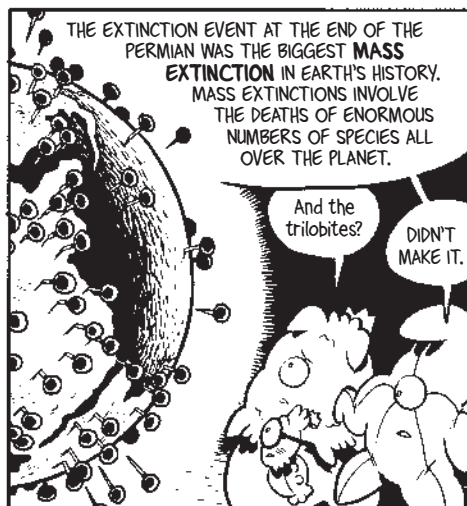
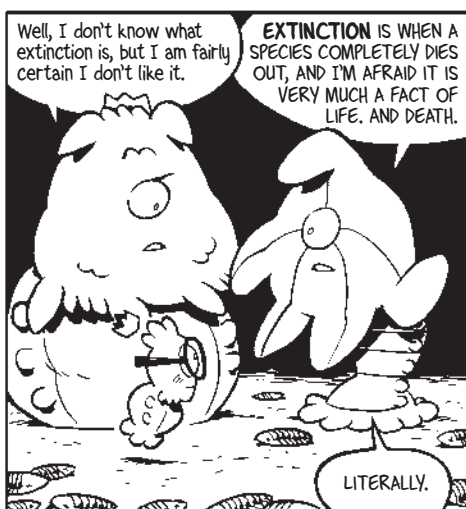
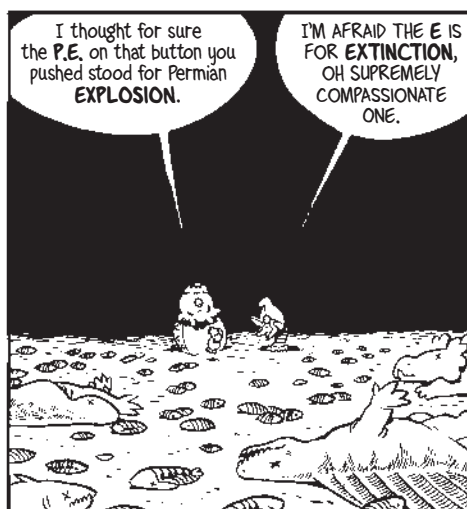
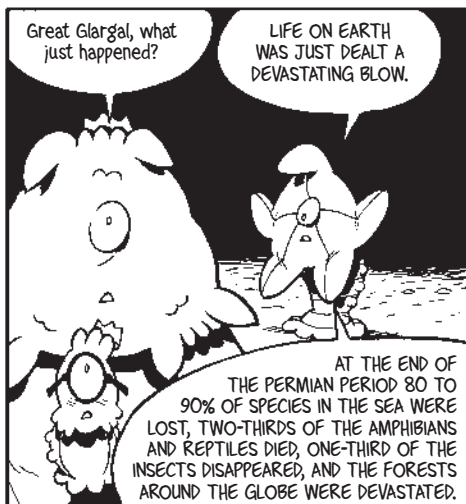
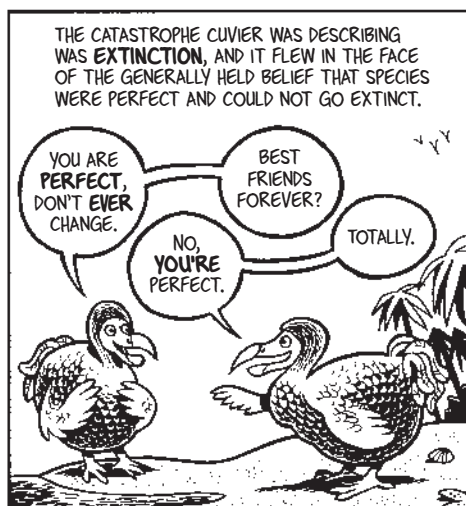
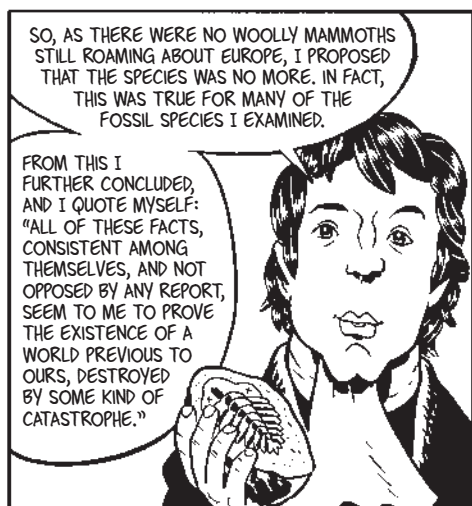
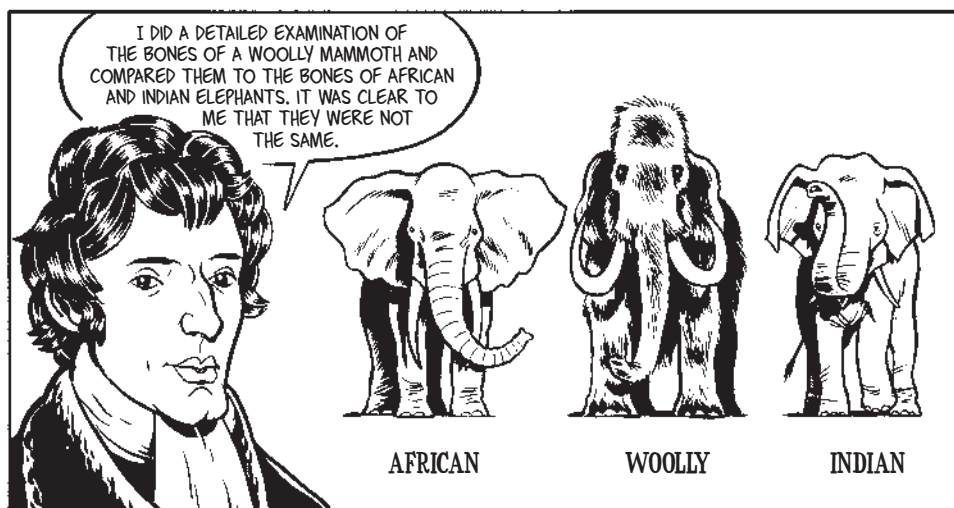
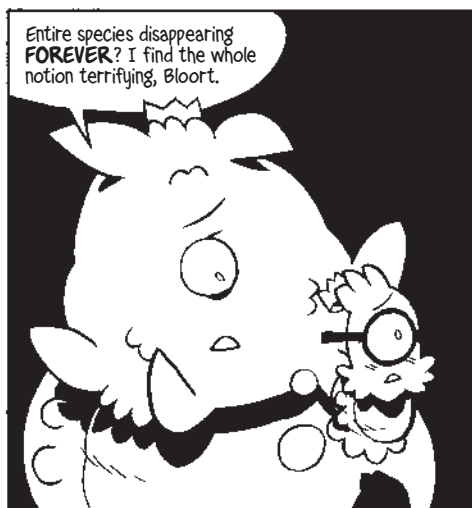


CHAPTER 3

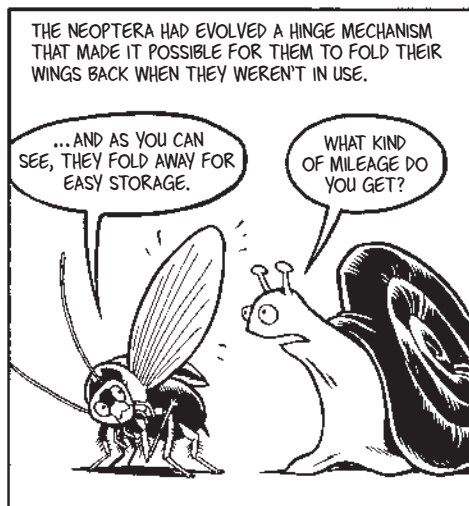
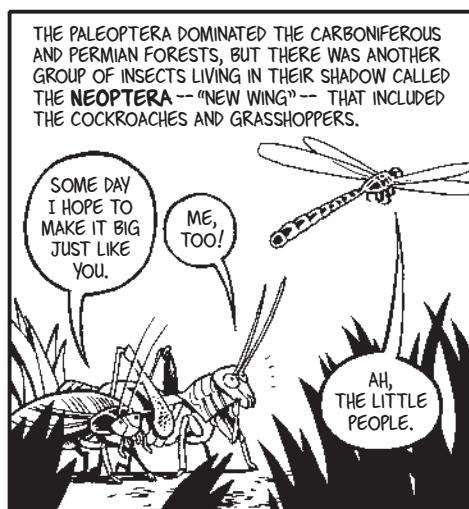
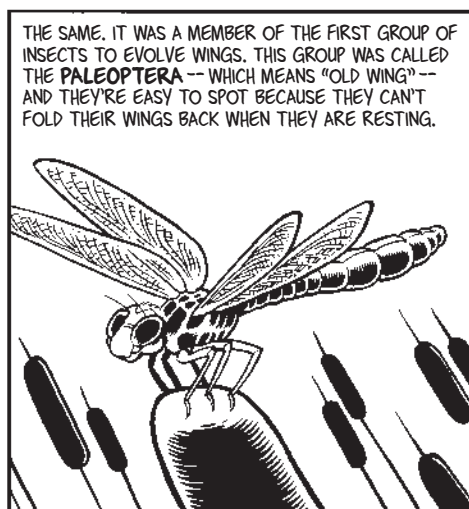
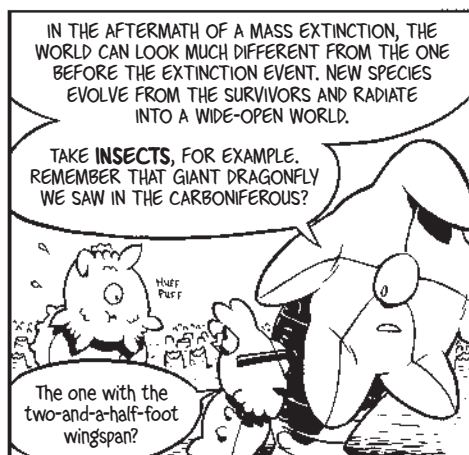
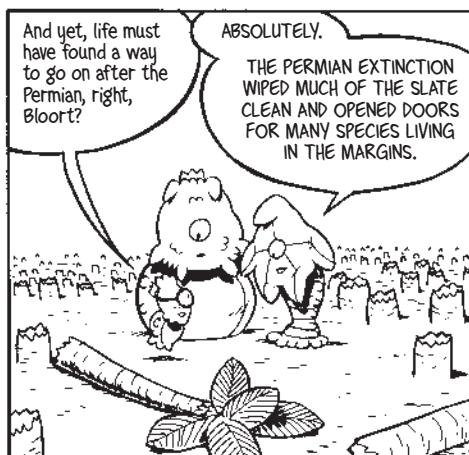
E Is for Extinction

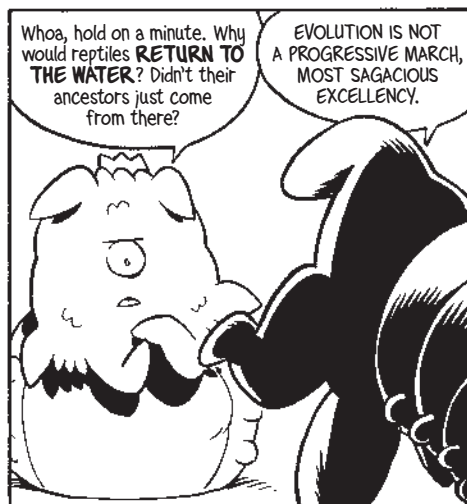
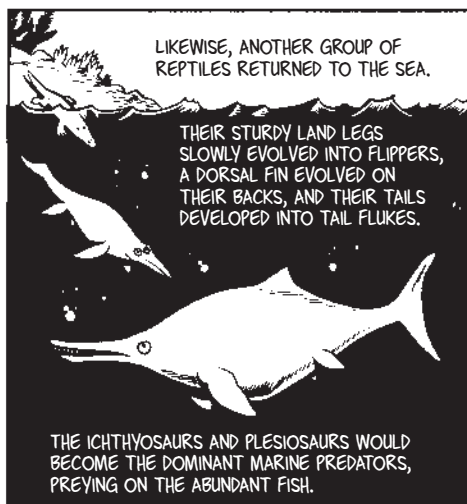
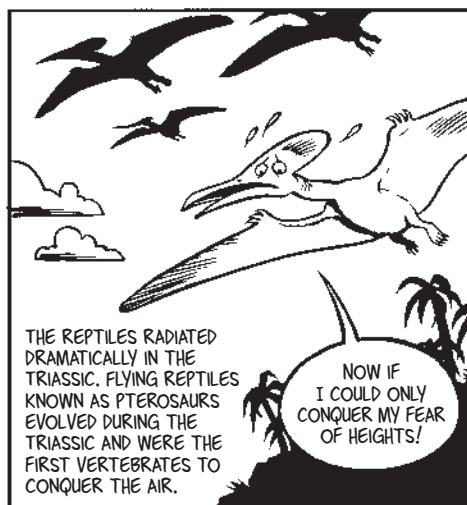
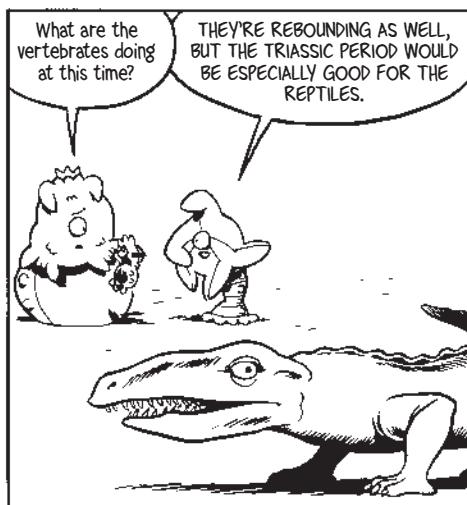
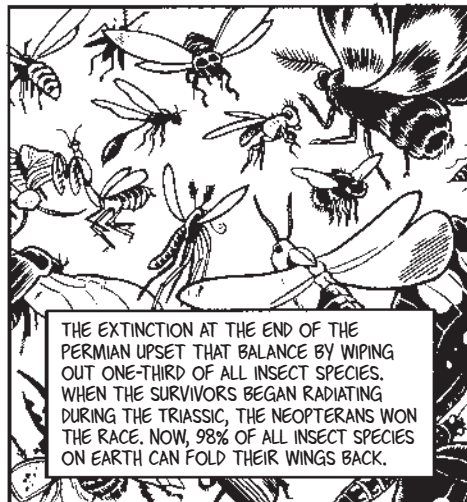
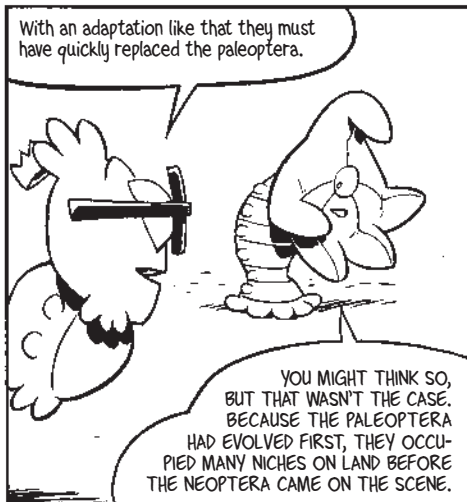


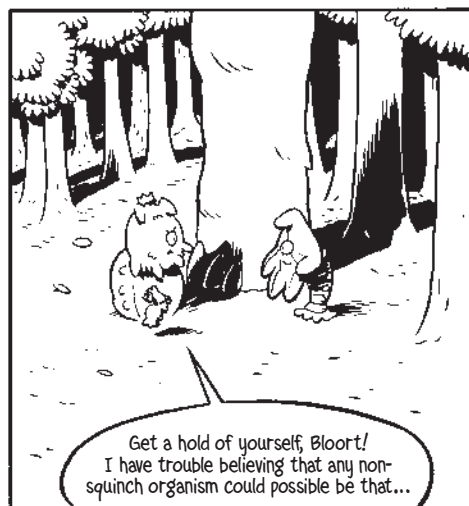
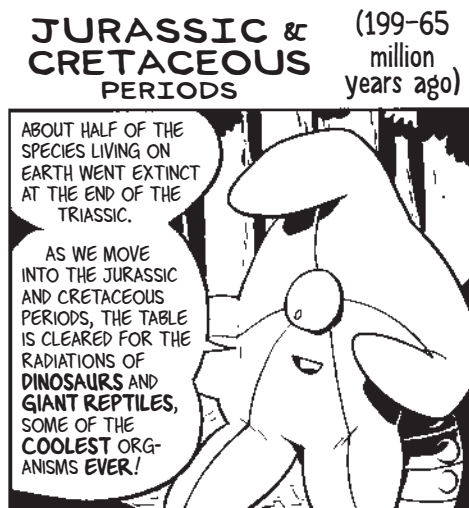
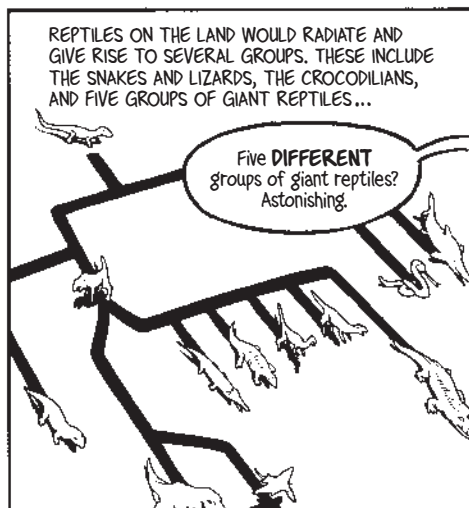
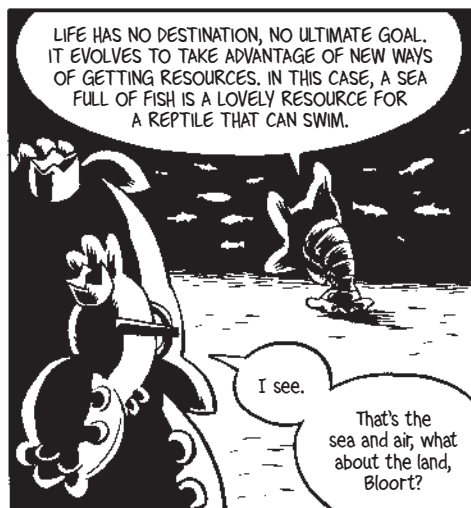


TRIASSIC PERIOD

251-199 MILLION YEARS AGO







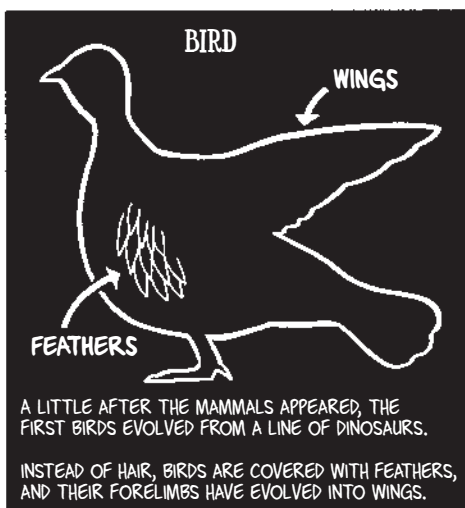
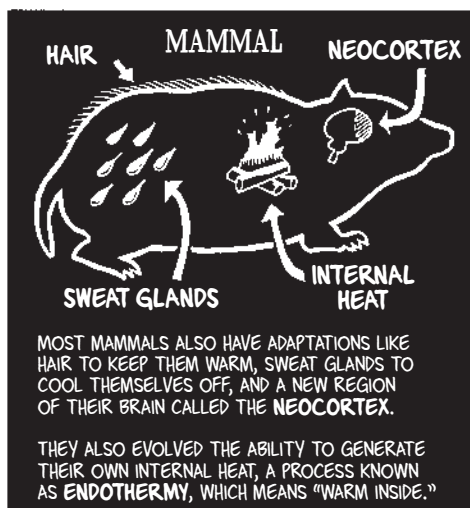
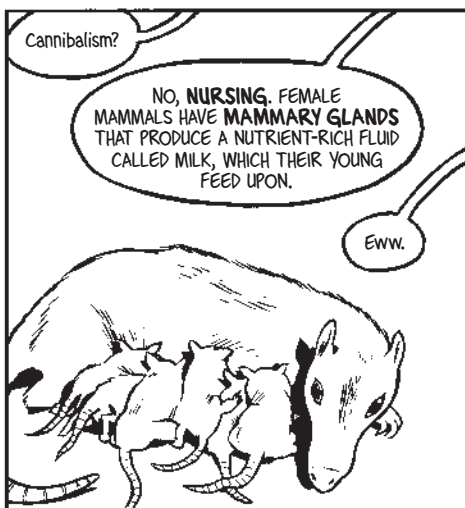
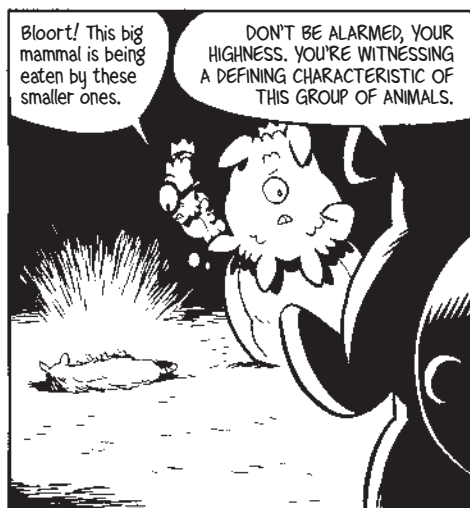
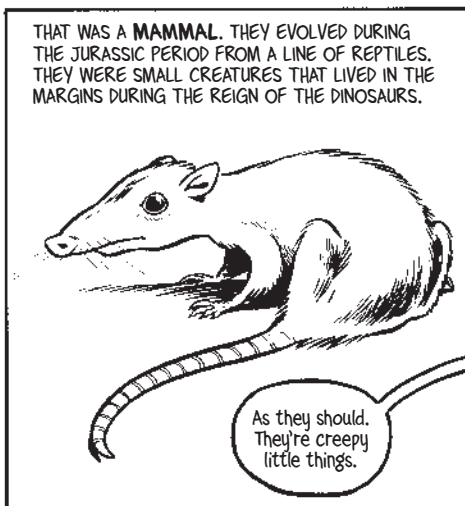




Great
glargally-
margally!

You didn't
say they would be
ENORMOUS.

ACTUALLY,
I THINK I
DID.



IMAGINE A WORLD WHERE BIG BIRD WAS KING AND YOU WILL HAVE A PRETTY GOOD PICTURE OF WHAT THE ISLANDS OF NEW ZEALAND WERE LIKE OVER SEVEN CENTURIES AGO.

NO MORE MOA

MORE THAN 250 DIFFERENT BIRD SPECIES POPULATED THE ISLANDS, INCLUDING ENORMOUS ANIMALS LIKE GIANT **MOAS** AND **HAAST'S EAGLES**. THIS HAVEN FOR BIRDS EXISTED FOR MILLIONS OF YEARS, UNTIL IT WAS RAPIDLY DECIMATED BY HUMANS SEVEN CENTURIES AGO.

THE ISLANDS OF NEW ZEALAND ARE PRETTY ISOLATED AND, NOT SURPRISINGLY, ANIMALS THAT COULD FLY WERE MOST LIKELY TO COLONIZE THEM. AS A RESULT, THERE WEREN'T ANY TERRESTRIAL, OR LAND-DWELLING, MAMMALS LIKE RATS OR CATS ON NEW ZEALAND, AND BIRDS WERE THE TOP DOGS (SO TO SPEAK). BECAUSE THEY DIDN'T HAVE TO COMPETE WITH MAMMALS FOR RESOURCES, MANY SPECIES OF NEW ZEALAND BIRDS EVOLVED TO **ENORMOUS** PROPORTIONS.

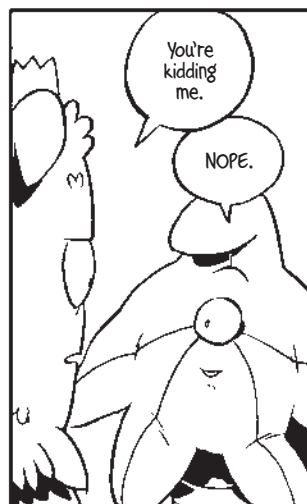
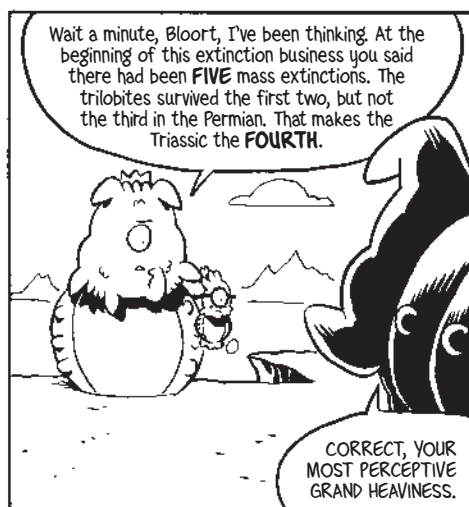
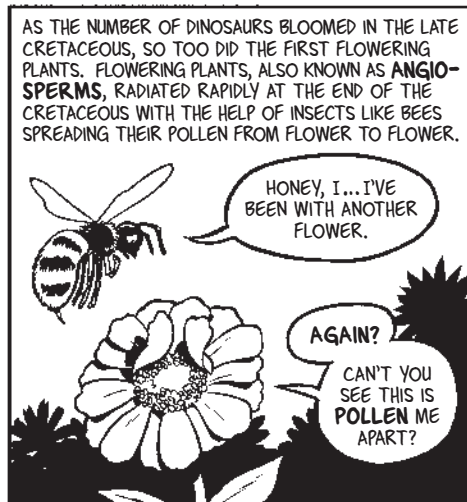
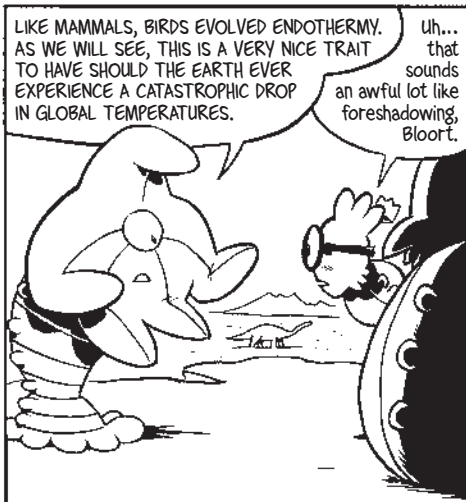
THE BIGGEST OF THE NEW ZEALAND BIRDS WERE THE GIANT MOAS THAT STOOD THIRTEEN FEET HIGH AND WEIGHED IN AT 500 POUNDS. THE MOAS WERE FLIGHTLESS BIRDS THAT ROAMED THE FOREST OF NEW ZEALAND, EATING PLANTS. FOR OVER A MILLION YEARS, THE ONLY THREAT TO THEIR EXISTENCE WAS A GIANT PREDATOR, HAAST'S EAGLE, WHICH COULD GROW TO BE AS MUCH AS THREE FEET HIGH, FIVE FEET LONG, AND HAVE A WINGSPAN OF OVER TEN FEET WIDE.

AROUND A.D. 1300, A TRIBE OF POLYNESIANS CALLED THE MAORI DISCOVERED NEW ZEALAND AND ESTABLISHED A SETTLEMENT. THE MAORI HUNTED AND ATE THE MOAS AND DESTROYED MUCH OF THEIR FOREST HABITAT. IN ADDITION, HUMANS INADVERTENTLY BROUGHT STOWAWAYS LIKE **RATS** WITH THEM WHEN THEY ARRIVED. THESE INTRODUCED RATS FEASTED ON THE MOAS' EGGS, WHICH SAT CONVENIENTLY IN NESTS ON THE GROUND. THE MOAS COULD NOT

REPRODUCE FAST ENOUGH IN THE FACE OF THIS HUMAN AND RAT ONSLAUGHT. WITHIN ONE HUNDRED YEARS OF HUMAN ARRIVAL, THE MOAS HAD BEEN DRIVEN TO EXTINCTION. BUT THE MOAS DID NOT GO ALONE. WITHOUT THEIR PRIMARY FOOD SOURCE, HAAST'S EAGLES SOON FOLLOWED THE MOAS INTO EXTINCTION.

TODAY, MANY SPECIES ARE AT RISK OF EXTINCTION AS A RESULT OF HUMAN HUNTING AND FISHING. WHAT'S MORE, THE LOSS OF ONE SPECIES CAN RESULT IN THE LOSS OF MANY MORE. SCIENTISTS AND CONSERVATIONISTS ARE LOOKING FOR BETTER WAYS TO MANAGE EARTH'S RESOURCES SO THAT WE CAN AVOID THE WIDESPREAD LOSS OF SPECIES VITAL FOR HUMAN SURVIVAL AND PERHAPS PREVENT OUR OWN EXTINCTION.





AT THE END OF THE CRETACEOUS, AN ASTEROID THE SIZE OF A MOUNTAIN STRUCK EARTH OFF THE COAST OF MEXICO.



THE IMPACT TRIGGERED DEVASTATING EARTHQUAKES, TIDAL WAVES, ACID RAIN, AND VOLCANIC ACTIVITY. THE HEAT FROM THE BLAST IGNITED WILDFIRES ACROSS THE GLOBE AND DEVASTATED FORESTS.



AFTER THE FIRES SUBSIDED, THE ASH AND SMOKE THEY PRODUCED BLOTTED OUT THE SUN AND LEFT THE WORLD COLD AND DARK.

THE RESULT WAS A **CALAMITY** FOR THE WORLD'S ECOSYSTEMS.

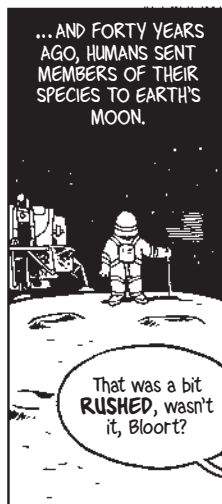
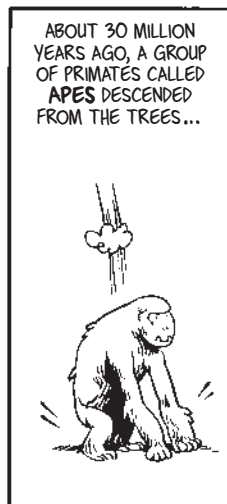
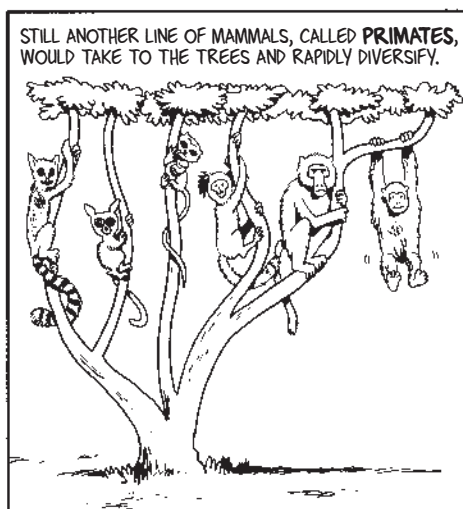
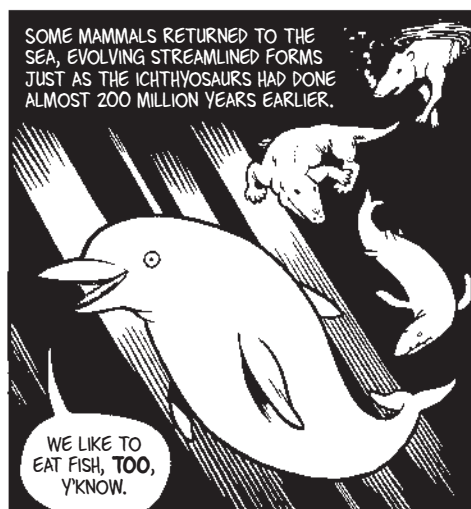
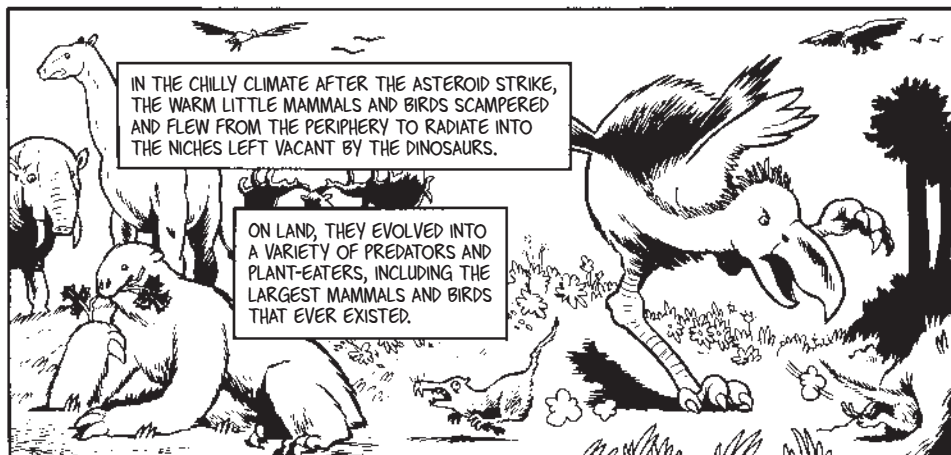
AN **ECOSYSTEM** IS A COMMUNITY THAT RESULTS FROM THE INTERACTION BETWEEN ORGANISMS AND THEIR PHYSICAL ENVIRONMENT.

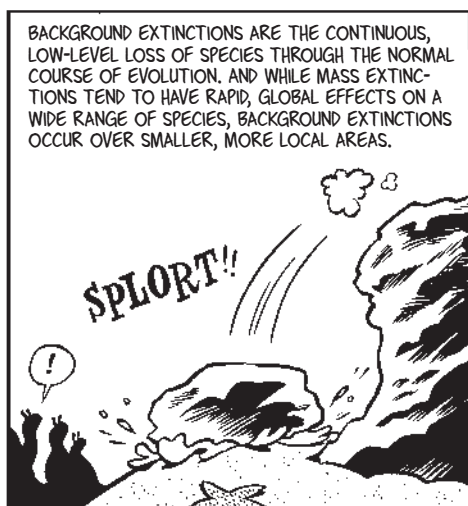
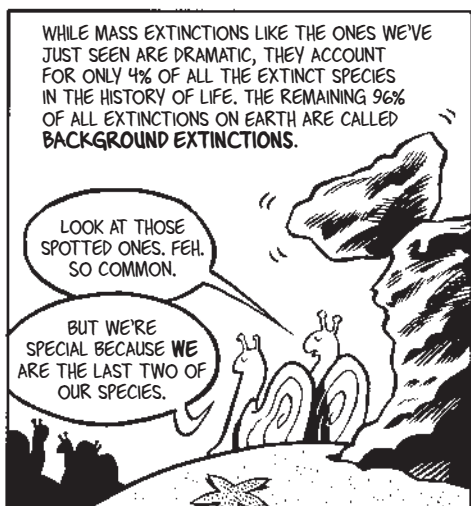
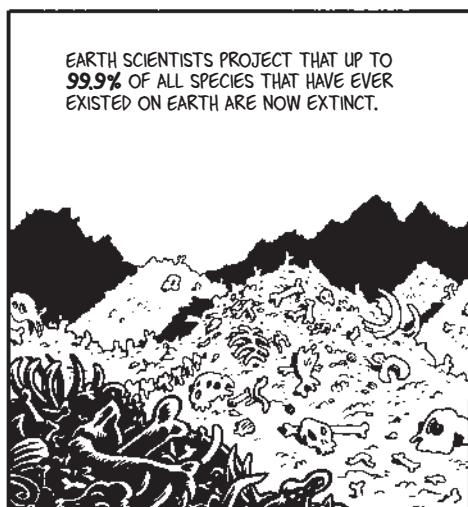
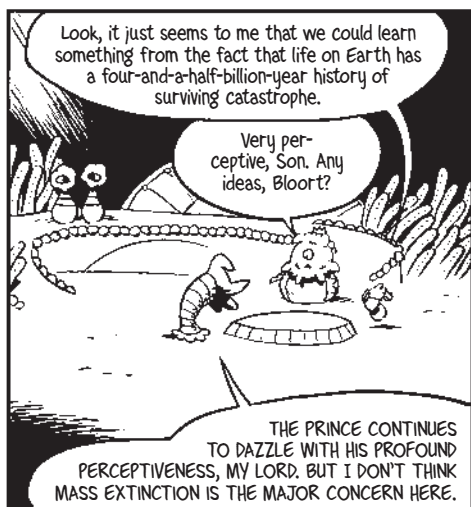
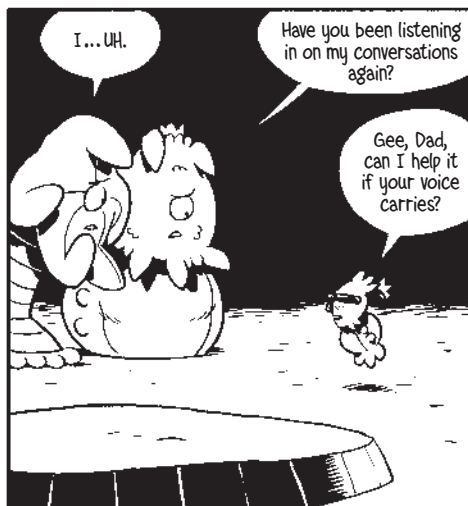
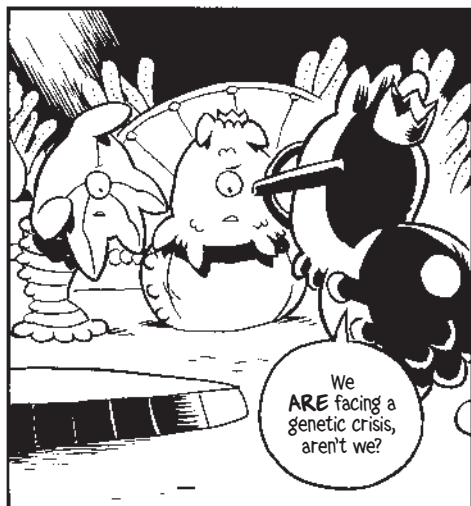
AS PLANT AND ANIMAL SPECIES WENT EXTINCT, THOSE COMPLEX INTERACTIONS **COLLAPSED**, CAUSING EVEN MORE SPECIES TO GO EXTINCT. DINOSAURS, FLYING REPTILES, AND MARINE REPTILES WERE COMPLETELY WIPED OUT.



CENOZOIC ERA

65 MILLION YEARS AGO TO PRESENT

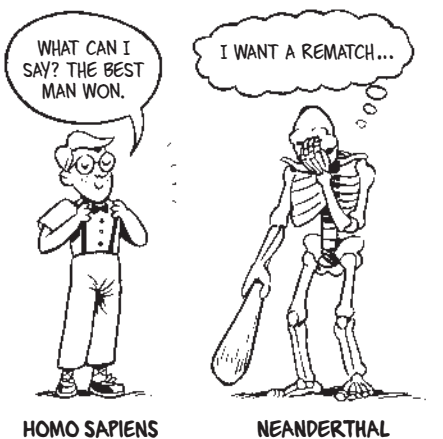




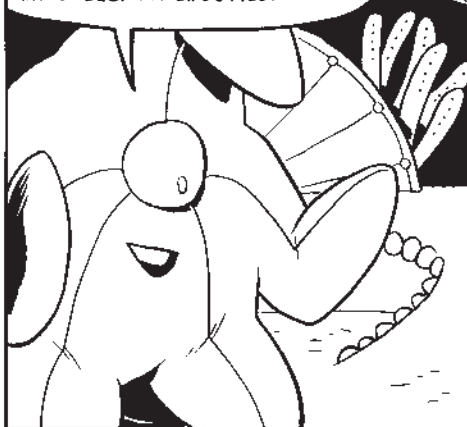
THE SLOW, GRADUAL EXTINCTIONS OF SPECIES CAN BE BAD LUCK BUT ARE USUALLY DUE TO THEIR **INABILITY TO ADAPT** TO GRADUAL CHANGES IN THE ENVIRONMENT, SUCH AS IN TEMPERATURE OR THE AMOUNT OF RESOURCES AVAILABLE.



COMPETITION WITH NEW SPECIES CAN ALSO DRIVE A SPECIES TO EXTINCTION.

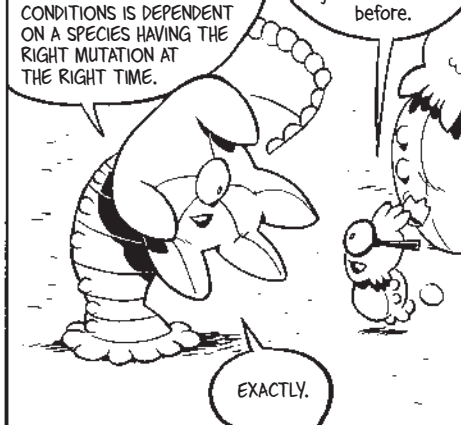


RETURNING TO YOUR QUESTION, YOUR HIGHNESS, I SUPPOSE **SURVIVING** EXTINCTION IS A MIX OF **LUCK** AND **LIFESTYLE**.

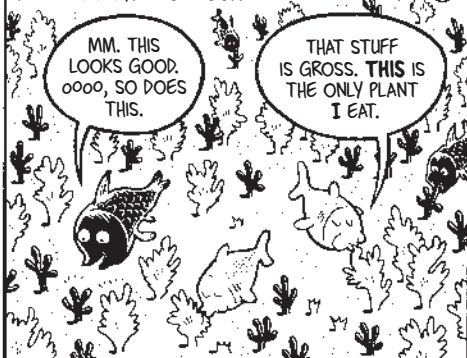


EVOLUTION ISN'T FORWARD LOOKING, SO EVOLVING AN ADAPTATION TO SUIT NEW CONDITIONS IS DEPENDENT ON A SPECIES HAVING THE RIGHT MUTATION AT THE RIGHT TIME.

Like the antibiotic-resistant bacteria you talked about before.



IN TERMS OF **LIFESTYLE**, THERE ARE TWO FACTORS THAT SEEM TO PLAY A ROLE IN SOME SPECIES SURVIVING EXTINCTION. THE FIRST IS BEING A **GENERALIST**. A GENERALIST CAN THRIVE IN A WIDE VARIETY OF ENVIRONMENTS AND TAKE ADVANTAGE OF MANY DIFFERENT TYPES OF FOOD.



FOR EXAMPLE, PICKY EATERS TEND TO GO THE WAY OF THEIR FOOD.

