

15-2 EVOLUTION OF BARBELLUS

To observe changes in organisms that take place only over long periods of time, scientists often use fossils. "Family trees" may then be constructed to illustrate the relationships of these organisms.

Besides the physical appearance of the fossils, the scientist may also be able to draw upon other information. Some fossils, for example, may be laid down in rock layers, or strata, above or below other strata. This provides a clue as to the relative ages of the organisms being studied. In this investigation, assume that all of the fossils of the imaginary genus, *Barbellus*, came from rock layers exposed along a stream bank, as shown in Fig. 1. Sometimes, the fossil record may seem to be incomplete. That is, proposed transition forms between existing fossils are not found. This does not mean, however, that they did not exist. Their existence can be presumed in much the same way that you interpolate when using graphed data.

OBJECTIVE

- To demonstrate one technique for hypothesizing about the evolutionary relationships among fossil organisms.

MATERIALS

scissors

tape or glue

PROCEDURE

1. Cut out the drawings in Fig. 2, making sure each creature's name stays with it.

2. Arrange the cut-outs on a piece of paper to show the sequence of changes that you think might have taken place in the genus *Barbellus*. Refer to Fig. 1 to decide on the relative ages of

the species. Remember, as you arrange your "tree," that there can be branches.

3. When you are satisfied with your arrangement, fasten each "fossil" to the page with tape, and draw the connecting "branches" of the evolutionary tree.

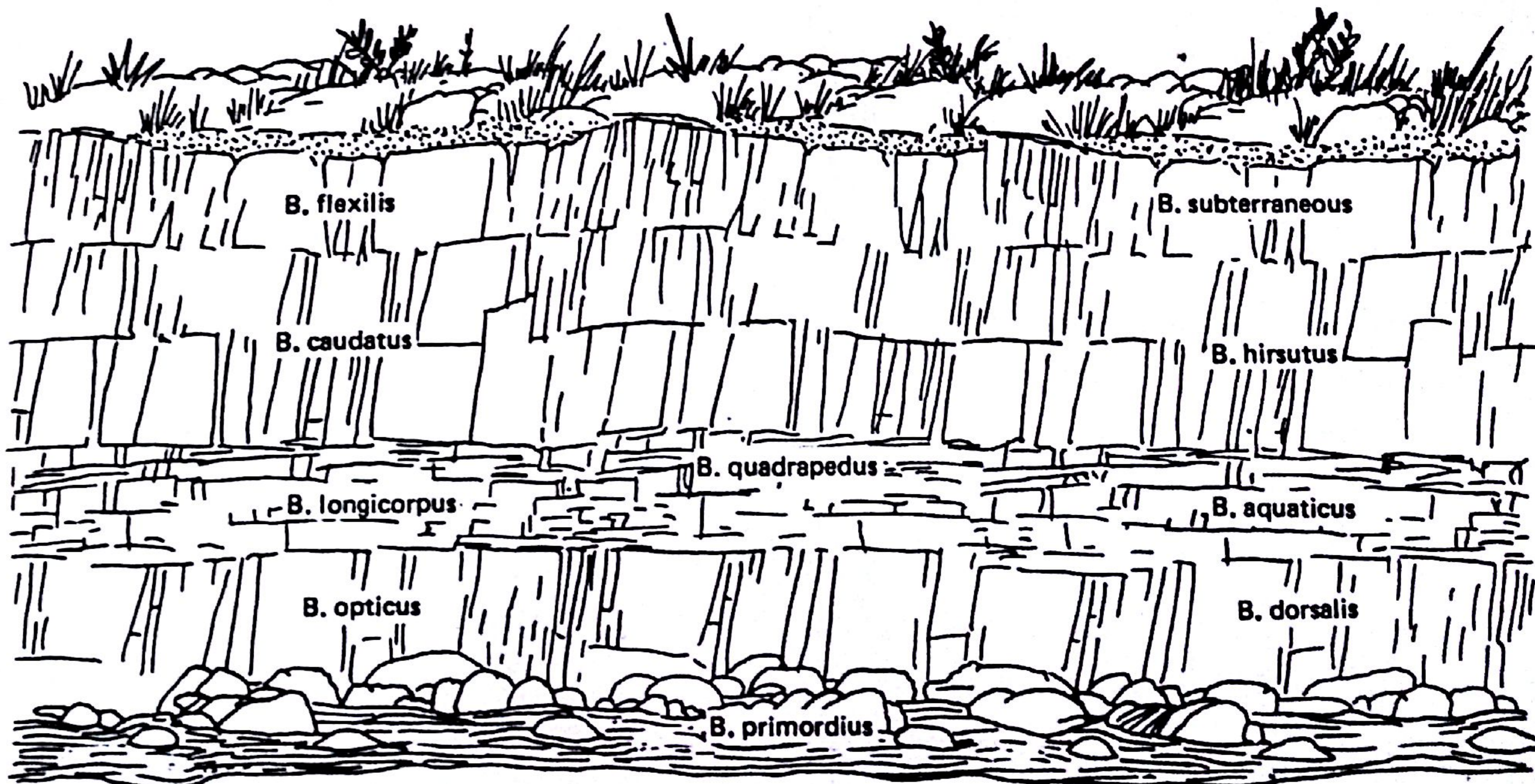


Fig. 1. Rock layers containing fossils of *Barbellus*.

DISCUSSION QUESTIONS

1. Which fossils are the oldest? _____
Which are the youngest? _____ How can you tell?

2. Does your "family tree" for the genus *Barbellus* agree with the information concerning the strata in which they were found? _____

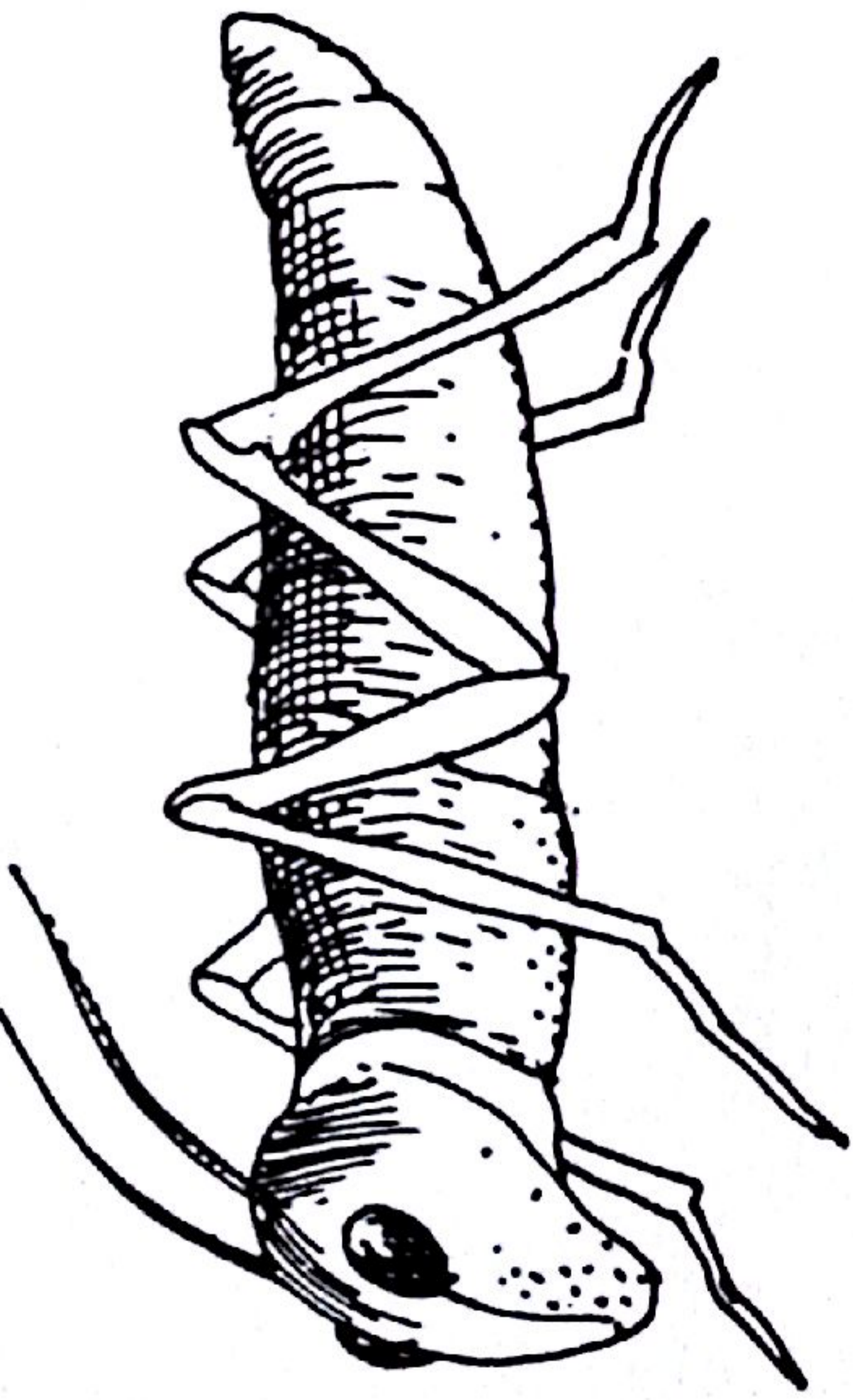
3. Why should information regarding physical appearance and information about the rock strata in which the fossils were found agree? _____

4. Are there any transition forms suggested by your "tree" that were not accounted for in the fossils found? _____ If so, describe. _____

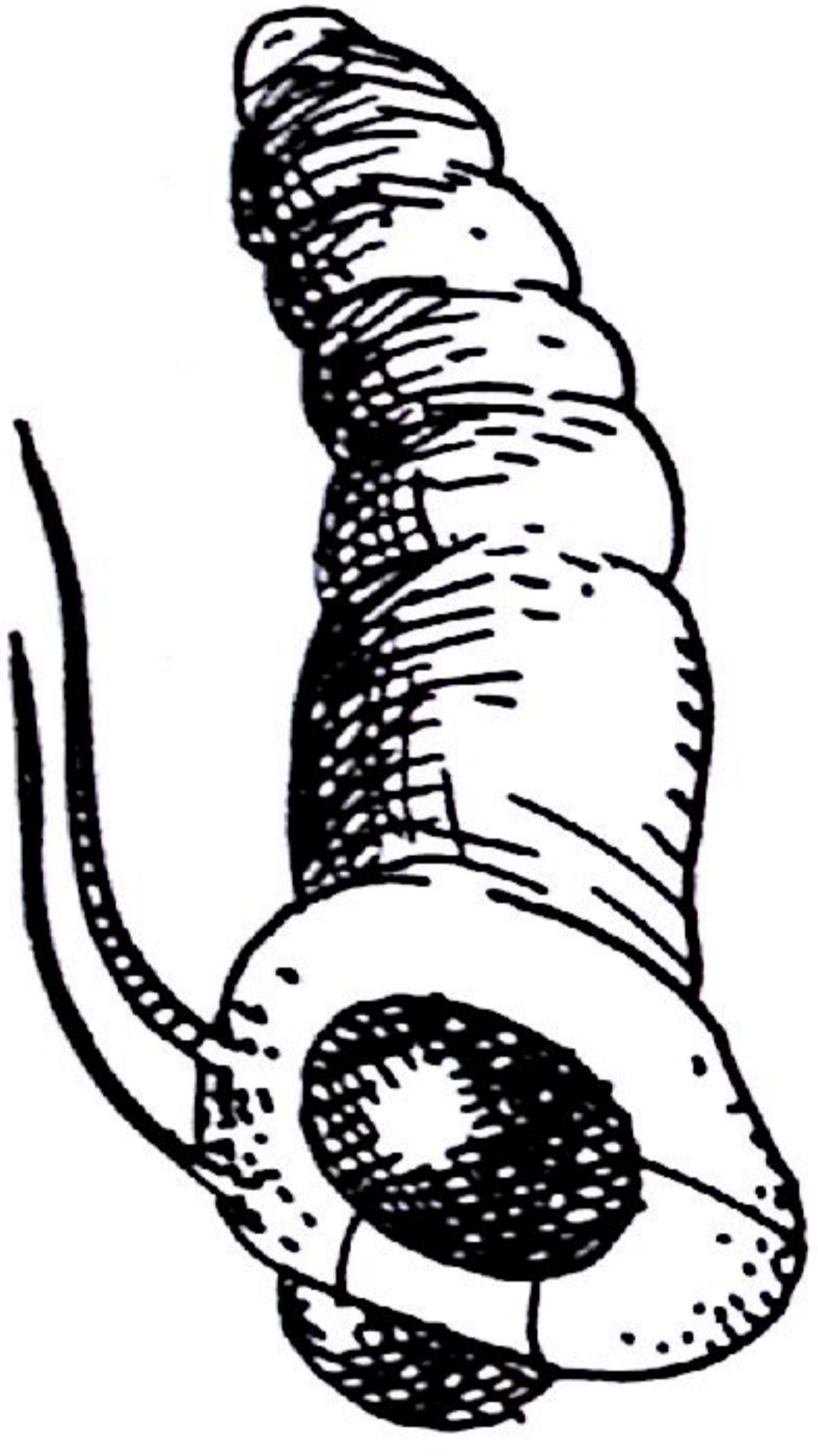
5. What is the relationship between the complexity and the age of a fossil? (Use specific examples.)

6. Write a short natural history of the evolution of the Genus *Barbellus*, citing reasons for the adaptive radiation shown by your "tree." _____

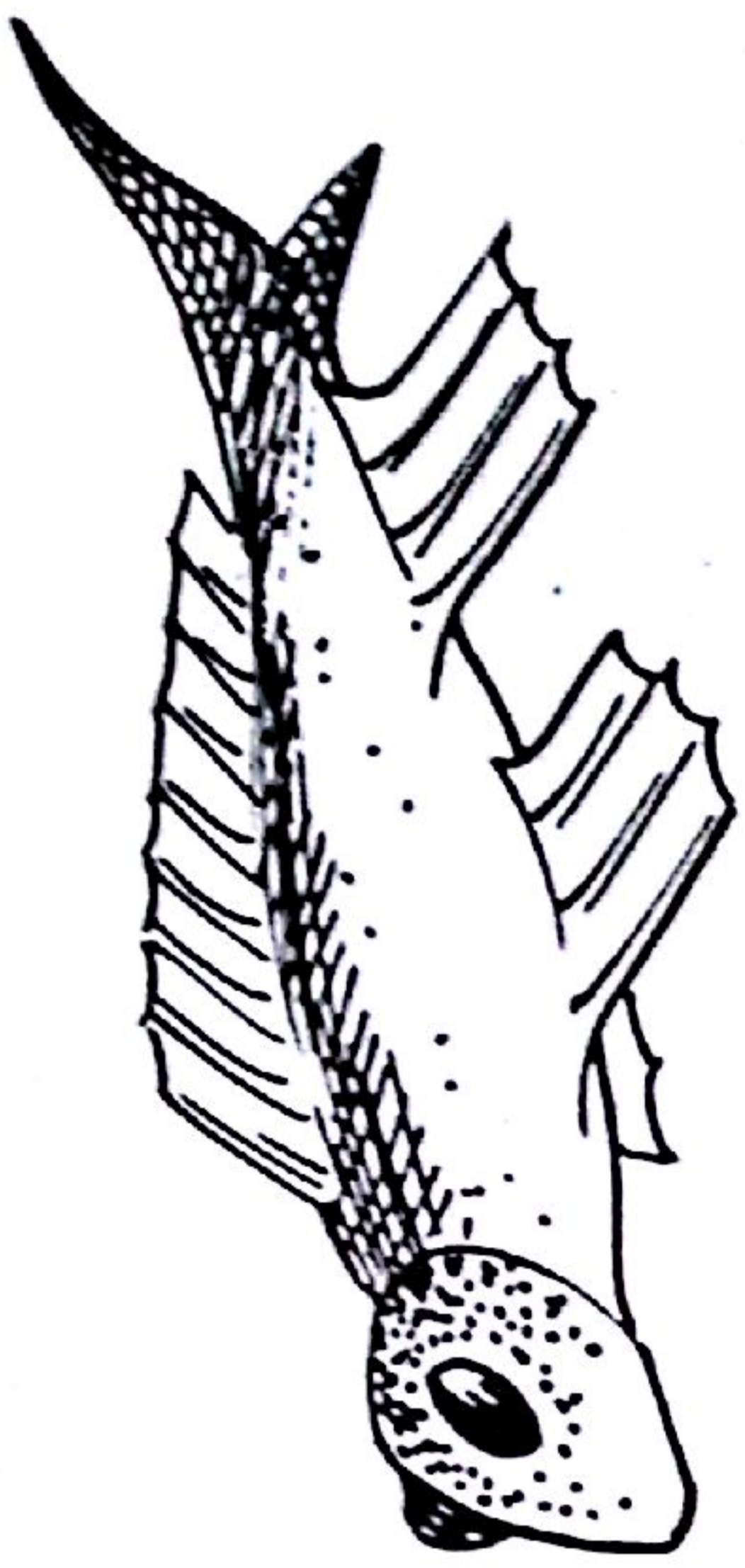
Fig. 2. Species of *Barbellus*



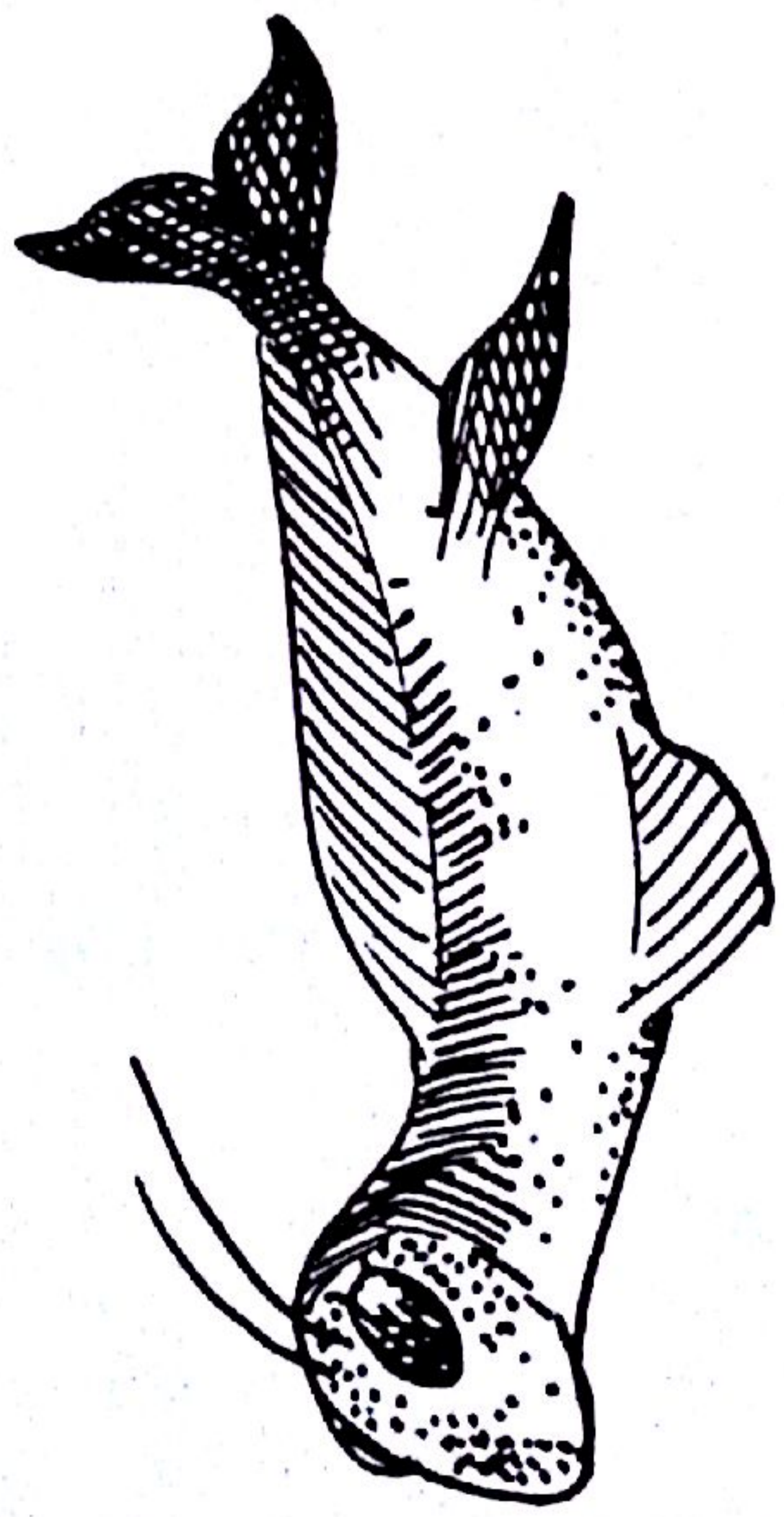
Barbellus quadrapedus



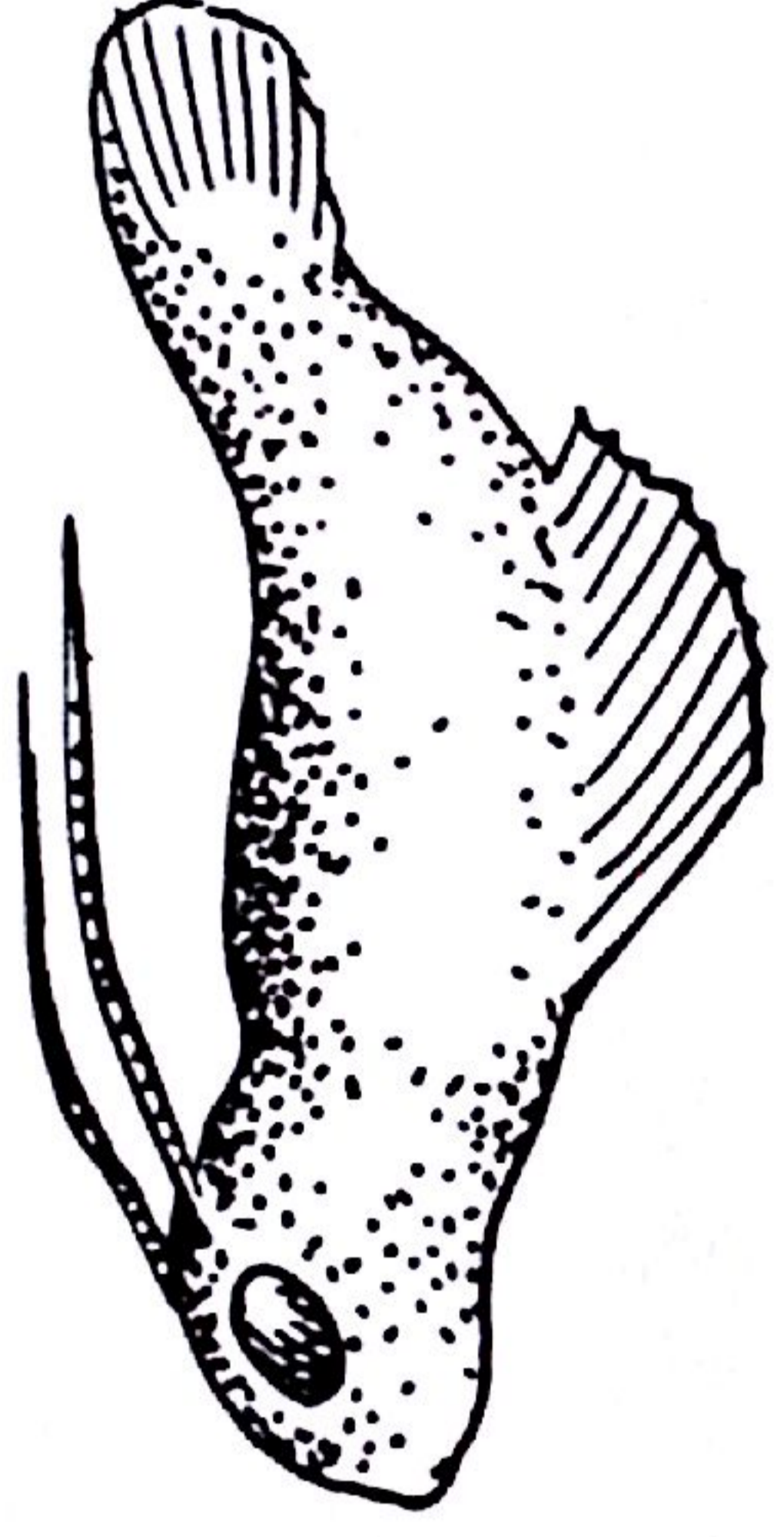
Barbellus opticus



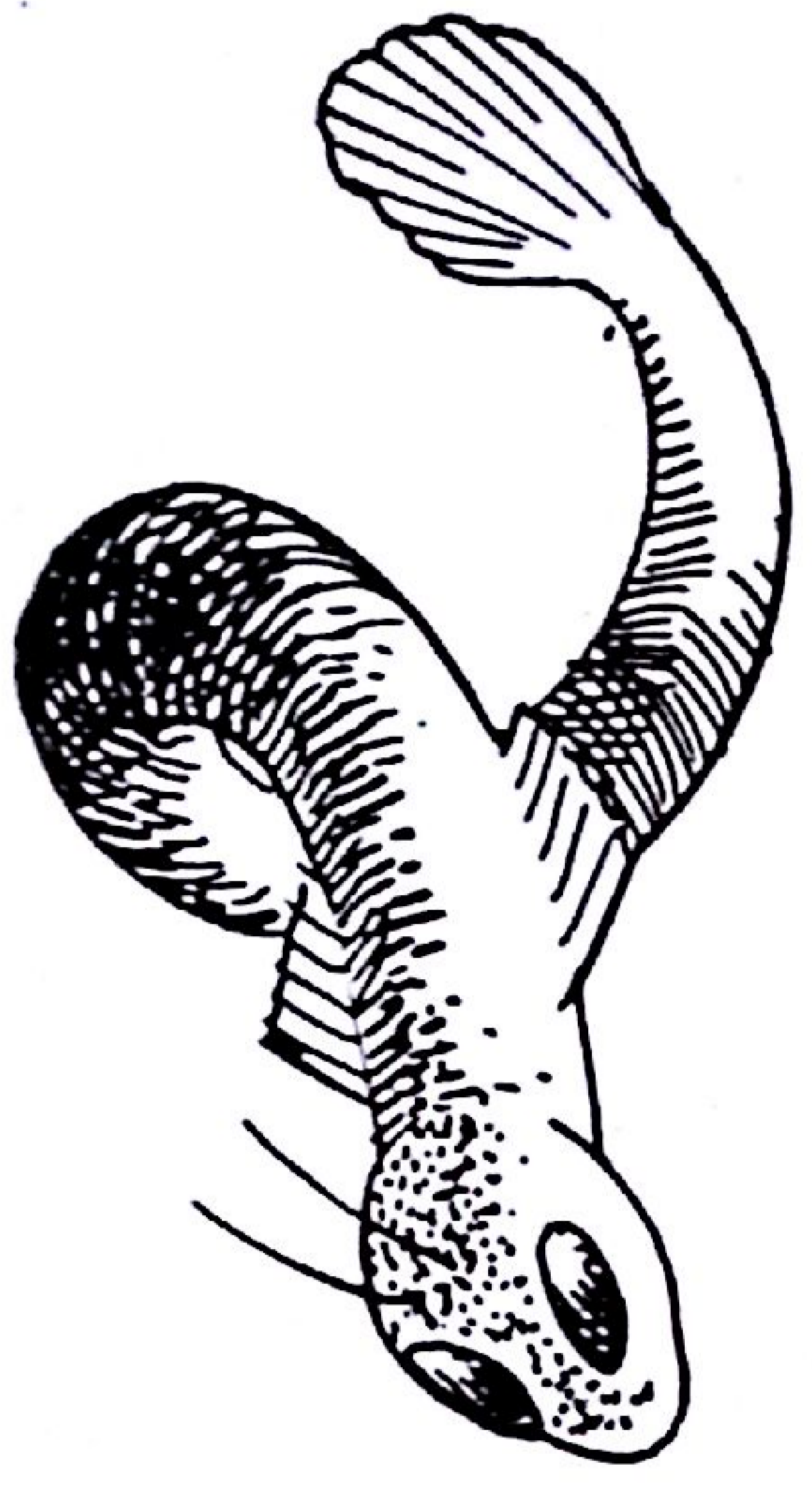
Barbellus caudatus



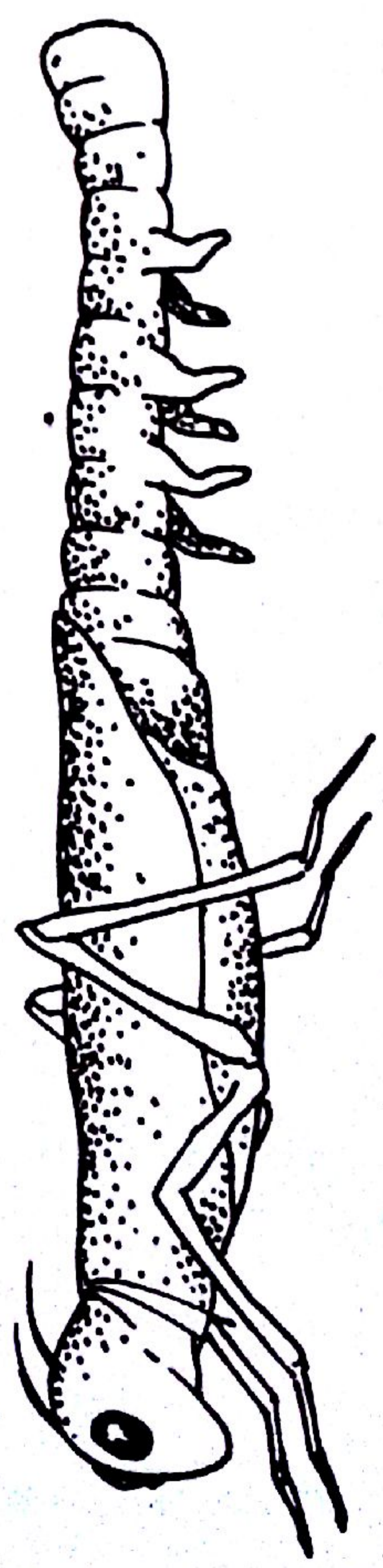
Barbellus aquaticus



Barbellus dorsalis



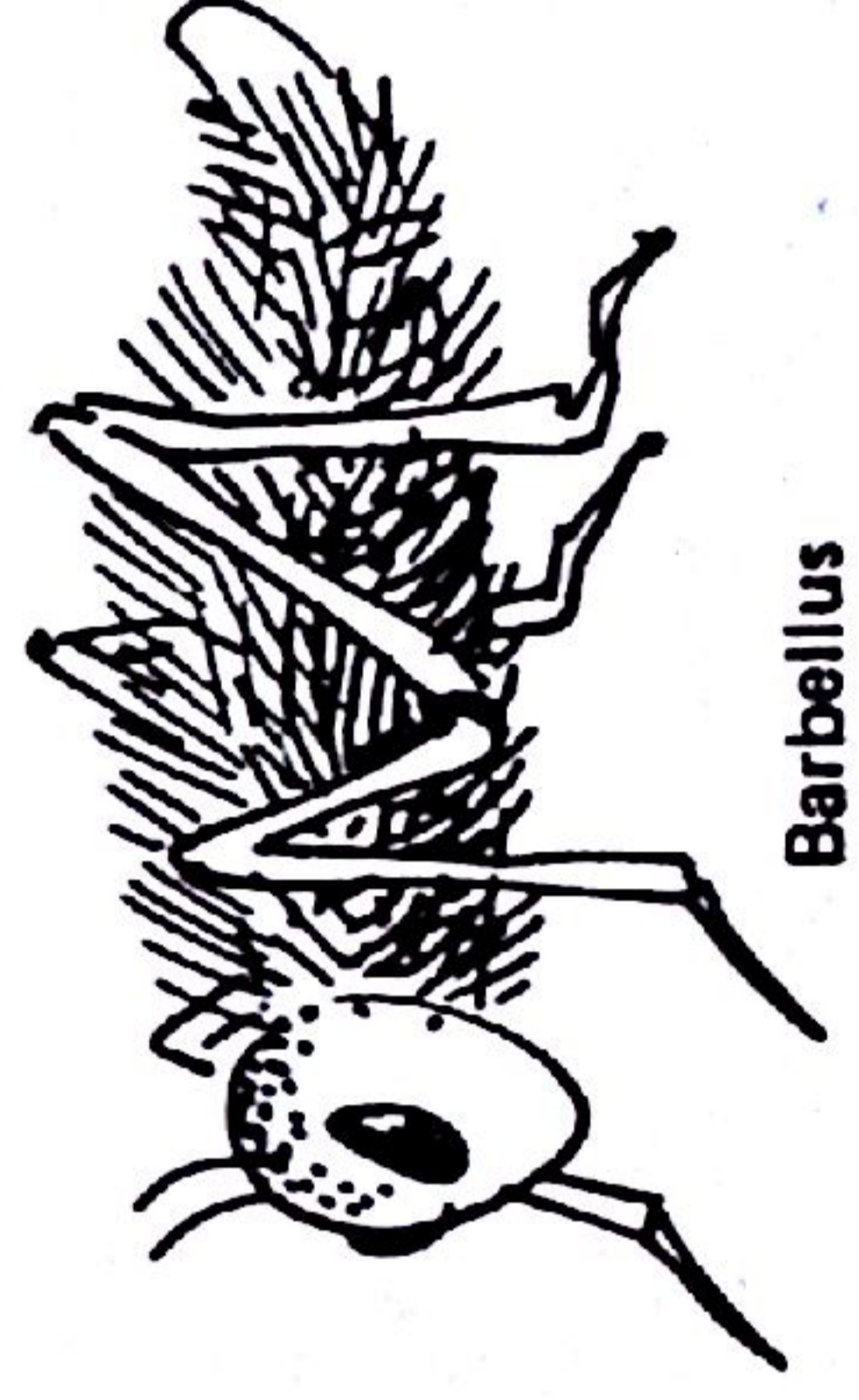
Barbellus flexilis



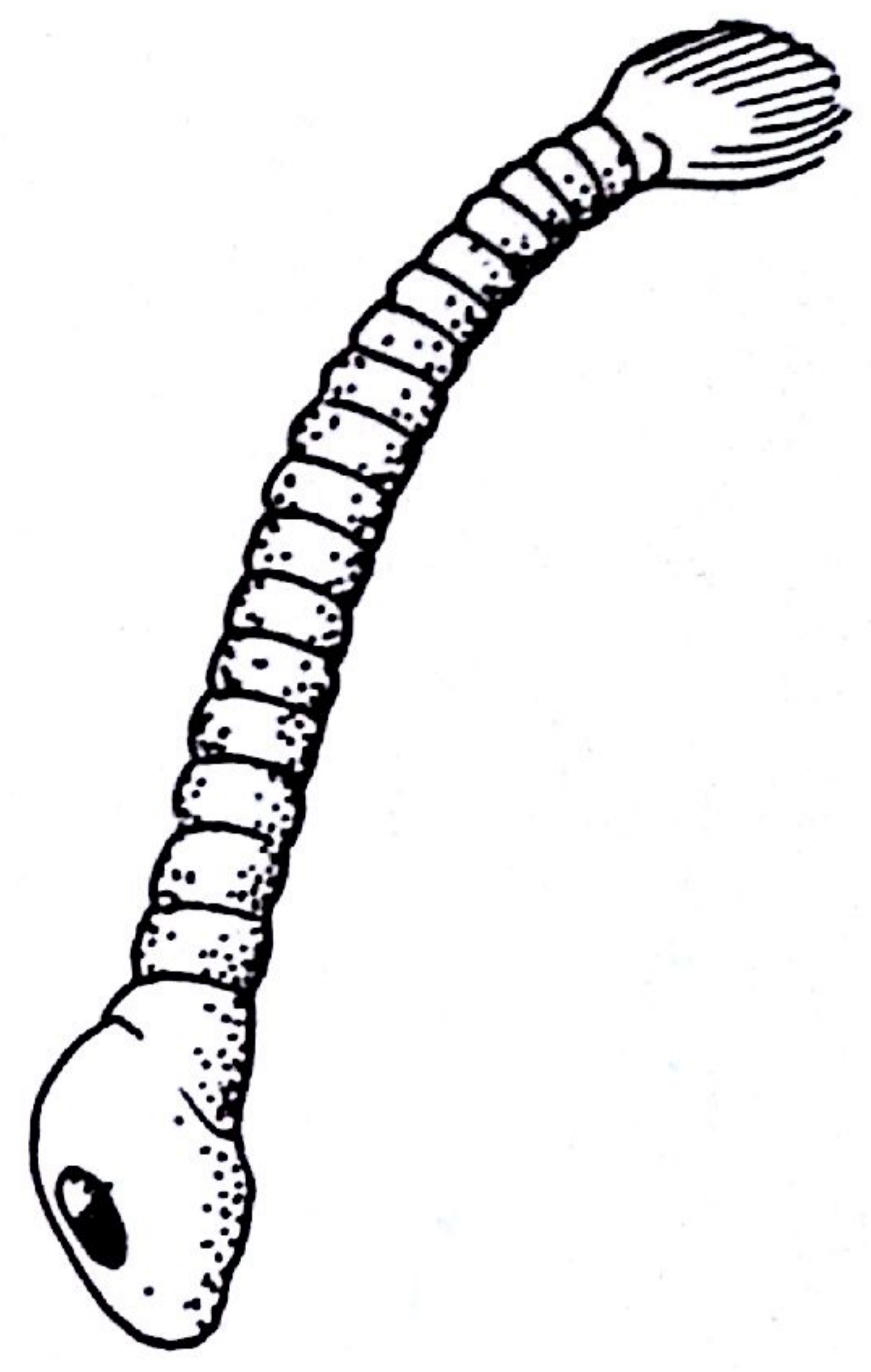
Barbellus longicarpus



Barbellus primordius



Barbellus hirsutus



Barbellus subterraneus