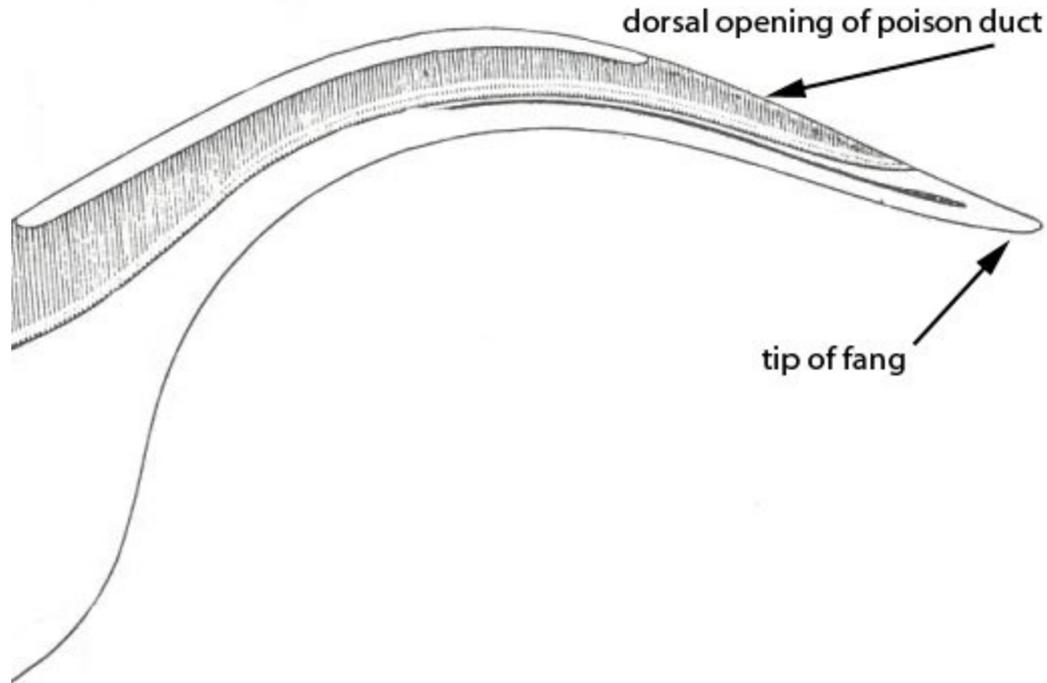


Fig. 7. Tip of a rattlesnake fang.

This design, the poison duct having a dorsal opening, is put to use by spitting cobras which are able to project venom a considerable distance at the face of an aggressor; a ventrally-opening duct would neither allow such behaviour nor would a duct opening at the tip of the fang.

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