Fish Forms

Overview:

In this activity, students will have the opportunity to build their own fish and describe how it will live in its habitat. Students will choose which type of body shape, mouth and tail will aid in the survival of their fish in their habitat. Students can draw in scales and sense organs if they choose.

Materials:

- fish forms
- glue
- crayons or markers
- scissors
- white paper
- construction paper

Background:

Fish have evolved remarkable adaptations that have enabled them to fully utilize the world under the water. The aquatic environment is very different from the terrestrial environment and requires different strategies for respiration, movement and feeding. Many fish use the waters of the estuary for breeding, feeding and protection.

Fins

The typical fish has a dorsal fin that runs down the back and a caudal fin, or tail fin, at the end of the body. There may be an anal fin on the lower side of the body near the tail. The caudal fin provides forward thrust to the swimming fish. The dorsal fin and anal fins act like a boat's keel by providing stability for the fish. There are usually a pair of pectoral fins located near the gill openings and a pair of pelvic fins lower on the body and near the head of the fish. The pectoral fins may be used for propulsion or for braking or turning movements. The pectoral fins may be highly modified as in the flying fish, which uses these fins to leap through the air. Another fish, known as the mud skipper, has modified pectoral fins that resemble a sort of "arm" used to walk from pond to pond. The pelvic fins often provide stability during maneuvering and braking. Each of the types of fins may be highly modified to enable a fish species to occupy a particular habitat. The variations of basic fin shapes are as numerous as the many habitats available to fish.

Grade Level

2^{nd} – 6^{th}

Objectives

* To be able to build a fish and describe how it uses its adaptations to live in its habitat.

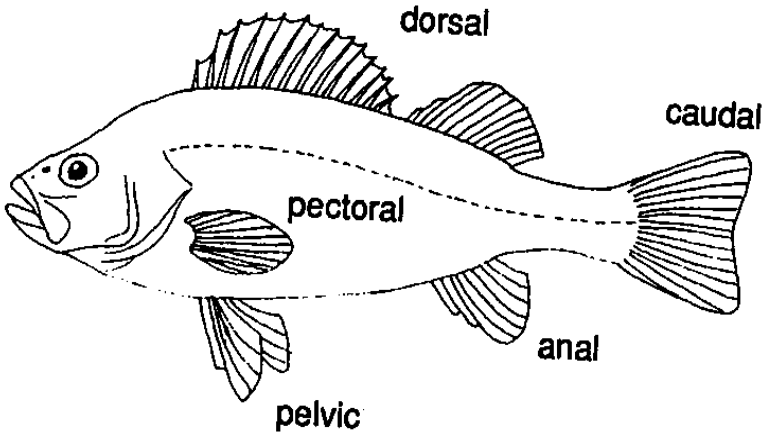
* To relate the anatomy of a fish to form and function.

* To be able to give examples of adaptations of fishes to their environments.

N.C. Standard Course of Study

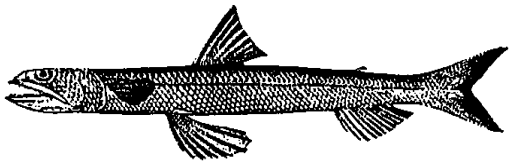
Grade 4
(4.L.1.1, 4.L.1.2, 4.L.1.3, 4.L.1.4)

Grade 5
(5.L.2.3)

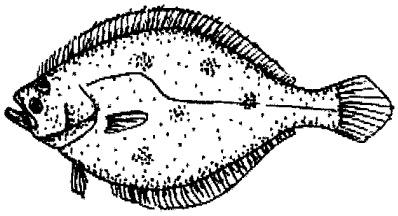


Body Shapes

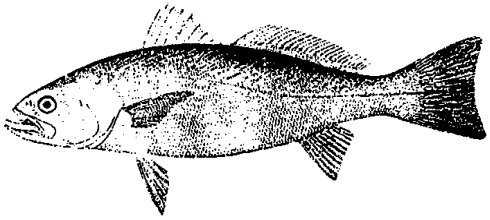
The bodies of fish are as varied as the fins, from eel-like to flattened like a flounder. Some fish like the puffer can blow up like a balloon when frightened. Others take strange shapes to resemble their surrounding environment. The shape of the body is usually related to the type of habitat the fish occupies.



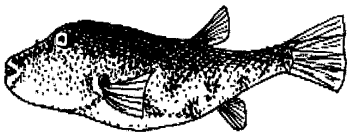
Lizardfish



Southern flounder



Weakfish



Northern puffer

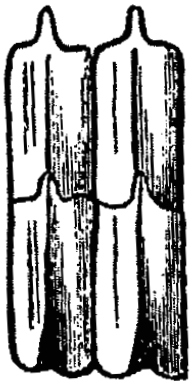
Scales

If you have ever taken a fish off a hook, you may have felt the thick layer of slime that covers the scales. This slime protects the body from infection, water loss or gain and helps reduce drag as the fish moves through the water. Most fish have scales that protect the body like a coat of armor. Sharks (cartilaginous fish) have primitive, tooth-like scales covered with enamel. These scales, known as placoid scales, resemble rows of tiny teeth and feel like sandpaper

when touched. The gar fish has diamond shaped scales called ganoid scales. This scale type is thick and plate-like. Most of the bony fish have thin, rounded scales, called cycloid scales, that overlap like tiles on a roof. Ctenoid scales, much like cycloid scales, can also be found on bony fish such as bass and crappie. The word “ctenoid” (pronounced tee-noid) comes from the Greek “cteno” and means comb.

Ctenoid Scale

Cycloid Scale

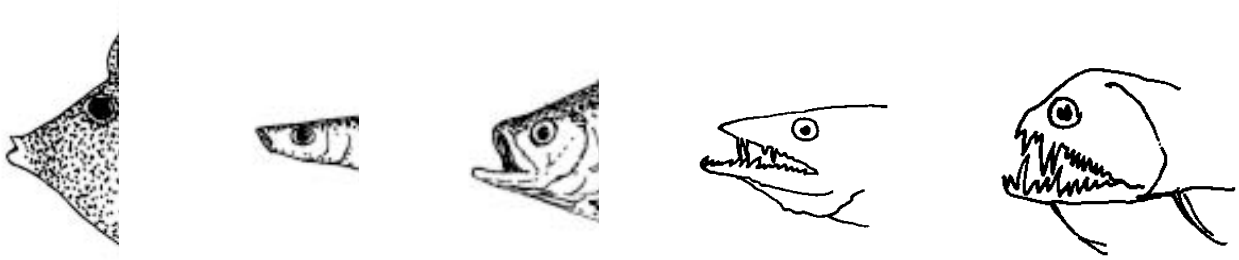


Ganoid Scale

Placoid Scale

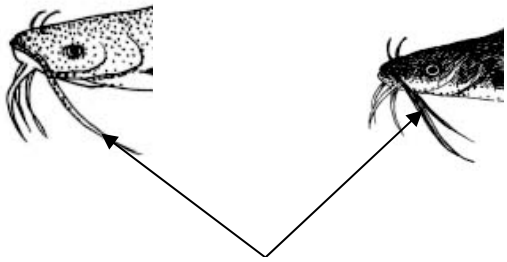
Teeth, Jaws, and Mouths

The mouths and jaws of fish are adapted for a range of eating habits. Some fish mouths are shaped like suckers, some are long and pointed, and others have mouths shaped like a sword. Fish also have adapted mouths that make them bottom or top feeders. The teeth also vary with the mouth shape. The parrot fish uses a beak formed from teeth fused with the jaw to chip off pieces of coral. Other fishes have tiny teeth all lined up in a row, ready to seize and swallow their prey.

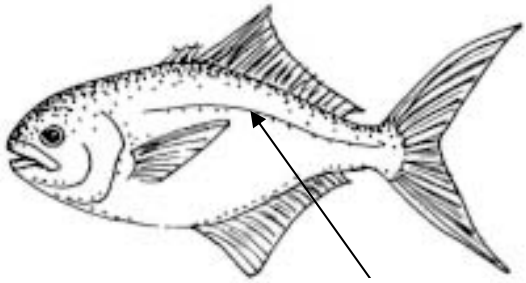


Sense Organs

Fishes generally use their eyes and sense of smell to locate food. Salmon use their sense of smell to guide them during migration. Biologists have shown that a baby salmon imprints, or holds a memory of the water chemistry of the stream where it was born. The young fish migrate to the ocean and later, as an adult, they migrate back to the same stream to breed where they were born. Fish lack an external nose like humans have; instead they have several openings, called nares, which open into the nasal cavity where the receptors for smelling are located. Catfish and bullheads have interesting whisker-like structures on their lower jaw. These structures are known as barbels and are covered with taste buds that help locate food.
Fish also have special lateral lines that help them detect pressure changes and vibrations in the water.



Barbels



Lateral Line

Activity:

Divide the class into groups of two or three. Inform the groups that their task is to build a fish that can live in the estuary. Their fish will have to find food among the creatures of the marsh and will have to cope with changing tides, salinities and temperatures. Encourage them to use their imagination to build the fish. Each group should get a sheet of blank paper, crayons or markers, a set of fish mouths, bodies and tails, glue and scissors. Fins and scales will need to be drawn in. After building their fish, have groups share with their classmates and describe how

their fish will survive in the estuary. The group will also need to include in their discussion how the fish eats, where it is found and any interesting behaviors it may have.

Extension:

- Have students color in estuarine habitats around their fish.
- Take a trip to a local aquarium or pet store and have students take note of the different parts of the fish they see.
- Have two groups get together and come up with what the offspring of their two fish would look like if mated.

Vocabulary:

- aquatic
- terrestrial
- respiration
- estuary
- dorsal fin
- caudal fin
- anal fin
- pectoral fin
- pelvic fin
- propulsion
- habitat
- placoid scales
- ctenoid scales
- ganoid scales
- cycloid scales
- prey
- predator
- imprinting
- nares
- barbels

References:

Manooch, C. S. 1991. Fisherman's Guide Fishes of The Southeastern United States. North Carolina State Museum of Natural History, North Carolina. 362pgs. (ISBN: 0-917134-07-9)

National Science Standards:

Content Standards *Science as inquiry. [K-4] [5-8]*

Life Science. [K-4] [5-8]

Ocean Literacy Principles:

Essential Principle #5 *The ocean supports a great diversity of life and ecosystems. (Fundamental Concept-i)*

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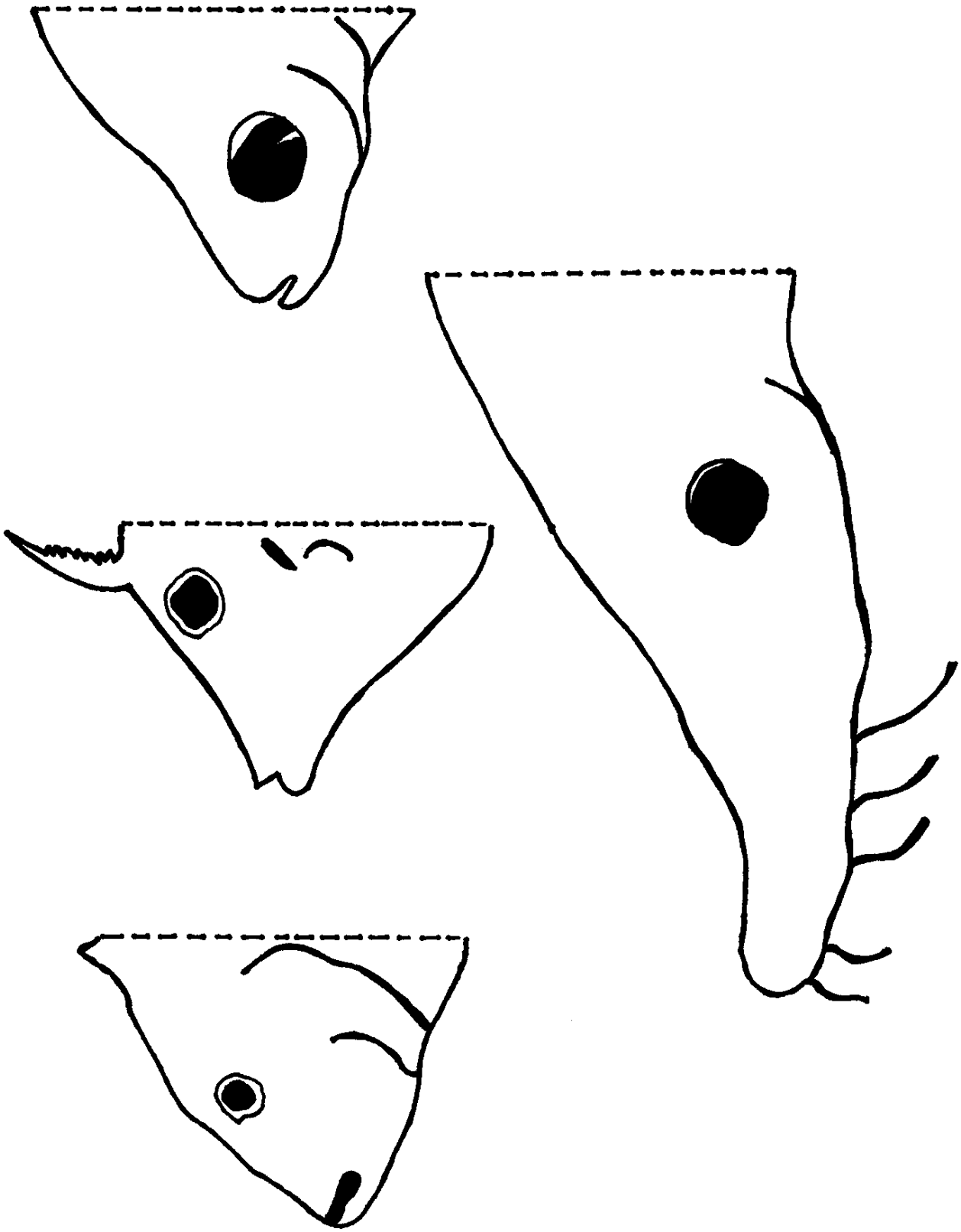
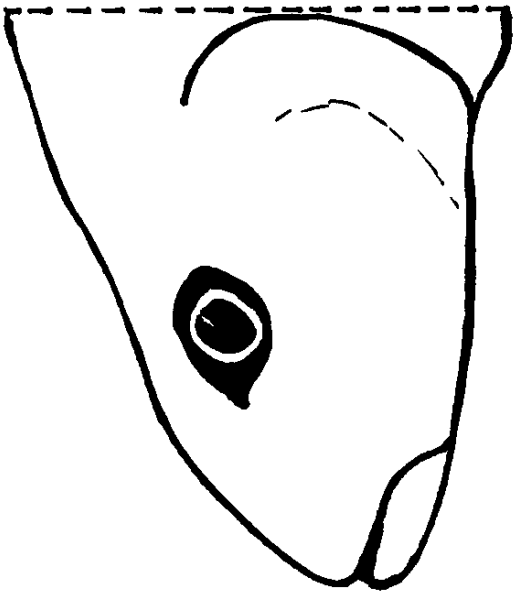
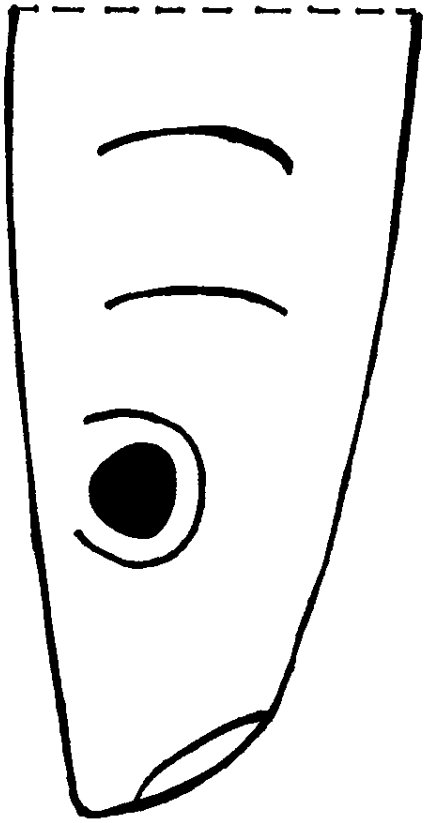
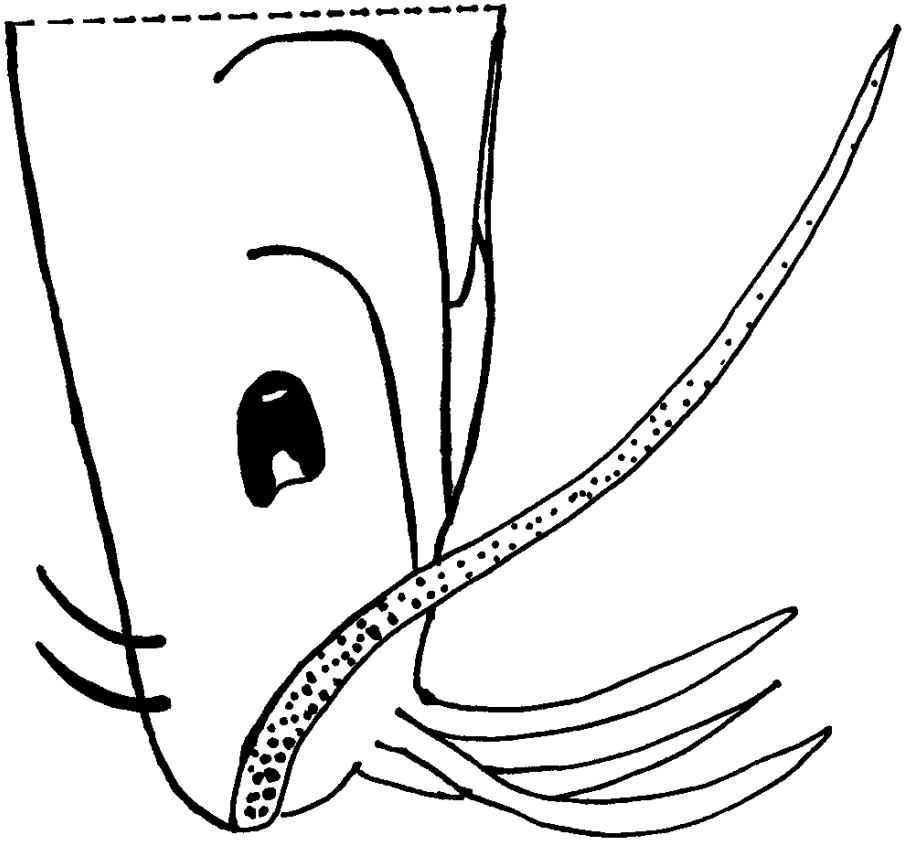
Mouths

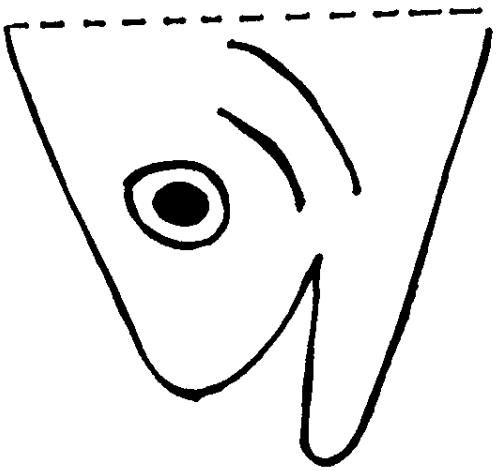


Mouths

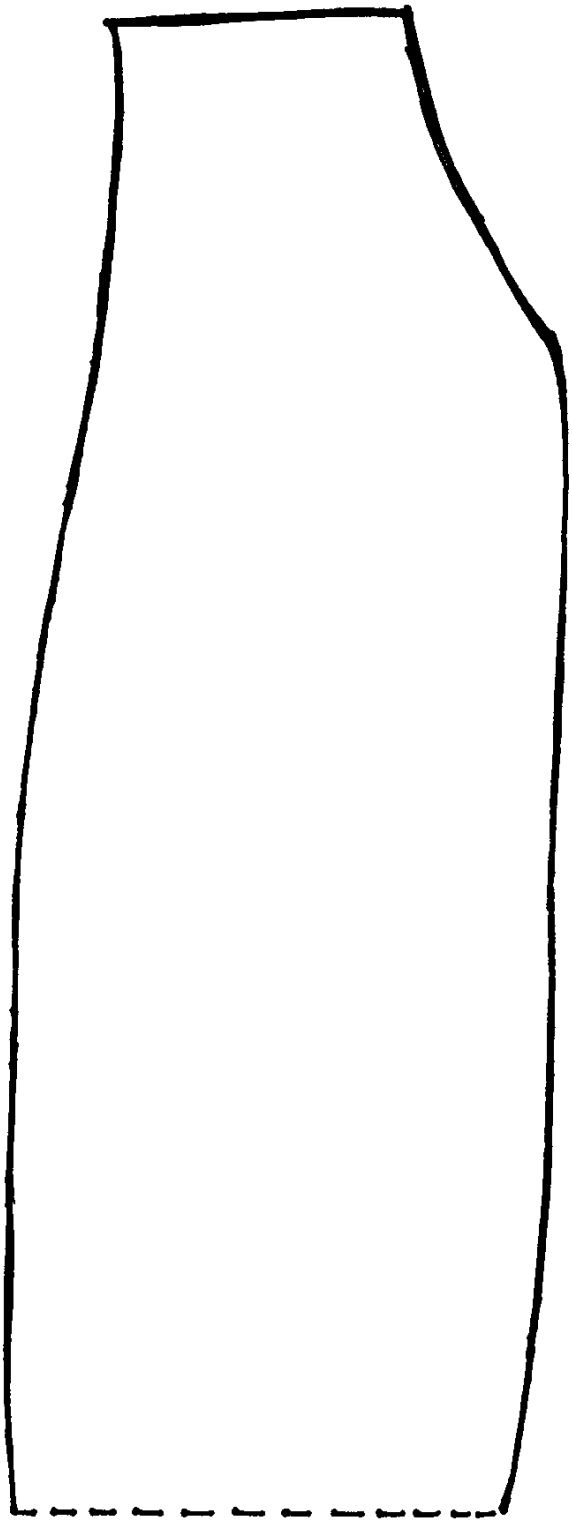


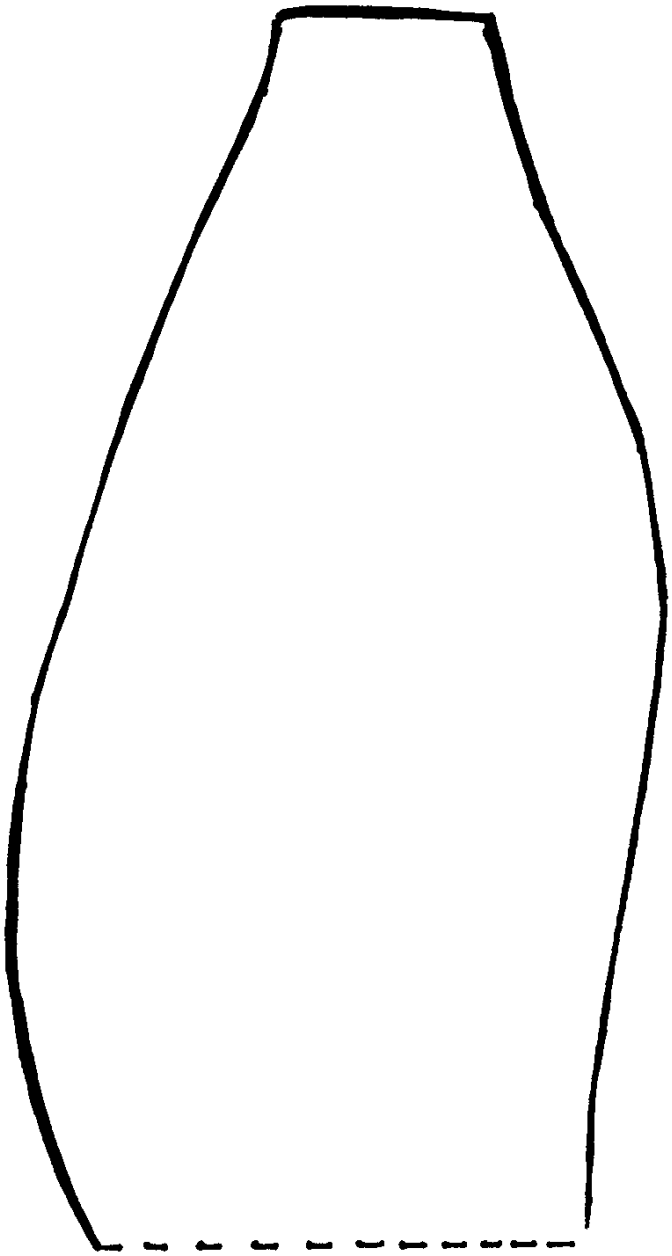






Bodies





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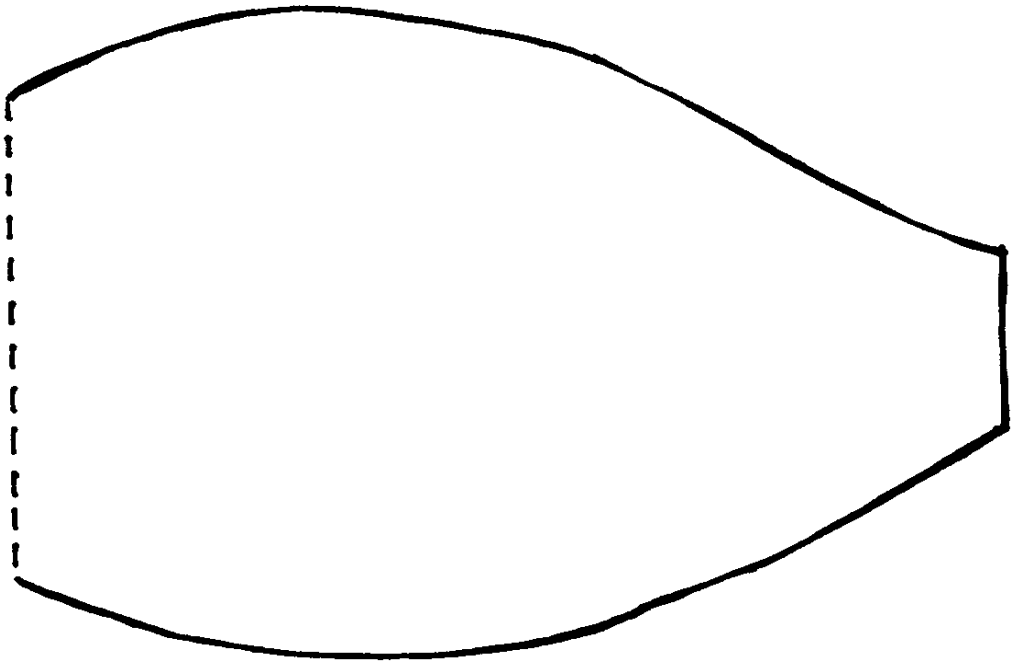

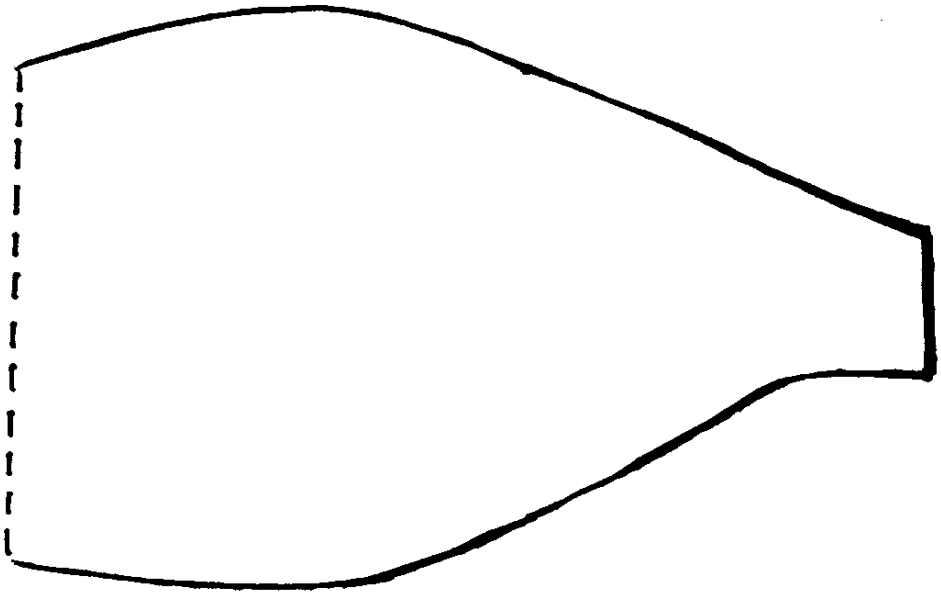

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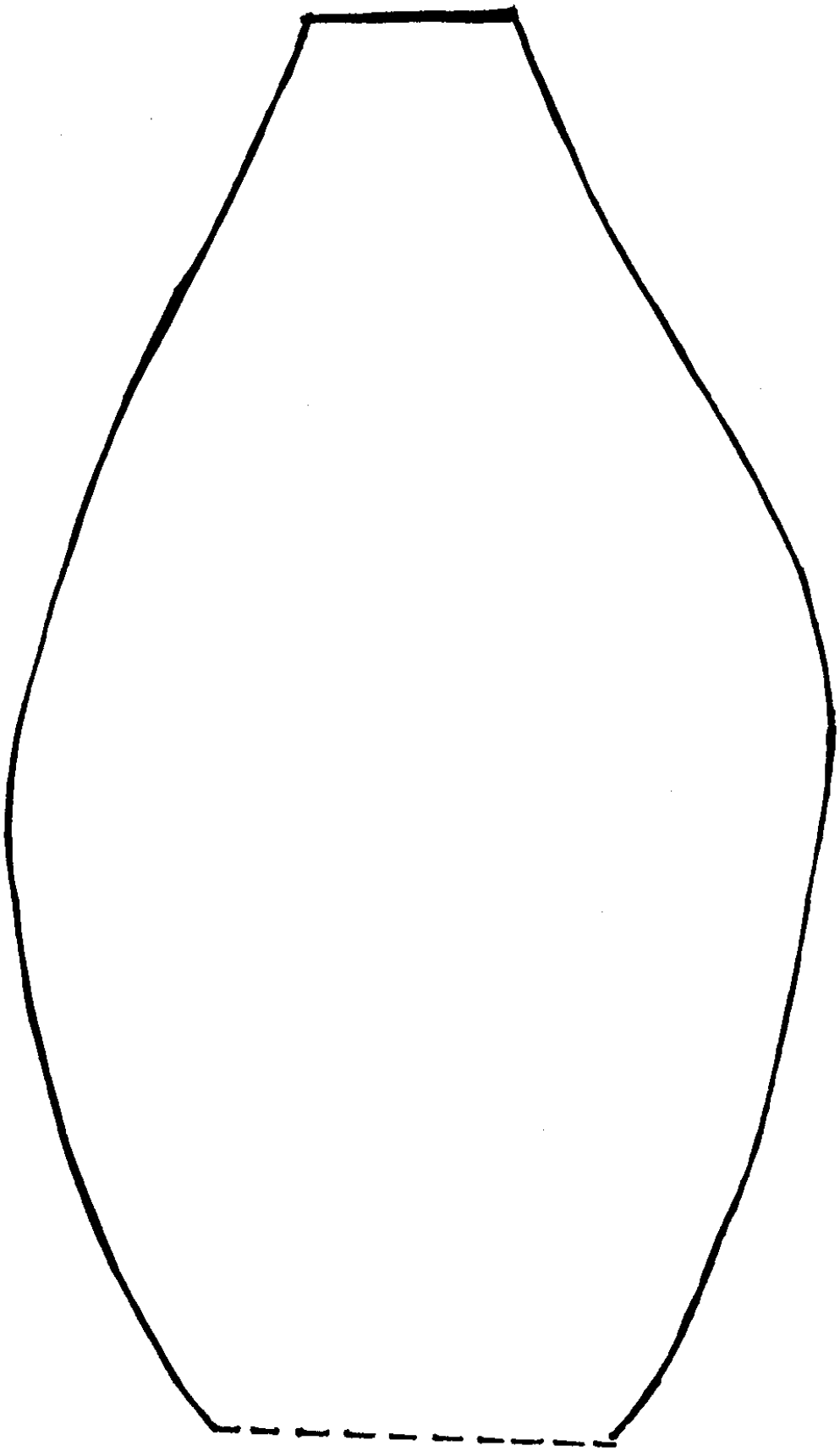

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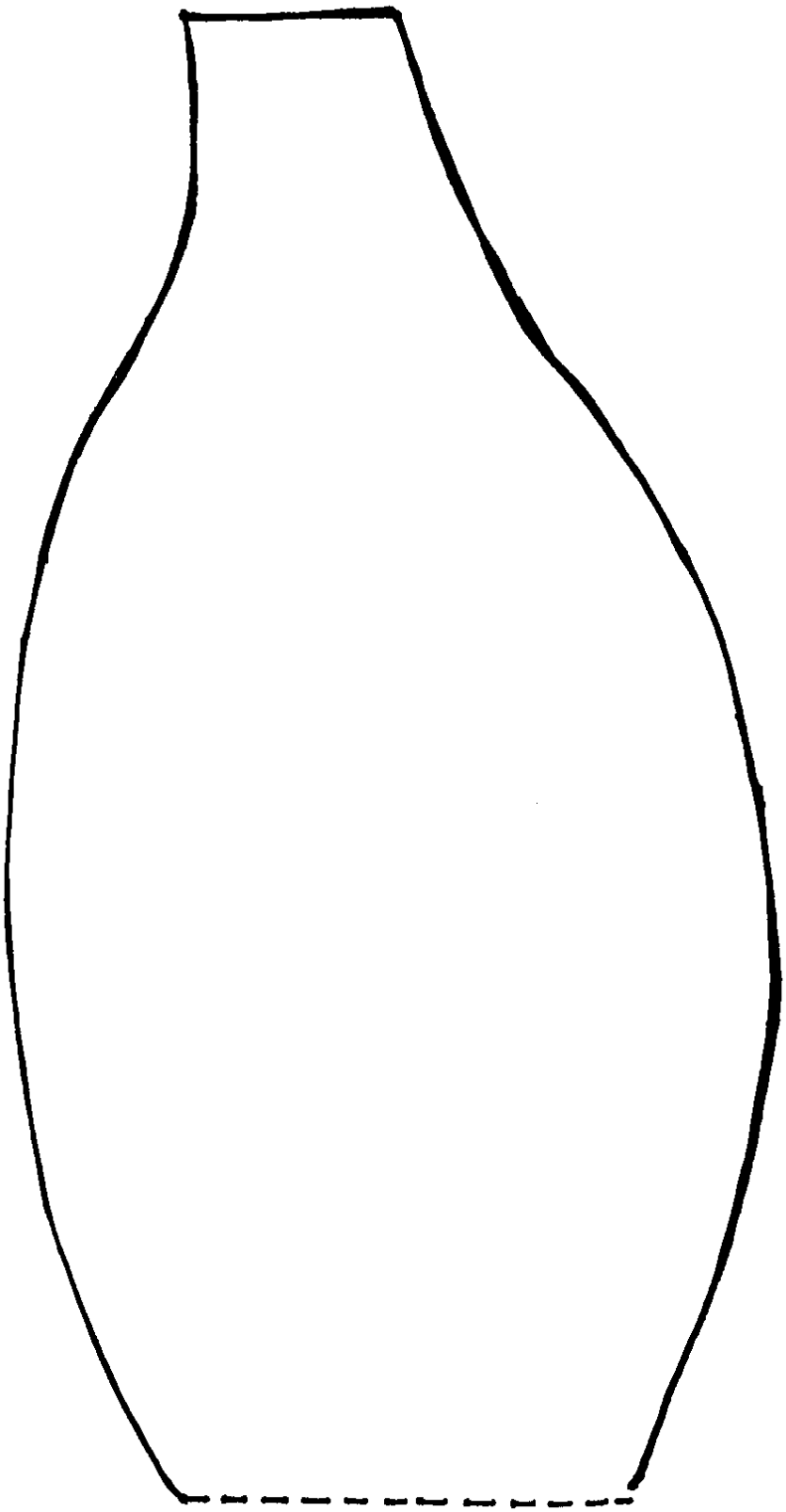

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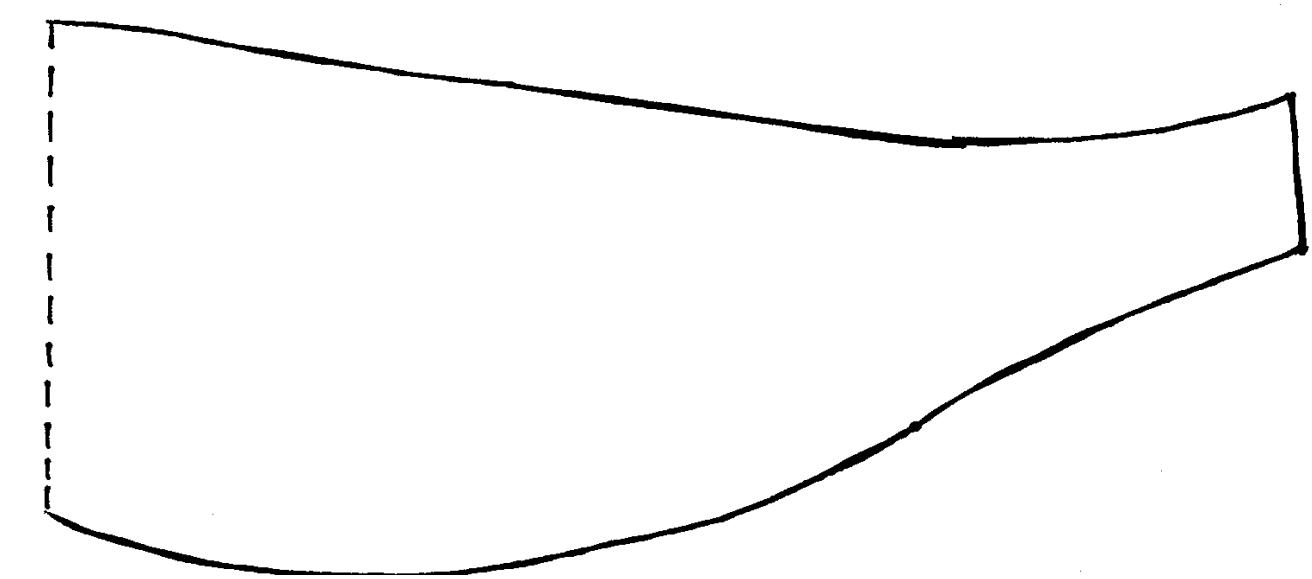
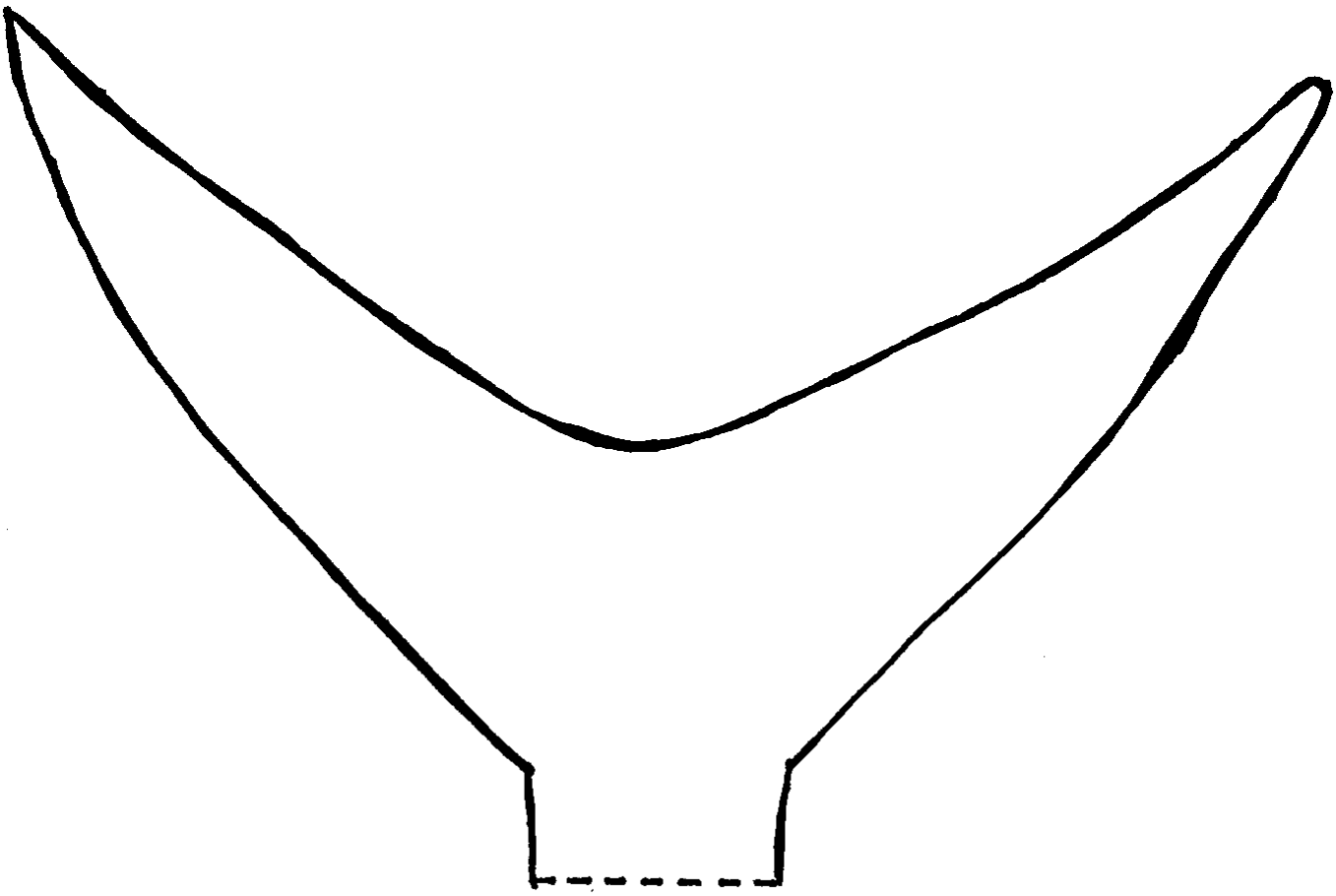
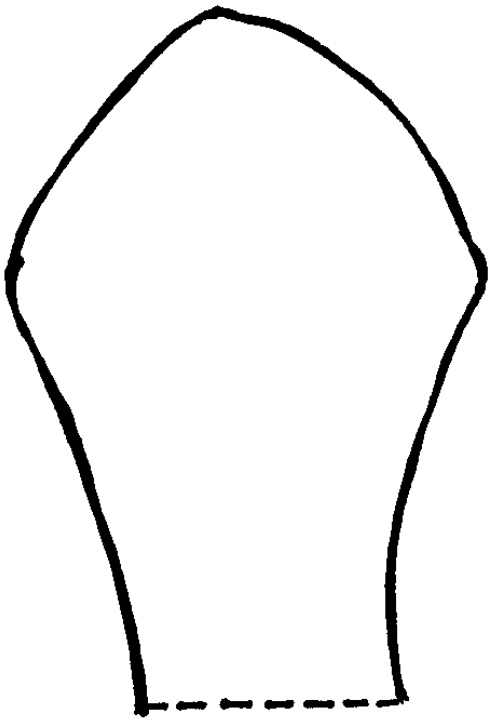
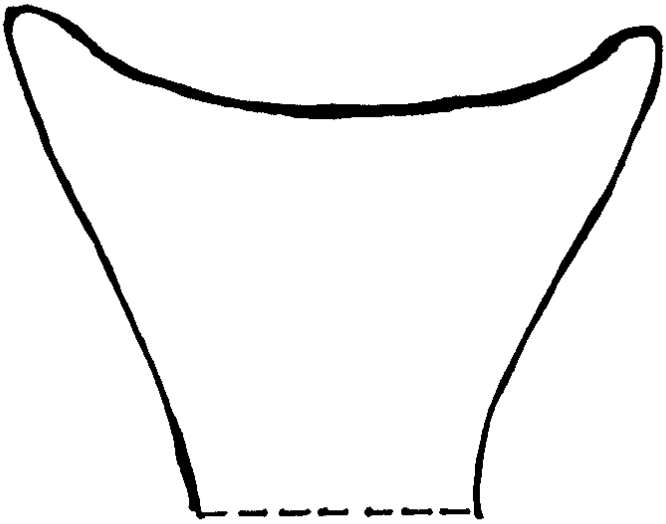
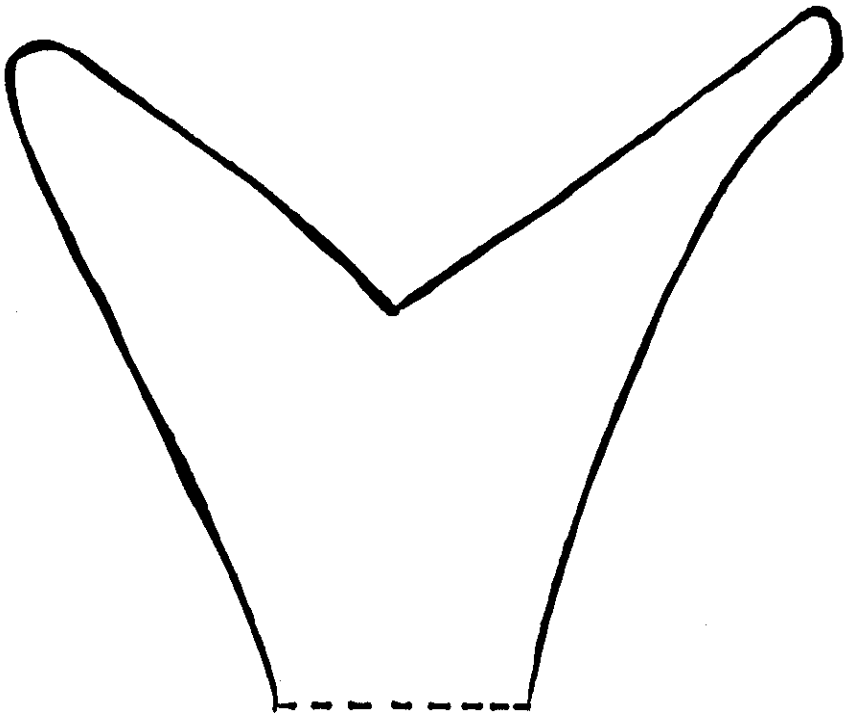


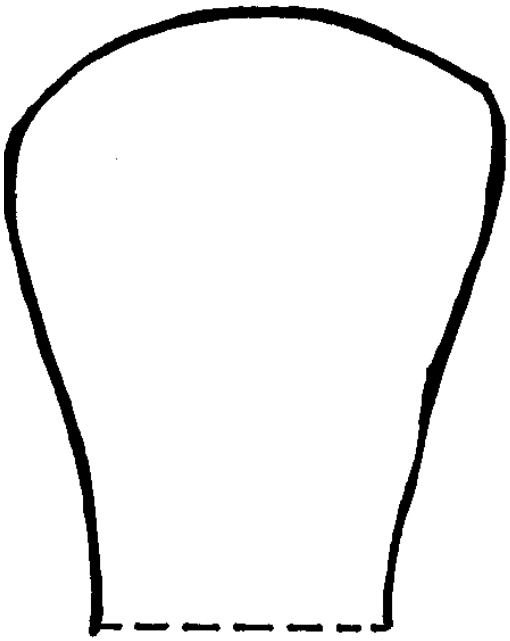


Tails









Tails