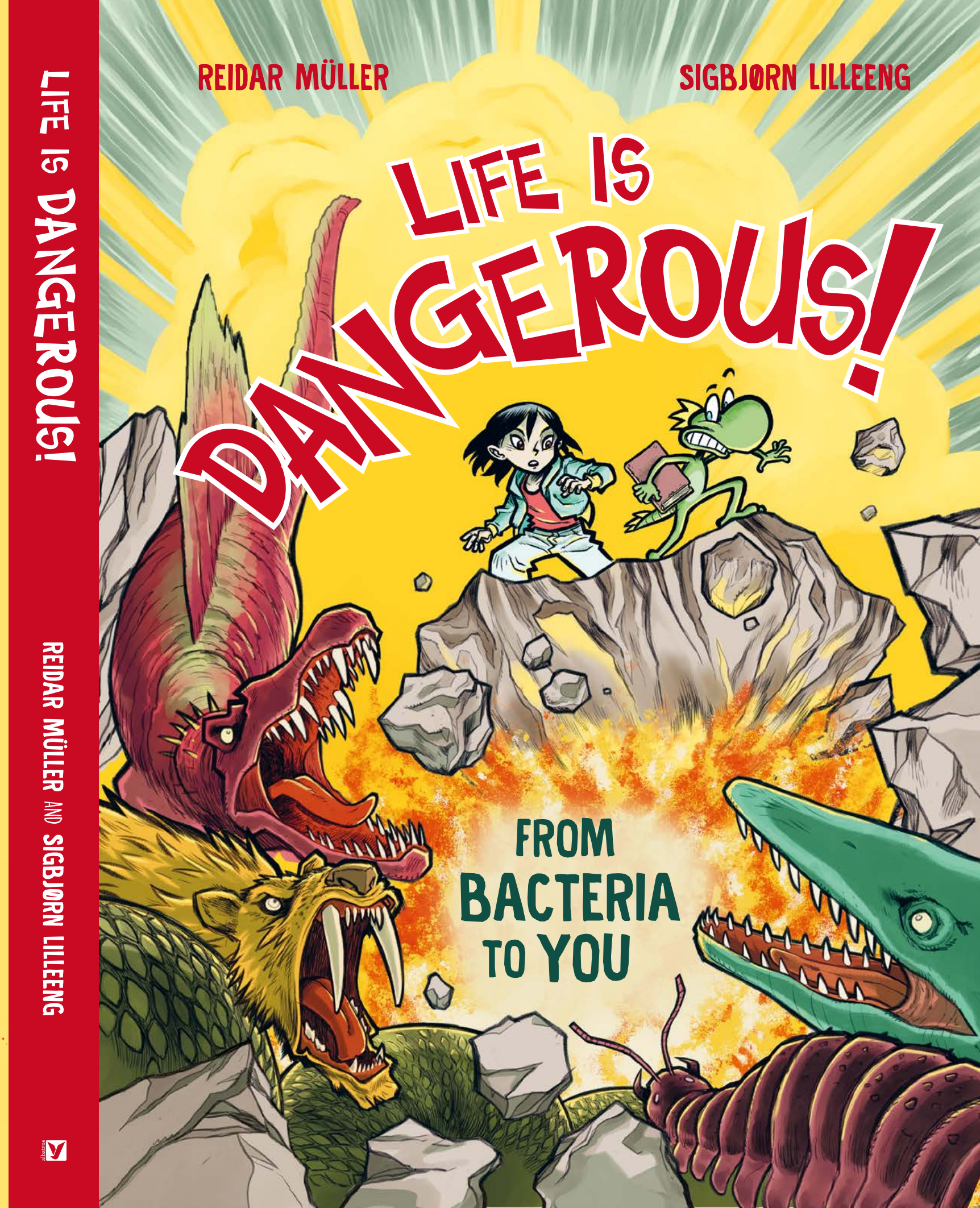

REIDAR MÜLLER
SIGBJØRN LILLEENG
LIFE IS DANGEROUS!
FROM BACTERIA TO YOU
LIFE IS DANGEROUS!
REIDAR MÜLLER AND SIGBJØRN LILLEENG

BOOOM!!!
THE CAMBRIAN EXPLOSION

Wooow!

Cool, right?

Now, animals developed a really special feature that no one on Earth had ever had before: ***EYES!***

Just think! Earth existed for many billions of years before anyone got to see what it looked like!

Hello! Is anyone there?

Next came scary mega shrimps, greedy trilobites, and loads of other strange animals.

Trilobites!!

They could **SEE** and **SWIM**, and—

Show me some ***TRILOBITES!***

Forget those creepy critters! There are so many other cool animals—

Trilo-hater!

UNTZ UNTZ UNTZ

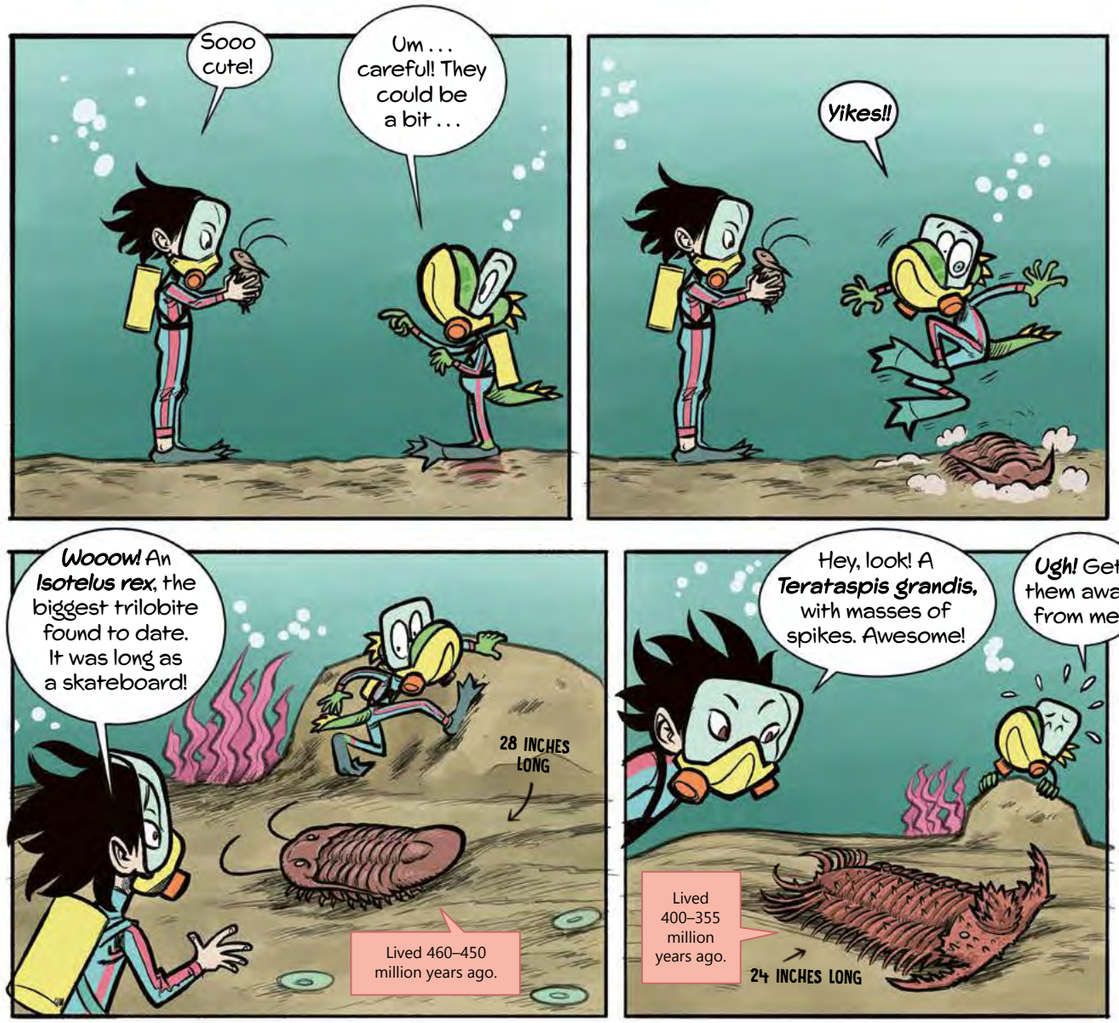
It's party central under the sea! But what about on land? . . . It's still pretty dull up here.

But, just wait!

IGGY'S EXAGGERATION CORNER!

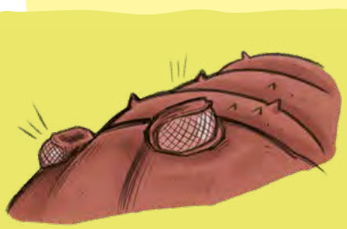
Most groups of animals on Earth appeared during the Cambrian explosion. It happened quickly, which is why scientists call it an explosion!

By "quickly" we mean 13–25 million years. Long for you, short for the Earth!



TOUGH TRILOBITES

Trilobite is the name for a large group of extinct arthropods. They lived in the sea between 521 and 252 million years ago. Several thousand different species have been found! The smallest was less than 1/2 inch, while the largest were more than 28 inches long.



TRILOBITES HAD EYES!
That made it easier for them to hunt other animals or spot enemies. A whole new way of life was possible: Life got smart.



TRILOBITES HAD SHELLS!
That was new in the animal kingdom. The shell protected them against enemies like the scary *Anomalocaris*. . . .



OK. I promised to show you the organisms you evolved from, right?

Ugh! Not more yucky larvae!

Yucky? Says the girl who loves *trilobites!*

We're looking for your several-hundred-millionth great-grandfather!

Is that it?

No.

Is that it?

No!

Is that it?

NO!

There it is! A *Pikaia!*

Let's head for the lab!

PIKAIA!

Size: 2 inches

Skills: May have swum like an eel.

It lived 513–505 million years ago.

Look at this thin line. What is it?

It looks like a fishbone!

Close! It's Pikaia's backbone. You actually inherited your backbone from this curious fish-like critter. So there's a bit of Pikaia in you.

Huh? My backbone?

It's one of our most distant relatives—an ancestor of the vertebrates!

If this animal hadn't survived, we wouldn't be here. We are both vertebrates.

PIKAIA'S INCREDIBLE CHALLENGES!

It's actually a minor miracle that Pikaia did survive! Think of all the perils it faced.

Eaten by an Anomalocaris

Barbecued by an underwater volcano

Hunted by Opabinia

IGGY'S INTRICATE OVER-EXPLANATION CORNER

Oh, I forgot to mention something a bit complicated. We don't know whether we evolved directly from Pikaia. Several similar species were alive back then.

OK . . . larvae and backbones. But where are all those cool, scary animals you promised me?

You're so impatient! Prepare to meet what may have been the most dangerous animal back then.

BIG EYES

ALMOST AS LONG AS A GIRAFFE IS TALL

A flock of giant *Endoceras!*

ENDOCERAS were giant relatives of octopuses that lived 470–440 million years ago. They could grow up to 20 feet long and hunted trilobites and other little critters!

Swim for your life! They're after the trilobites on the ocean bed . . .

. . . but they might decide to sample a spot of human or dinosaur if we don't . . . Liv?!

Stop eating the trilobites, you monster!

Liv!! Stop that! Are you crazy?

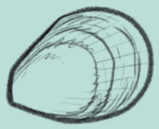
Urk!

Liv!!!

Aaaaaaaaa!

AAAAAAAAAAAAAAAA

SQUISHY MOLLUSK FACTS!



Just think: these monster endoceras are mollusks, and evolved from a much smaller animal called a primitive mollusk (Monoplacophora). They were smaller than a dime.

But watch your step here, 'cuz there are . . .

AAAAAAAAAAAAAAAAAA

POIK!

. . . sea scorpions here!

SCARY SPIKE!

COULD BE MORE THAN 7 FEET LONG!

HUGE CLAWS!

DANGEROUS FACTS:

SEA SCORPION

The smartest fish in the sea steered clear of this brute! Sea scorpions lived 467–252 million years ago. They ate mostly fish. But who knows? Maybe they'd have been tempted by a human if they'd had the chance.

I've seen enough now! I want to go home!

But we'll soon be in the Devonian! You have loads more relatives there.

That scorpion is no relative of mine!

No, no, it's an arthropod! The same group that crabs, lobsters, and ants belong to.

It's looking a lot nicer around here, now, don't you think?

DEVONIAN 419–359 MILLION YEARS AGO

PRIMITIVE FACTS ABOUT PRIMEVAL FORESTS

The oldest forest fossils we've found are 390 million years old.

There were still plenty of trilobites and giant endoceras in the ocean.

But the Devonian is when ***FISH*** really began to rule the seas!

OK. That was *suuuuper cool!* Can we move on?

You're so hard to impress! Just you wait—

Iggy!!!

Waaaahhhhh!

PLACODERMS!

The very largest Placoderms were as big as buses! They got their name because parts of their bodies were covered in bony plates. The Placoderms had powerful tooth plates instead of teeth. These allowed them to crush their prey.

DUNKLEOSTEUS lived 382–358 million years ago. It could be up to 33 feet long.

MEGA POWERFUL BITE

Gulp!

TITANICHTHYS lived 372–358 million years ago. Could be 23 feet long.

blubb!

GORGONICHTHYS lived 371–359 million years ago. Could be 20 feet long.

What was that?

Puff! Pant! Dunkleosteus! A humongous placoderm.

Luckily, the line snapped....

What's so creepy about this? It's just a bunch of weird trees.

SHF SHF SHF

What was that?

I promised you huge, horrible animals, right?

Well, get *reaaaaaady!!!!*

ARTHROPLEURA was a giant millipede that could grow to be close to 7 feet long!

Aaaahhh!! Heeelp!!

Scorpions

:Gulp!:

MEGANEURA was a giant dragonfly with a 3-foot wingspan.

DUNK!

Quick! There's the door!

EXIT

SPLAT!

BANG

Puff! That's the worst thing that's ever happened to me!

Puff! Gasp! I said it was scary!

How come those icky bugs got so big anyway?

One theory is that high oxygen levels resulted in big animals.

Abundant food and a warm climate may also have helped!

GASP!

Speaking of teeth . . . are you planning to tear, bite, and chew us up?

I never eat relatives. It really kills the vibe at family parties.

But watch out for my buddies. The Permian's called . . .

THE AGE OF THE FORGOTTEN MONSTERS!

TITANOPHONEUS was a carnivore that lived 268–265 million years ago. It could grow up to 10 feet long. Its name means "big killer."

Good luck! *Hee-hee!*

Maybe we'd better get moving.

SPHENACODON was a carnivore that could grow up to 10 feet long. It was a close relative of Dimetrodon and crawled like a crocodile. It lived 300–280 million years ago.

LYSTROSAURUS was a very common herbivore 255–250 million years ago. It could grow up to 8 feet long. Lystrosaurus fossils have been found in almost every corner of the world. It was a real globe-trotter.

GRRR

INOSTRANCEVIA was a carnivore that lived 259–251 million years ago. It weighed 660 pounds and could be more than 11 feet long. Its 6-inch canine teeth allowed it to tear its prey to pieces.

RRRRRR . . .

RUMMMBLE!

What was that?

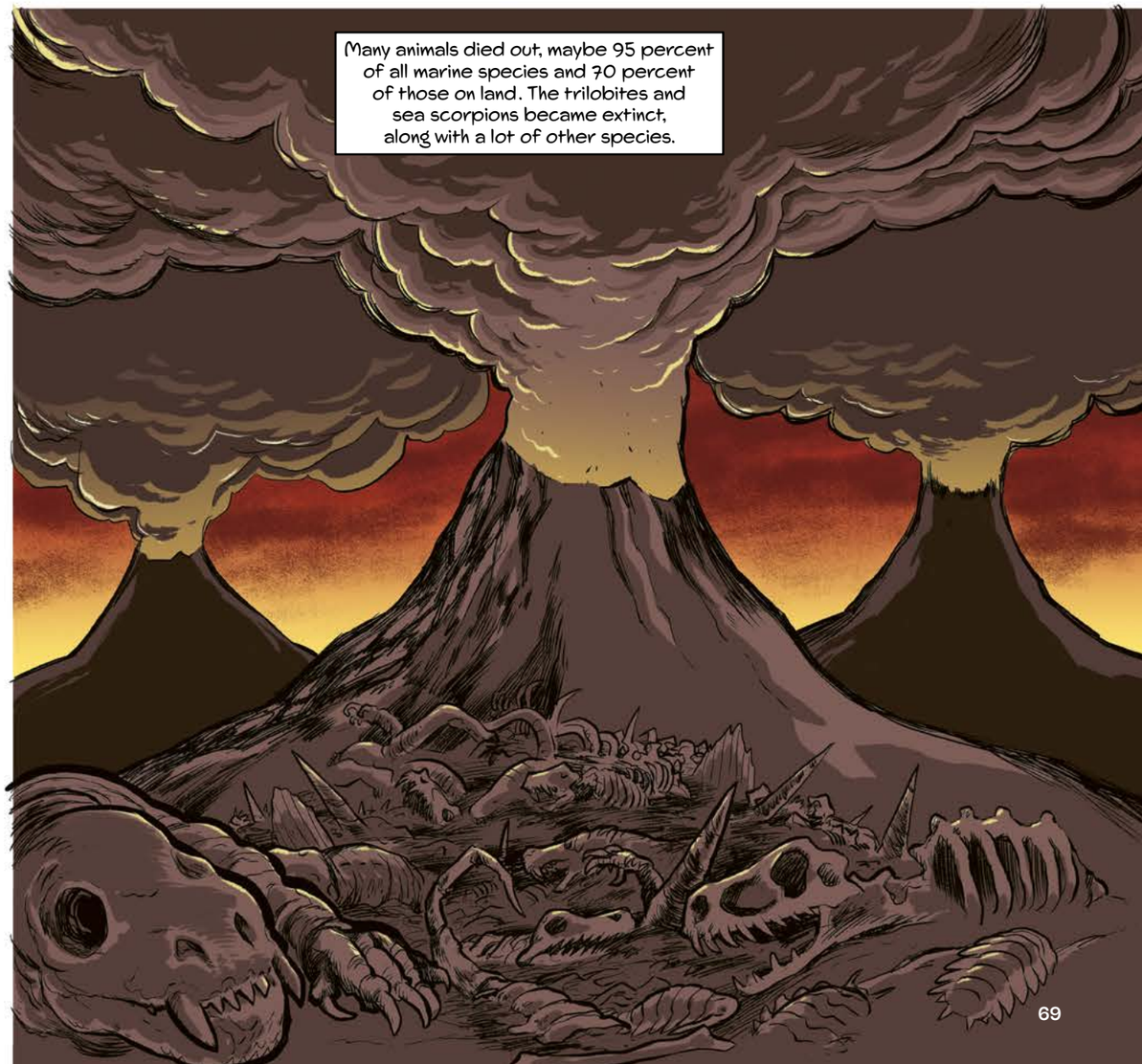
Now things get dramatic! Prepare for—

CRACKKKK!!


THE BIGGEST
EVER
MASS EXTINCTION !!!
Ugh! The air is full of poisonous gases!

* ATTENTION!!! This actually happened over a few million years. There were volcanic eruptions and earthquakes, but the earth didn't open up as suddenly and violently as this.




Many animals died out, maybe 95 percent of all marine species and 70 percent of those on land. The trilobites and sea scorpions became extinct, along with a lot of other species.

TOTALLY REGULAR PARK

Ready for a walk in the park?

This is a favorite period for a lot of people, like me!

Everyone digs dinosaurs. I guess they're kinda cool.

Kinda?! But I'm after something even cooler as far as you're concerned. . . .

Ha, I bet it's another icky little critter I'm descended from.

Icky?—Bah! This'll take a bit of finding. It's pretty bashful.

There!

BINK BONK BANG!

ARRRGH!

. . . It got away.

Now eventually you do plan to have dinosaurs on your dinosaur tour, right?

I've already seen plenty of slimy sausages, thanks!

OK, fine! I'm just trying to teach you something about yourself that not everyone knows.

But the first seriously scary animals weren't dinosaurs. . . .

Really?

Luckily they're more interested in beating each other up!

I'm glad there aren't any of those carnivores these days!

But the sauropods were cute!

Cute?! Dinosaurs are individuals with hopes and dreams! We aren't pets!

Nice jacket!

Beat it, loser!

Hmmmm, pets . . .

DON'T LOOK! IT'S TOO SCARY!

Say hi to *Spiney!*

Ha ha ha!

Liv? Hello? Calling planet Liv!

Oh, oh, whose eggs are those?

BOOM BOOM

Gulp! Something huge by the sound of it.

Well, duh! Remember where we are.

Quick! Into the bushes!

BOOM BOOM

THE WORLD'S BIGGEST OMELET?

The biggest dino egg ever found was 12 inches long. The egg was as big as 40 chicken eggs put together.

Prepare to meet the BIGGEST MAMMALS THAT HAVE EVER LIVED ON LAND!

Eeek... Were they meant to come at me this fast?

STOMP STOMP

PARACERATHERIUM lived 34 to 23 million years ago and is a distant relative of the modern rhinoceros. It could weigh as much as two elephants and could be 16 feet tall.

Aaaaargh! You were supposed to do tricks! Not squash me flat! Urgh!

BANG

Oh, wooooow!

Iggy! Are you OK?

I just have to post this!

Owwww.

Ooooh! There are more on the way! This isn't going to plan.

ENTELODONT lived 38–19 million years ago and was called the "Hell Pig!"

GRRR!!

HSSS!

PROAILURUS MAJOR lived 30–25 million years ago and is an ancestor of lions and all other cats alive today.

Aaaaagh! Stop filming, Liv! Help me!

MEGACEROPS is a rhino-like animal that lived 38–34 million years ago. It could be more than 16 feet long, weighed 7,700 pounds, and had deadly horns.

Aaagh! Sob!

CRASH!

Are you crazy, Iggy? The last video already has 10,000 views!

You've gone viral!

I get more views than that!

Weren't you going to tell me how a tiny mouse-like animal turned into me?

Yes, soon! But mammals didn't only live on land!

Come and visit my aquarium!

IGGY's SEA WORLD

0 DAYS SINCE THE LAST KILLER WHALE ACCIDENT.

Aaargh!

Say hi to my biggest buddy!

Glub, glub!*

Wooow!

*Hi, Iggy!

SHIP AHOY! BEACHED WHALE!

The skeletons of many types of whales have been found in the deserts of Egypt. They lived 40 million years ago. One of these whales could also move about on land. They are known as "walking whales."

BLUE WHALES are mammals that live in the sea. They have lungs and have to go up to the surface to breathe roughly every fifteen minutes. Blue whales live off krill and can reach an age of almost 100 years! The blue whale's heart weighs as much as three adult humans.

It can be 100 feet long and can weigh up to 440,000 pounds. In fact, the blue whale is the biggest animal that has ever lived!

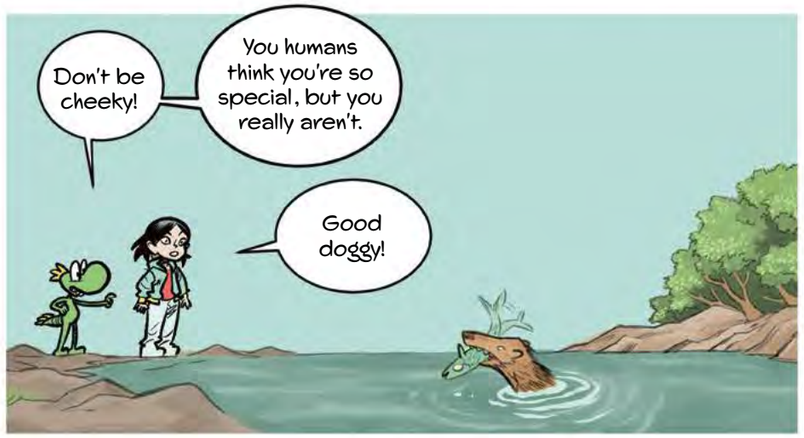
You're quite an expert!

But do you know who the blue whale is related to?



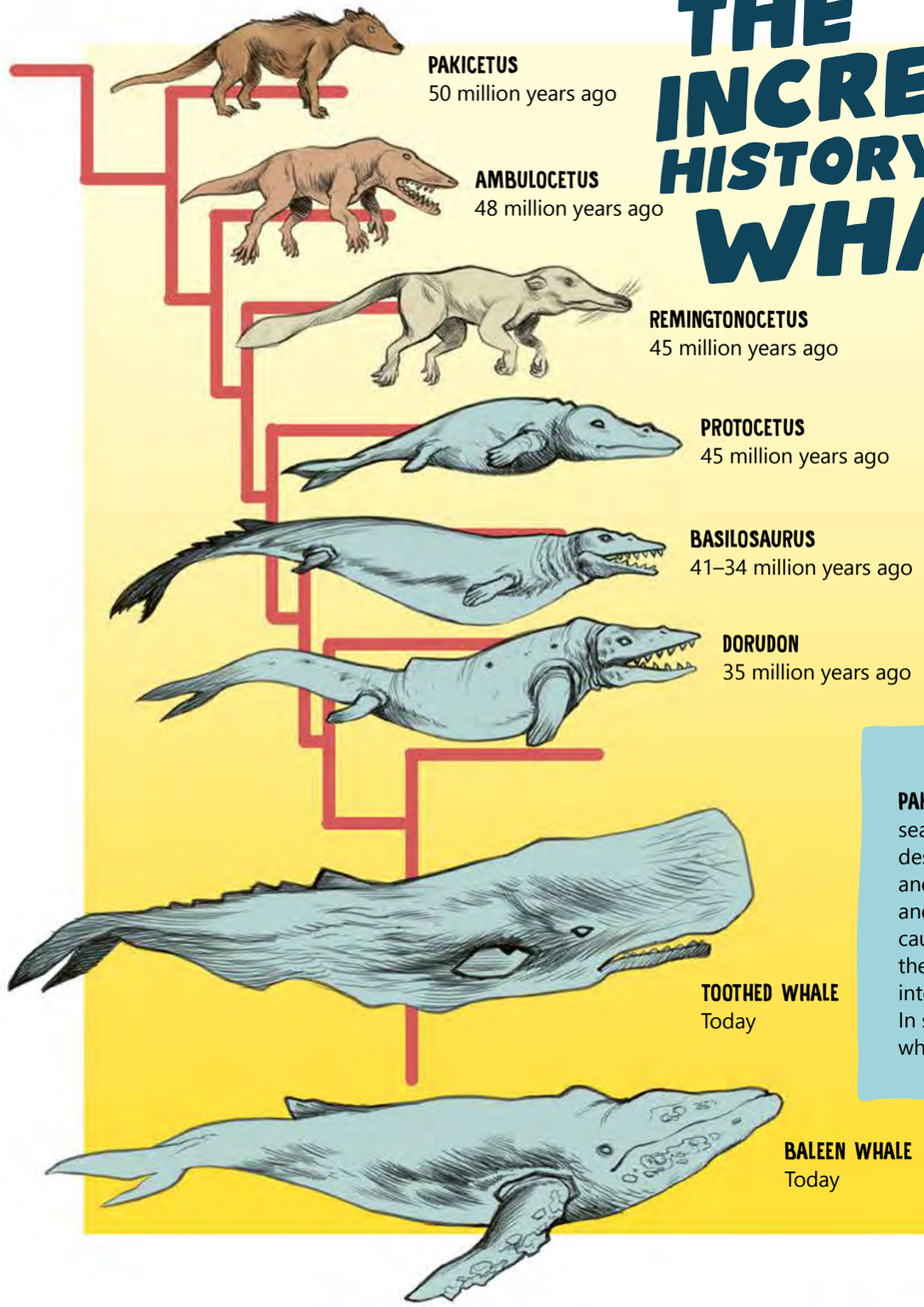






THE INCREDIBLE HISTORY OF THE WHALES!

OR: THE ART OF BECOMING THE WORLD'S BIGGEST ANIMAL





PAKICETUS thrived both in sea and on land. So did its descendants! They spent more and more time in the water and little by little, evolution caused them to adapt to life in the ocean. Their arms evolved into fins. Claws became flippers. In some whales, like the blue whale, the teeth became baleen.



A lot of other Ice Age animals have been found in Siberia, Russia, like the *woolly rhinoceros*.

WOOLLY RHINOCEROS lived 3.6 million–14,000 years ago. Its long fur helped it cope with the cold. The two sharp horns kept enemies away.

13 FEET LONG

3-FOOT LONG HORN

WEIGHED UP TO 6,500 POUNDS



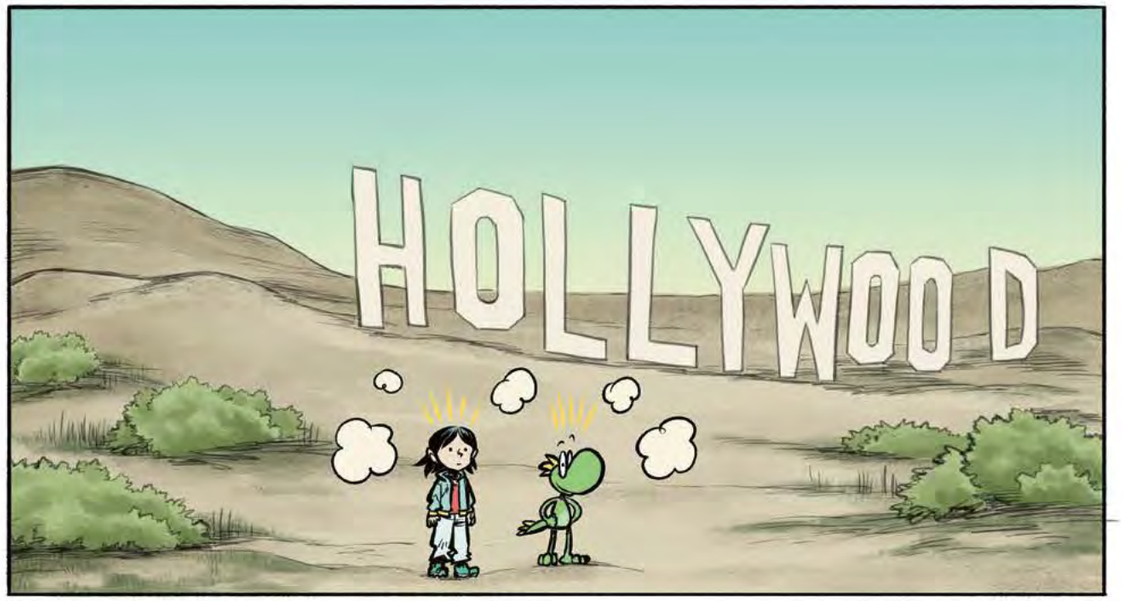
DRAGON OR RHINOCEROS?

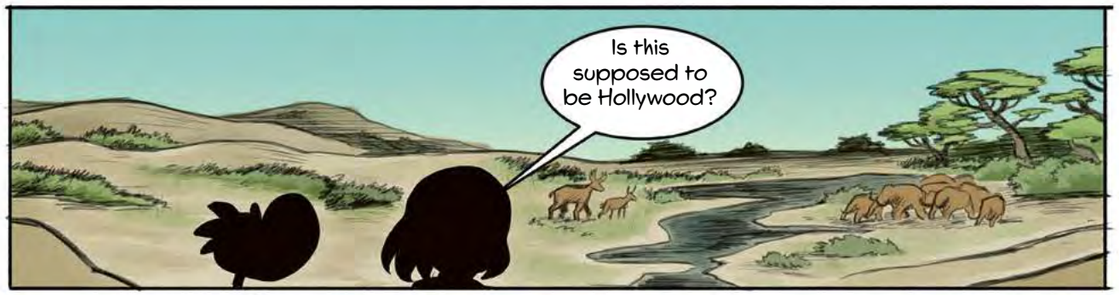
In 1335, the skull of a woolly rhinoceros was found outside the city of Klagenfurt in Austria. The people who found it thought they'd found the head of an enormous, fire-breathing dragon.

But what about humans?

Cool!

I'll get to that. Stop bugging me, first, we're taking a trip to Hollywood!





Where are the A-listers and the awesome houses?

We're in Los Angeles during the Ice Age, around 20,000 years ago!





GRRRR!

Eeeek!

DANGEROUS FACTS

SMILODON FATALIS

This saber-toothed tiger lived 400,000–13,000 years ago. It had deadly canines that could be up to 6 inches long. Its favorite foods were bison, camel, and armadillo—and maybe humans!

We have to get down to the lake!

That log is our only hope!

7 FEET LONG

WEIGHED ROUGHLY 650 POUNDS

Hup!

!?

SPLORP

MRAAWOOOOOO

Phew! This is a tar pit. If we fall in we're dead!

LA BREA TAR PITS

A tar pit?

Yes, it's really thick and sticky!

Gasp! There's a mammoth stuck in the tar.

Yes, but we can't help it! We'd only get stuck too.

They aren't the only ones. Several thousand predators have gotten stuck too.

Some people call this a ***predator trap!***

Oh, why does everything always have to be so dangerous?

PREDATOR TRAP!!

NO ONE GETS OUT ALIVE!

These tar pits are in the middle of downtown Los Angeles in the United States. The pit is full of the skeletons of predators. Extinct animals such as dire wolves, short-faced bears, mammoths, and saber-toothed tigers have been found, along with grizzly bears, panthers, and other animals that still exist today.

SHORT-FACED BEARS lived 2.5 million–12,800 years ago. They weighed up to 2,000 pounds and are among the largest land-dwelling predatory mammals. When a short-faced bear stood up on its hind legs, it could be 12 feet tall—the same height as a bus.

DIRE WOLVES lived 250,000–2,500 years ago. They could grow as long as 6 feet and weigh up to 150 pounds. Dire wolves hunted in packs and had a powerful bite.

Life is dangerous and pretty wonderful!