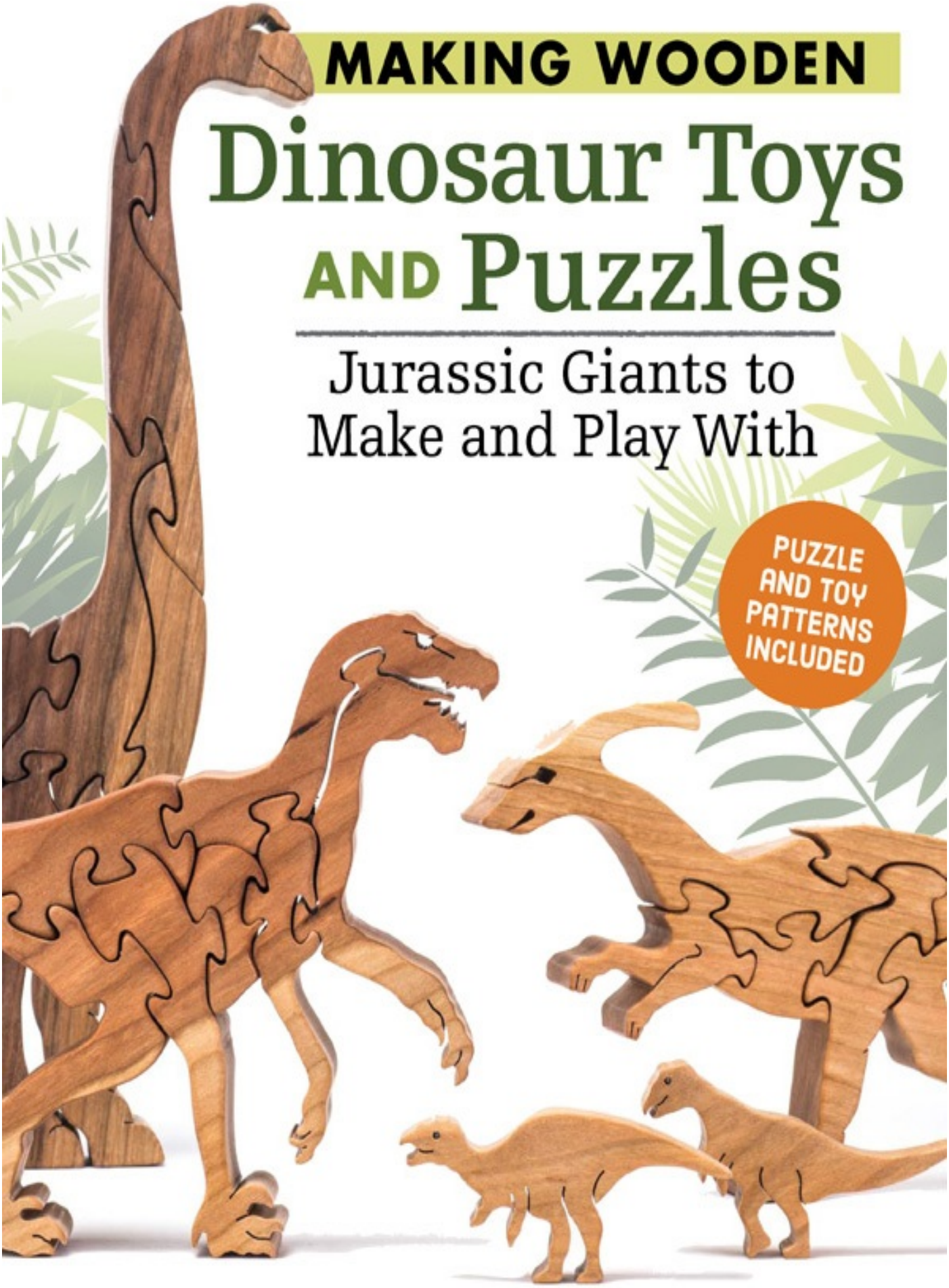
MAKING WOODEN Dinosaur Toys AND Puzzles

Jurassic Giants to Make and Play With

PUZZLE AND TOY PATTERNS INCLUDED



JUDY AND DAVE PETERSON

MAKING WOODEN Dinosaur Toys AND Puzzles

Jurassic Giants to Make and Play With

By Judy and Dave Peterson

A Scroll Saw Woodworking & Crafts Book

www.ScrollSawer.com

Fox Chapel Publishing

INTRODUCTION

WHY DINOS?

I discovered at age 50 that I liked dinosaurs again. I had already designed quite a few puzzles and decided to try my hand at dinosaurs. While this book contains 63 patterns, there are only 27 different dinosaur species represented. That's because I do more than one version of the better-known dinos. For example, there are five Tyrannosaurus Rex patterns (the Toy Rex, the easy Baby Rex, the intermediate 6-piece version, the advanced 10-piece version, plus the one that appears in a puzzle titled "In the Cretaceous," the largest puzzle in the book).

How complicated should a puzzle be for a preschooler? This question is important to someone who makes puzzles for a living. It's important to someone who's making a puzzle for a child, too. The rule of thumb I use is "age plus one piece." This varies with the child. The more dexterous the child, and/or the more experience the child has with puzzles, the more complicated the puzzle can be.

However, if you'd like to create a piece that won't cause parents any anxiety, you can also cut out a "toy" version of the puzzle. The toy is almost exactly the same as the puzzle, it just doesn't break into pieces.

Many of the dinosaurs in this book are not well known. That's why we've included a little information about each one on the patterns. This is intended to level the playing field for those of you who are making one or more of these puzzles for a child. Chances are good the child will already know about most of them.

WHY PUZZLES?

I like puzzles! These days when I'm not making my own puzzles, I'm likely to be doing someone else's. In 1989 my family and I made our annual trek to a nearby Renaissance Faire. As a souvenir I bought a five-piece rabbit puzzle. While it was attractive, it was not interlocking, so you really couldn't handle it.

The first thing I cut out when I brought home my first scroll saw—a wonderful new toy—was a three-piece rabbit. When I began designing my own puzzles, I decided all of them would be interlocking.

The puzzles in this book reflect that decision I made in 1990: all of these puzzles are interlocking. That means that once you have them in a standing position you can pick them up by any piece and turn them completely around without having them fall apart (but use caution with the Maiasaura). You can, that is, as long as you don't tip them!

WHY HARDWOODS?

When I was starting with my scroll saw, I tried cutting many different types of wood. I found I got much less “chip-out” using hardwoods. Hardwoods seem to be more uniformly dense. Another natural advantage of hardwoods is that they come in different colors, and so they don’t need to be painted. Moreover, hardwoods look good with an oil finish.

When the idea of trying to sell my puzzles occurred to me, I tried painting them, but that took forever. Besides, I’m really not good at painting. I’m much better with a saw. This is the reason I cut the eyes, the mouth, and other details.

I have also found hardwoods to be very durable. Puzzles and toys cut from hardwoods will stand up to a lot of use, which is important whether you are cutting a puzzle or toy for a young child or an “old” child.

All of the puzzles in this book are interlocking. The puzzle pieces stay together when you pick up an assembled puzzle.

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GETTING STARTED

SAFETY FIRST

It should come as no surprise that cutting thick wood generates a lot of sawdust. Breathing sawdust is not good for you. In my workshop, I have a dust collector and an air cleaner. The dust collector picks up large particles and a lot of the small ones. The air cleaner is mounted on the ceiling and removes a high percentage of the particles the dust collector misses. However, the air in the workshop will still have lots of tiny particles floating around. To ensure that I'm breathing clean air, I wear a dust mask that uses replaceable filters. I strongly suggest you do the same.

Dust that accumulates on your piece as you work is also a safety hazard. You'll do a better job of cutting and be safer if your saw has a good dust blower. Allowing the dust blower to blow dust away from your cut line is much safer than trying to brush the dust away with your hand.

Eye protection is a must! I use my regular glasses, however, I have titanium frames and hardened lenses. When I'm sanding, I wear side shields. These translucent plastic devices slide onto your frames and keep flying particles from hitting your eyes from the side. Whatever kind of eye protection you use in your workshop should include side shielding. If you don't need prescription lenses, use safety goggles.

Lighting is important, too. Make sure you have enough light in your workshop so you can see what you're doing. I have two swing-arm lamps mounted on my saw. These lamps come with clamps, and you can usually find somewhere to attach them if you don't have a mount for them on your saw. I find that I can cut longer with light coming from both sides. This eliminates shadows and lots of eye strain.

I also wear a hearing protector. If you're into serious woodworking you would be well advised to at least invest in a mask, eye protection, some type of hearing protection, and a dust collector.

Many finishes, including Danish oil, which I suggest for finishing dinosaur puzzles, have dangerous fumes. It is important to do your finishing in a well-ventilated area. It is equally important to let the paper towels dry thoroughly before discarding them. Never put them in a closed container or closed garbage bag before they are thoroughly dry, or you run the risk of starting a fire.

CHOOSING A BOARD

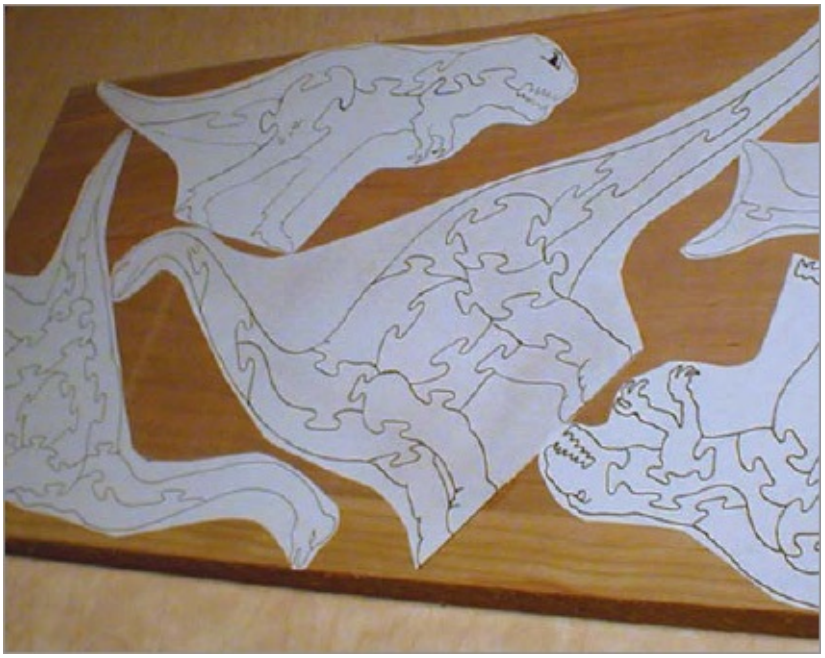
If your intent is to cut only one puzzle from a board, you need only choose a board wide enough and long enough to fit the puzzle. If you want to cut more than one puzzle from a board, choose a board wide enough to fit the largest puzzle.

You'll see references in this book to 4/4 hardwood. (When you speak it, say "four quarter.") When a board is cut from a log, it is sized by the quarter inch. Usually by the time it appears in a rack at a lumberyard, a 4/4 has been planed to $^{13}/_{16}$" (20mm) thick.

Because all my puzzles are designed to stand, the wider the board is, the more stable the puzzles will be. I usually use boards that are $^{15}/_{16}$" (23mm) thick. I don't recommend using boards less than ¾" (19mm) thick.

CHOOSING A BLADE

I recommend a #7 or #7 reverse-tooth blade to cut 4/4 hardwoods. The kerf is wide enough to allow the pieces to slide in and out easily. At the same time, the puzzles will hang together well. When using a thicker board use a #9 blade. Use a #5 blade for a board less than ¾" (19mm) thick.



Careful planning will allow you to cut many dinosaur puzzles from one board.

SQUARING THE TABLE

Most scroll saws have an adjustable table that allows you to make cuts at different angles. There are times when you want the saw set at an angle, but most cutting is done with the blade perpendicular to the table. If the table is even slightly off

square, the cuts will be angled, which will prevent the puzzle pieces from sliding together properly.

The most common method for squaring a table uses a small metal square, or right-angle tool. Set the square flat on the saw table against a blade that has been inserted and tensioned. Adjust the table to form a 90° angle to the blade. There are minute changes which can be made by adjusting the set screws on the bottom blade clamp on most saws.

The cutting-through method is also popular. Saw through a piece of scrap wood at least ¾" (19mm) thick and check the angle of the cut using a square. Adjust the table until you get a perfectly square cut.

You can also use the kerf-test method. Take a 1¾" (44mm)-thick piece of scrap wood and cut about ½" (13mm) into it. Stop the saw, back the blade out, and spin the wood around to the back of the blade. If the blade slips easily into the kerf, the table is square. If it doesn't slide into the kerf, adjust the table and perform the test again until the blade slips in easily.

LAYING OUT PATTERNS

For best results, you should plan how you're going to lay puzzle patterns out on a board before you start to glue them down. Trim around each pattern, trimming closest to the tails, noses, and feet—any part that is likely to be closest to other patterns or to the edge of the board.

Wood boards can be very dynamic. You'll often find wavy grains and color changes. Be sure to take advantage of these natural features. Wood boards can also contain flaws. Position your patterns carefully to avoid cracks and knots.

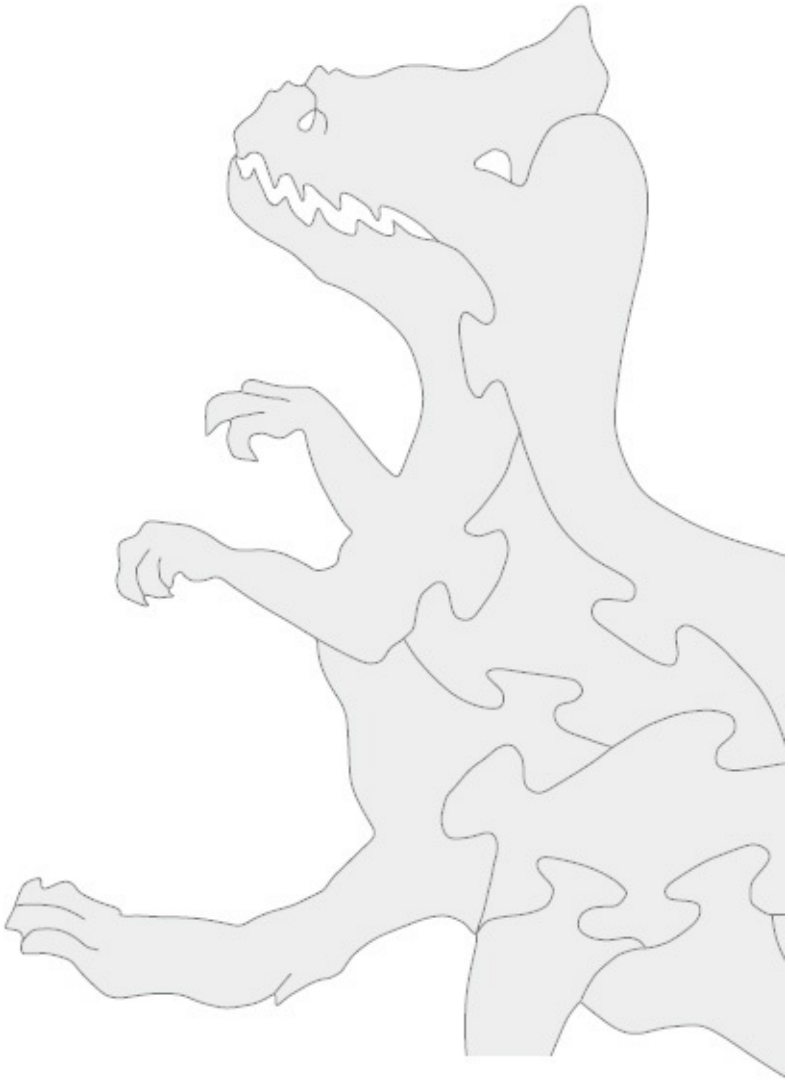
Use a spray adhesive to attach your patterns to the wood. Choose a product that mentions "repositionable bonding" on the label. Spray the back of the pattern, not the board.

USING PLASTIC TAPE

Many of the hardwoods are so dense or have so much resin that the blade stays in one place long enough to cause the wood to burn. If you're planning to cut a light-colored hardwood, be sure to glue the pattern down and then cover it with 2" (51mm)-wide clear packing tape. Any brand will do, but don't purchase a product with mylar threads.

This is my interpretation of what happens: the heat provided by the blade melts some of the plastic. The liquid plastic provides lubrication for the blade. In addition to reducing or eliminating burning, it is easier to push the blade through the wood.

I recommend using clear packing tape when cutting cherry, maple, and birch boards, as well as any light-colored exotics. Tape walnut if it is thicker than $^{15}/_{16}$" (24mm). I tape everything, even Aspen.



CUTTING ON THE LINE

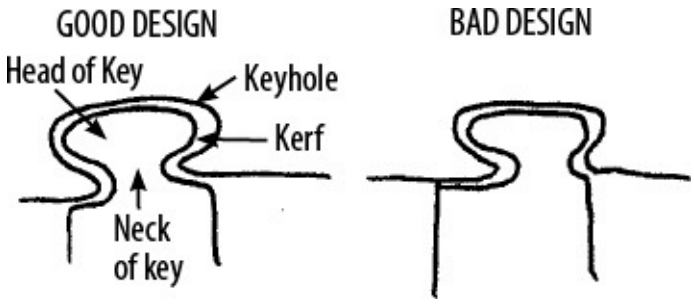
Cutting on the line is fairly important on the outer edges of the puzzle. It's very important for facial features and somewhat important on the inner cuts.

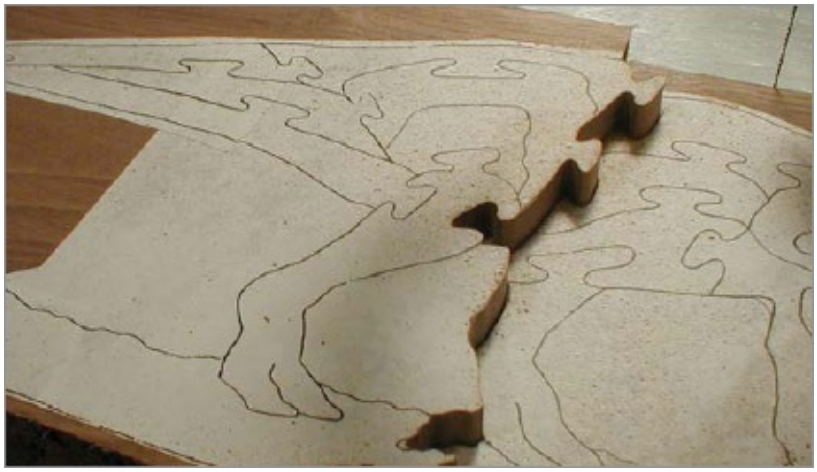
If you wobble on the outside edge of a puzzle, you can either re-cut it or ignore it. If you get off the line on the feature cuts, stop cutting. Look where you are and see if the cut can be saved. If it can, try to do so. If it can't, throw the puzzle out and try again.

On the interior, or interlocking, cuts, accuracy is not terribly important. What is important is the shape of the key. In order for the key to remain in the keyhole, the head of the key must be larger than the neck of the key. It also must be balanced so that there is material on both sides of the neck.

On puzzles with large pieces, there is a lot of room for error. The smaller and more complex the pieces, the more important accuracy becomes.

GOOD vs. BAD KEY DESIGN

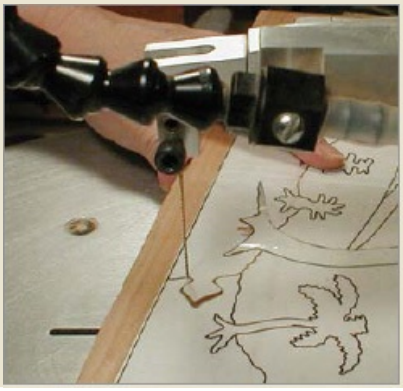




Keys (the little knobs that hold the puzzle together) can be a variety of shapes.

Cutting Large Patterns

Large patterns don't have to be difficult to cut. To handle the "In the Cretaceous" diorama on page 84, cut the puzzle in half down the center along the tall Cycad tree. Then cut along the Tyrannosaurus Rex's back to free the top and the bottom on one half. Cut the cycad free. Now cut along the back of the Lambeosaur. This results in four pieces of manageable sizes plus the tall cycad.



SANDING

I do a lot of sanding because my puzzles are meant to be handled. Smooth feels better. In the wooden puzzle art show booth, "smooth" means "sales." For the best effect, all the surfaces of these puzzles should be sanded. In addition, round off the sharp corners to avoid injury to those who handle the puzzles.

I use a drum sander and a drill with sanding attachments. If you don't have a

drum sander, don't run out to buy one just to make the puzzles in this book. I use all of this equipment because my business is designing and making puzzles. All of the flat sanding can be done with a disk pad chucked into a drill. It will be helpful if you have a drill with a variable speed lock.

A disk pad chucked into a drill with a variable speed lock is ideal for quick flat sanding.

FINISHING

Hardwood puzzles look great with an oil finish. In addition, Danish oil has three important advantages. First, it is absorbed by the wood and therefore creates no build-up that can affect how the pieces fit together. Second, it cures in about 30 days, by which time it has polymerized. This strengthens the puzzles and makes them "waterproof." (Basically, if they get wet, the water will not raise the grain.) Third, it's non-toxic after it has dried. This is an important characteristic if the puzzle is to be given to a child.

Danish oil comes in an assortment of hues. Because I want to enhance, not obscure, the natural color of the hardwoods, I use a clear Danish oil.

I do not recommend brushing a finish on the puzzle pieces because the build-up may affect the fit of the pieces. After some experimentation, I have discovered that immersion works best. I pour oil into a bag and insert the puzzle pieces, one at a time. I dip the pieces briefly, and then stand them on a flat, non-oil-absorbing surface covered with paper towels.

As necessary, I wipe the excess oil off with paper towels. The more cut line details there are in a puzzle, the more attention it needs at this step. After drying any pieces that need it, I let the air-dry overnight and reassemble the puzzle.

If you choose to paint a puzzle, seal the wood and then use acrylic craft paints. Don't paint the cut edges on the inside of the puzzle.

Using a Drum Sander

I estimate that using a drum sander reduces my flat sanding time by 75 percent. The price I pay is that I occasionally crunch a puzzle. I keep track

of which patterns cause such problems and simply don't use a drum sander for those puzzles. For the patterns in this book, I have found it safe to use a drum sander on all of the puzzles except for the following: Allosaur, Cryolophosaur, Velociraptor, Spinosaurus, and Anzu Wyliei. With those puzzles, I leave the scrap around the arms, legs, and/or feathers and sand the whole thing. With the Brachiosaur and Barosaur, I separate each into a head, neck, and front legs section, and a body, hind legs, and tail section. I sand each section separately.

1. Put a #64 rubber band completely around the outside of the puzzle.
2. Group the puzzles you have according to the thickness of the wood.
3. Start with the group made of the thickest wood. Position each puzzle on the conveyor belt so it goes through with the grain.
4. Run the first group through on both sides. Use one or more push sticks to support each puzzle as it goes through.
5. Adjust the height of the sanding drum down for the next group.

PATTERN CLASSIFICATIONS

The patterns in this book cover a wide variety of skill levels, both for the maker and the receiver.

TOYS:

These are basically one-piece puzzles I created for parents and scrollers who are nervous about puzzles with a lot of pieces or who have kids who love the dinosaur puzzles but may be a little too hard on a puzzle.

EASY PUZZLES:

A linear puzzle is one that has all of its pieces in a line. Each piece connects only to the next one. The shape of each key is a geometric design meant to be easier for young children to match. The three "baby" dinosaurs are shapes that I think of as "stuffed animal" puzzles. They are the kind of dinosaurs that appear on Saturday morning cartoons. They're not realistic, but they are very popular with two- and three-year-olds. These are definitely starter puzzles for the child and practice pieces for those of you who are beginning scrollers.

Realistic puzzles are much the same as the baby dinosaur puzzles, except they have more realistic shapes.

INTERMEDIATE PUZZLES:

Unlike the linear puzzles, each of these has pieces that connect to more than one other piece. They are more difficult to put together. The child has to see all the connections and be able to line them up so that all the keys will drop into the appropriate keyholes. The three intermediate puzzles in this book were designed for children ages four and five. All of the pieces are large, making them less likely to get lost and harder to break.

ADVANCED PUZZLES:

These puzzles are medium to hard to put together and to cut. Most of them have small pieces that could easily be swallowed. Do not give these puzzles to children under the age of three, and do not leave them where such children might find them.

DIORAMAS:

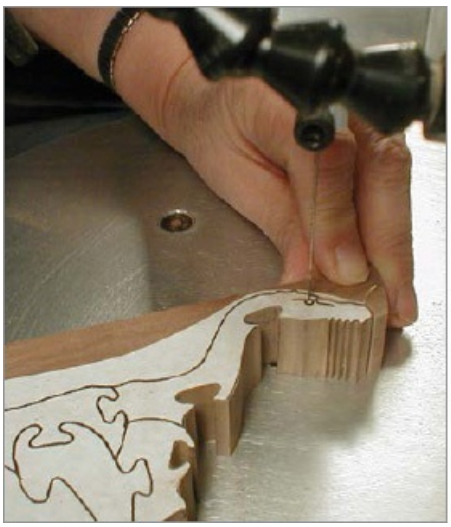
These puzzle scenes include several dinosaur subjects and some landscape elements. They are more difficult to put together. They also require some tight, intricate cutting and some special cutting techniques.

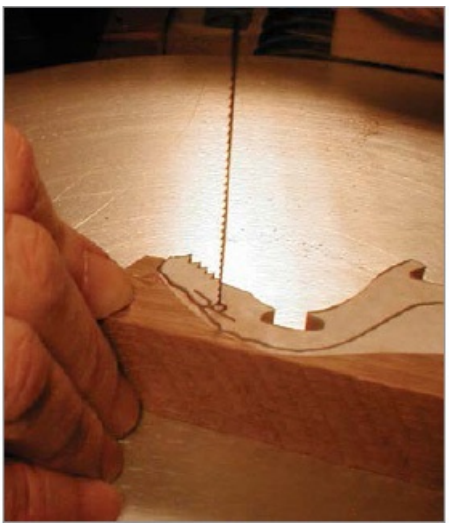
CUTTING DINO FEATURES

EYES

Almost all of my puzzles represent some kind of life form, real or imaginary. Thus, most of them have facial features. I developed a variety of eye shapes, either cut or drilled.

Drilling Eyes: Drill a hole in the center of the eye with the drill bit before cutting the pattern. The eye socket should be created after the pattern has been scrolled. Put a ¼" (6mm) burr in a rotary power tool, position the head piece so the drilled hole is in the center of the eye, and then carve out the eye socket. I use a burr that is tear-drop shaped. It allows me to make different sizes of eyes by deepening the hole.

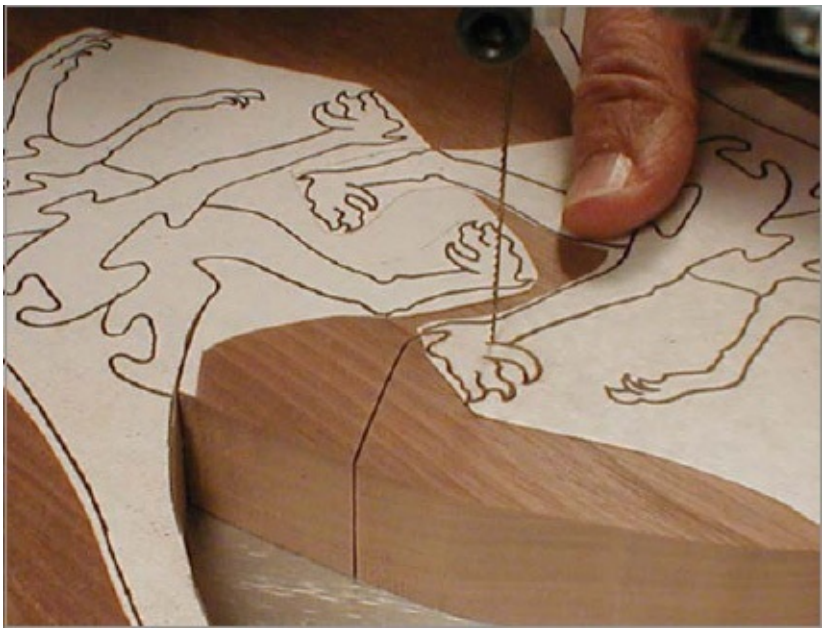




Cutting Eyes: Make an access cut with the saw. From there, follow the lines on the pattern. If the eye is a simple hole—round, square, diamond or half circle—just cut it with the saw. Some of the animals have eyebrow cuts. To make these, cut the eye hole first, and then back out or turn around and cut the eyebrow.

CLAWS AND TEETH

Claws and teeth in my puzzles are exaggerated in size. Claws need to be thick enough to withstand sanding and play. The Velociraptor claws, both hand and foot, are the most fragile, so I chose that dinosaur for the pictures to illustrate the exaggerations.



Claws: I generally start at the back foot and cut the claws on both feet. Then, I cut around to the arms, and complete them. Next, I go up to the jaws and cut the teeth. At that point, I cut both the bottom jaw/arm piece and the other arm free. These are the most fragile pieces. Set them aside. Now cut the face around to the eye detail and finish up.

Teeth: To cut the teeth, start at the front of the bottom jaw. Cut up to the point of the first tooth. Pivot to go down and then up to the point of the next tooth. This is easier said than done, and you will need to practice. The trick is to stop pushing forward as you pivot.

CUTTING A TRICERATOPS PUZZLE

I chose redgum for the Triceratops puzzle. When you have chosen the board you plan to use for your Triceratops puzzle, trim the pattern and use a spray adhesive to attach the pattern to the board. If you have chosen a very dense hardwood—like cherry, maple, or birch—tape the pattern down with 2” (51mm)-wide clear packing tape (the kind without mylar threads). The tape acts as a lubricant for the blade and minimizes any potential burning.

Materials & Tools

Materials:

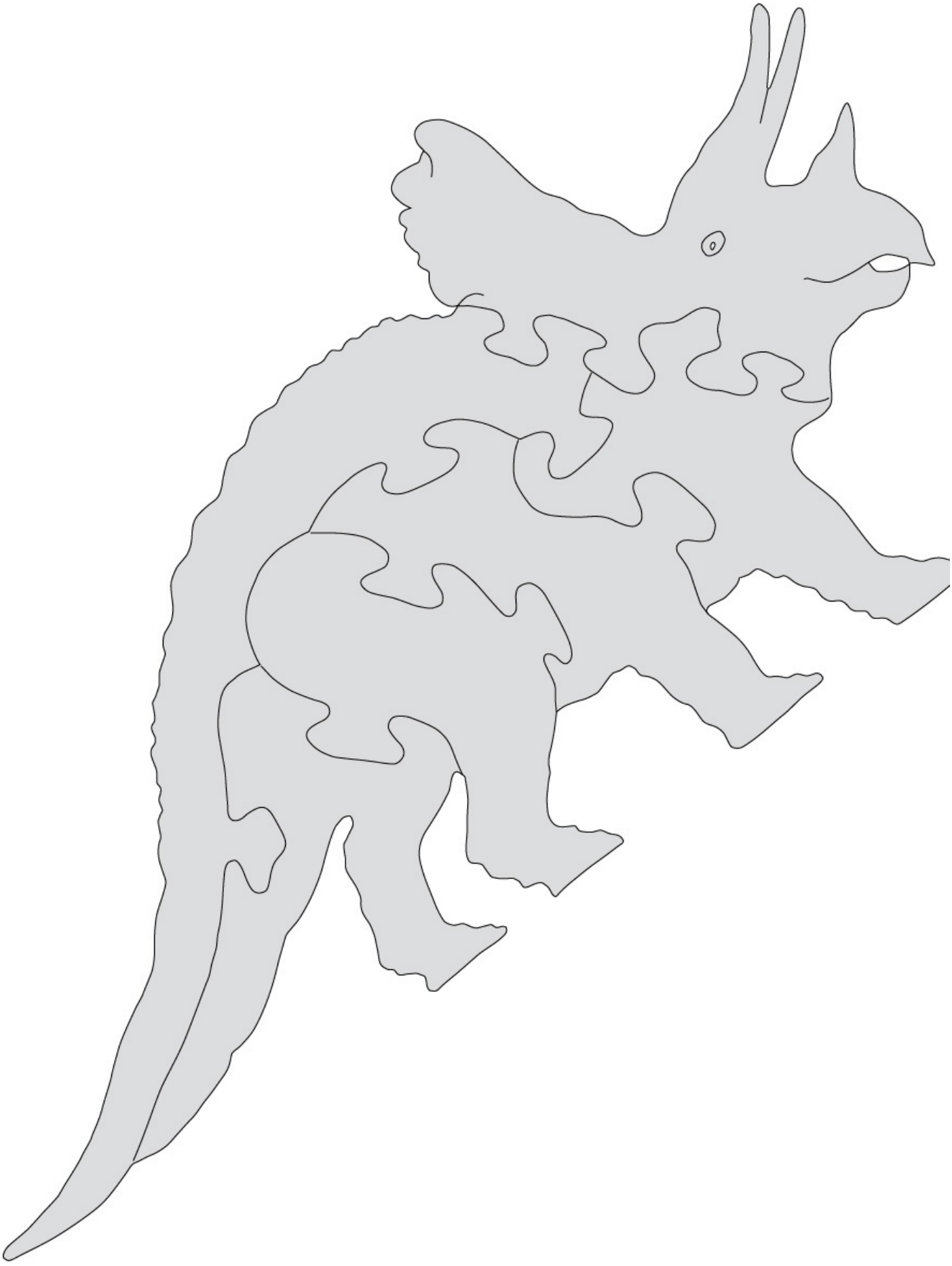
- Redgum board
- Spray adhesive
- Plastic bags: gallon resealable
- Paper towels
- Rubber gloves
- Sandpaper disk, adhesive-backed: 220 grit
- Tape: 2” (51mm)-wide clear packaging

Tools:

- Scroll saw

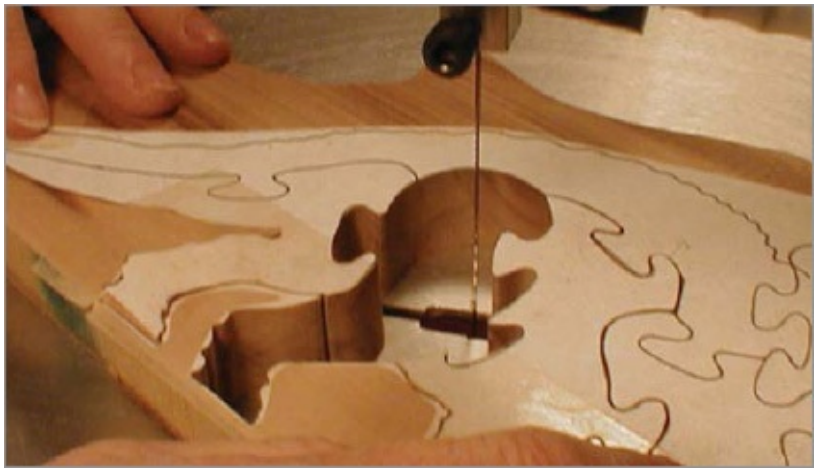
- Blades (plain or reverse tooth): #5, #7, #9
- Dust blower
- Square
- Disk pad
- Drill
- Drill stand
- Flap sander
- Flat trays
- Glue box
- Metal tray
- Rubber finger tips

TRICERATOPS PATTERN



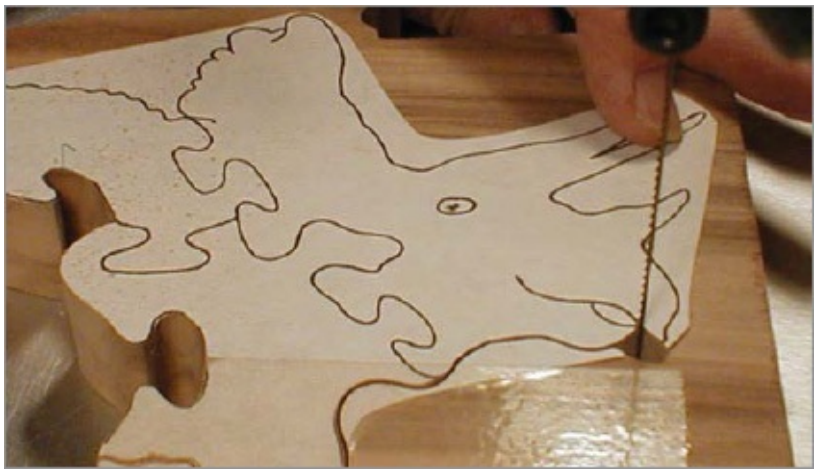
TRICERATOPS: CUTTING THE PIECES

1 Cut the outline of the puzzle. Drill a hole in the eye, as marked. Begin to cut at the tip of the tail, and cut the bottom of the tail and the two hind legs. Cut completely around the forward hind leg, remove it from the blank, and peel off the pattern.

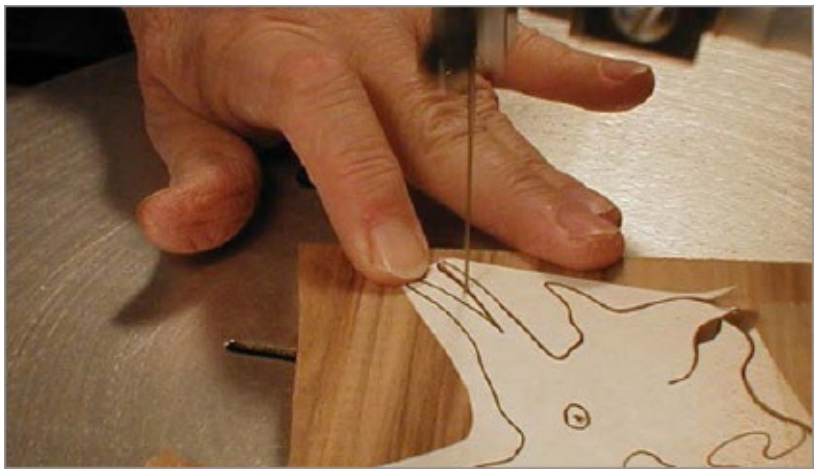


2 Cut the backmost front leg. Next, cut the front leg closest to the forward hind leg, and remove it from the blank.

3 Continue cutting the outline. Cut around the bottom of the forward front leg, continue to the tip of the beak, and then stop.



4 Cut the beak. Pull the blade back slightly and turn the teeth to the right into the scrap wood. Cut to the point where the bottom and top of the beak meet. Stop the saw and remove the scrap. Cut the top line of the beak, and back the blade out of the cut you just made. Reposition the blade and cut the bottom line of the beak. Stop the saw and remove the scrap from the inside of the beak.



5 Cut the nose and first horn. Starting at the tip of the beak, cut around the nose horn and up to the first forehead horn. From there, cut to the bottom of the V. Instead of turning the piece to try to create a perfect V, back the blade out halfway to the tip of the horn. Then, turn the blank 180° with the teeth facing into the scrap. Back down into the bottom of the V.

6 Cut the second horn. Continue around the second horn and proceed to the top of the frill. Stop when you get to the position shown in the photograph.

7 Cut the head. Back the blade up slightly and cut down the back of the frill, making detail cuts as you go. Finish cutting around the head and remove it from the blank.

8 Finish cutting the pieces. Cut out the forward front leg piece. Cut around the back leg, separating it from the backbone. Finally, cut the backbone piece. There should be plenty of scrap left so that you can hold onto the piece safely and securely.

Tip

As you remove each piece, interlock it with the pieces you cut earlier. This will give you a chance to verify that the blade is vertical and the pieces fit correctly.

TRICERATOPS: FINISHING THE PUZZLE

9 Sand the surfaces of the puzzle. Chuck a disk pad into the drill and apply a 200-grit adhesive-backed sandpaper disc to it. Hold each puzzle piece firmly, and lightly sand the top and bottom surfaces. When sufficiently smooth, check the cut surfaces for any burrs. Sand the outer cut surfaces of the puzzle smooth to the touch. Sand the inner cut surfaces of the puzzle only enough to remove stray wood fibers or other flaws.

10 Round the puzzle pieces. Use a flap sander to gently round the edges of the pieces, steadily moving the piece under the flap sander. Don’t hold the piece in one place for too long.

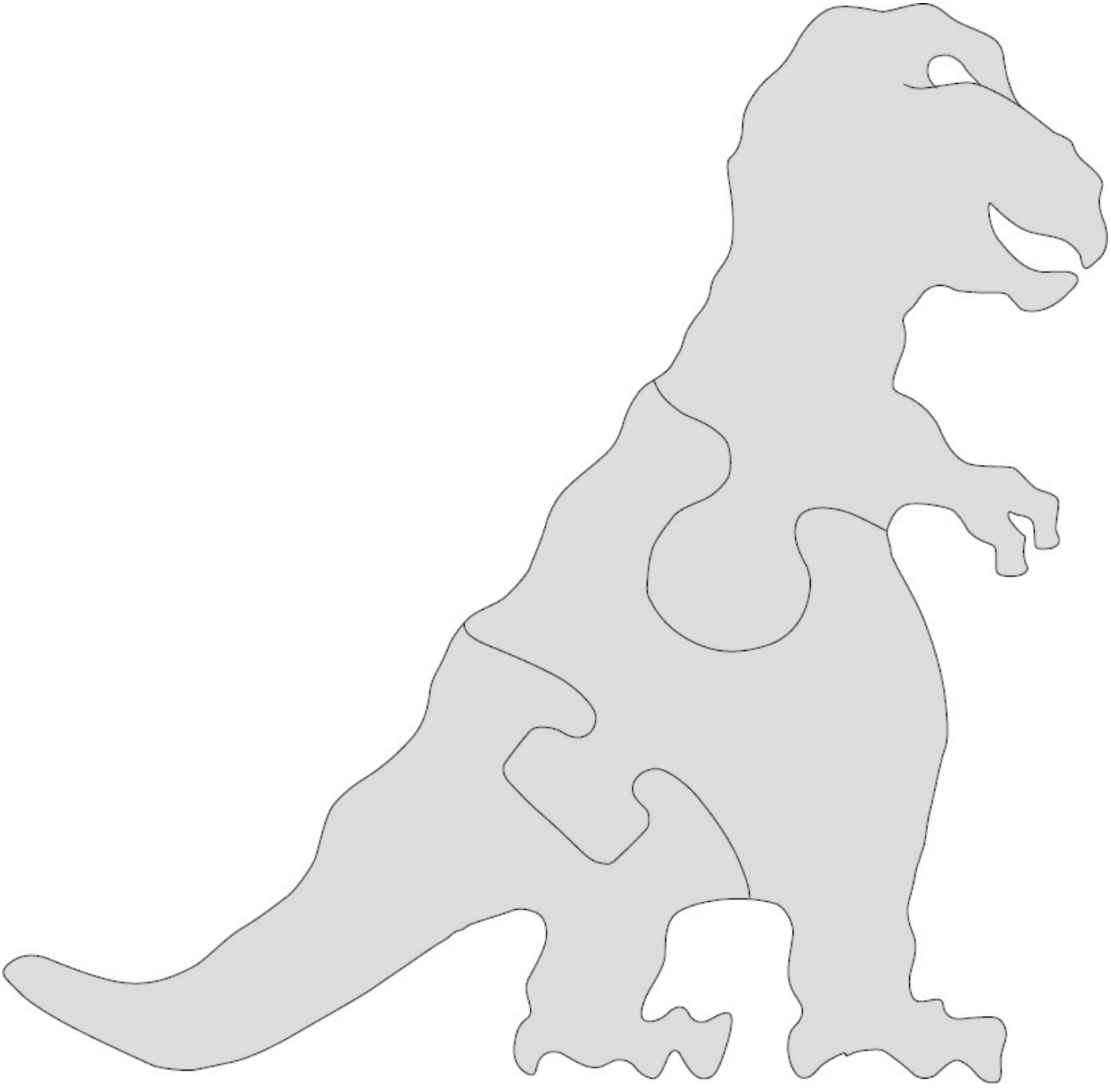
11 Finish the puzzle. Fill a gallon-size resealable plastic bag with clear Danish oil. Dip the pieces briefly in the bag, remove them, and stand them on a flat tray covered with paper towels. Wipe off any excess oil with paper towels. Allow the pieces to dry for 12 to 24 hours before assembling the puzzle.

Tip

Make sure the flat surface won’t absorb excess oil. I use restaurant trays

that I found at a local restaurant supply store.

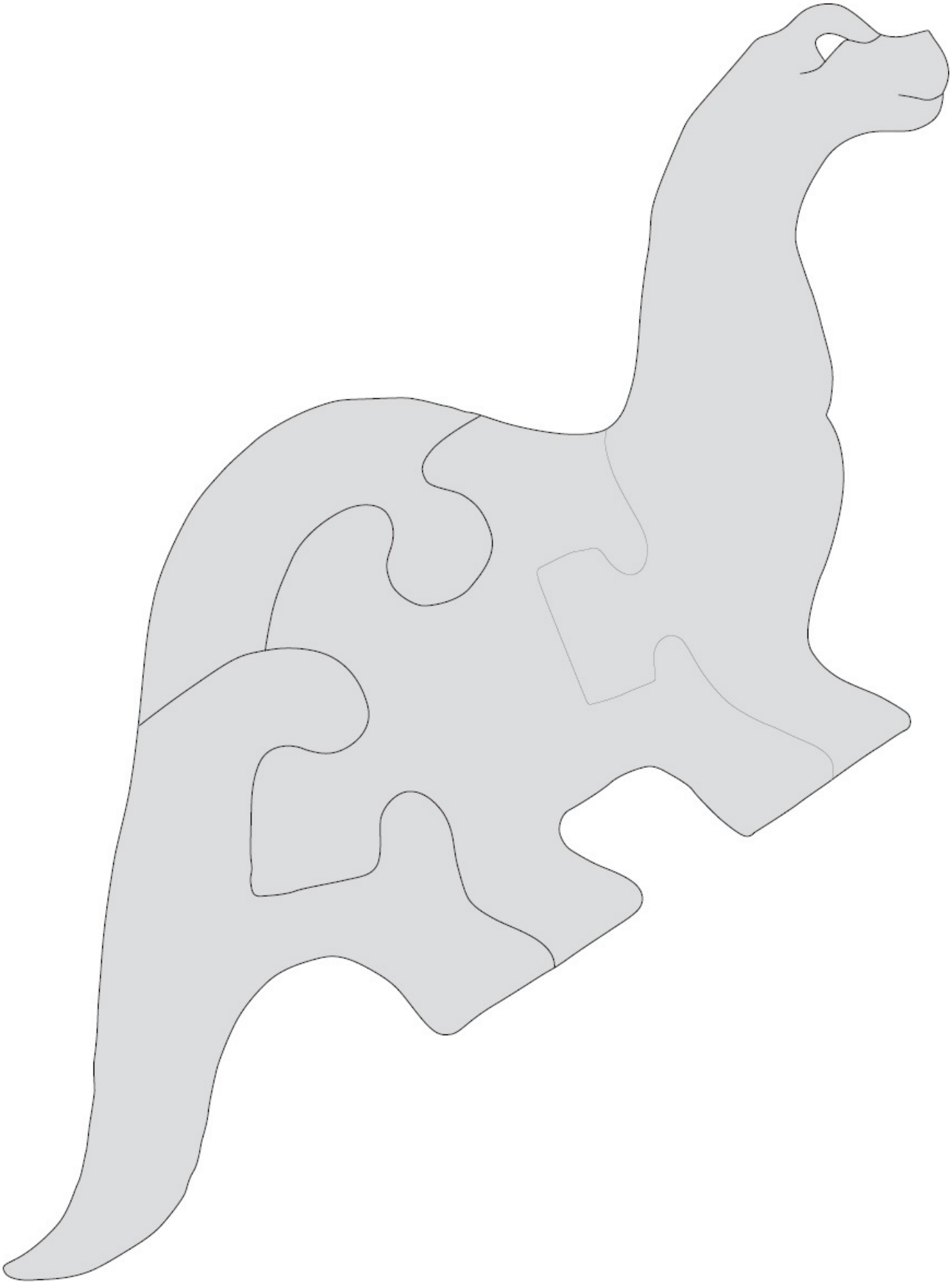
PUZZLES



EASY PUZZLES

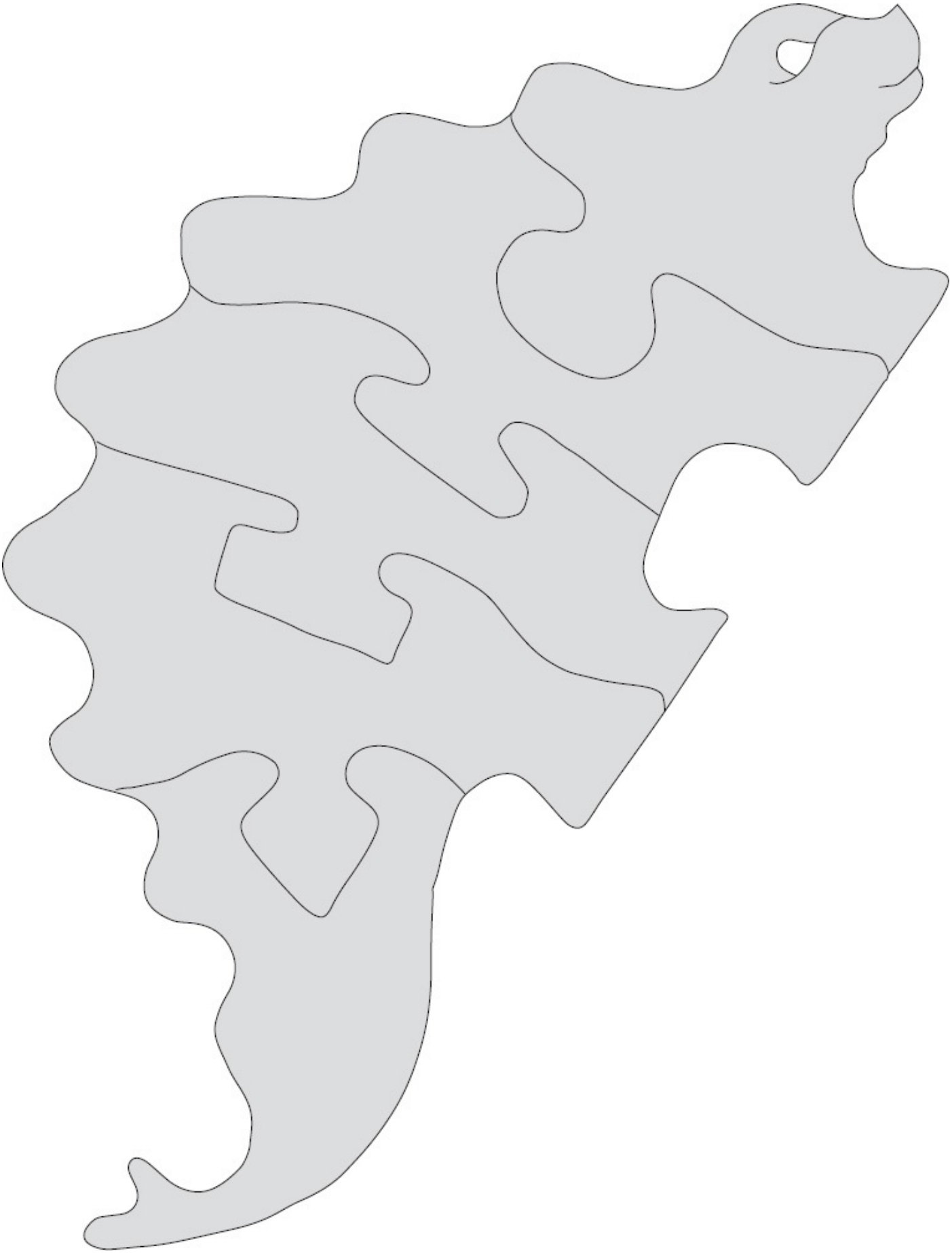
BABY T-REX

Tyrannosaurus Rex (King Tyrant Lizard) is easily one of the scariest dinos of the Cretaceous Age. Oddly enough, he’s also a much-loved subject of children. Notice the two geometric keys. (Cut from walnut.)



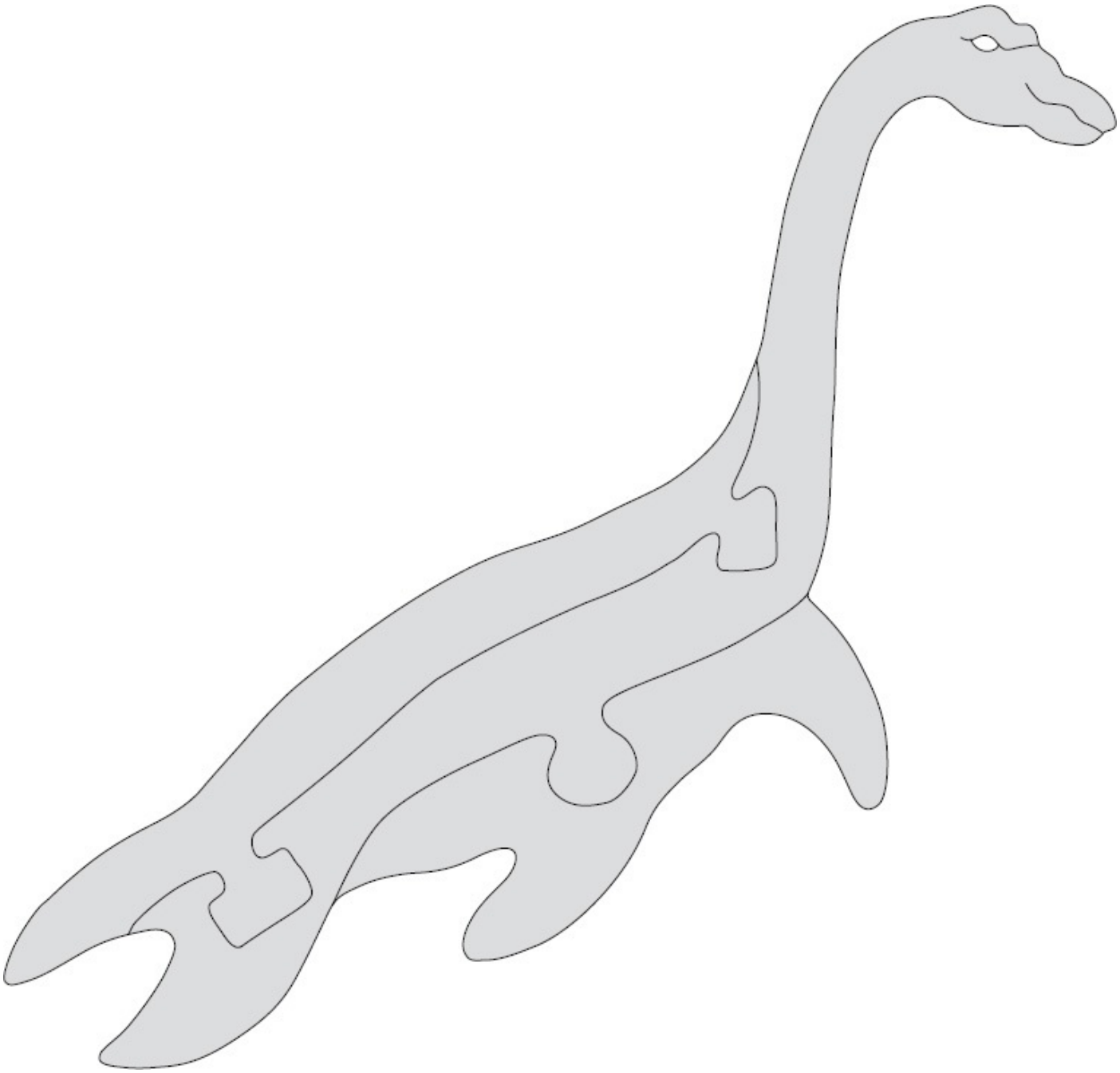
BABY BRONTO

Brontosaur (Thunder Lizard) was renamed Apatosaur (Deceptive Lizard), then re-renamed Brontosaurus. Compare this easy version to the intermediate puzzle on page 32 to see how I altered this puzzle for children. (Cut from butternut.)



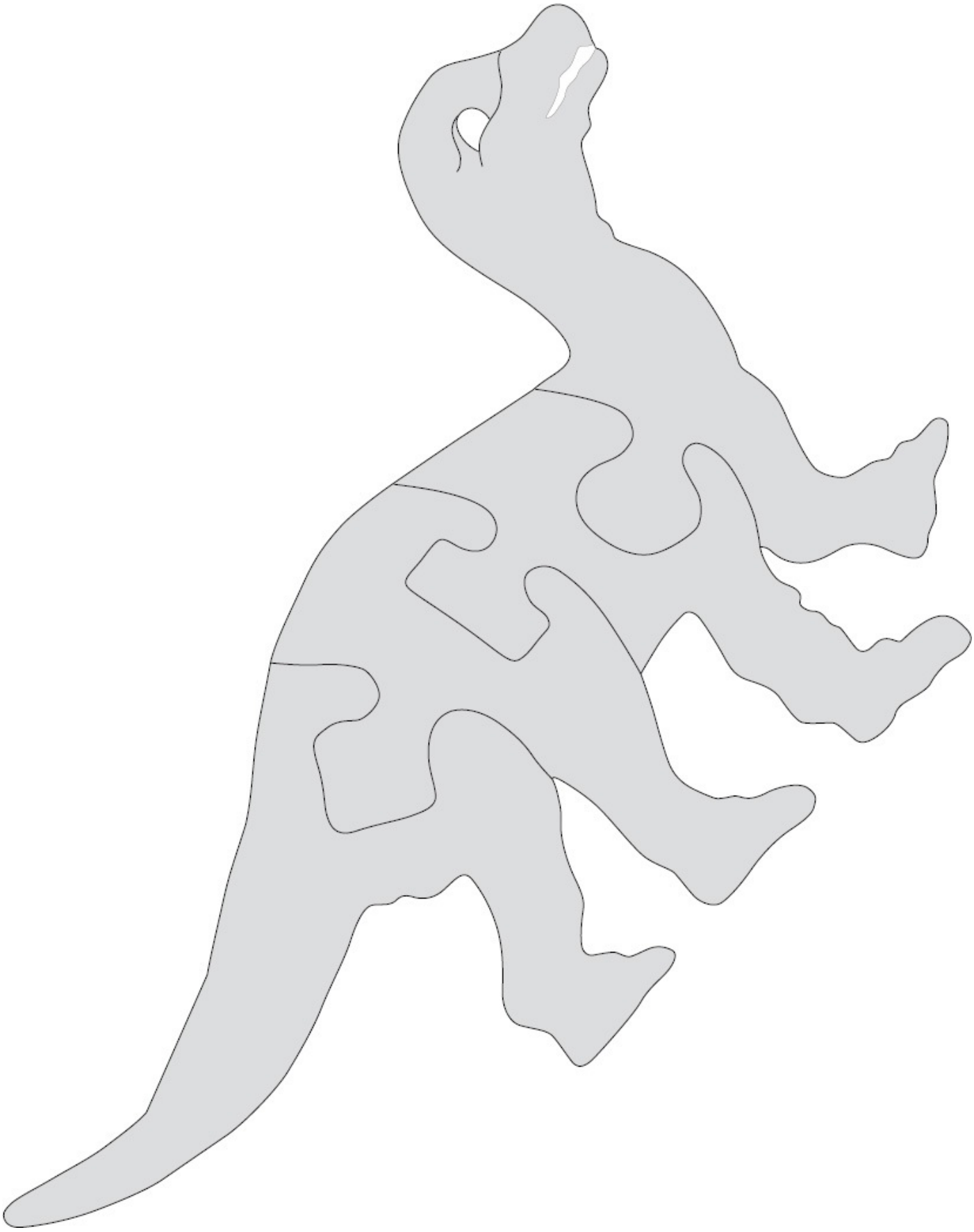
BABY STEGO

The rounded plates, shortened tail spikes, and geometric keys make Baby Stego a fun-shaped dino for young puzzle lovers. See the intermediate and advanced realistic Stegosaur puzzles on pages 28 and 70. (Cut from sassafras.)



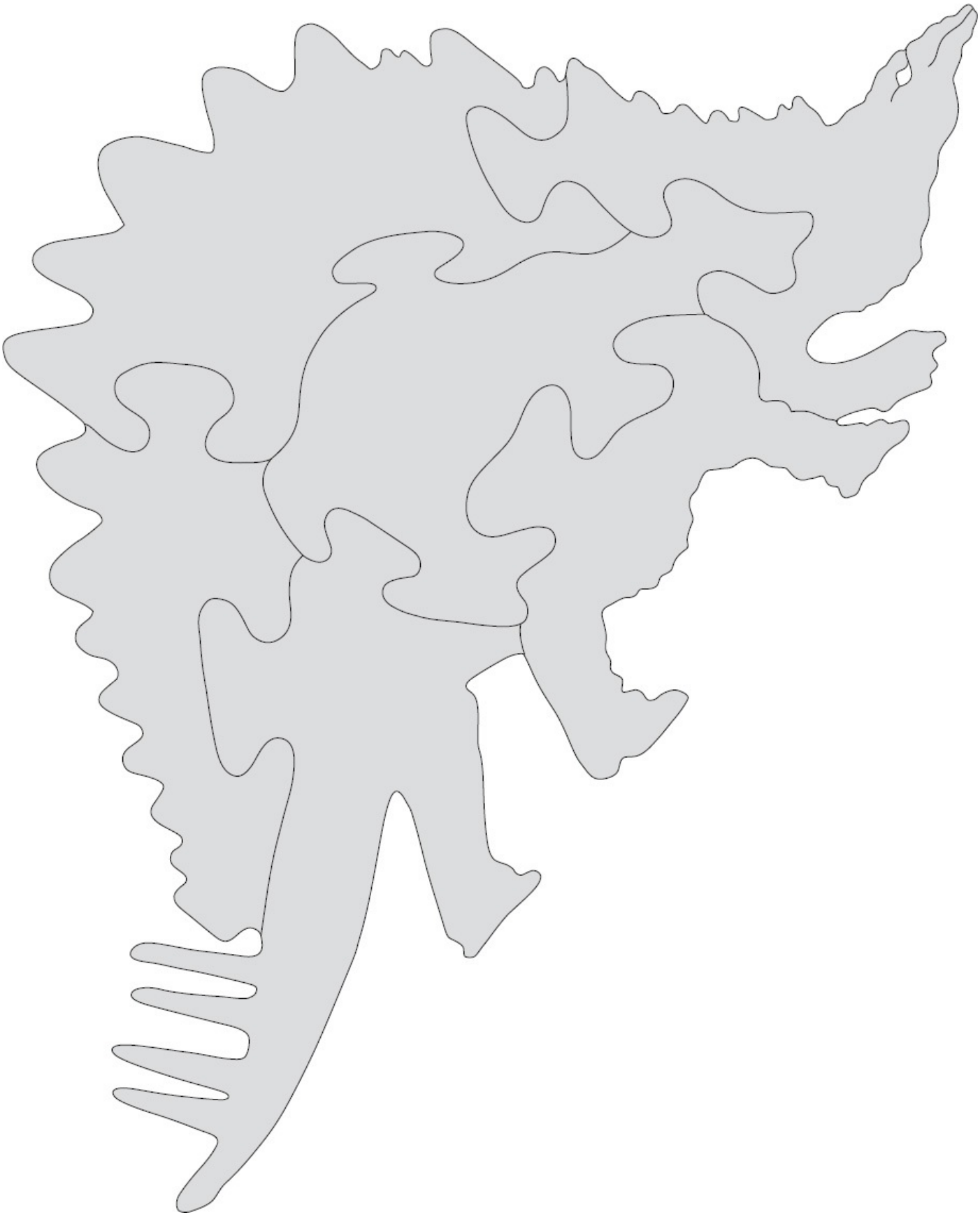
PLESIOSAUR

Plesiosaur (Near Lizard) was a marine reptile from the Jurassic Age. This fish-eater was about 10 feet long and was found world-wide. (Cut from cherry.)



MUSSAURUS

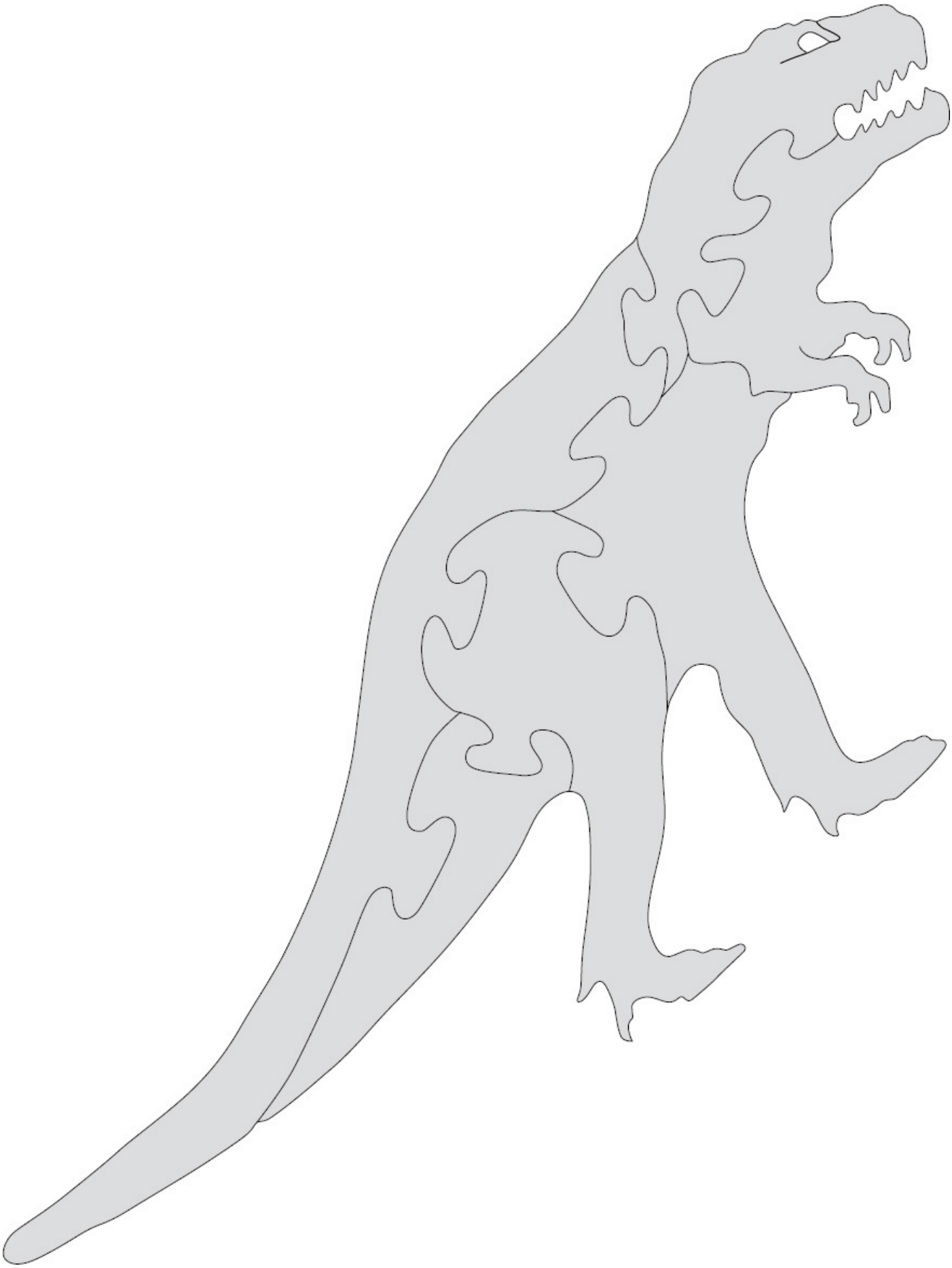
Mussaurus (Mouse Lizard) was a plant-eating Prosauropod from the Triassic Age. He was so-named before adult skeletons of the genus had been found. The adult Mussaurus may have been up to 10 feet in length and weighed up to 150 pounds. Not exactly mouse-sized! (Cut from Kentucky coffeetree.)



INTERMEDIATE PUZZLES

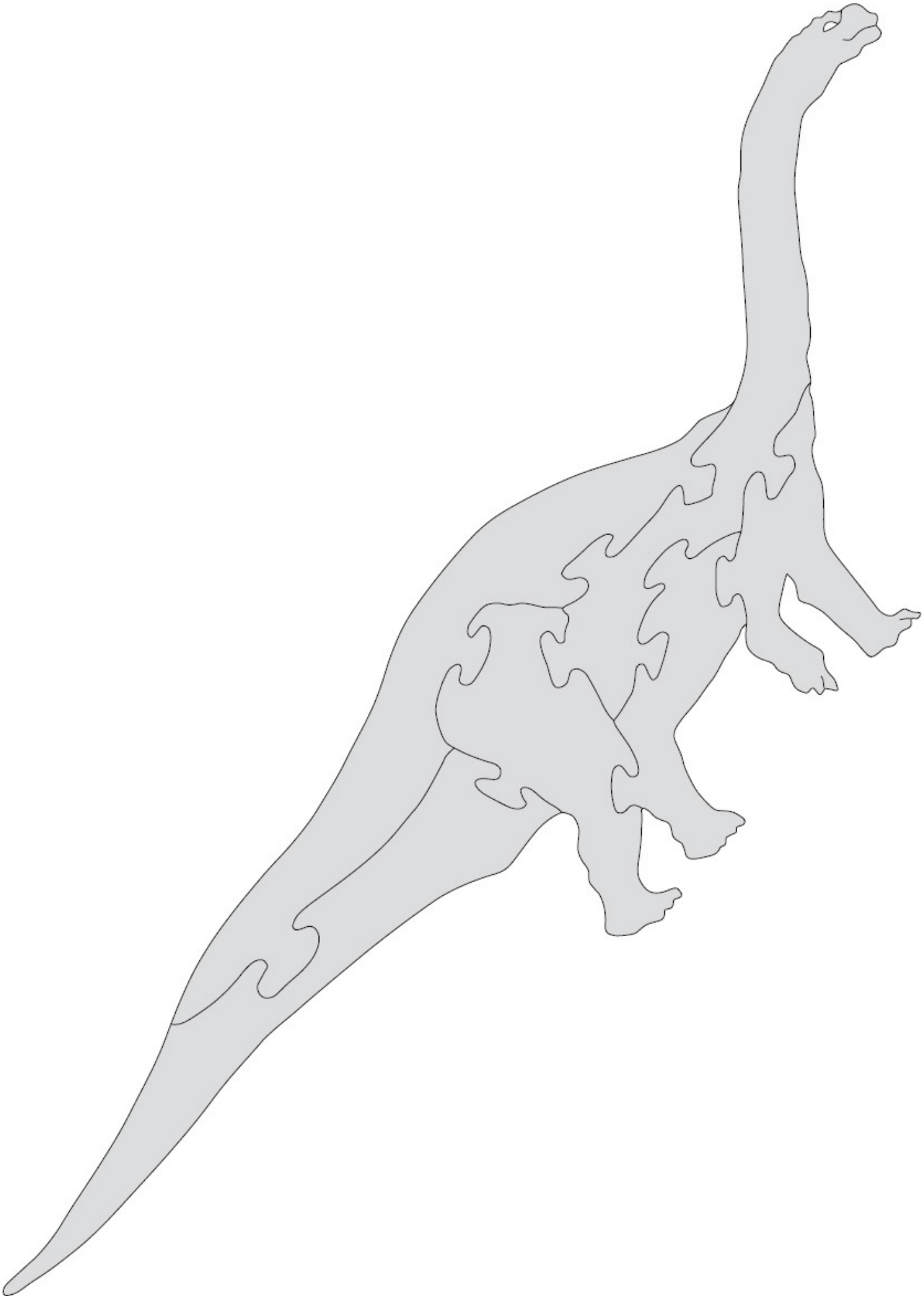
STEGOSAUR

Stegosaur (Plated Lizard) lived during the Jurassic Age in Europe and North America. It was a plant-eater that grew to be about 25 feet long and 11 feet tall at the hip. (Cut from walnut.)



TYRANNOSAURUS REX

Tyrannosaurus Rex (King Tyrant Lizard) needs little introduction. This meat-eating Therapod lived during the Cretaceous Age and was found in North America. It stood about 18 feet tall and was 50 feet long. (Cut from honey locust).



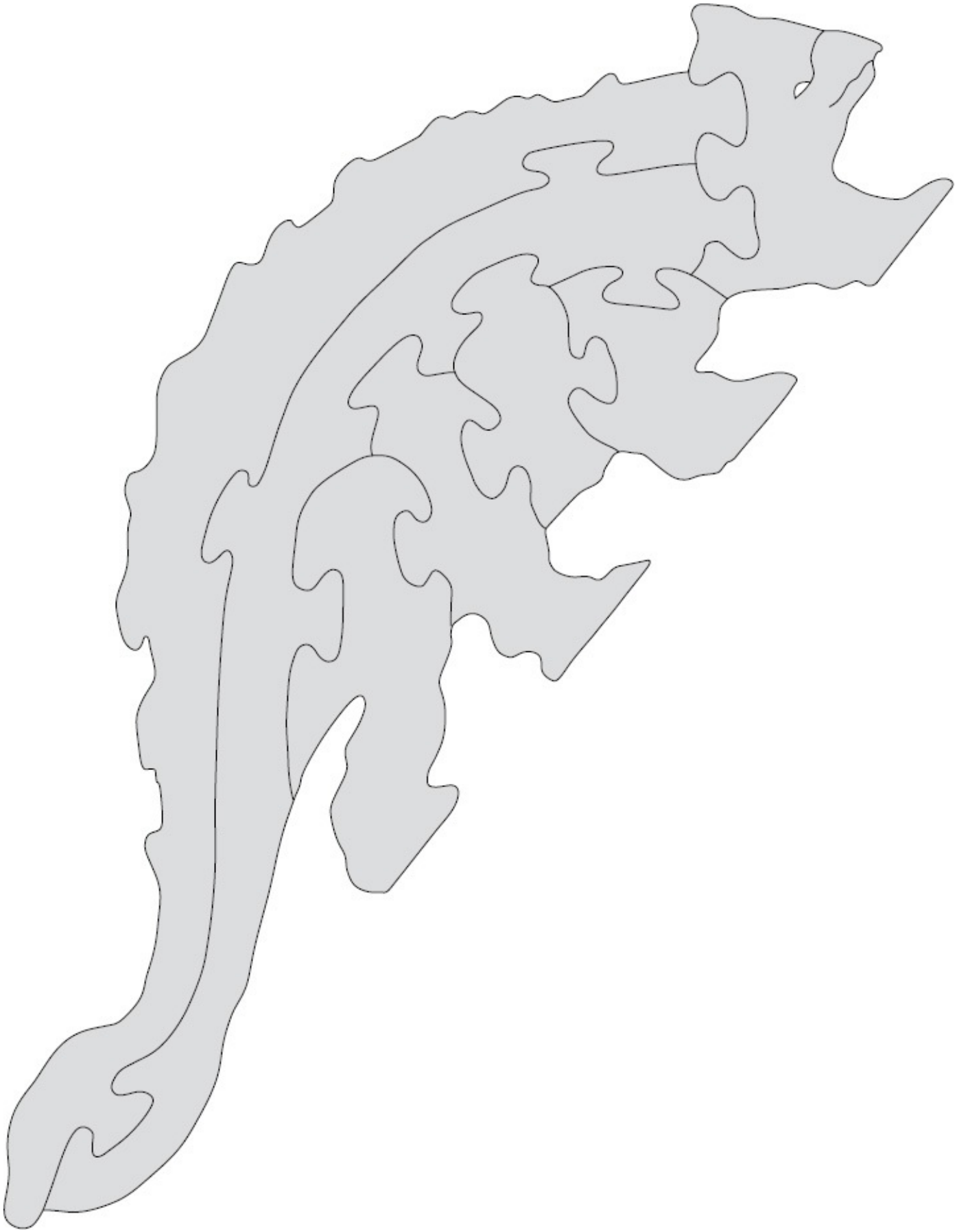
BRONTOSAUR

Brontosaur (Thunder Lizard) was a Sauropod of the Jurassic Age. This animal was found in North America and Europe. It ate plants and grew to be about 75 feet long, 15 feet tall, and 30 tons. (Cut from redgum.)

ADVANCED PUZZLES

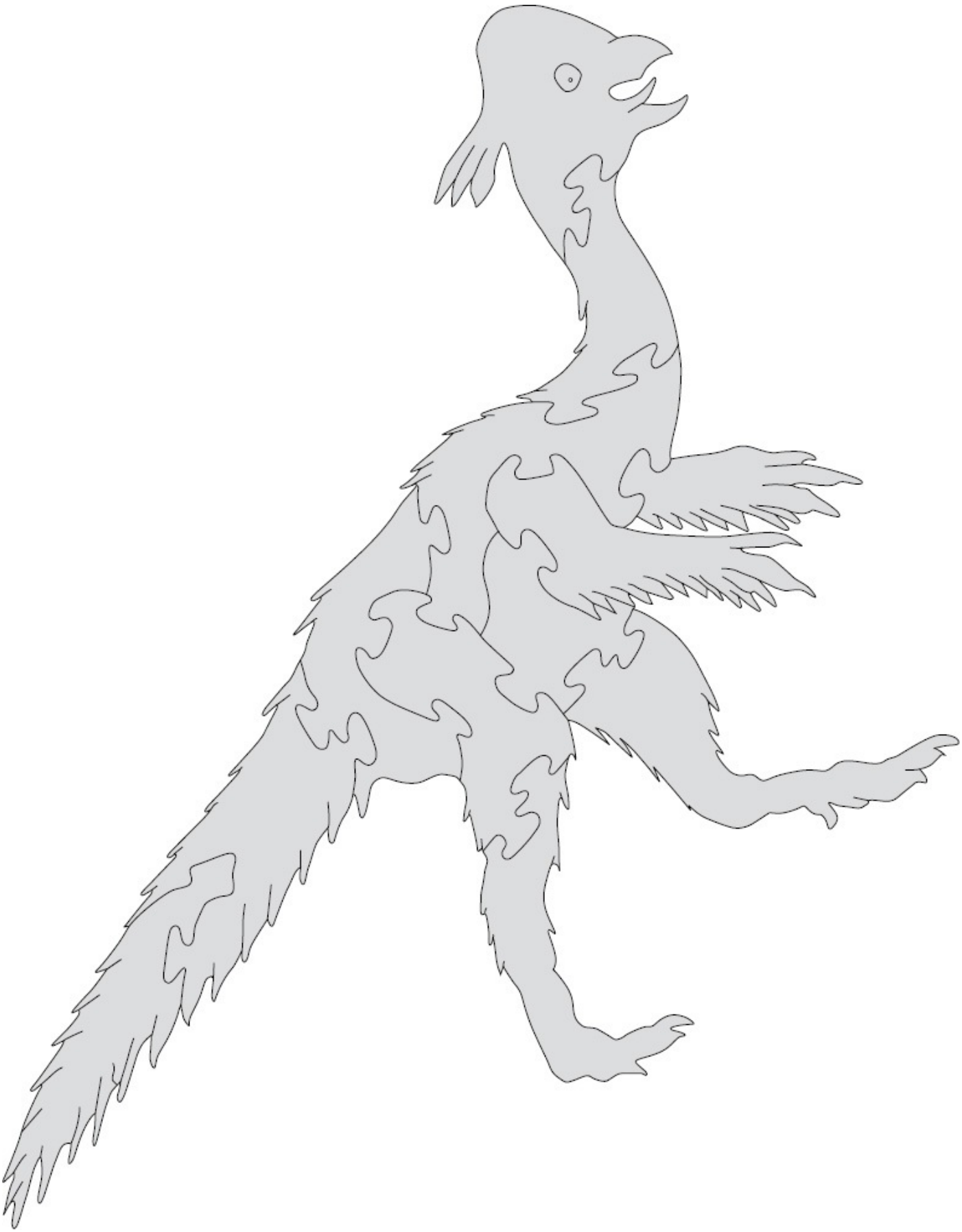
ALLOSAUR

Allosaur (Different Lizard) was a Therapod from the Jurassic Age. This meat-eater was found in North America, Africa, and Asia. It measured about 35 to 45 feet long and weighed about 4 tons. (Cut from walnut.)



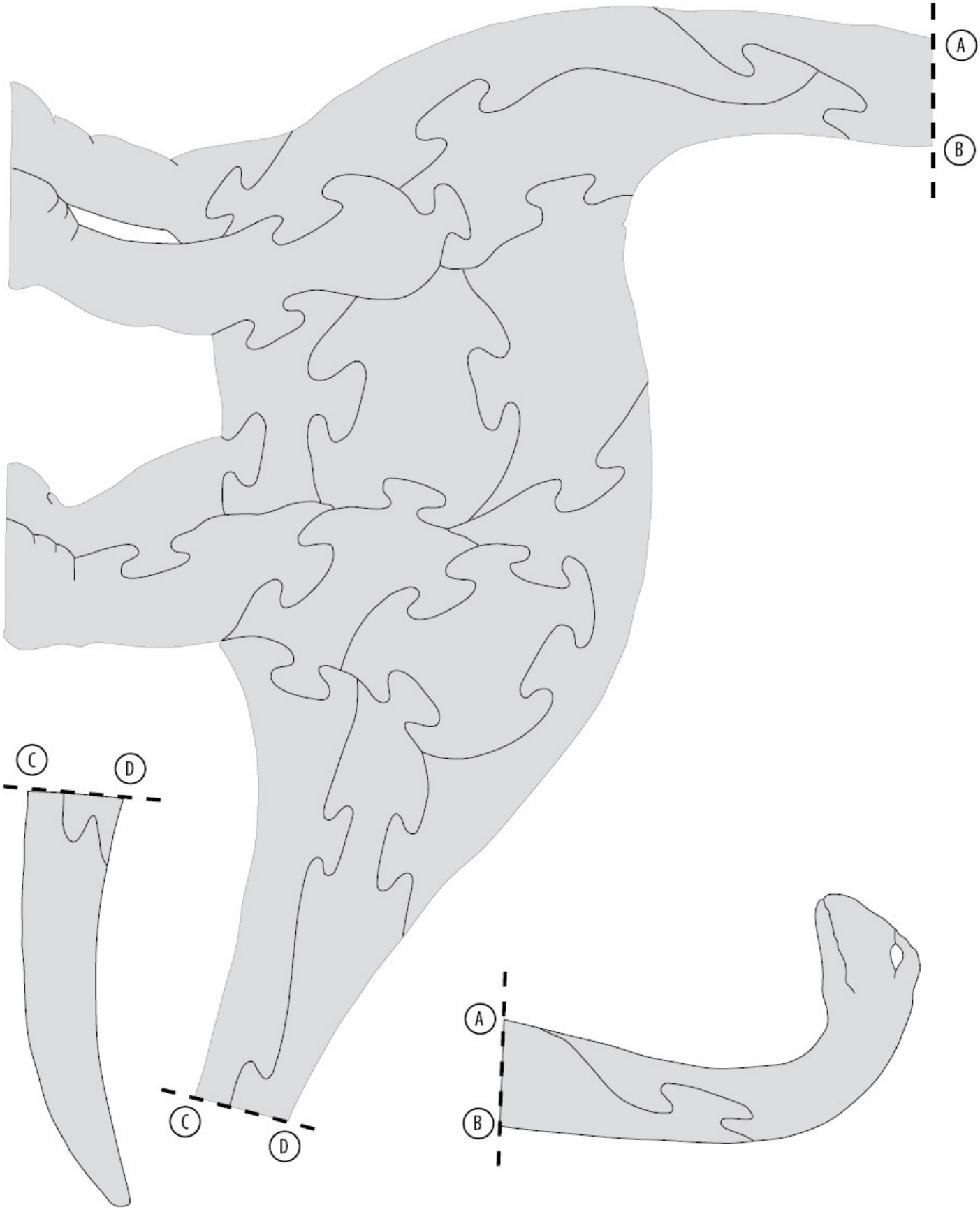
ANKYLOSAUR

Ankylosaur (Armored Lizard) was found in North America during the Cretaceous Age. It ate plants and grew to about 25 feet long, 6 feet wide, and 4 feet tall. (Cut from mesquite.)



ANZU WYLIEI

Anzu Wyliei is named for a feathered demon from Sumerian mythology. Nicknamed “The Chicken from Hell,” it’s a 500 pound feathered dinosaur from the late Cretaceous Age that was found in the Hell’s Creek formation in the Dakotas. (Cut from sycamore.)


A
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D
C
D
A
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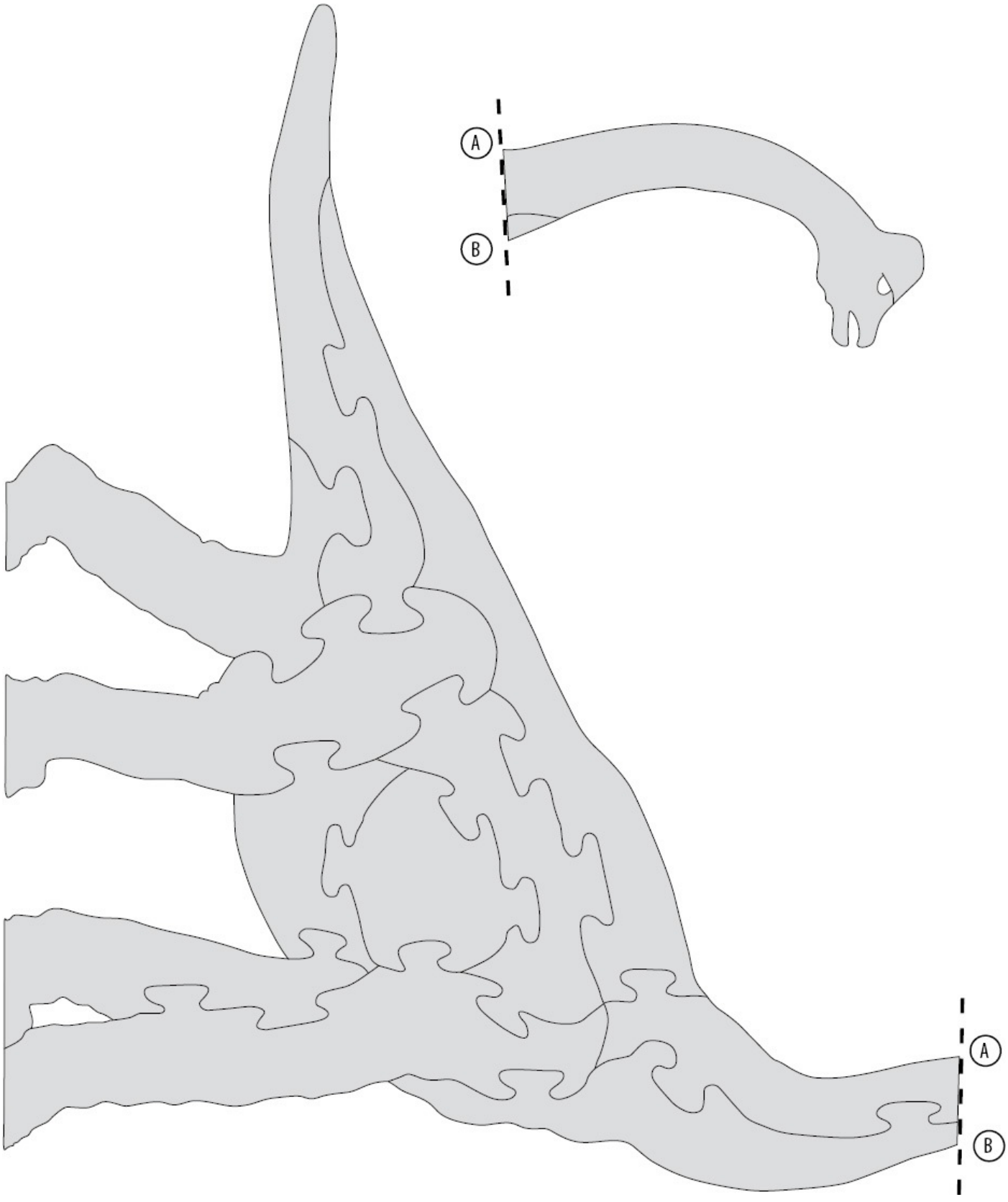
BAROSAUR

Barosaur (Heavy Lizard) was the longest Sauropod, measuring nearly 90 feet long. This plant-eater was found in North America and Africa during the Jurassic Age. (Cut from walnut.)


A
B
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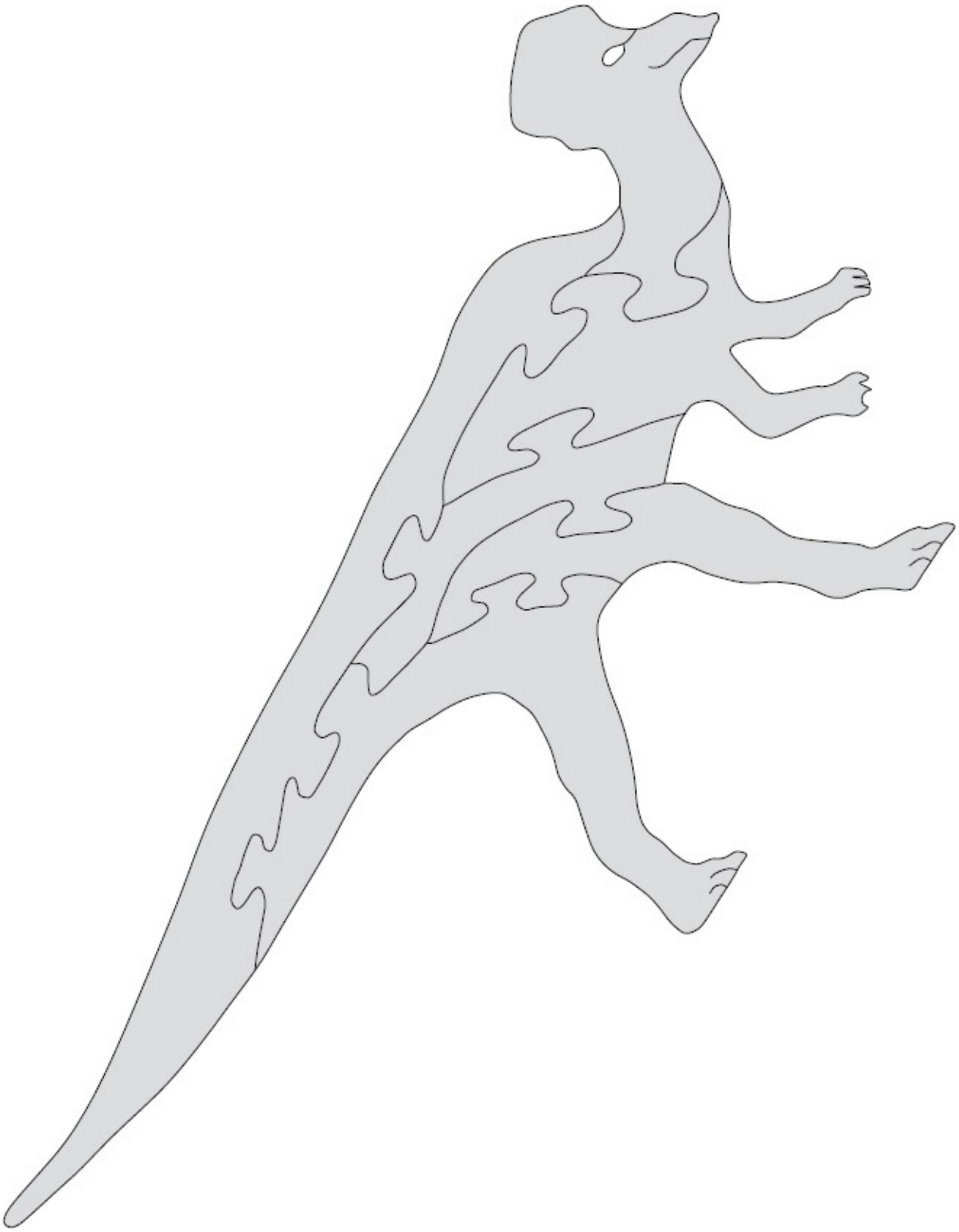
B

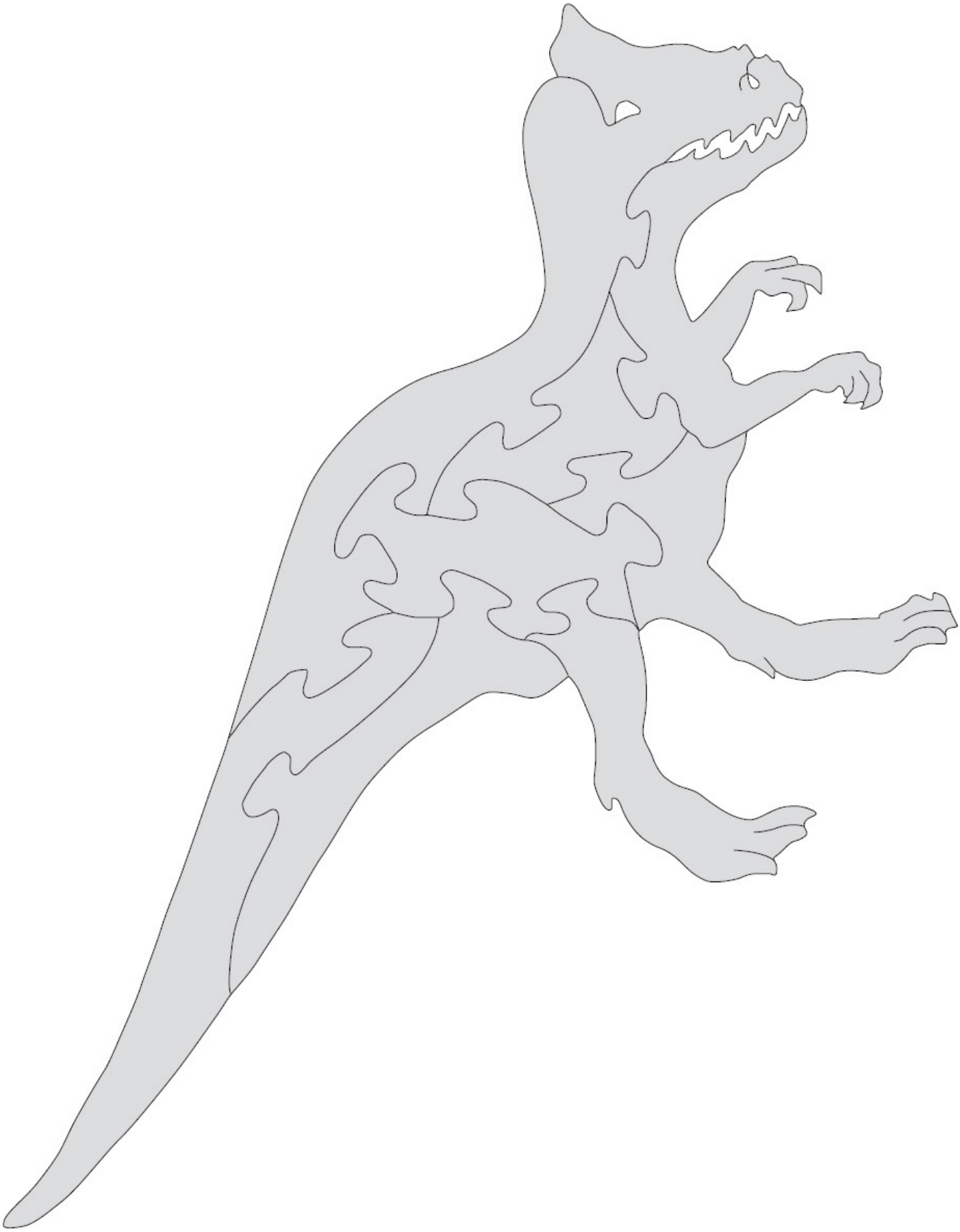
BRACHIOSAUR

Brachiosaur (Arm Lizard) stood taller than a four-story building. This plant-eating Sauropod from the Jurassic Age was found in North America, Europe, and Africa. It grew to about 85 feet long and 40 feet tall, and weighed 70 to 80 tons. (Cut from cherry.)



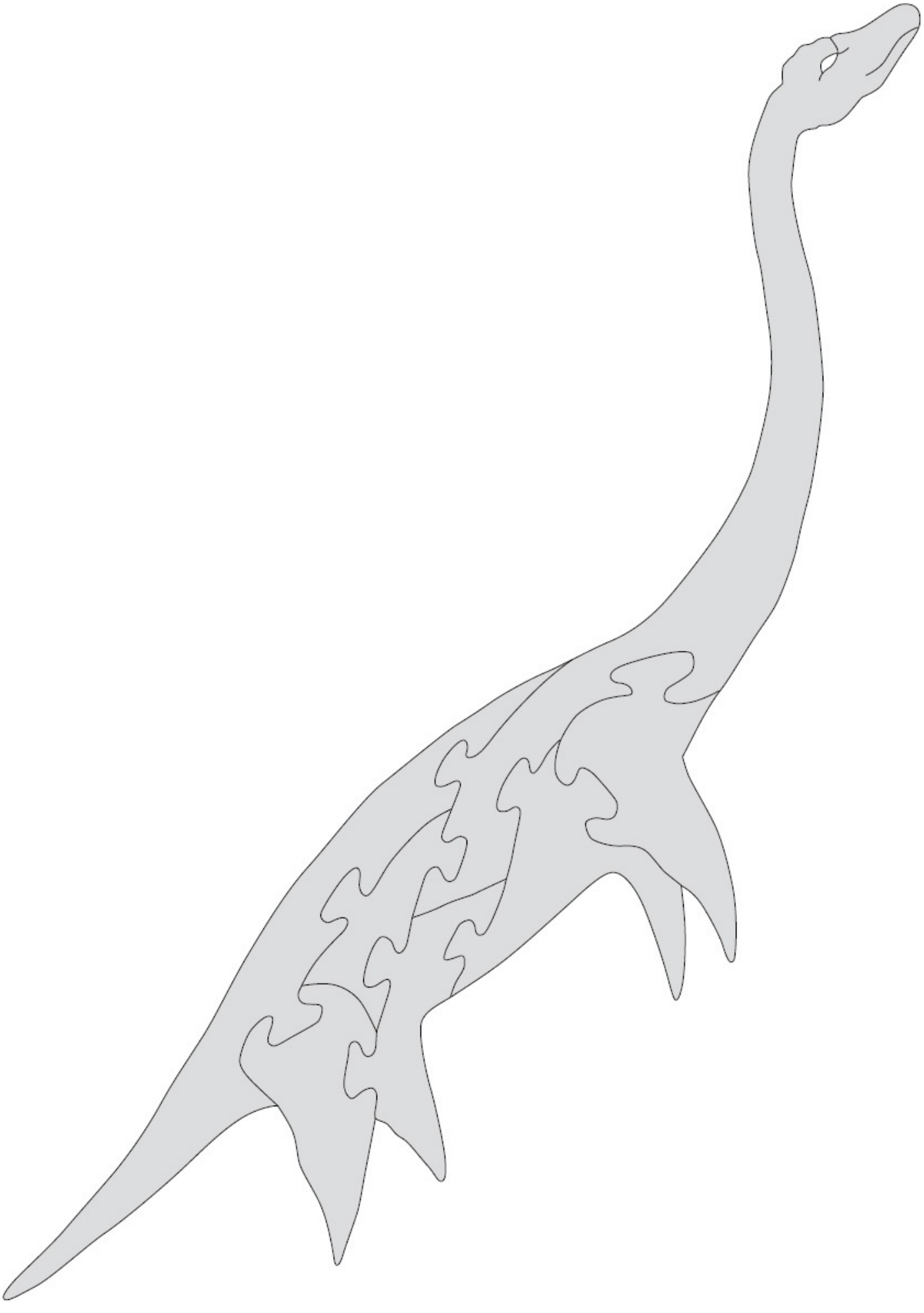
CORYTHOSAUR

Corythosaur (Helmet Lizard) was a hadrosaur of the Cretaceous Age. This plant-eater was found in North America and measured about 30 feet long. (Cut from sycamore.)



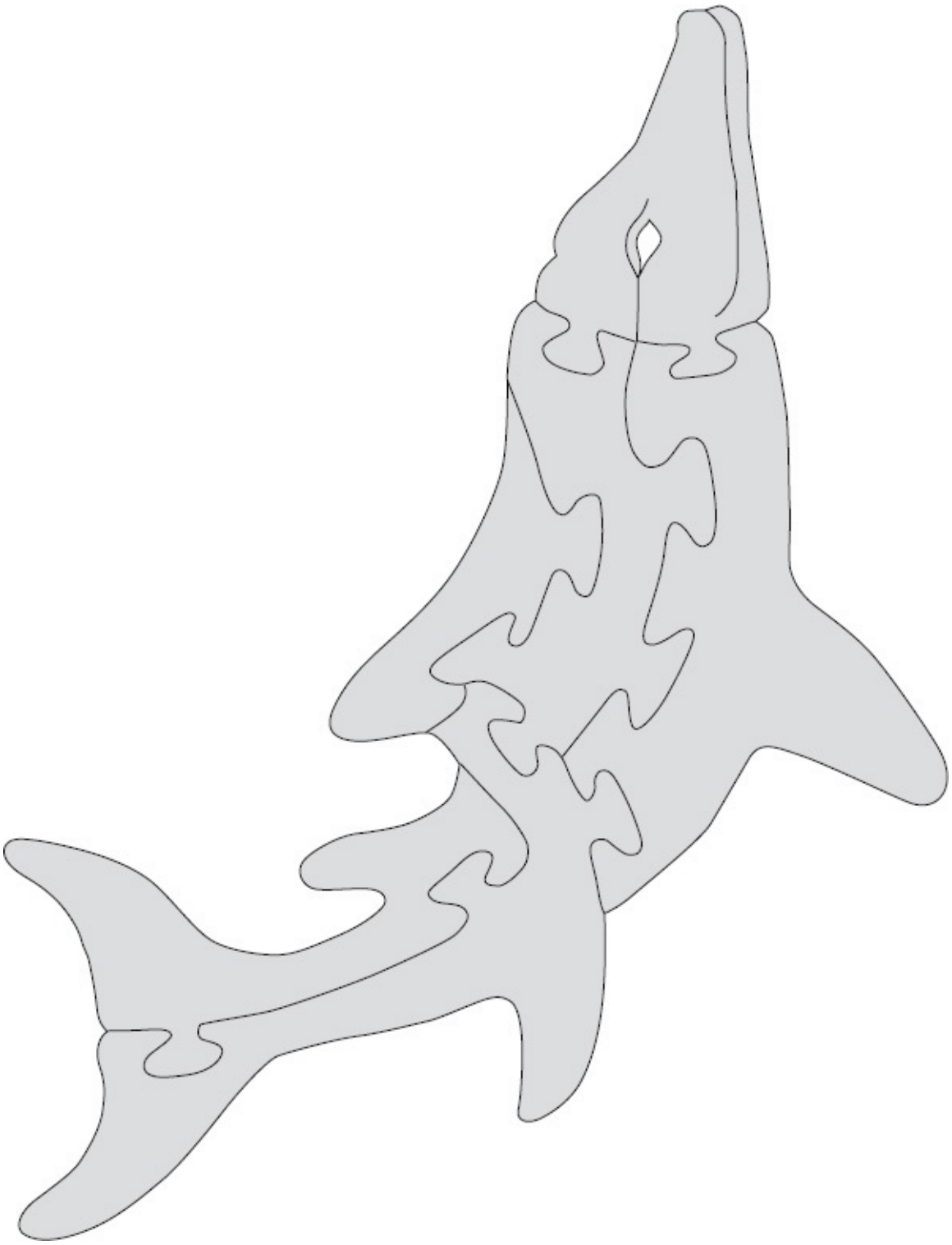
CRYOLOPHOSAUR

Cryolophosaur (Frozen-Crested Lizard) was found in Antarctica. This meat-eater was about 24 feet long and lived in the Early Jurassic Age. (Cut from Goncalo Alves.)



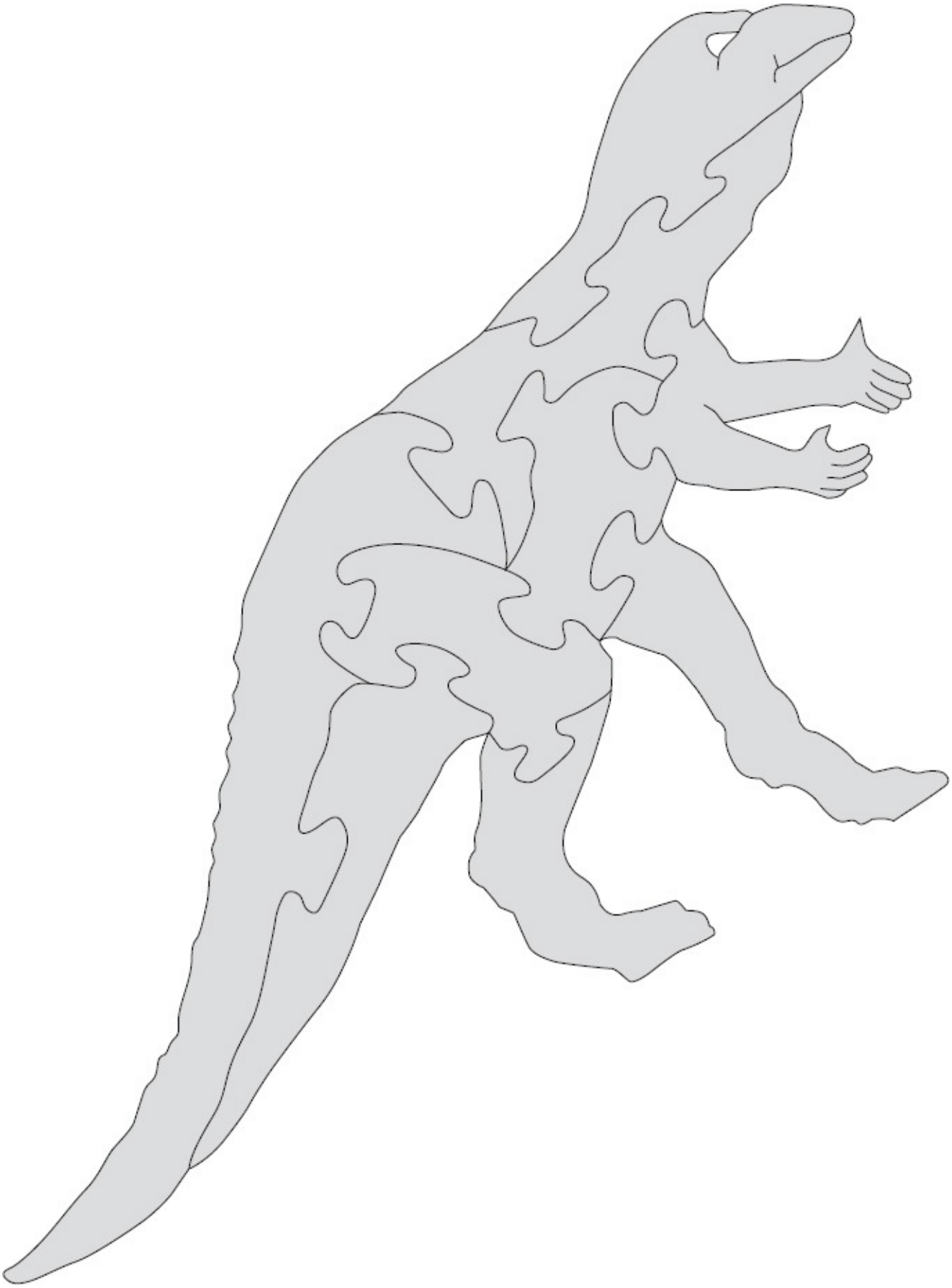
ELASMOSAUR

Elasmosaur (Thin-Plated Lizard) ate fish and lived during the Cretaceous Age. A marine reptile, it was found in North America and measured about 43 feet long. (Cut from oak.)



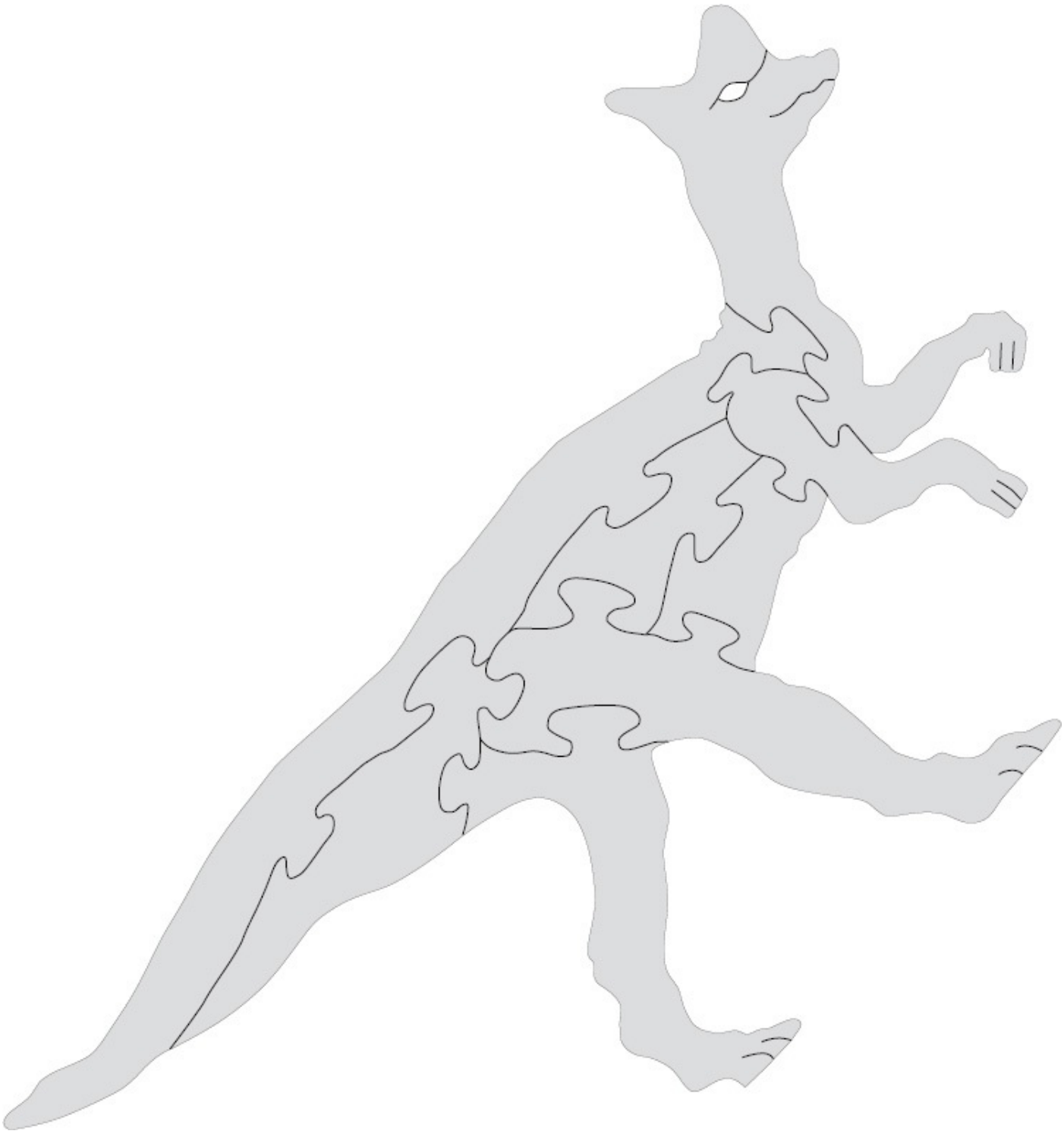
ICHTHYOSAUR

Ichthyosaur (Fish Lizard) was a marine reptile of the Triassic, Jurassic, and Cretaceous Ages. A fish-eater, it was found in North America, South America, and Europe. (Cut from oak.)



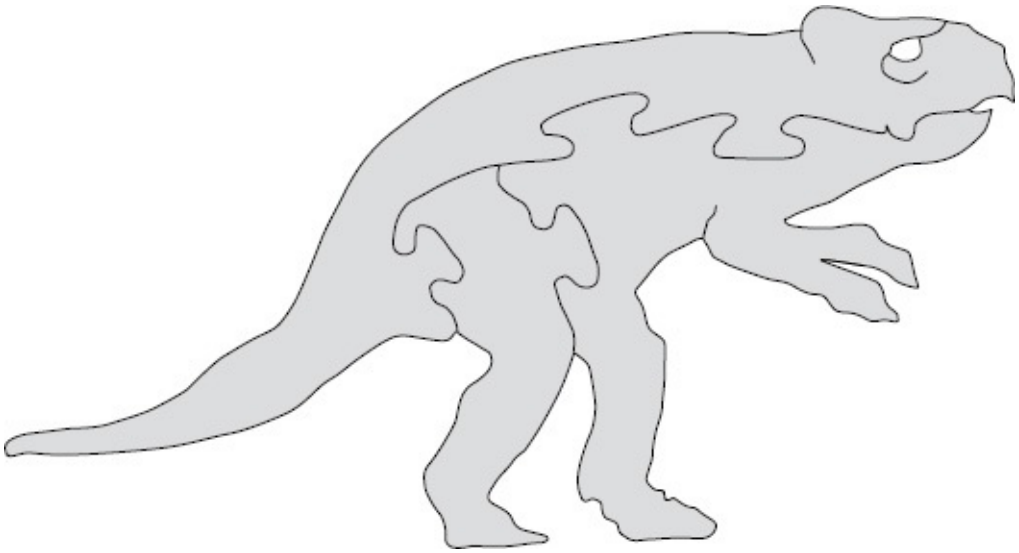
IGUANODON

Iguanodon (Iguana Tooth) was the first dinosaur discovered in Sussex, England, in 1822. It lived in the early Cretaceous period. (Cut from Goncalo Alves.)



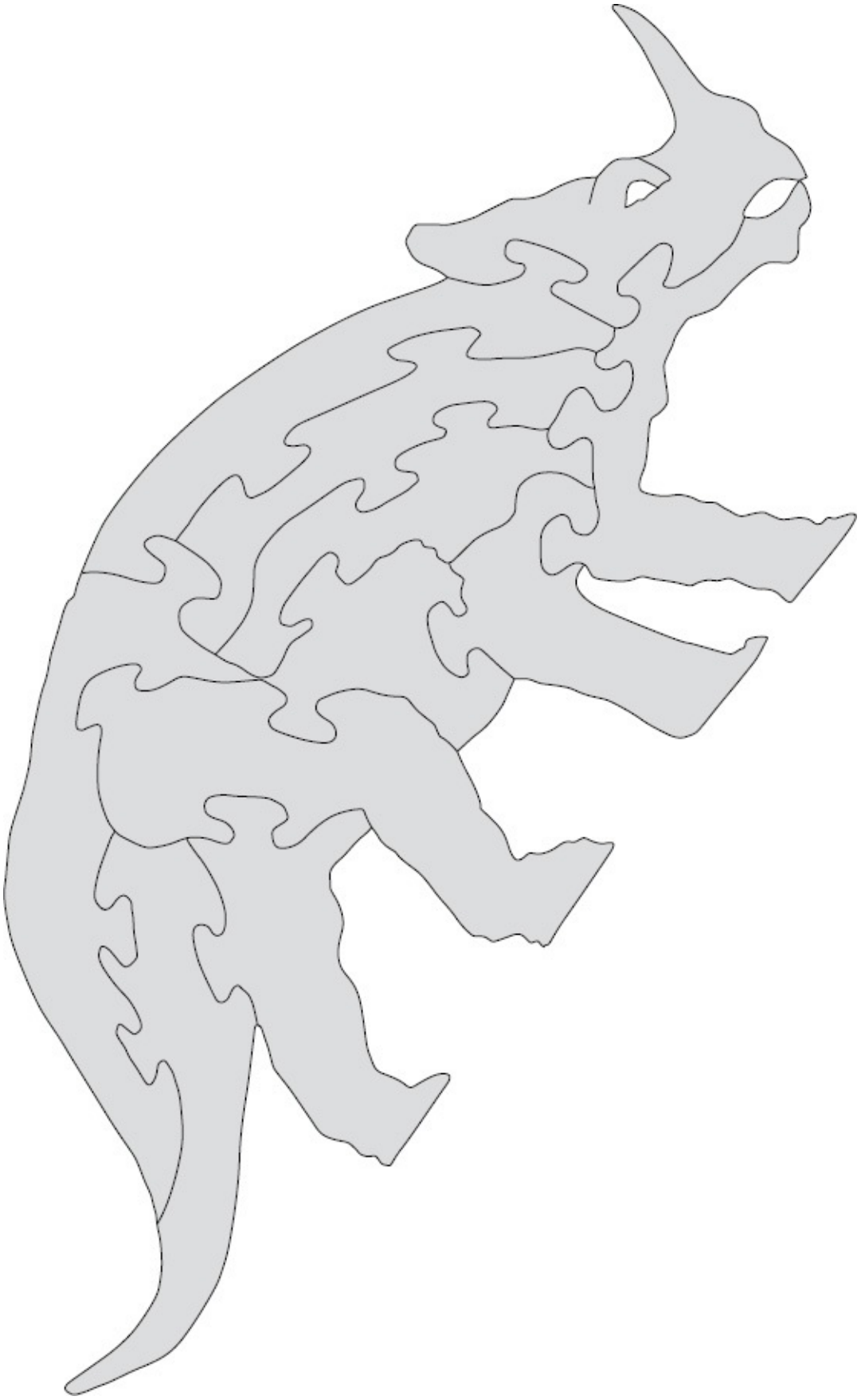
LAMBEOSAUR

Lambeosaur (Lamb’s Lizard) is one of many crested hadrosaurs, or duck-billed dinosaurs, of the late Cretaceous Age. The first one was found in Canada. (Cut from sycamore.)



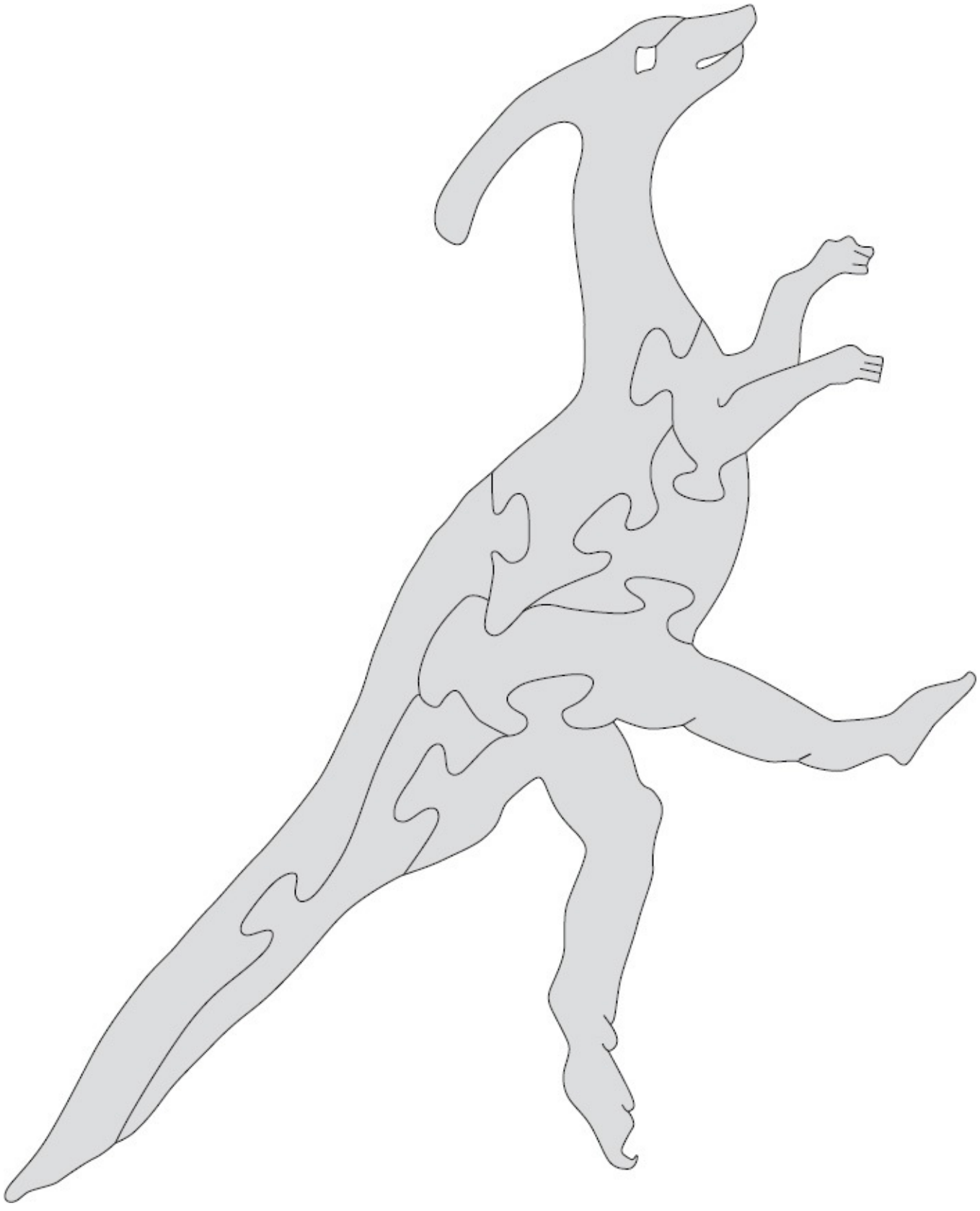
MICROCERATUS

Microceratus–formerly Microceratops (Tiny Horned Face)– was a Ceratopsian from the Cretaceous Age. Found only in Asia, this tiny plant-eater was a mere 30 inches long. (Cut from cherry.)



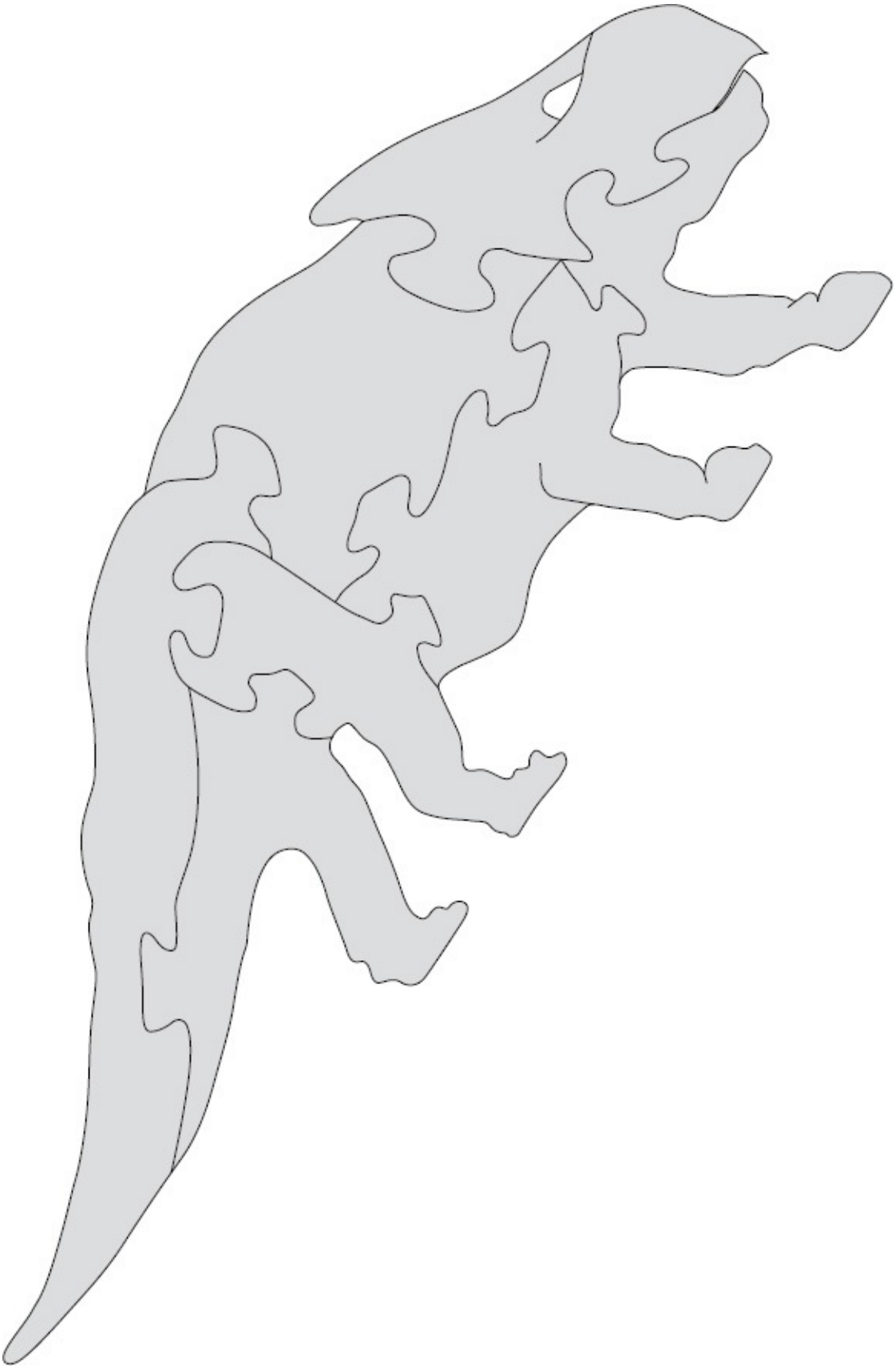
MONOCLONIUS

Monoclonius (Single Stem) was found in North America during the Cretaceous Age. This Ceratopsian was a 20-foot-long plant-eater. It was one of the first Ceratopsian fossils ever found. (Cut from walnut.)



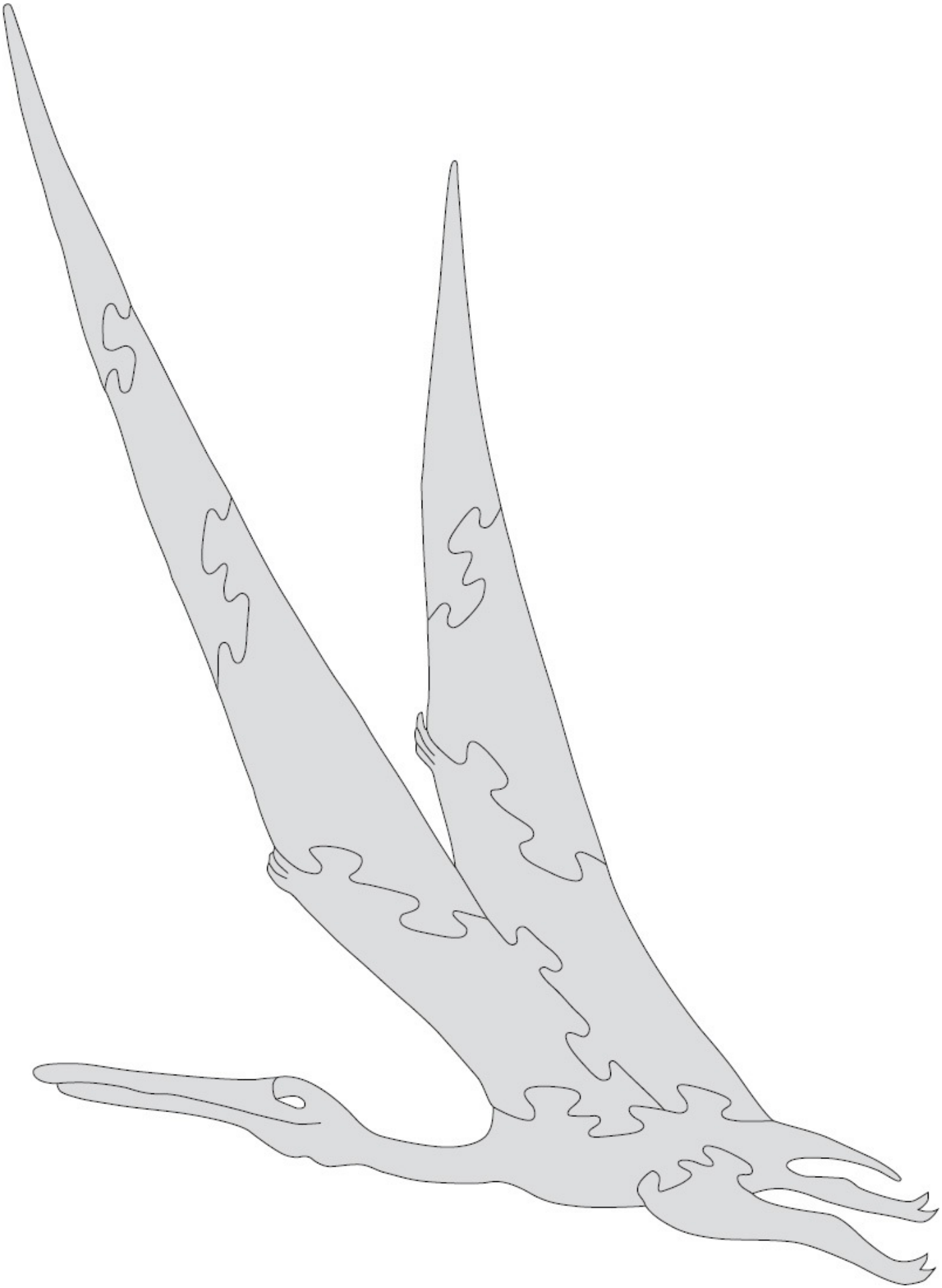
PARASAUROLOPHUS

Parasaurolophus (Similar Crested Lizard) was a hadrosaur that lived in North America during the Cretaceous Age. A plant eater, it measured about 30 feet long and 16 feet tall, with a crest about 5 feet long. (Cut from cherry.)



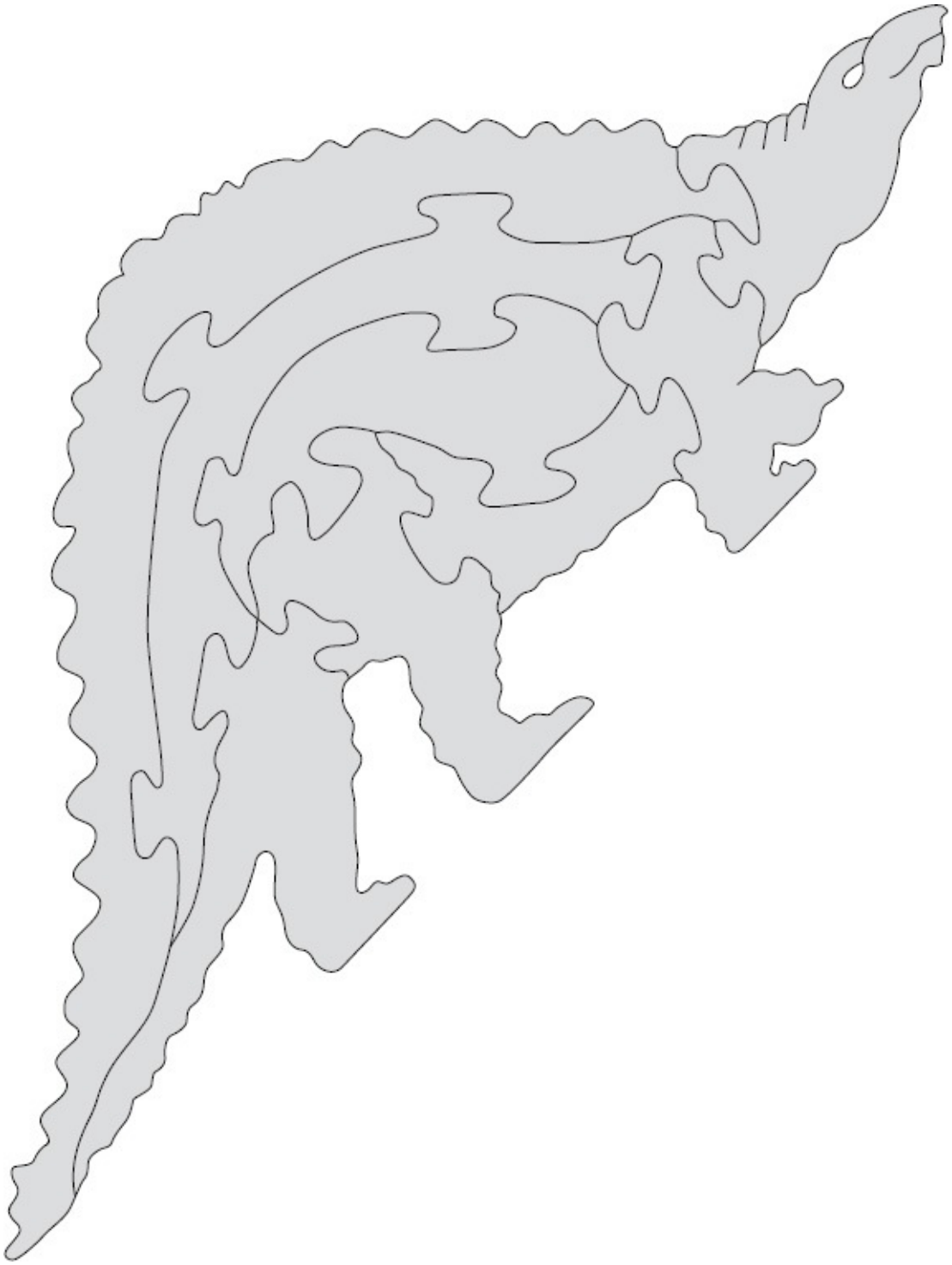
PROTOCERATOPS

Protoceratops (First Horned Face) was an early member of the Ceratopsian family. This dinosaur ate plants and lived in Asia during the Cretaceous Age. (Cut from cherry.)



QUETZALCOATLUS

Quetzalcoatlus was named for the Aztec feathered serpent god Quetzalcoatl. It was discovered in Texas in 1971. This late Cretaceous pterosaur was the largest flying reptile, with a wingspan of 35 feet. (Cut from cherry.)



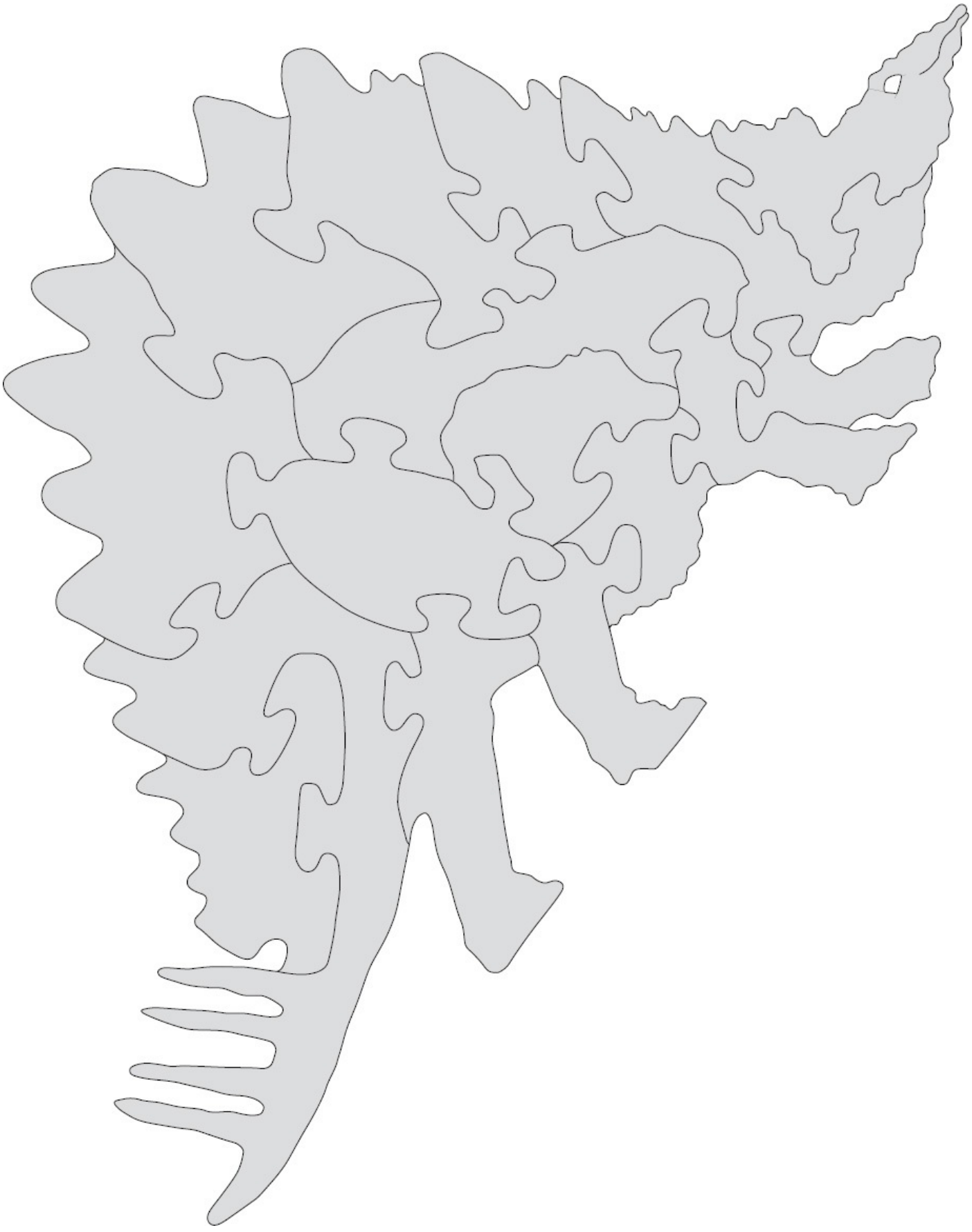
SCELIDOSAUR

Scelidosaur (Ribbed Lizard) was an Ankylosaurid from the Jurassic Age. This plant-eater was found in England and measured about 12 feet long. (Cut from ambrosia maple.)


B
A
A
B

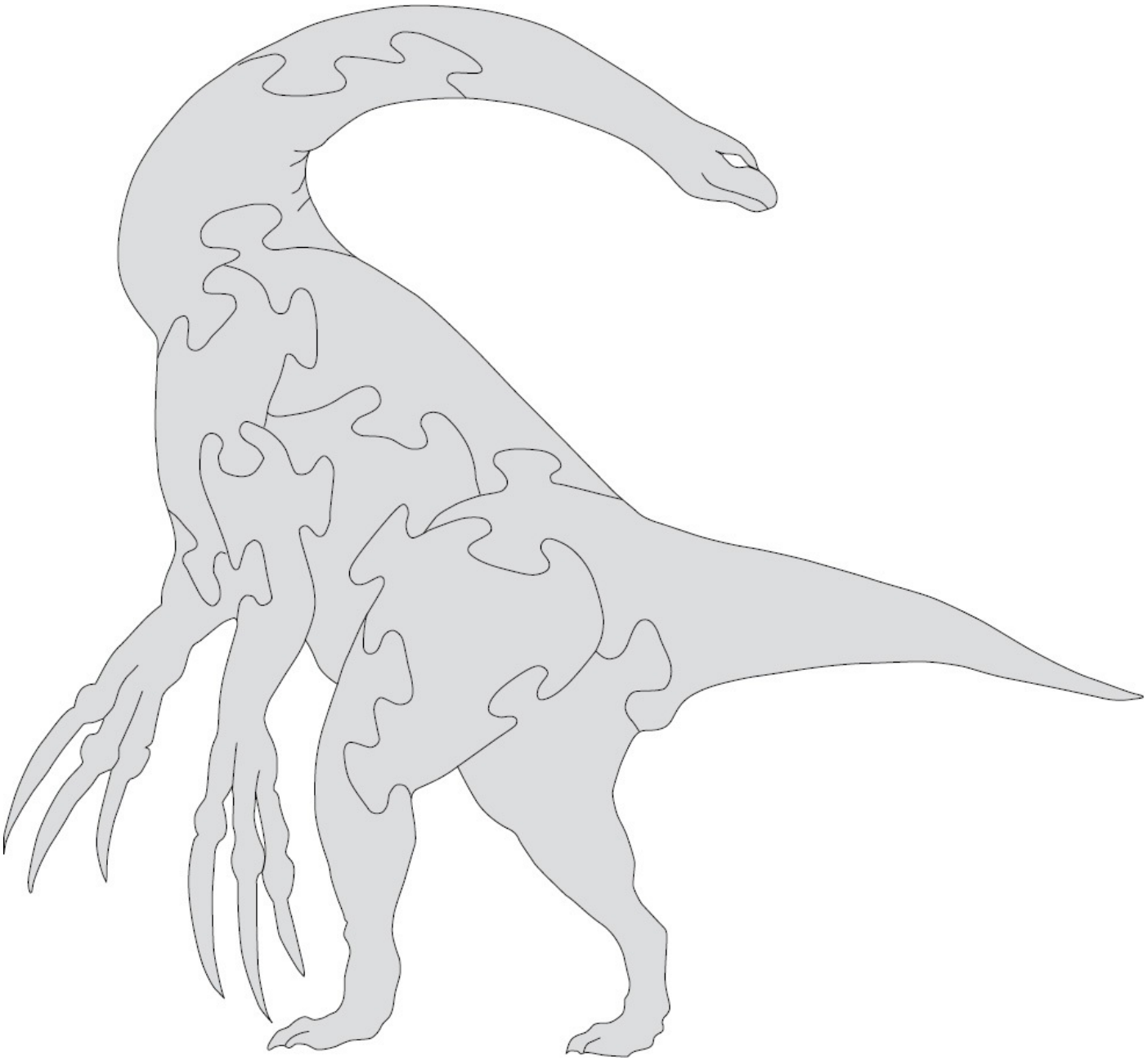
SPINOSAURUS

Spinosaurus (Spine Lizard) was one of the largest carnosaurs, eating both fish and other animals. It was first dug up in Egypt in 1912. The spines are elongated vertebrae, which were probably covered with skin. (Cut from cherry.)



STEGOSAUR

Here is my advanced version of the Stegosaur. It has the same outline as the Stegosaur in the Intermediate section, but has more pieces and more keys! (Cut from cherry.)



THERIZINOSAURUS

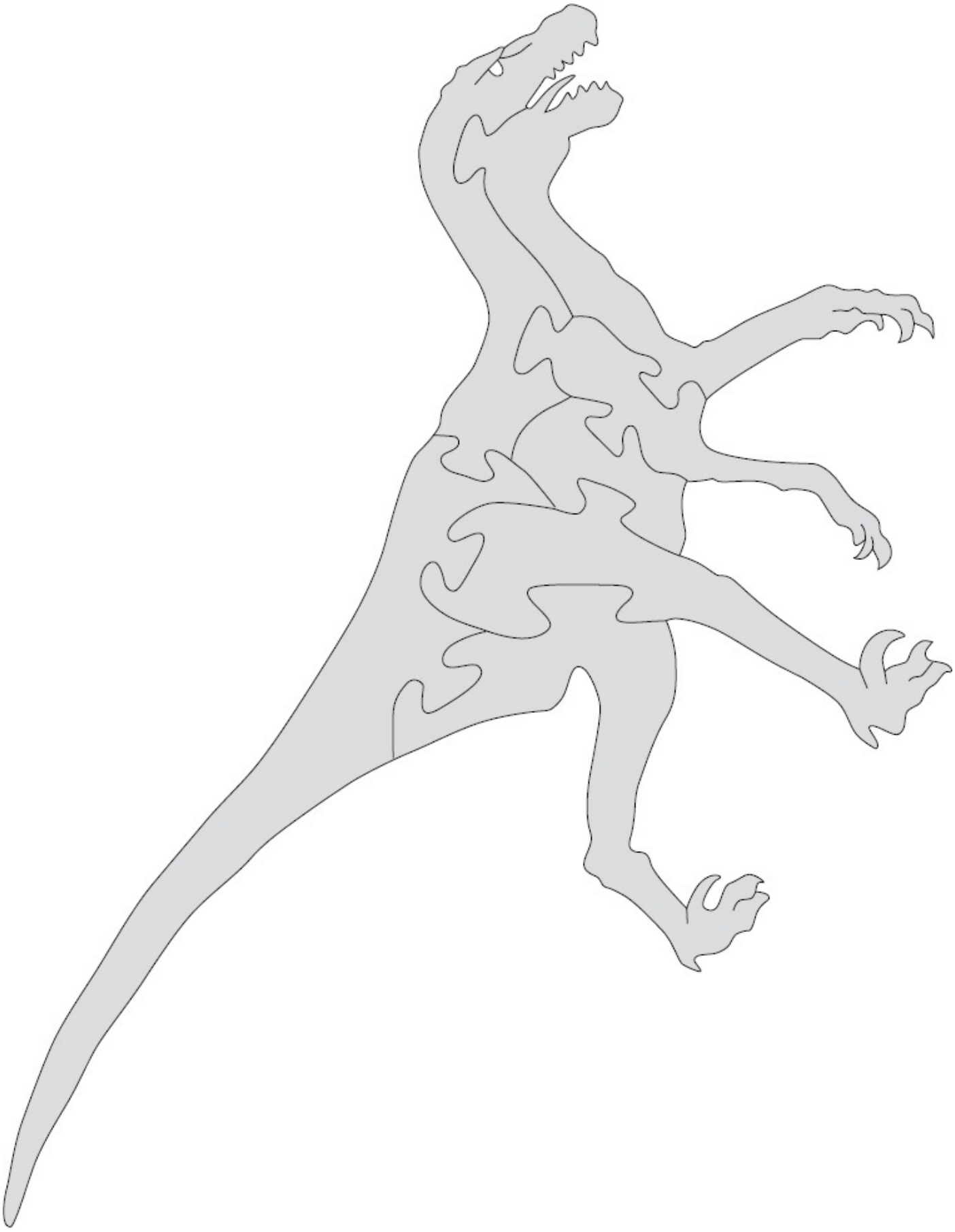
Therizinosaurus (Scythe Lizard) was named for its 3-foot-long claws, which were probably used to cut leafy branches. (Cut from mesquite.)

TRICERATOPS

Triceratops (Three-Horned Face) is a Ceratopsian from the Cretaceous Age. This plant-eater was found in North America and grew to be about 25 feet long and 9 feet tall. (Cut from cherry.)

TYRANNOSAURUS REX

Test your cutting skills with this advanced version of the Tyrannosaurus Rex. It has the same outline as the T-Rex in the Intermediate section, but has more pieces. (Cut from zebrawood.)



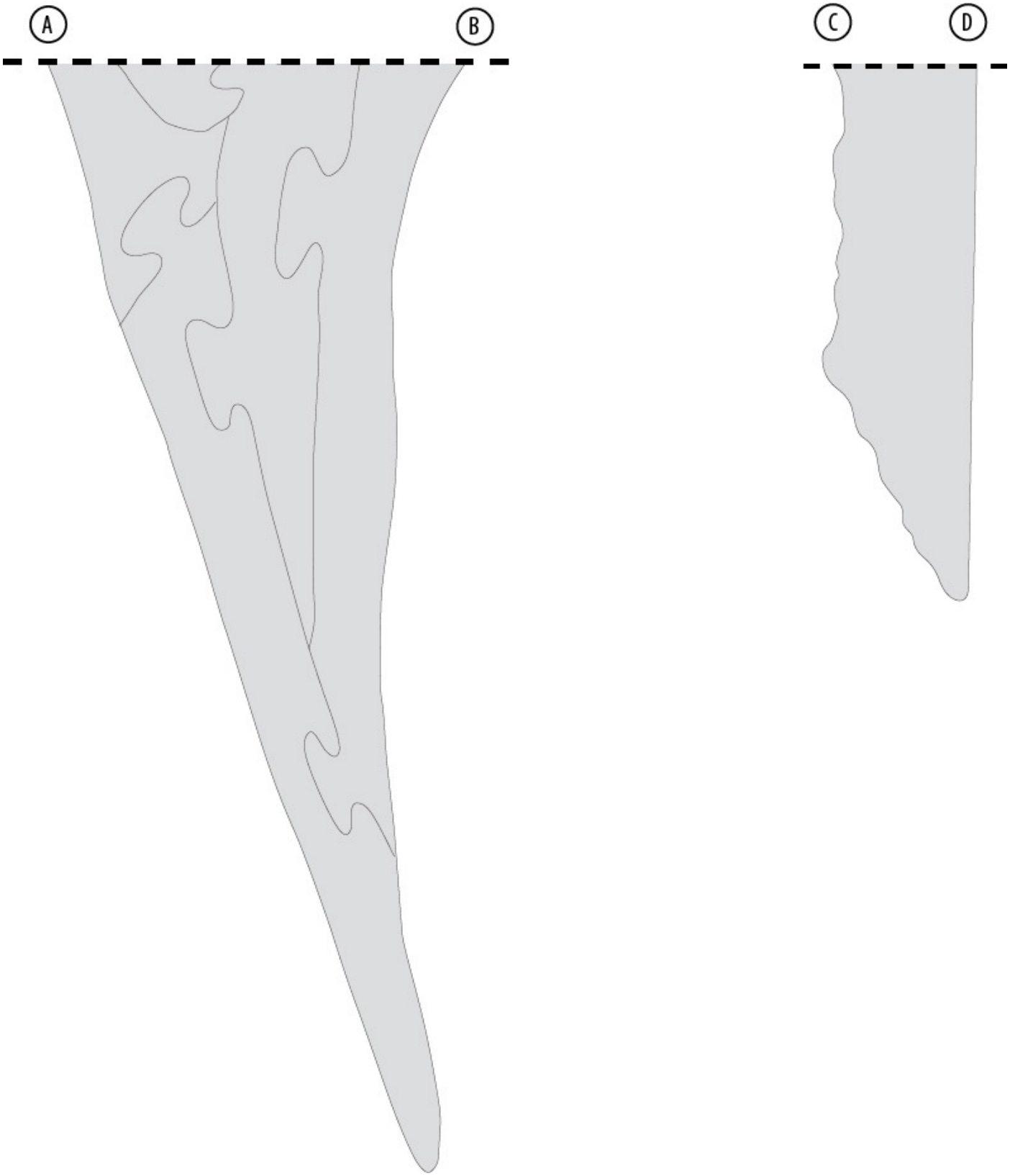
VELOCIRAPTOR

Velociraptor (Speedy Robber) was a small, very fast dinosaur. This theropod, meaning “beast-footed,” from the Cretaceous Age was about 6 feet long and probably hunted in packs. (Cut from cherry.)

DIORAMAS

MAIASAUR

This puzzle is based on the site in Montana where the remains of several Maiasaur dinosaurs were found, complete with babies. The nest was about seven feet wide. This hadrosaur’s name means Good Mother Lizard. The adults were plant eaters that grew to nearly 30 feet long. (Cut from cherry.)



Creative Keys

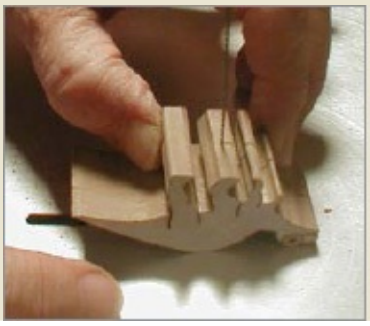
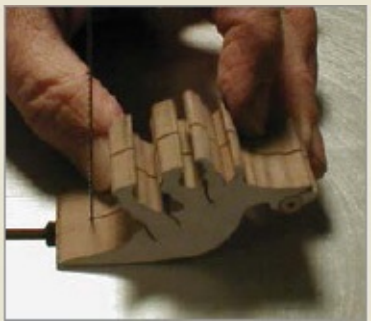
Key shapes can be varied almost infinitely, as long as you remember to get a little material on both sides of the head. The Maiasaur and In the Cretaceous dioramas are perfect examples of creative keys. The keys that hold the mountains together are the conifer trees. The major key is the tall cycad, a palm-tree-shaped piece that holds the two sections of the puzzle together.

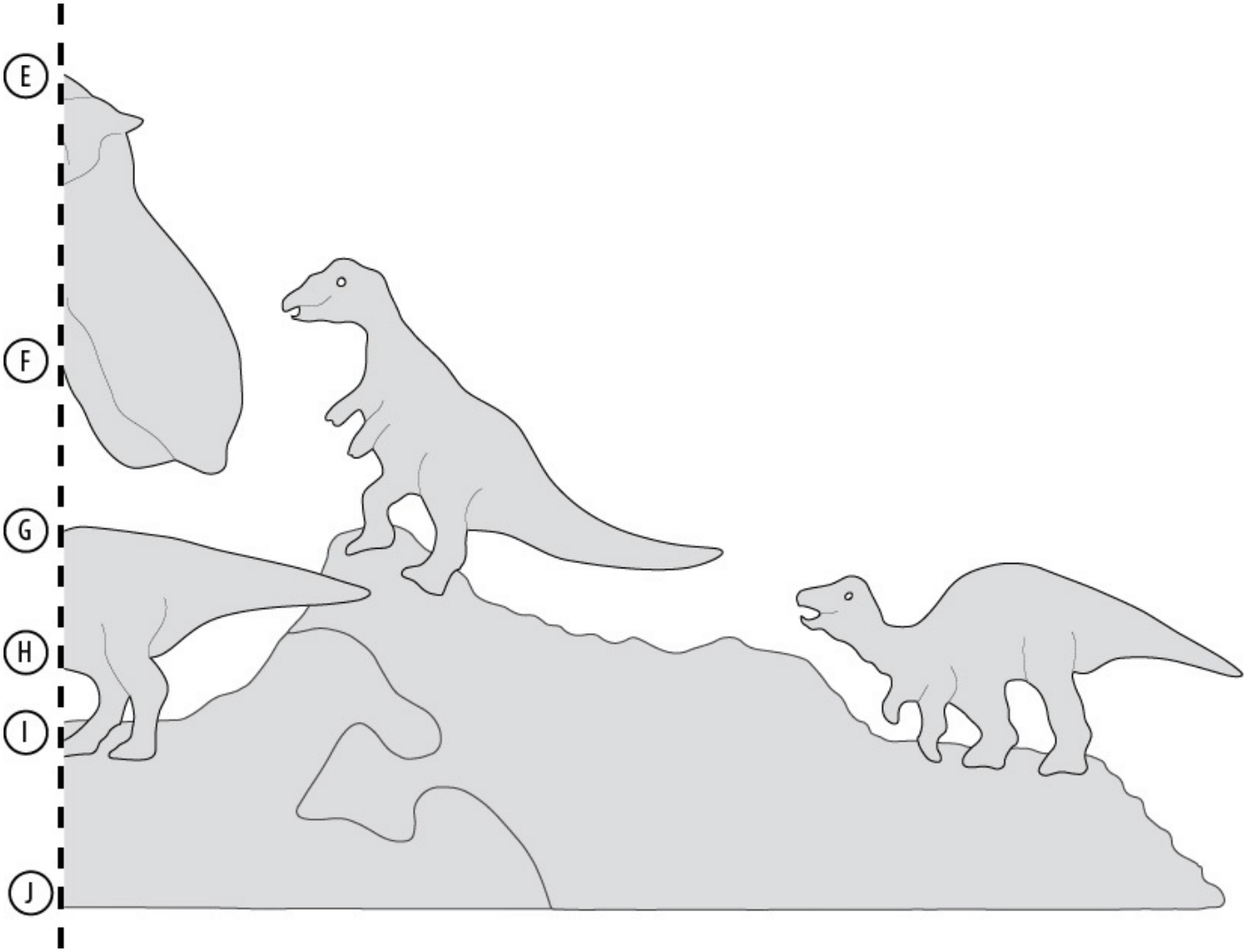
These keys played a major part in the design of In the Cretaceous (page 84). I positioned the Lambeosaur and the T-Rex first, and then designed the puzzle cuts. Around them I built the landscape with mountains for background and a ground line for the dinosaurs to stand on. Then I placed conifers and cycads (plants that lived at that time) in locations where they could act as keys. The tall cycad made an ideal central element with roots and leaves forming keys.

Cutting the Maiasaur's Babies

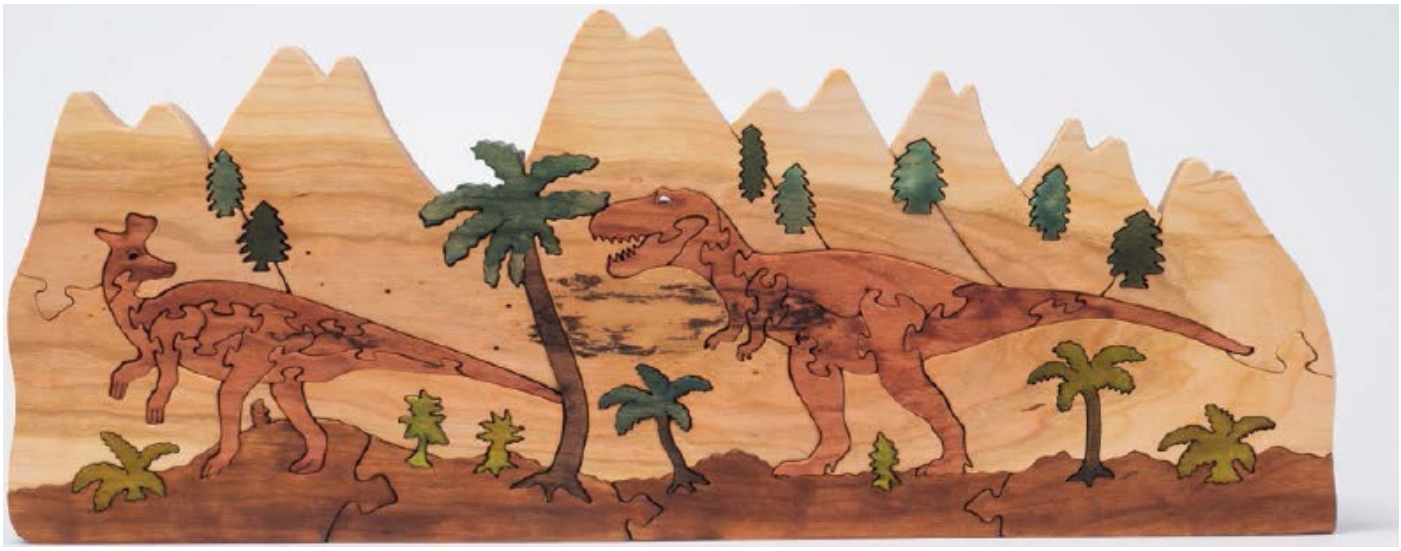
First, drill the holes that represent the babies' eyes. Because of the length of this puzzle, segment the puzzle down the center (following the dashed line on page 82), and then cut the three babies free. Turn each into twins as follows: Lay one baby on its back. Starting at the head, slice it in half. With the two babies that do not lay flat on the saw table, you'll need to compensate. When you get to the hind leg, tip the head up and the tail

down while you slice. Support the tail on the saw table until you finish the cut.

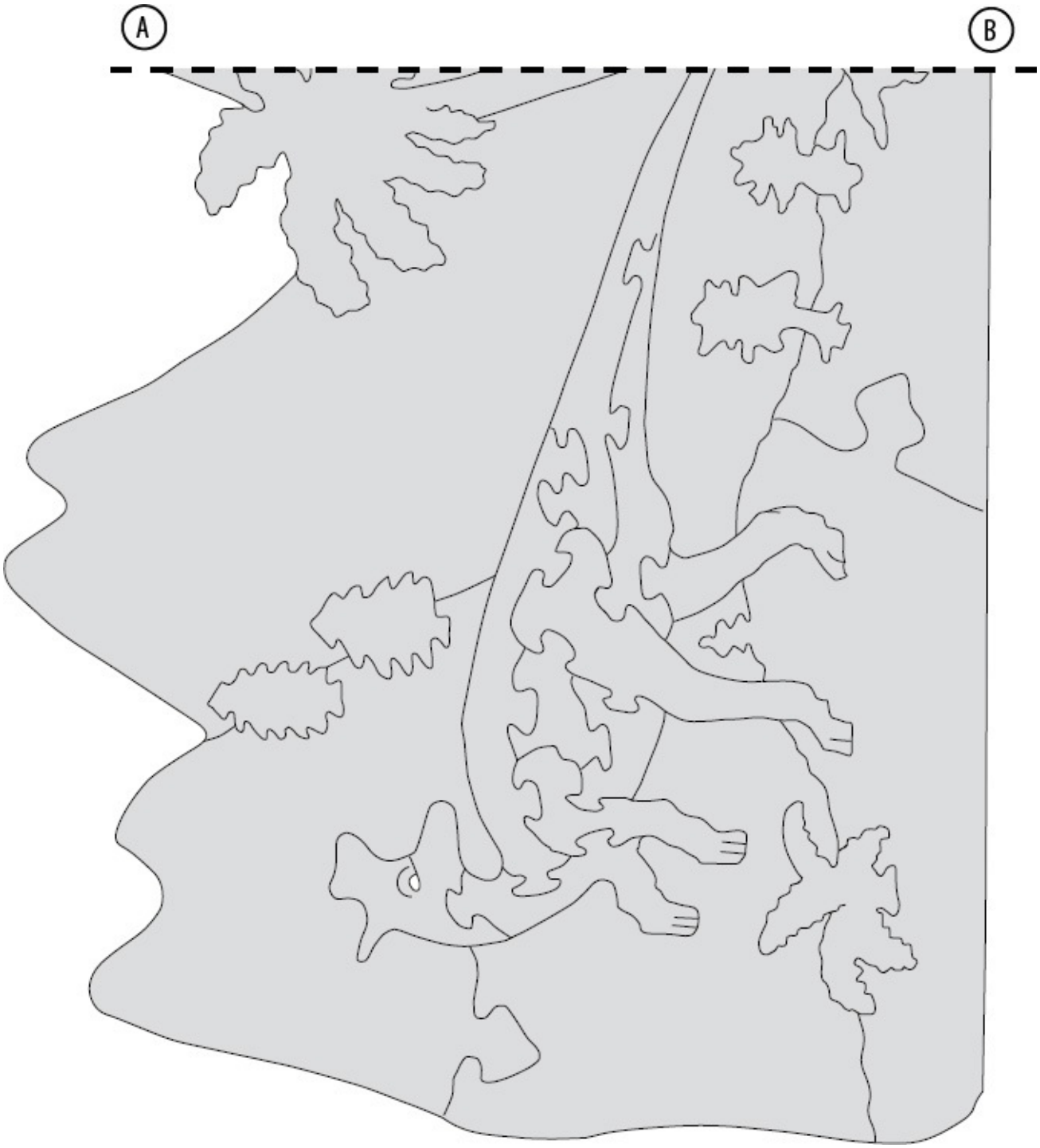
IN THE CRETACEOUS



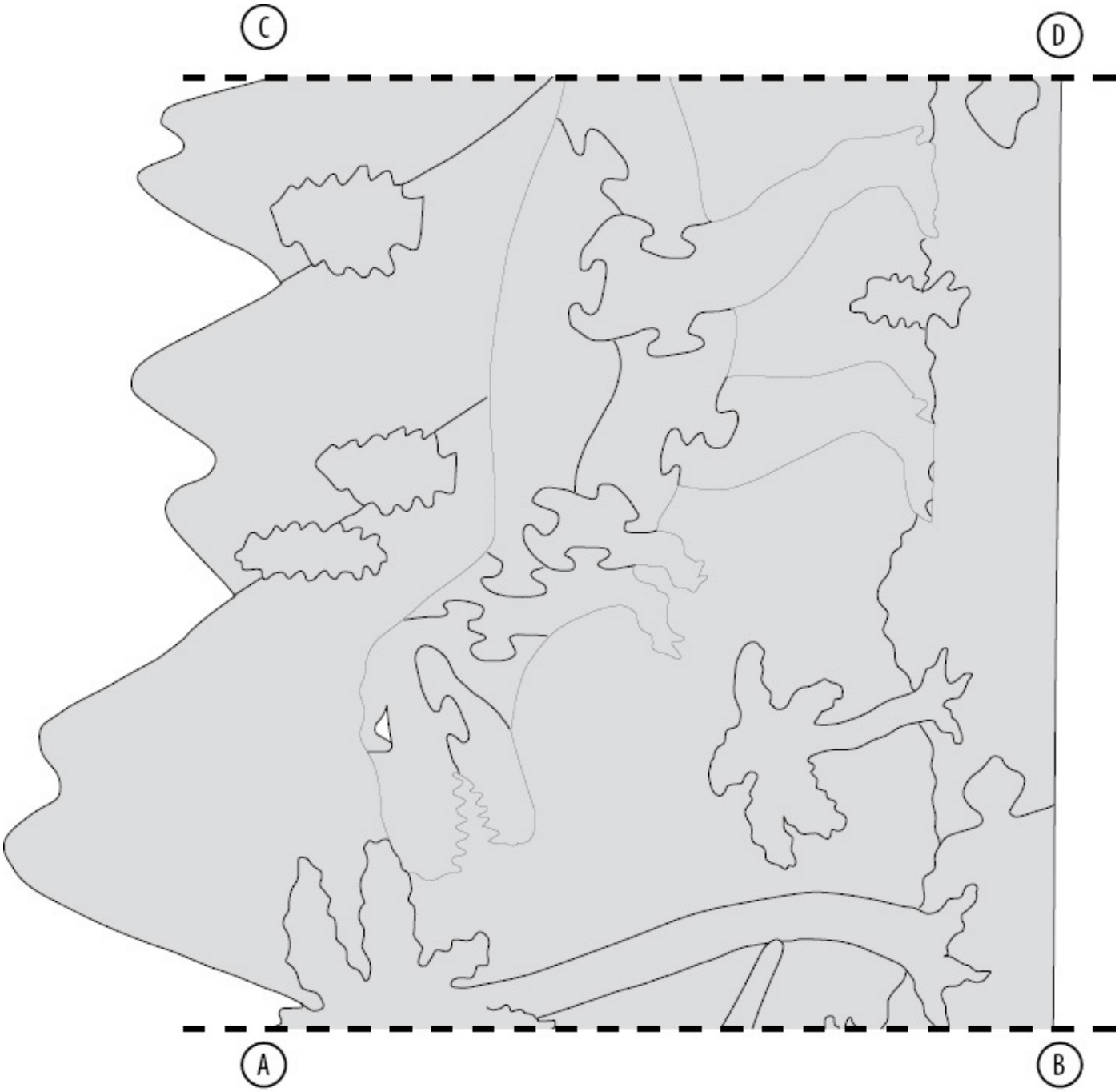
“In the Cretaceous” shows a Tyrannosaurus Rex about to attack its prey, a plant-eating Lambeosaur. Except for the conifer trees, which looked pretty much like they do today, all of the other plants are cycads. All of these life forms lived in the Late Cretaceous Era, 65 to 100 million years ago. (Cut from cherry.)

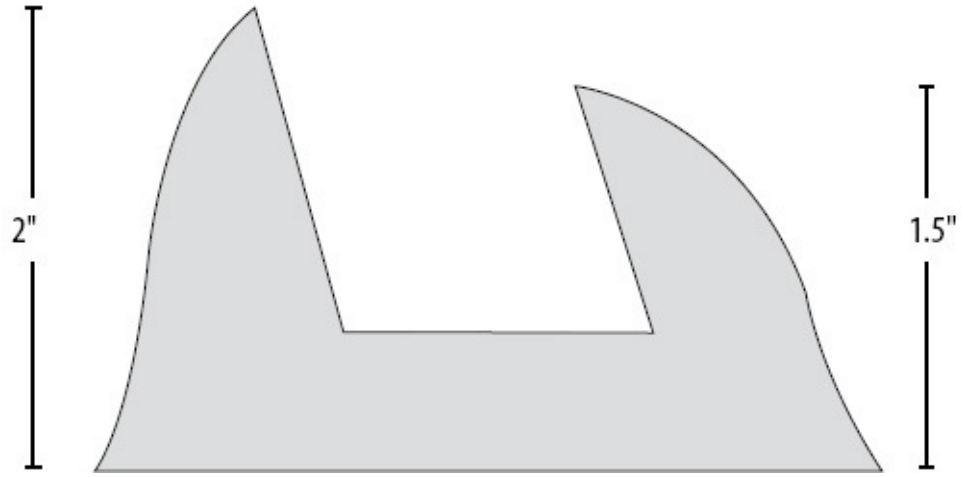
Backerboard and Puzzle Stands

If desired, add a backerboard to your puzzle. To make the backerboard, trace the puzzle on a piece of Baltic birch or thin plywood, and then cut it. To make the stands, use the pattern on page 86. You can cut them from scrap puzzle wood. The exterior of the stands can be any shape you like. The bottom of the stands should be ½” (13mm) thick for strength. The interior dimension should be the sum of the widths of your puzzle board plus your backerboard plus a hair’s width for clearance.



Note: Increase to 186% or any percentage you'd like.





Note: To determine the width of the cut-out, measure the width of the puzzle and the backerboard, and add a hair's width for clearance.

Staining on In the Cretaceous

To stain the vegetation on this puzzle, I used green, yellow, and black stain and plastic bags. I put green stain in all of the bags, and then created a lighter green by adding yellow to one of the bags, and a darker green by adding black to a bag. For the dinosaurs, I started with a light cherry stain. I added black to the cherry stain for the base pieces, and then added more black so I could stain the tree trunk the darkest.

CUTTING A TYRANNOSAURUS REX TOY

I was asked to design one-piece dinosaurs using my existing patterns. For this sample project, I marked detail cuts on my existing patterns in blue to indicate important features of each dinosaur. However, in the Toy section of this book, I've included almost all of my patterns in Toy versions without any keys so you won't be confused.

I chose walnut for the Tyrannosaurus Rex Toy. When you have chosen the board you plan to use for the toy, trim the pattern and use a spray adhesive to attach the pattern to the board. As with the puzzles, if you choose a very dense hardwood—like cherry, maple, or birch—tape the pattern down with 2" (51mm)-wide clear packing tape (the kind without mylar threads). The tape acts as a lubricant for the blade and minimizes any potential burning.

Materials & Tools

Materials:

- Walnut board
- Spray adhesive
- Plastic bags: gallon resealable
- Paper towels
- Rubber gloves
- Sandpaper disk, adhesive-backed: 220 grit

- Tape: 2” (51mm)-wide clear packaging

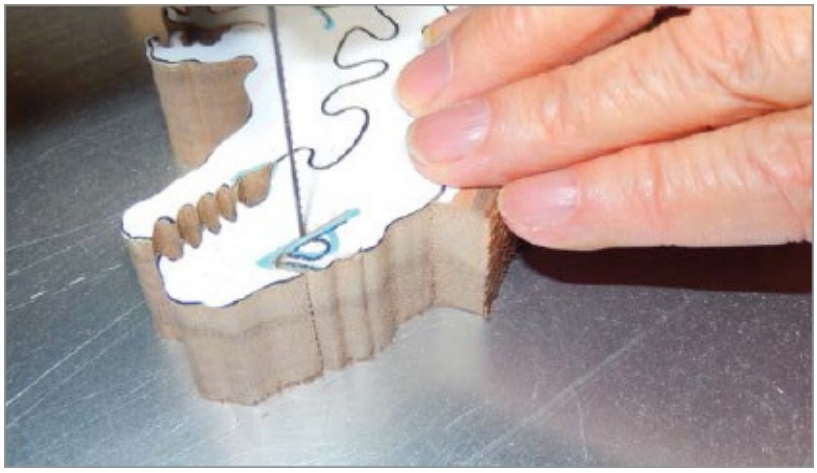
Tools:

- Scroll saw
- Blades (plain or reverse tooth): #5, #7, #9
- Dust blower
- Square
- Disk pad
- Flap sander

TYRANNOSAURUS REX: CUTTING AND FINISHING THE TOY

1 Cut to the top of the head. The easiest place to start is the front toe. Continue to the top of the head, and stop the saw.

2 Cut the teeth. Start at the front of the bottom jaw, and cut to the point of the first tooth. Pivot to go down to the bottom of the first tooth, and then pivot to go up to the point of the next tooth. Continue this process until all of the teeth are cut, and then stop the saw.



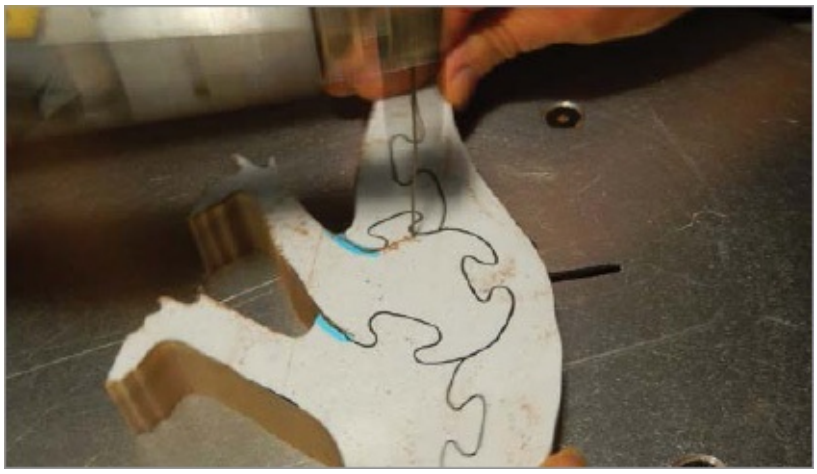
3 Cut the eye detail. Make an access cut with the saw, and then follow the lines on the pattern. When the eye is completed, back out of the cut.

Detail Cuts

If you think the detail cuts will weaken the toy, omit them or use only part

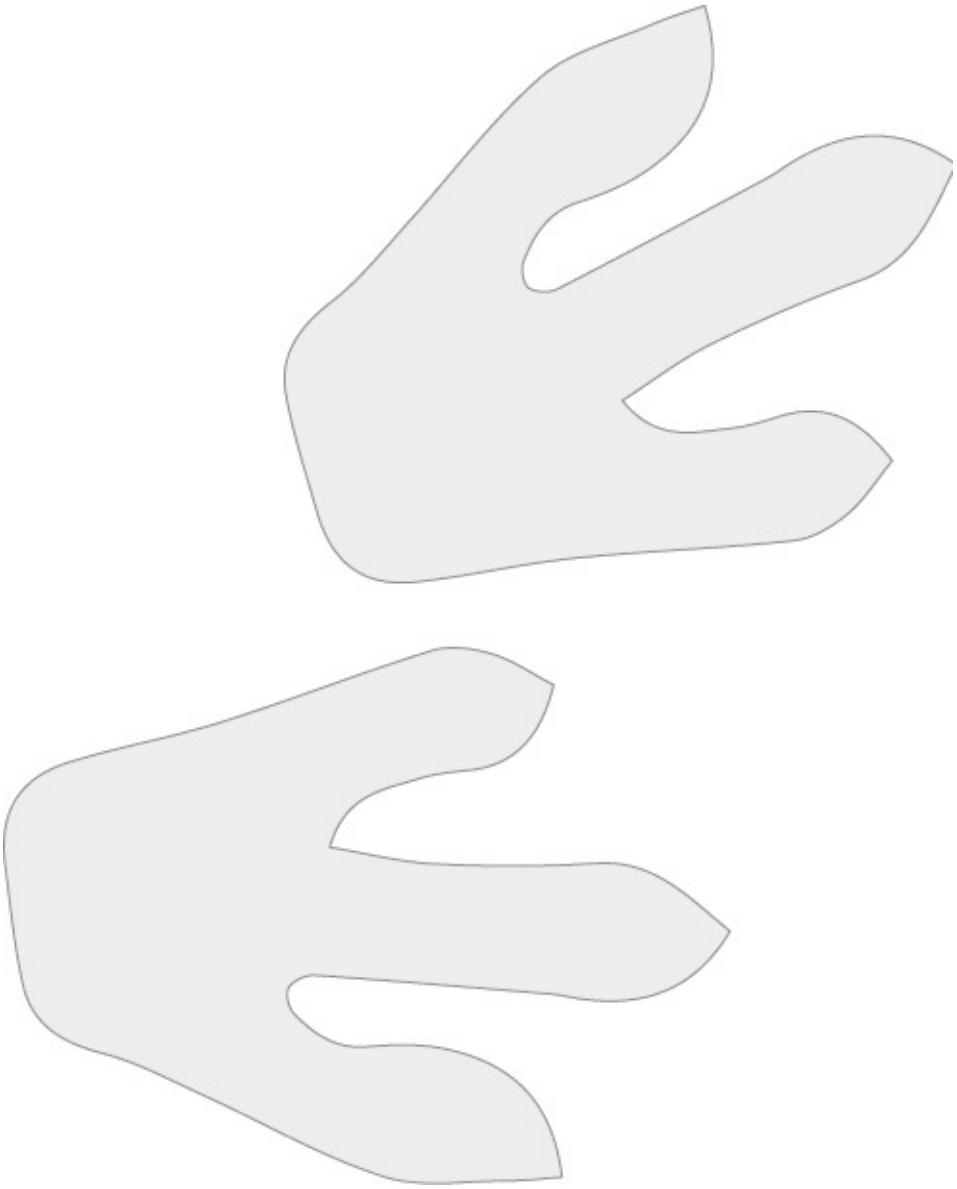
of the cut.

4 Finish cutting the outline. Cut along the back of the toy, and continue cutting around the tail and the legs. When you reach the hind leg, cut the detail line to define the hip of the hind leg.



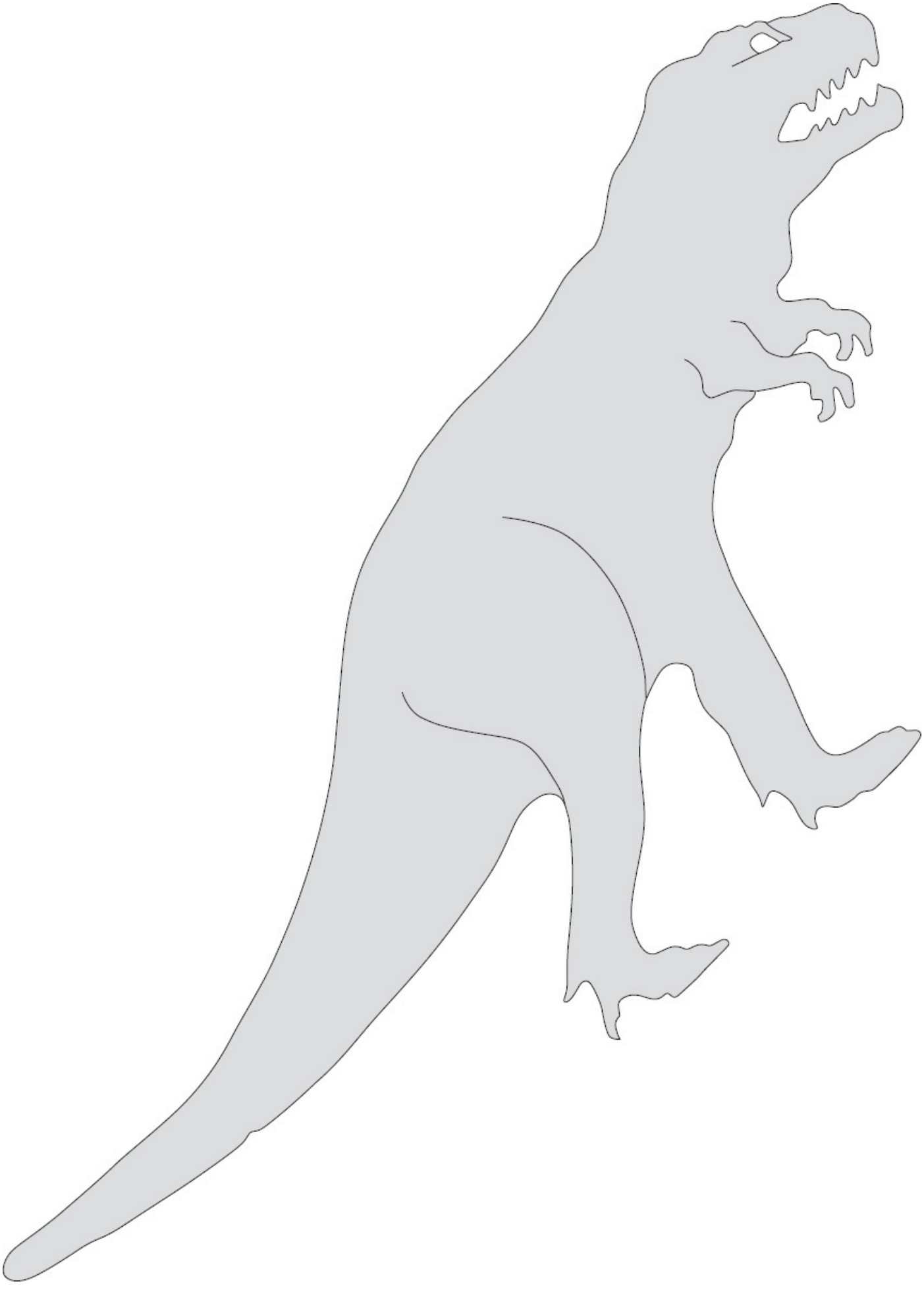
5 Cut the details on the hind leg. Notice that I have cut farther than my blue line indicated. I did that because it looked better that way.

6 Finish the toy. Sand the exposed surfaces with a disk sander, and touch up all of the edges with a flap sander to remove sharp edges and give a finished appearance.



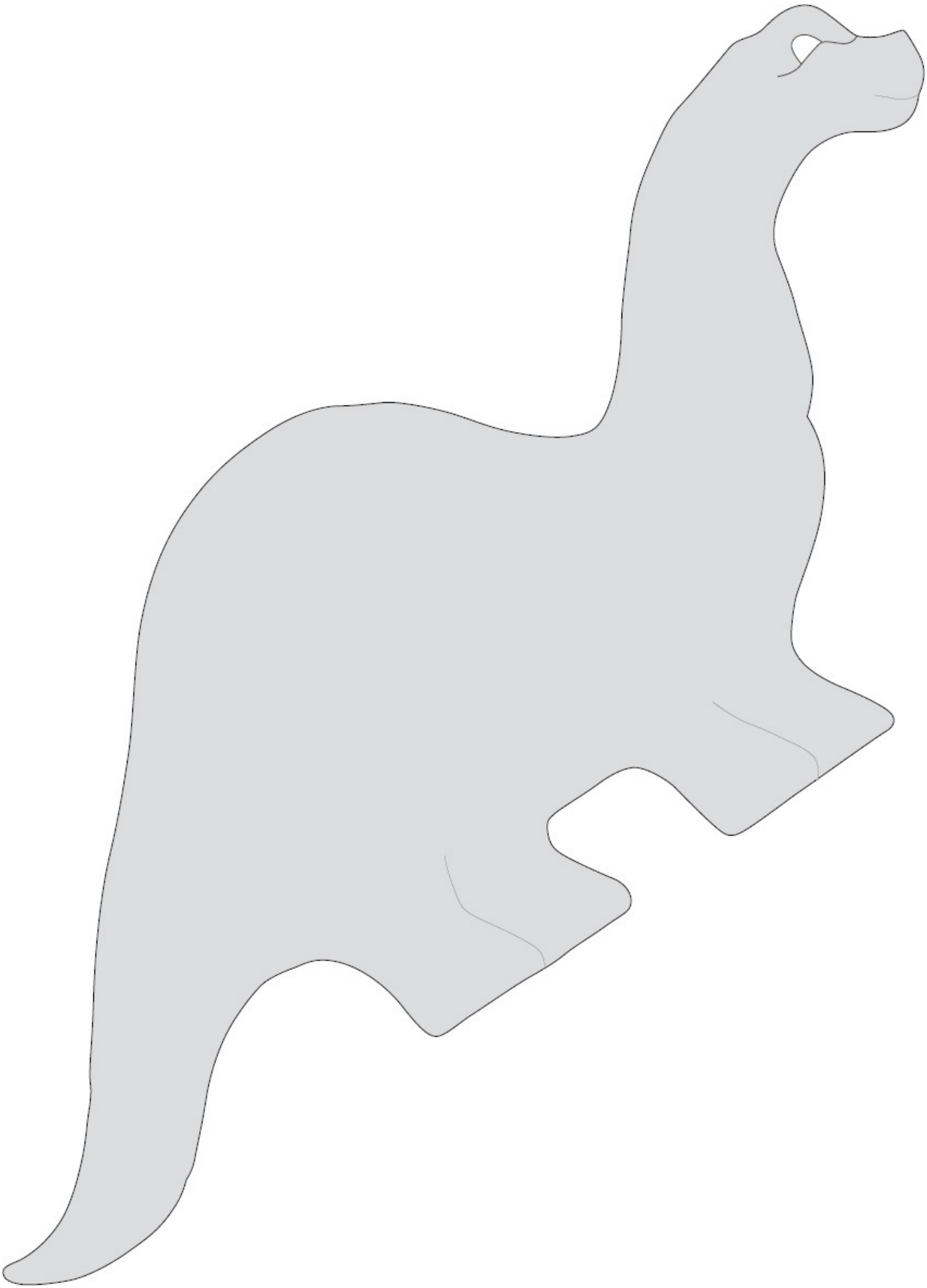
TOYS

TYRANNOSAURUS REX

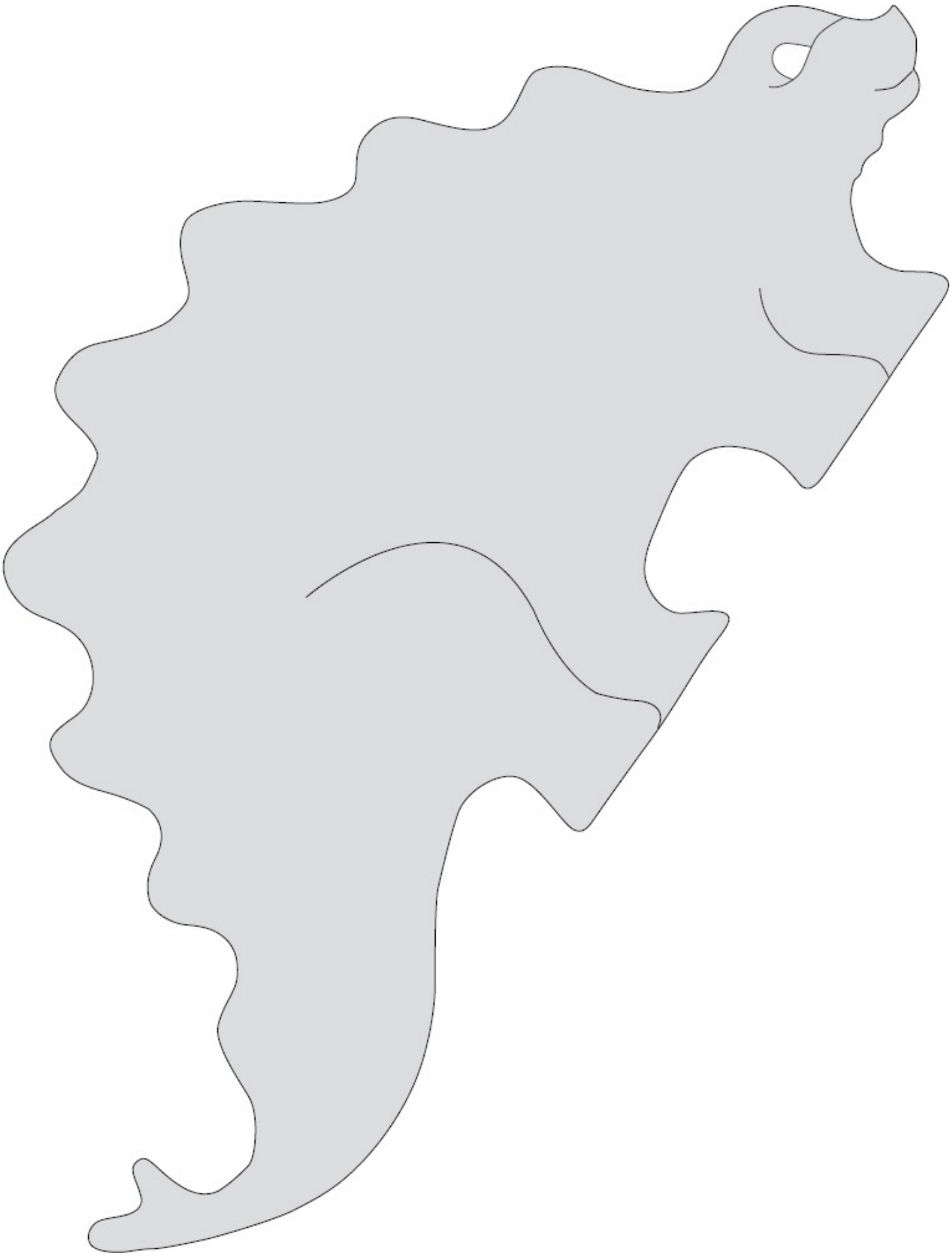


BABY T-REX

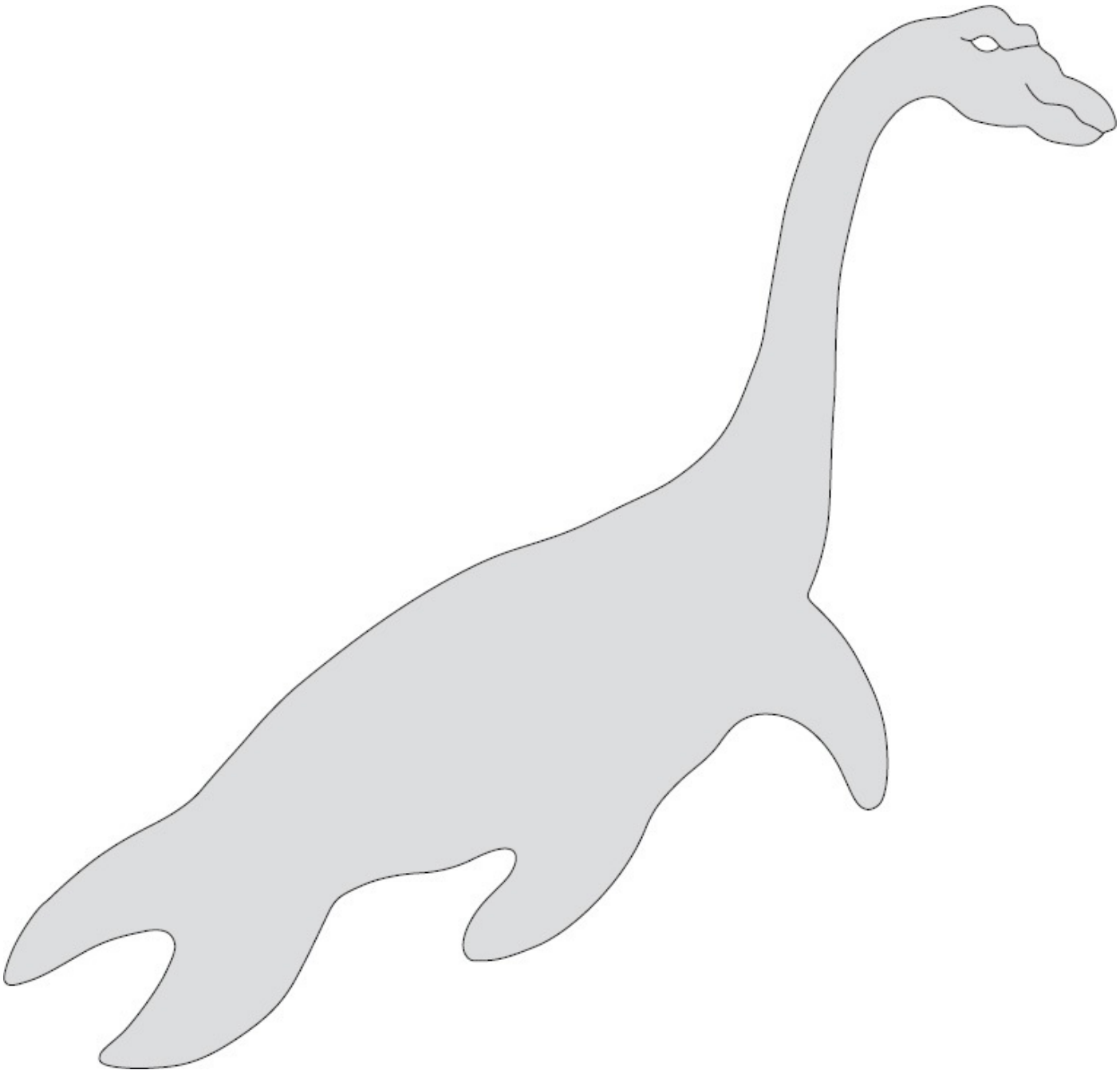
BABY BRONTO



BABY STEGO



PLESIOSAUR



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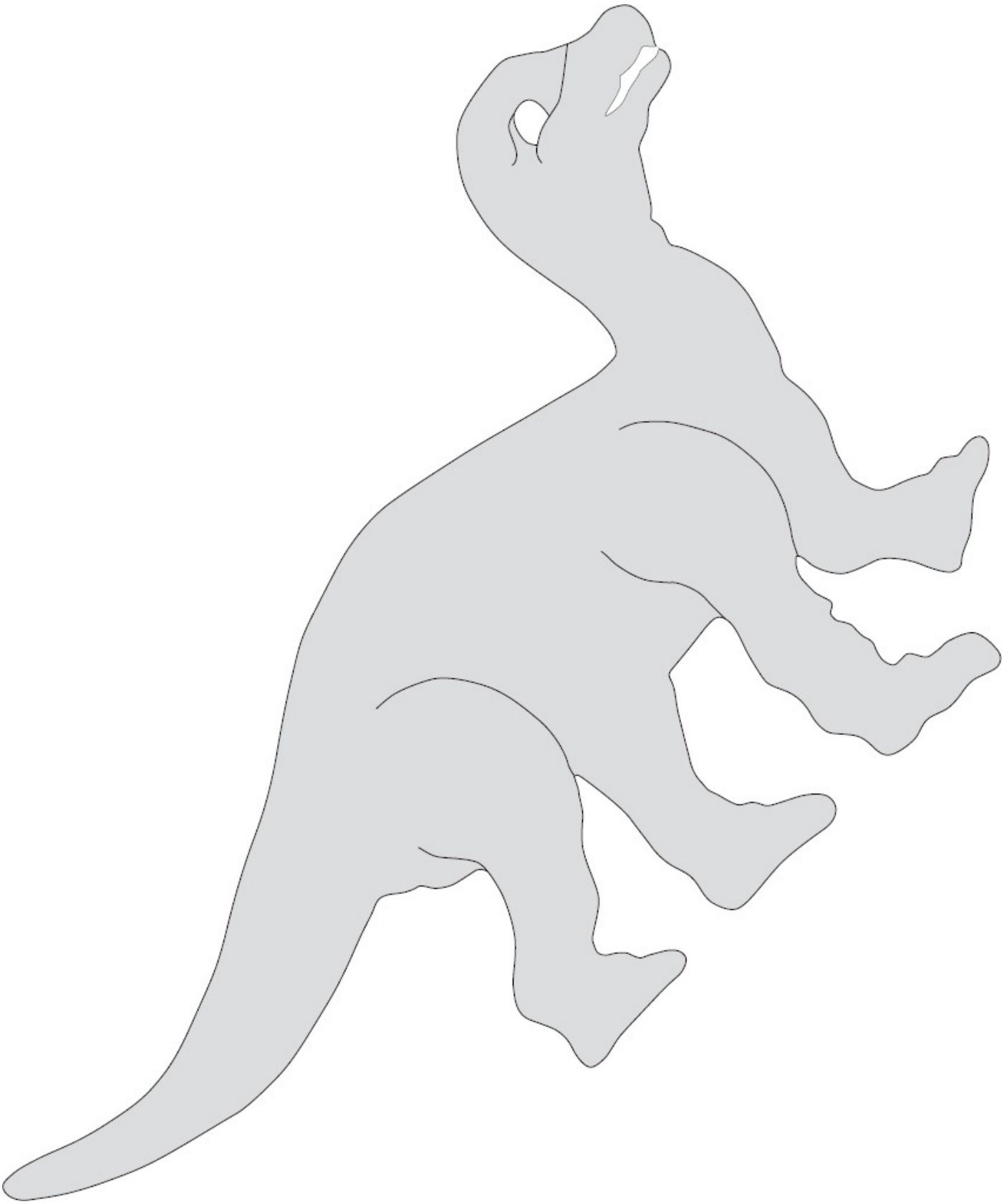

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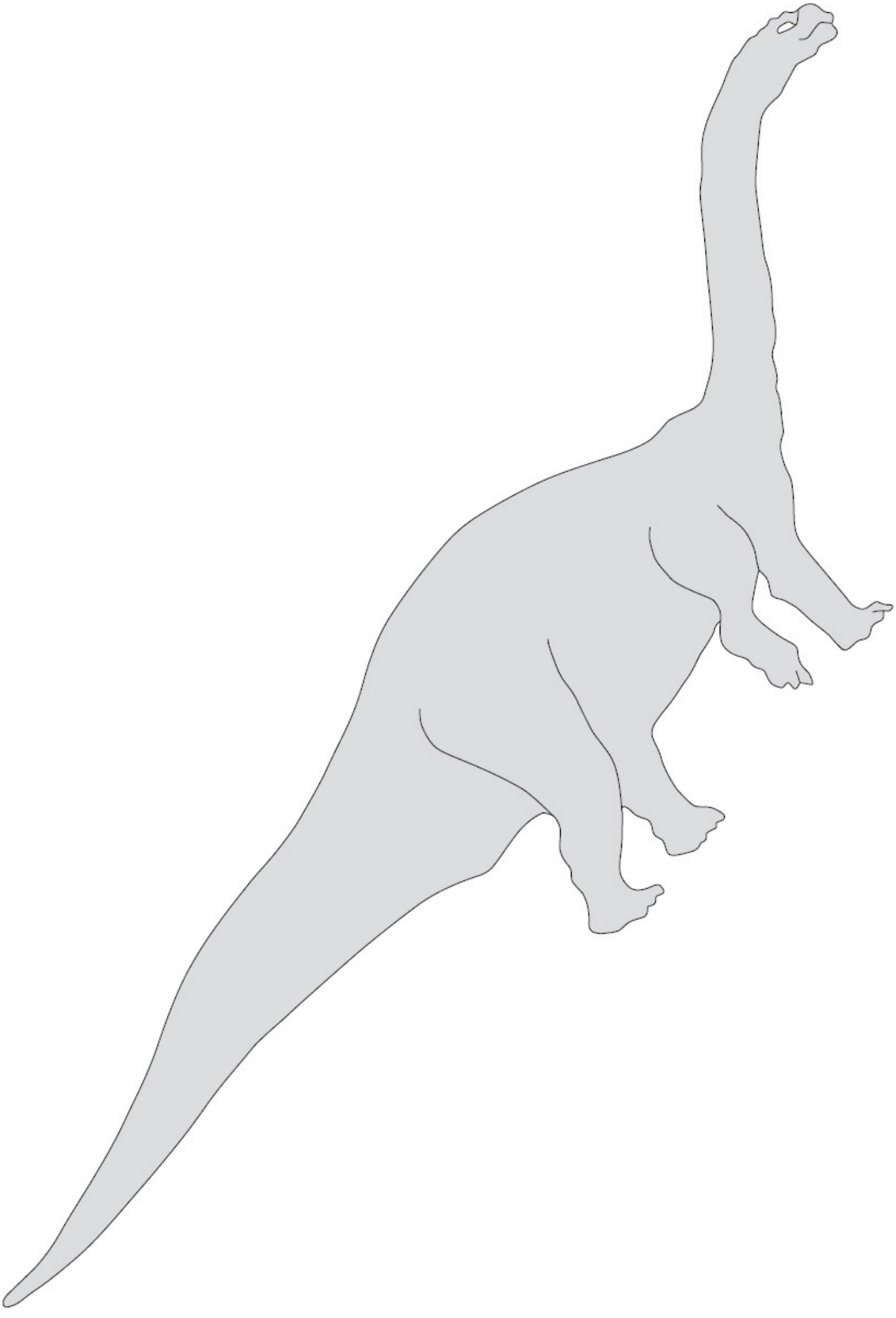

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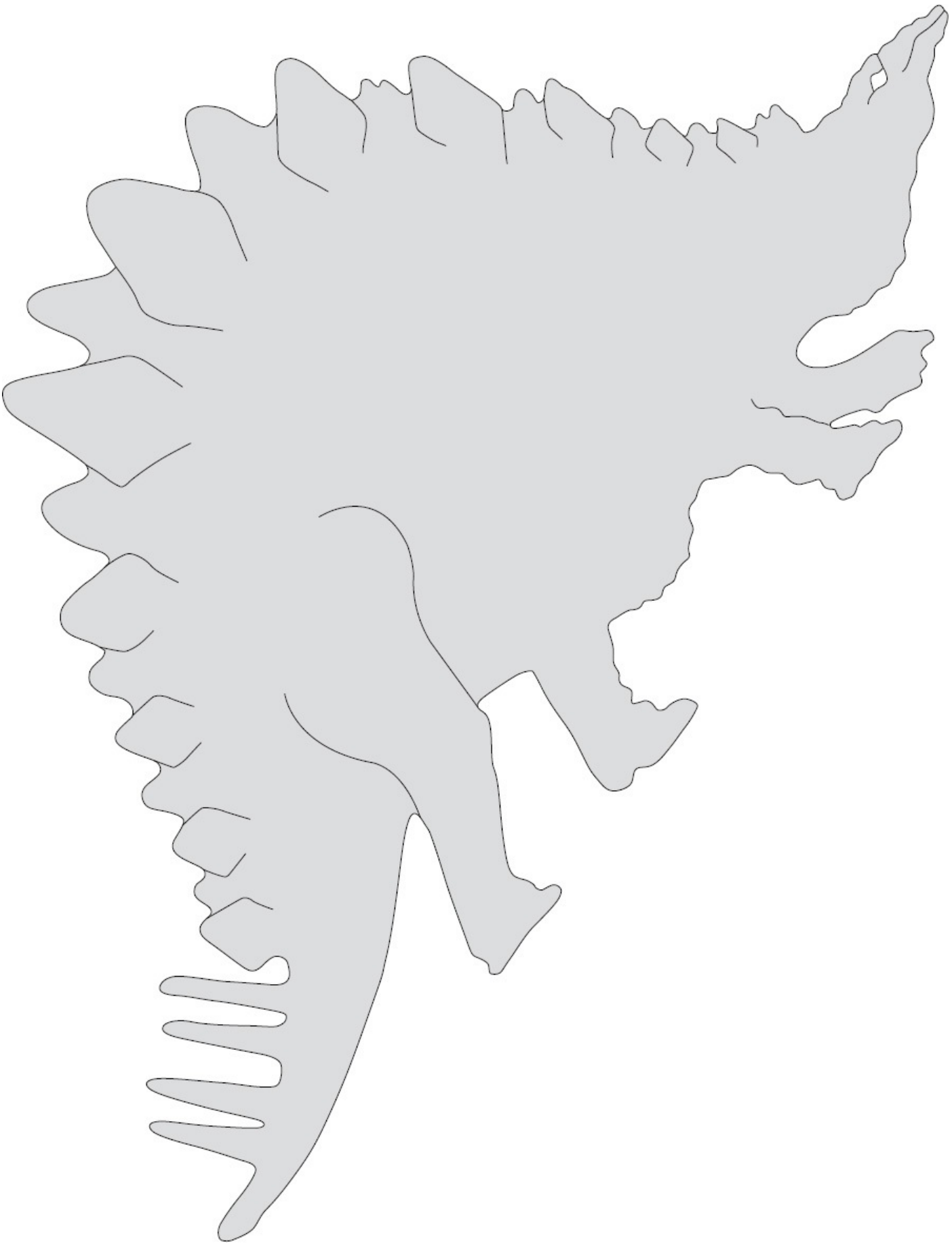

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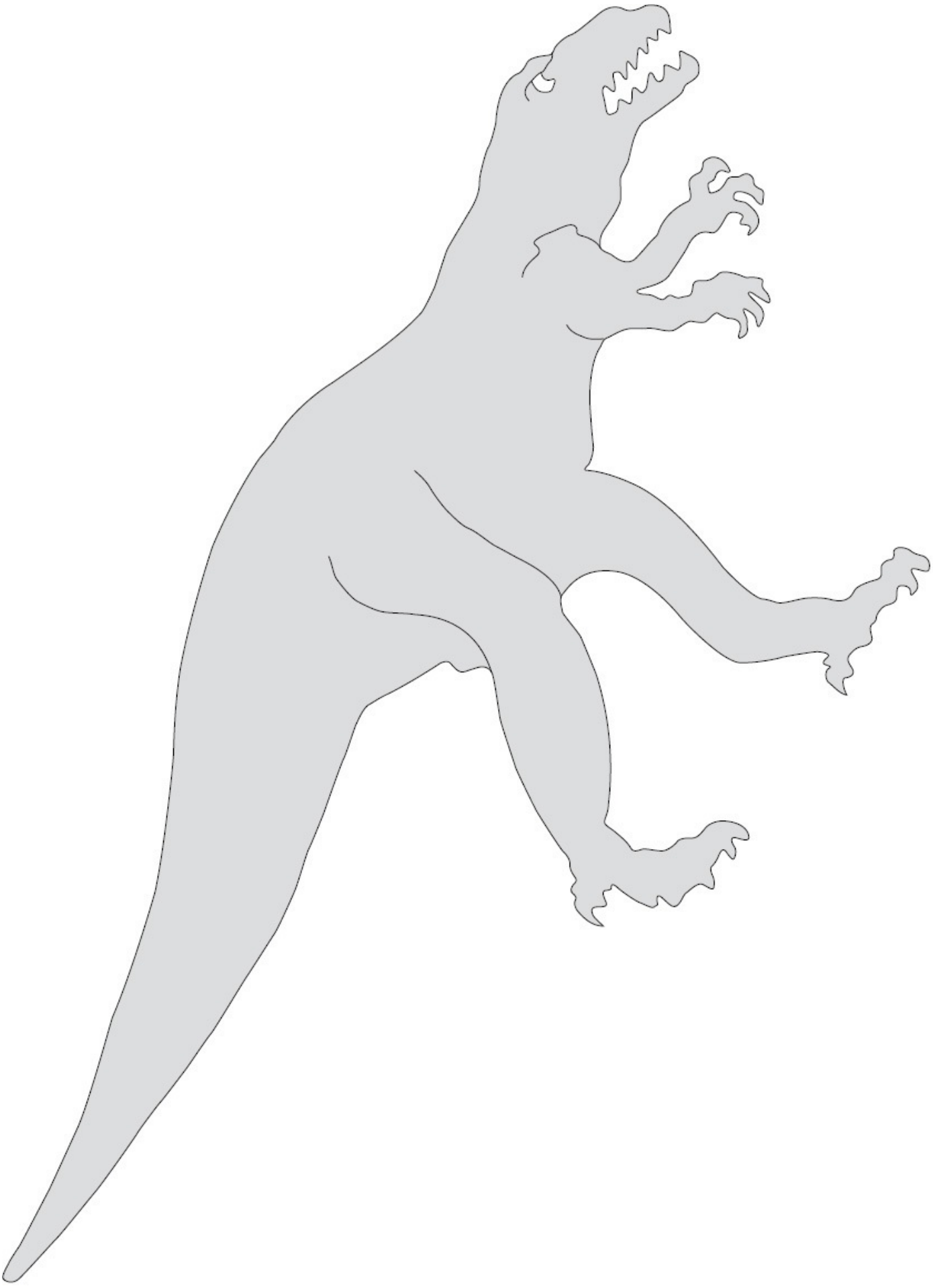

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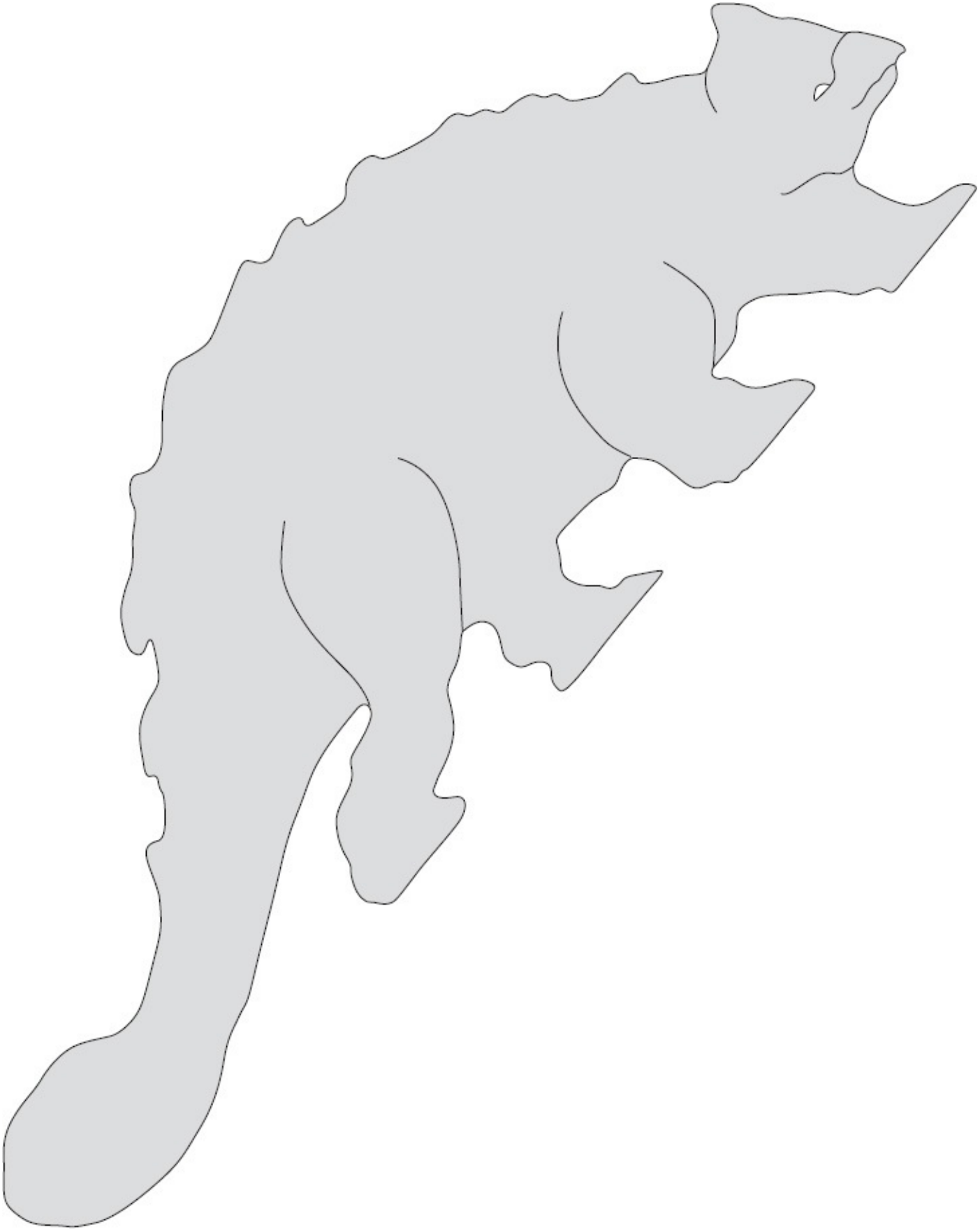

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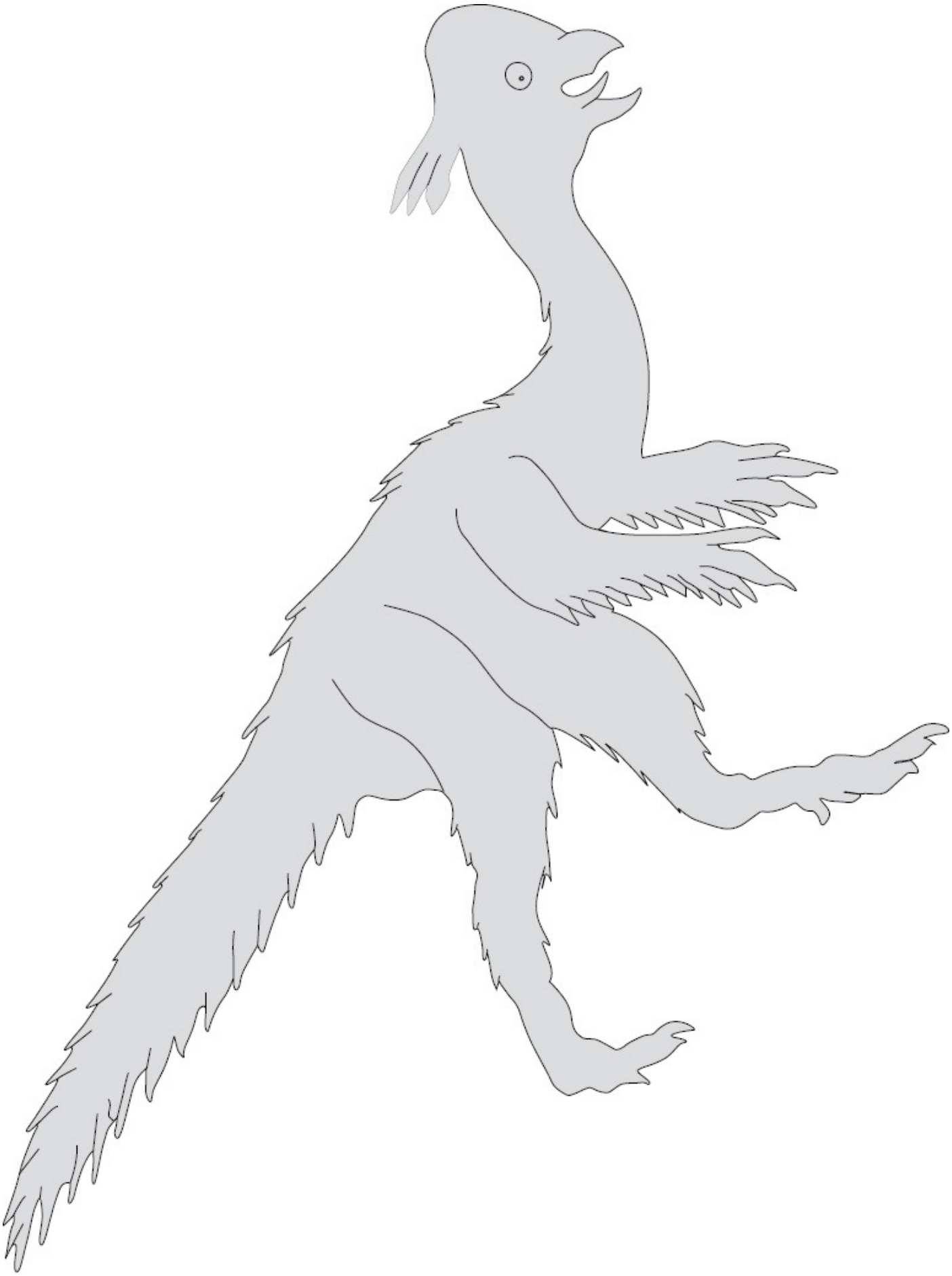

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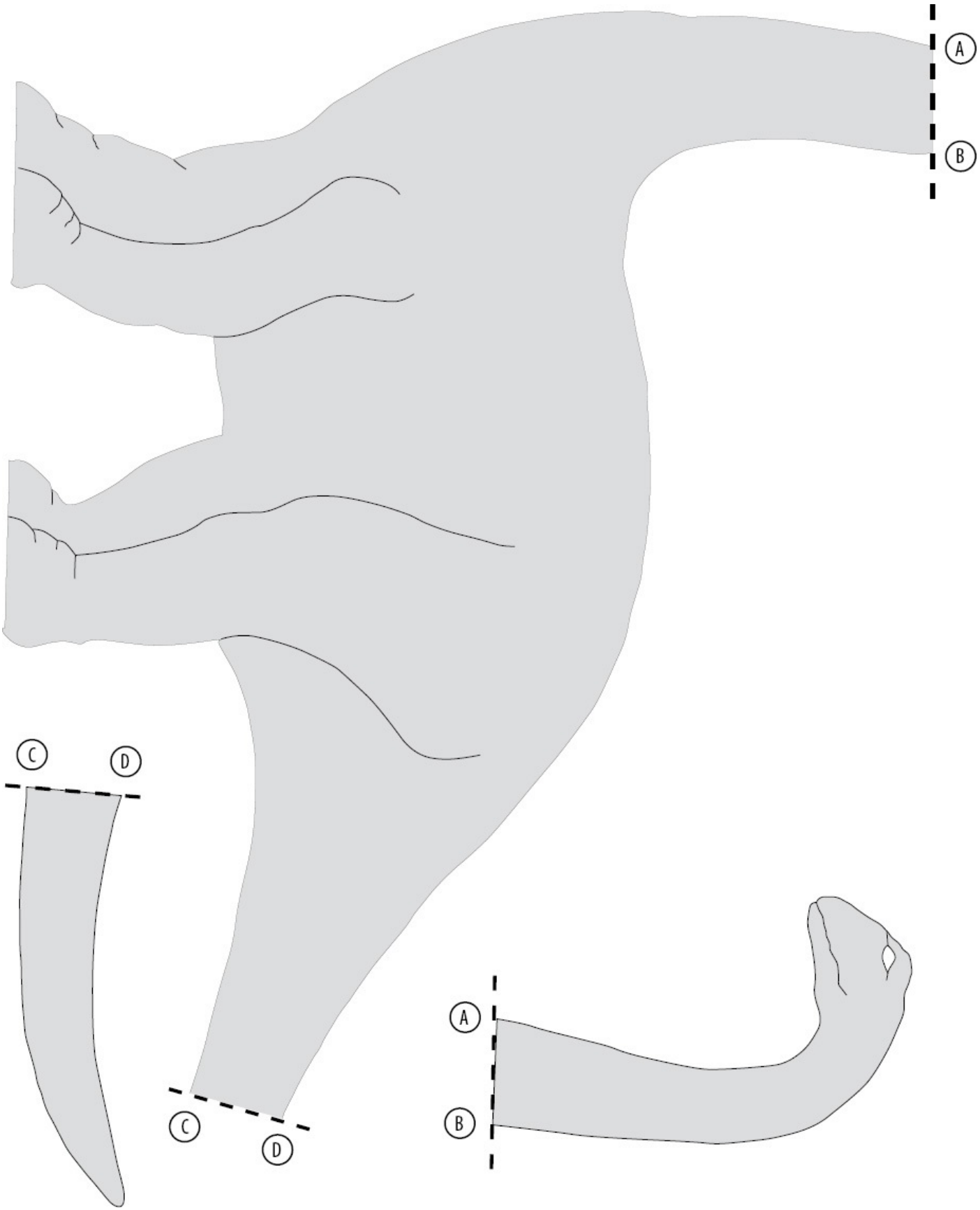

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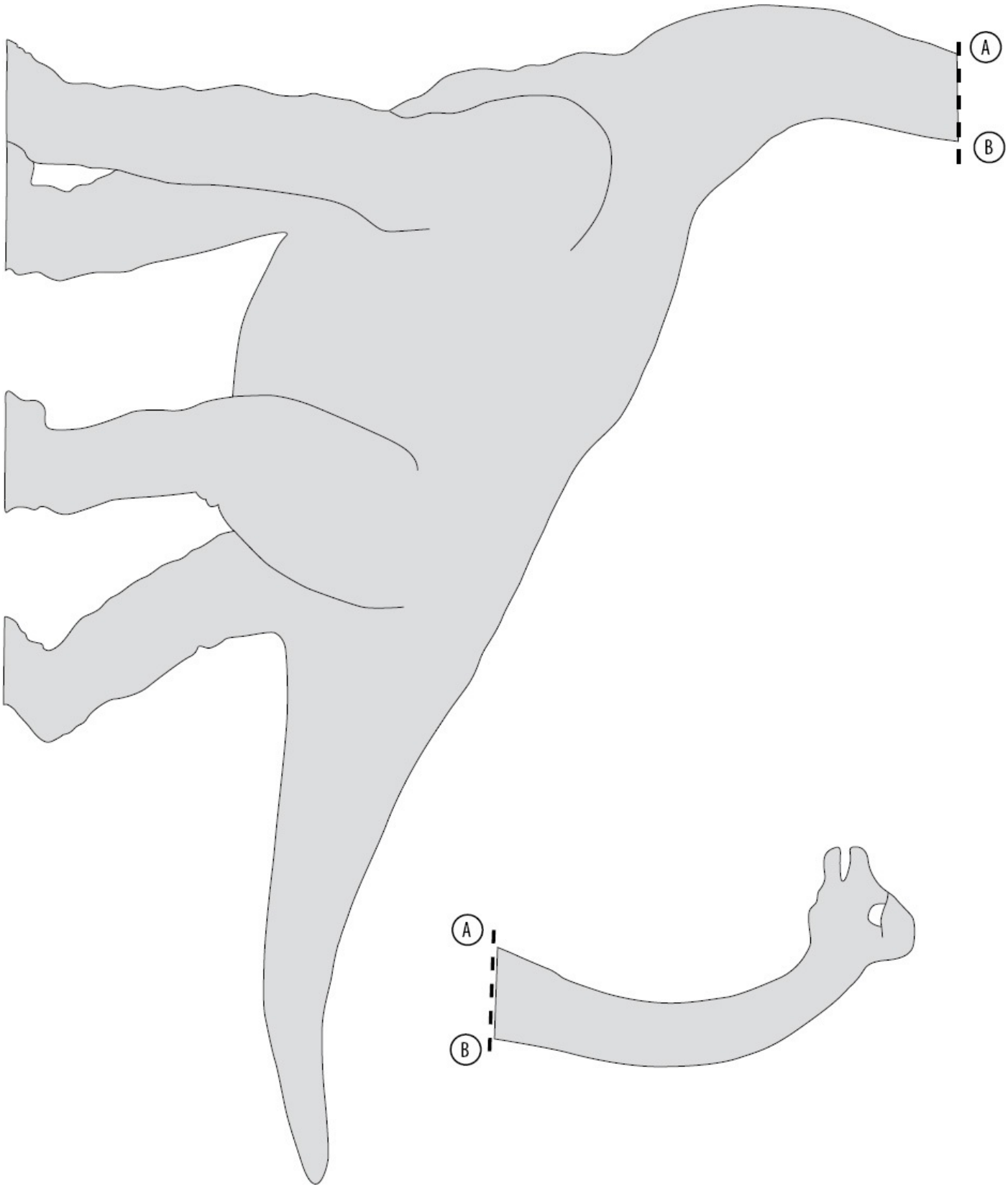

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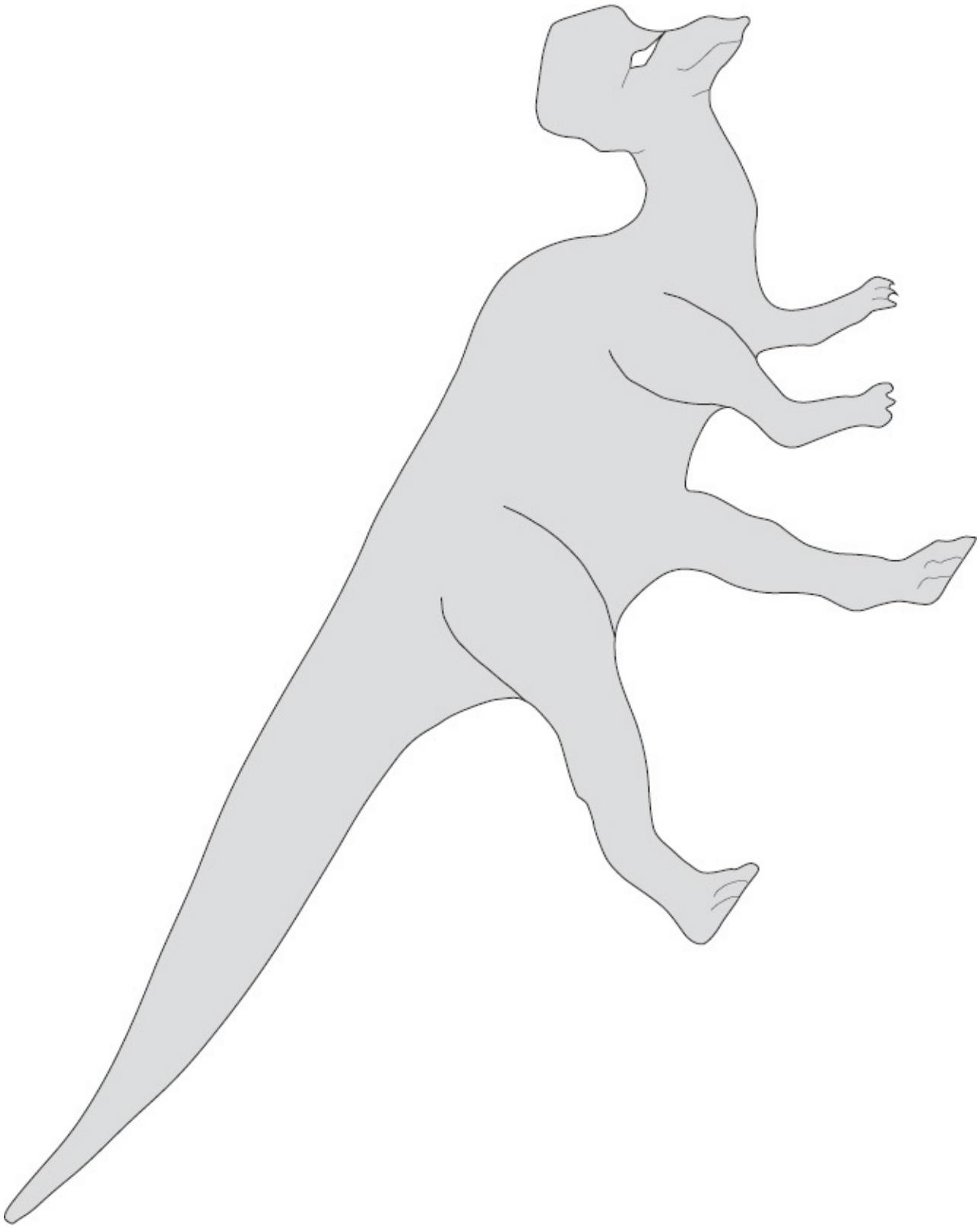

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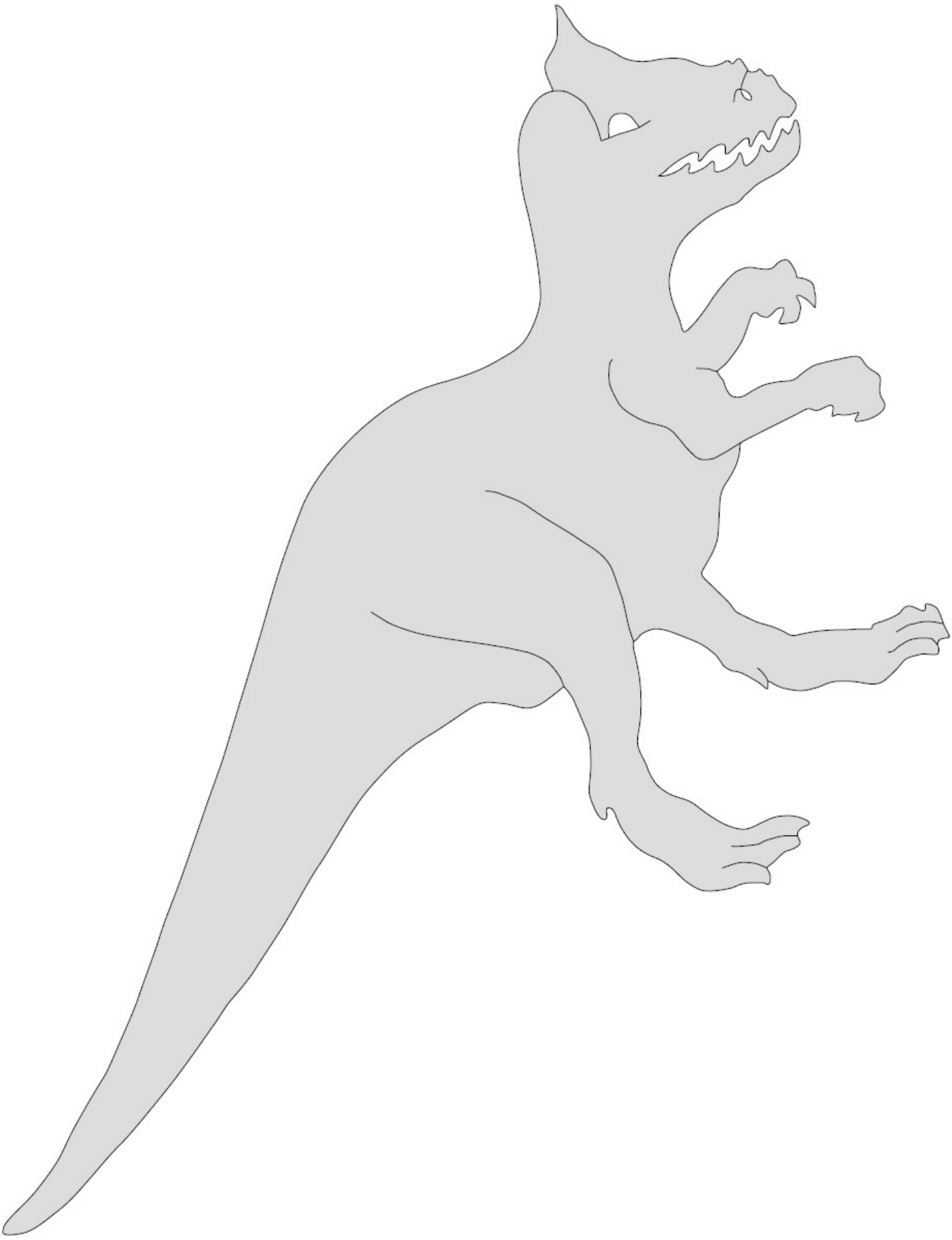

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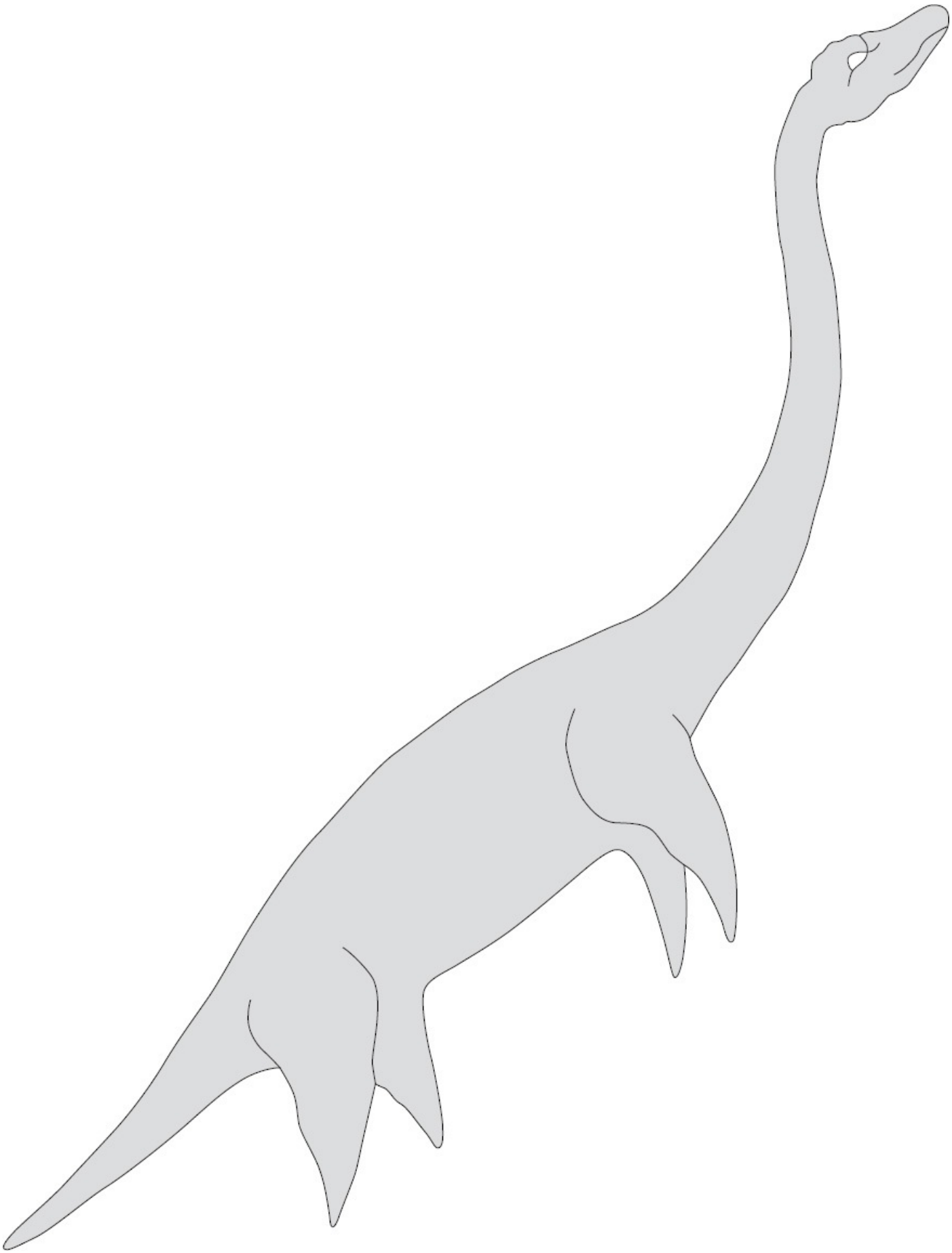

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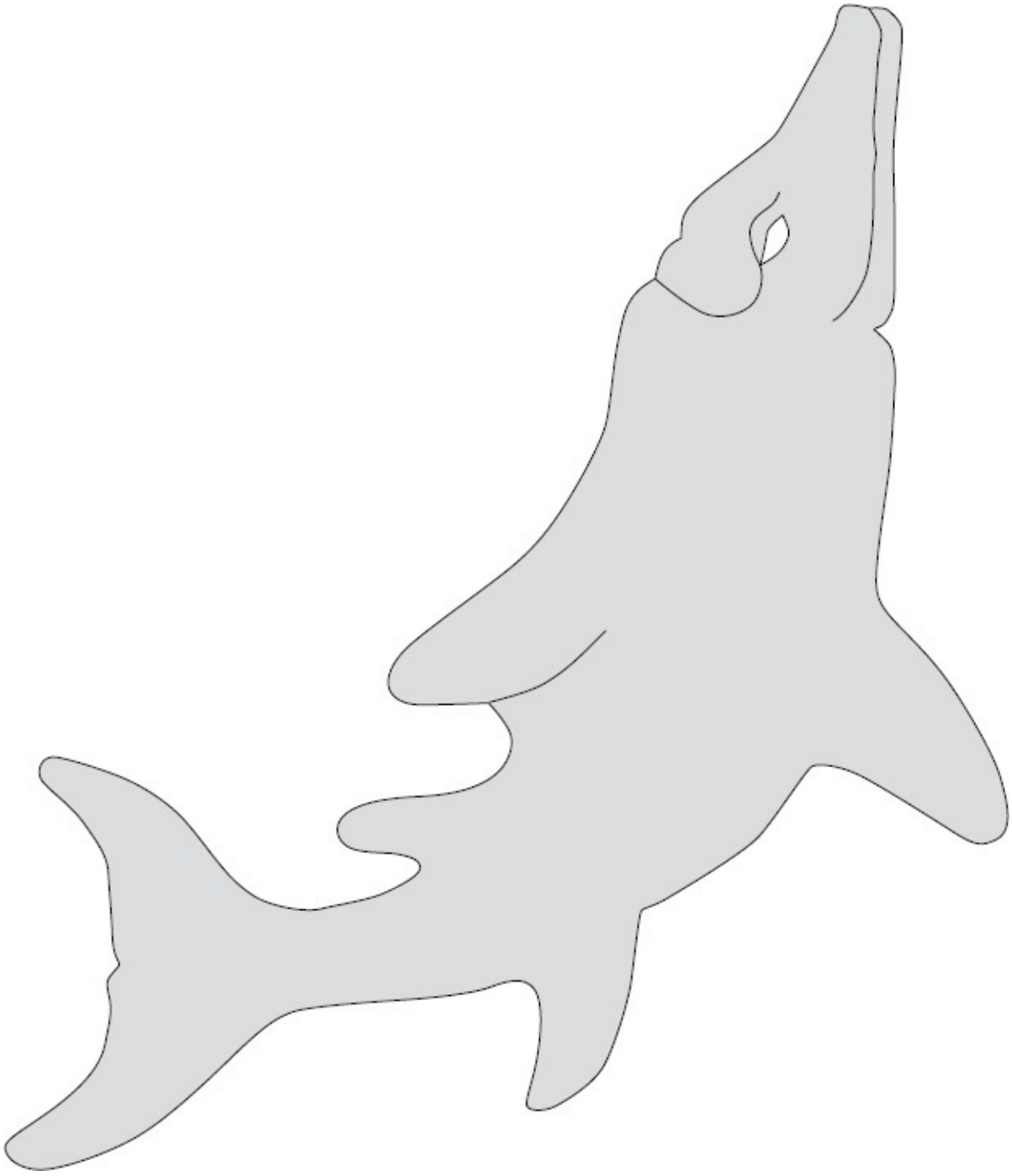

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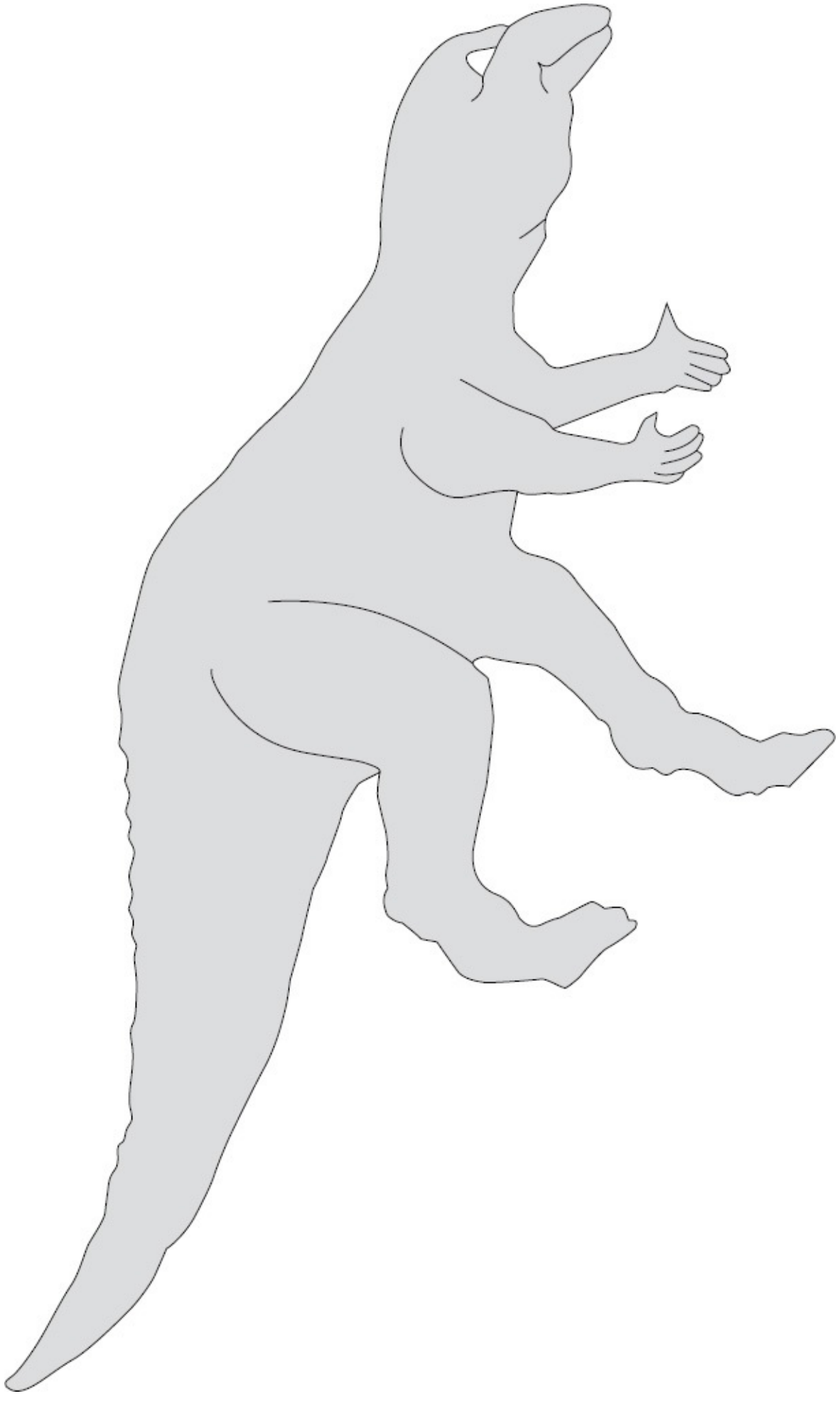

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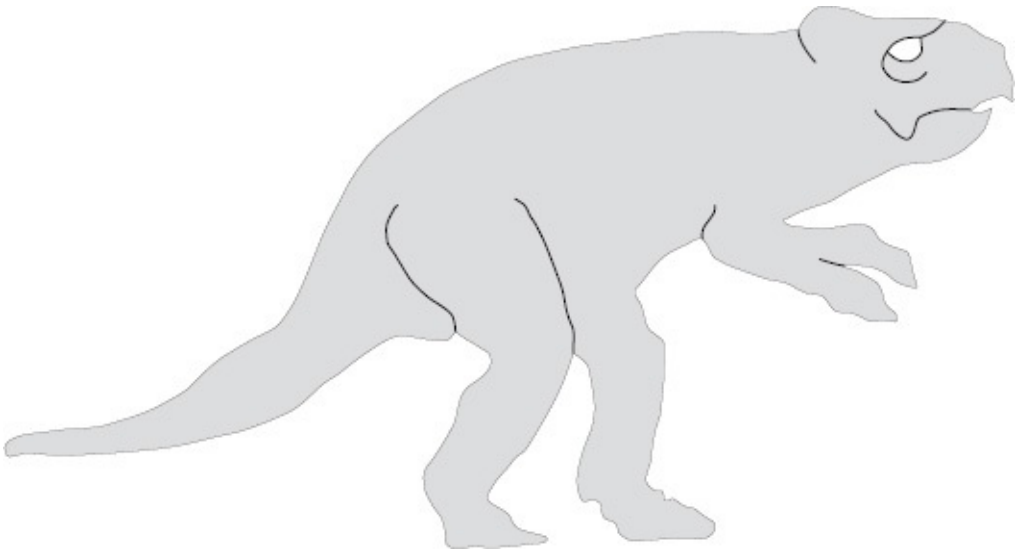

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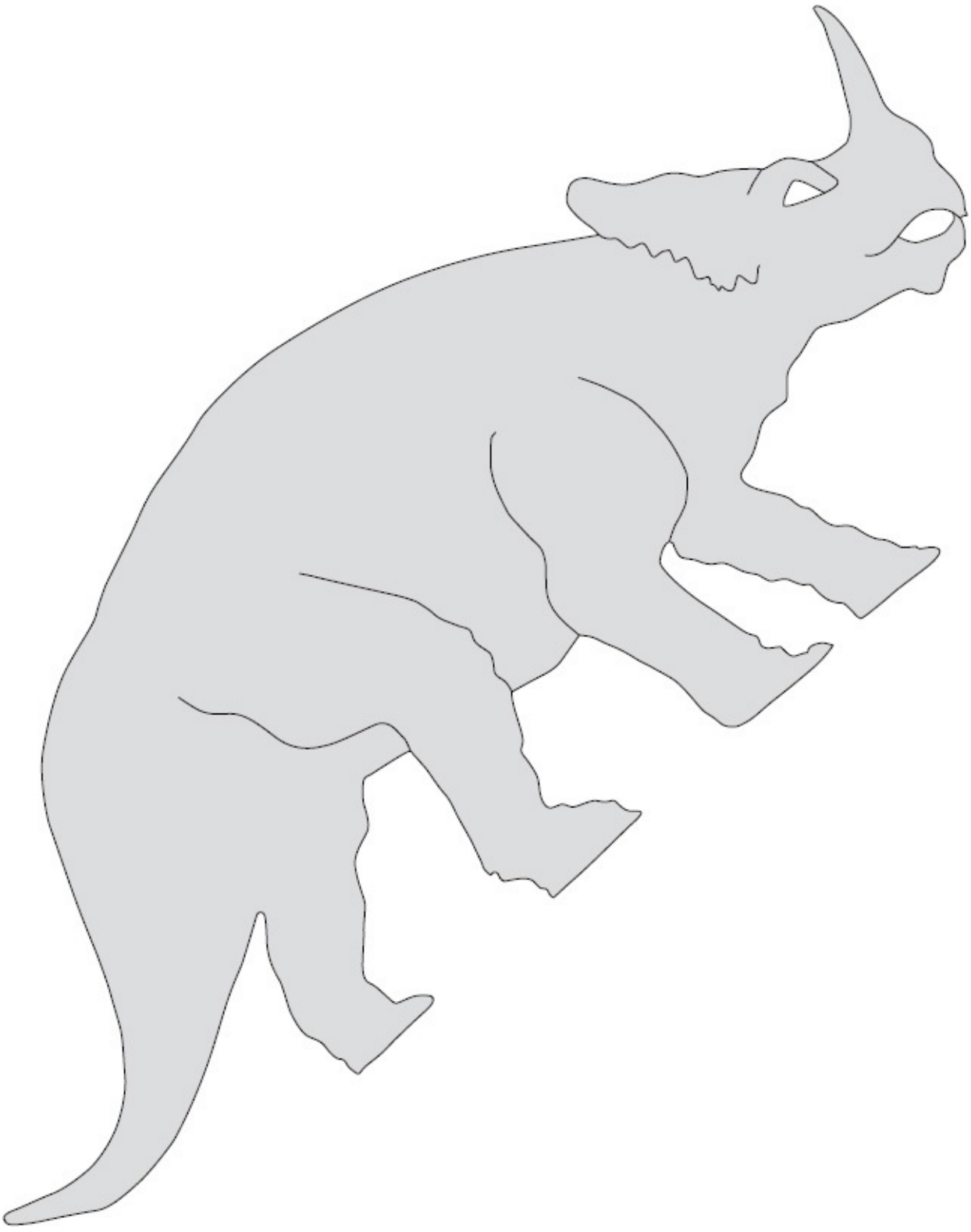

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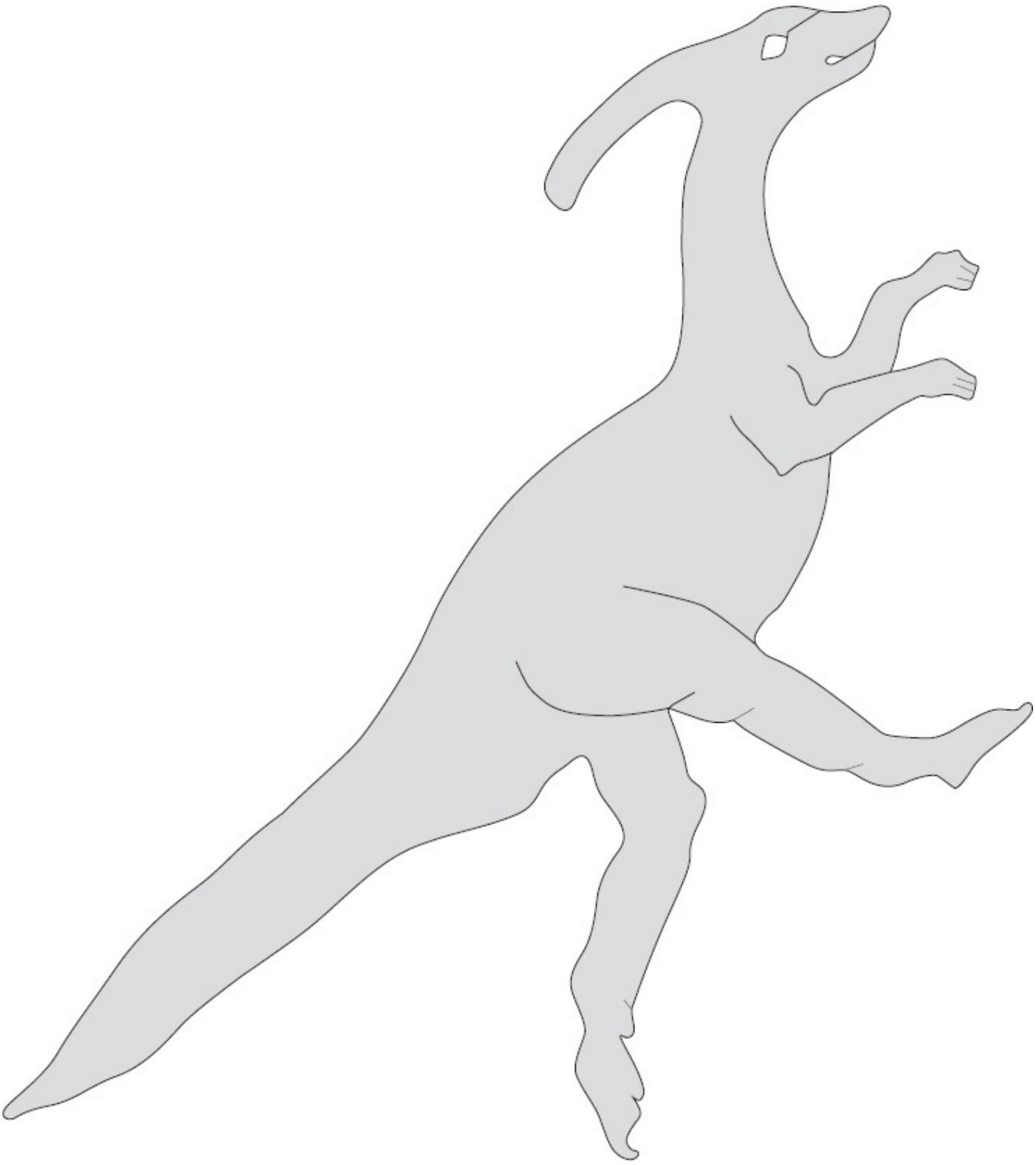

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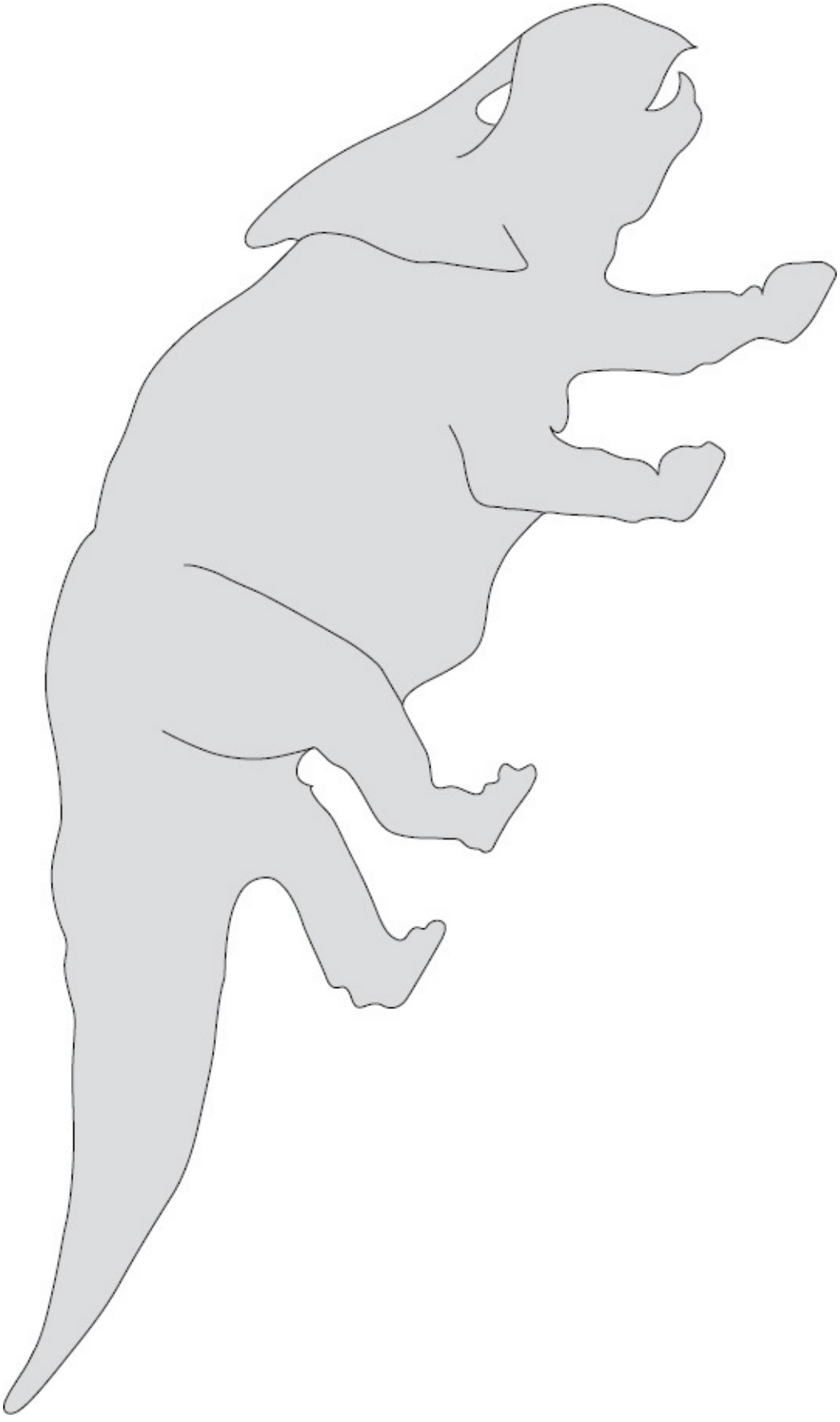

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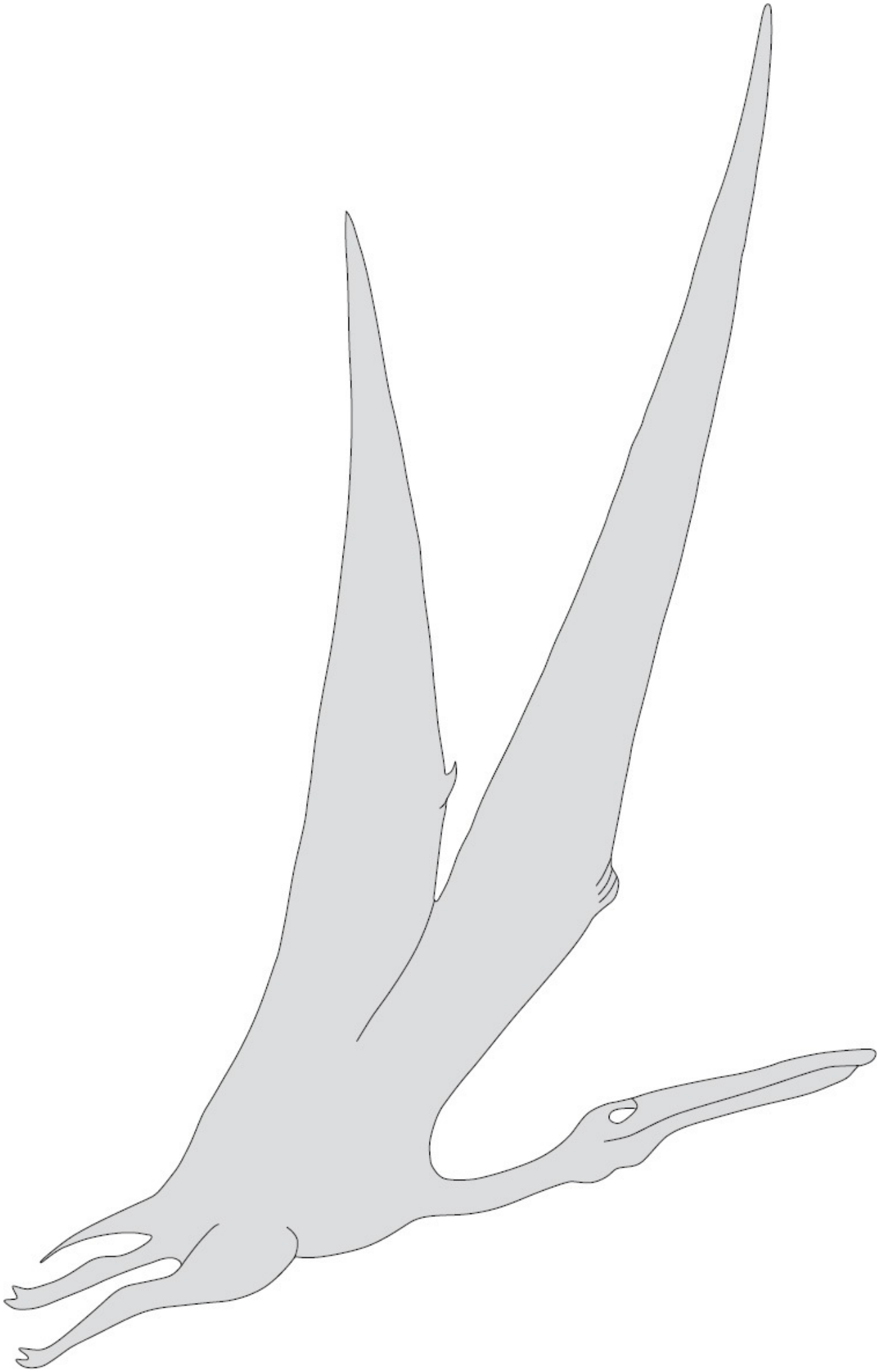

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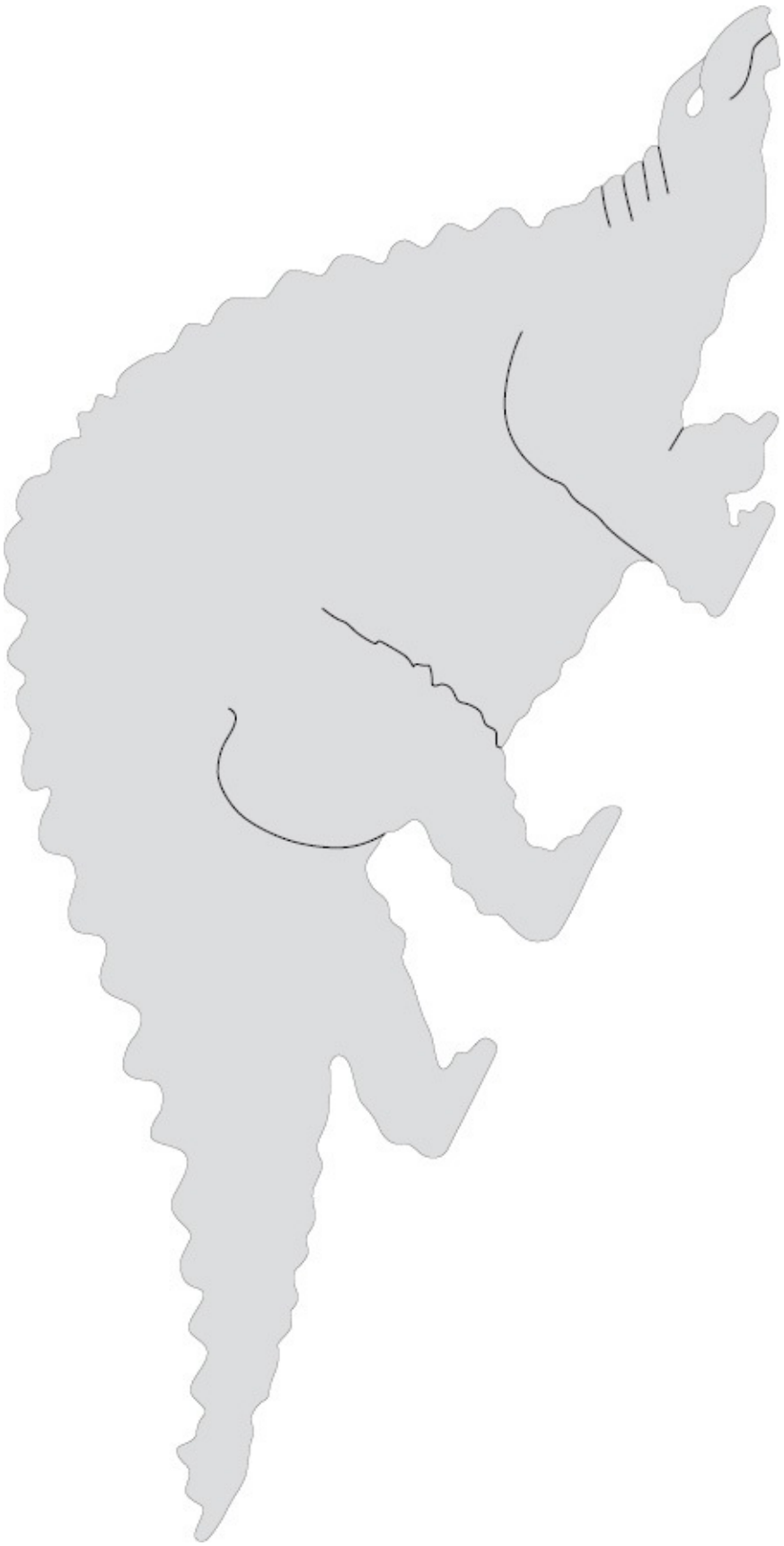

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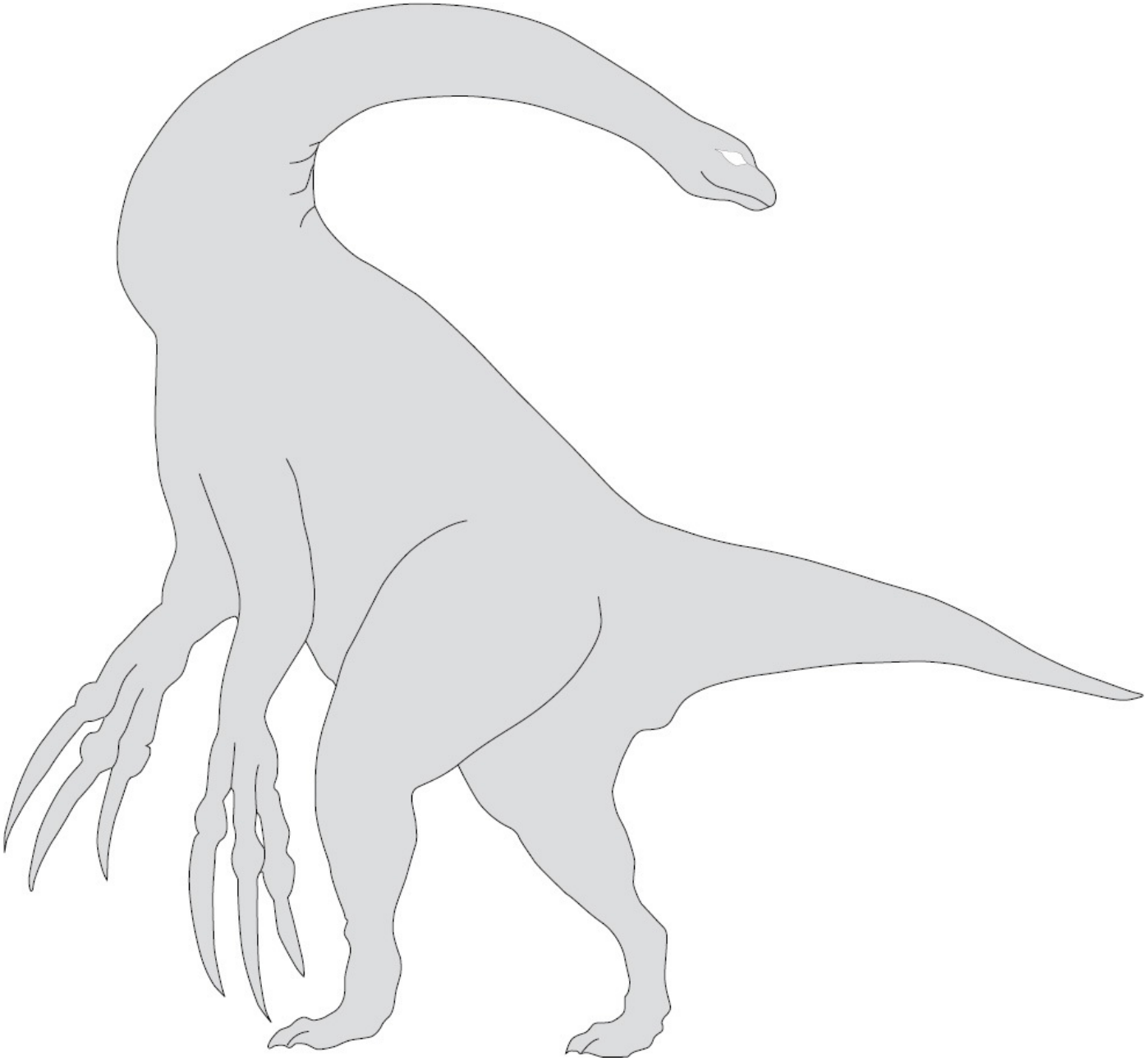

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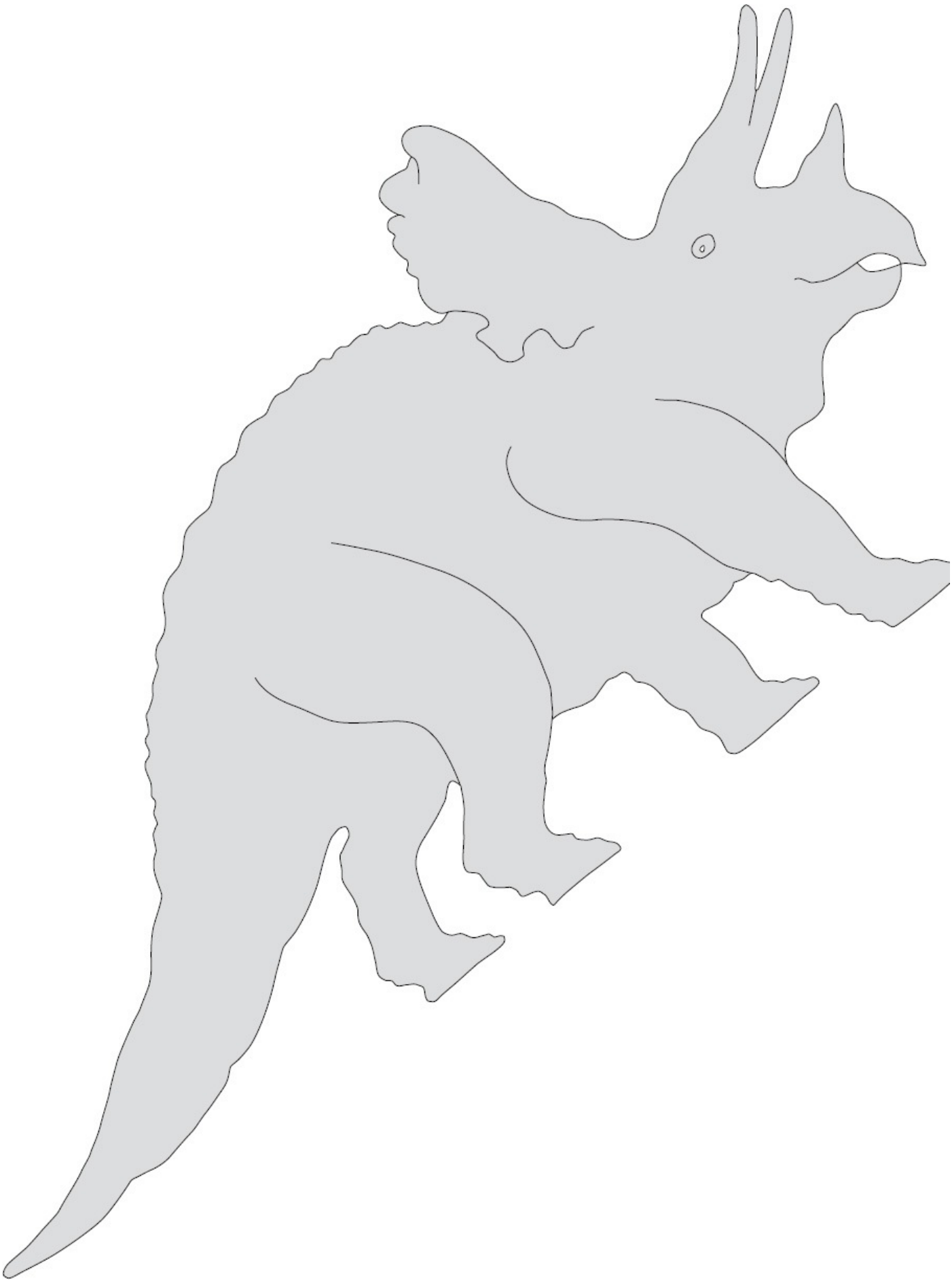

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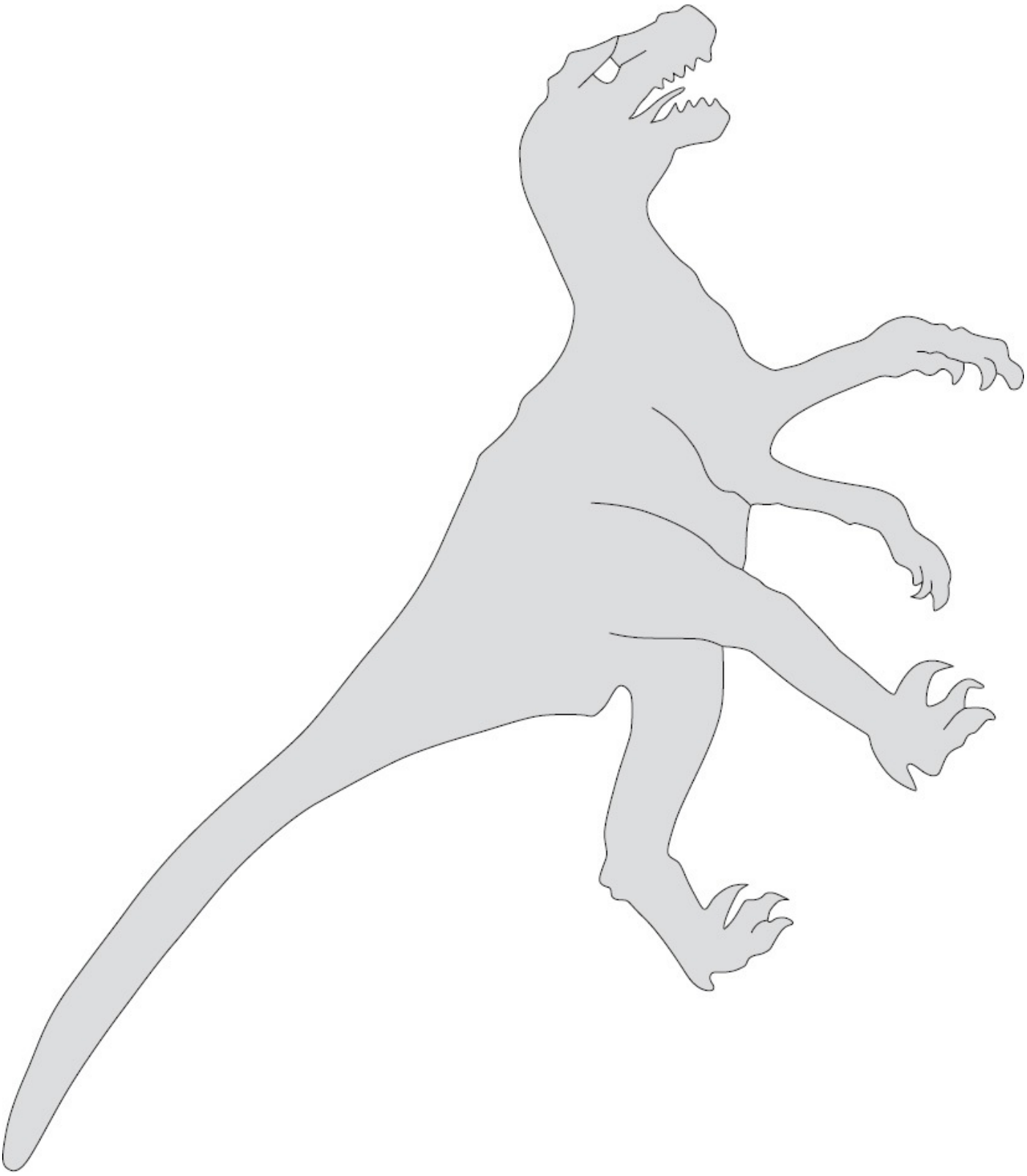

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ABOUT THE AUTHORS

A former teacher and librarian, Judy Peterson found her niche in life as a woodworker. A winner of many design awards, she sells her puzzles at art shows around the country. Her husband, Dave, runs the record-keeping side of the business. Together they have written several books which are available at www.FoxChapelPublishing.com. Judy and Dave can be reached via e-mail at fantaminals@yahoo.com.

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