



JOIN US ON AN  
EXPEDITION THROUGH...

# DINOSAUR DESERT

DR NICK CRUMPTON

OLA PŁOCIŃSKA







To the children of conflict. — N.C.

Ola's dedication.

— O.P.

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# DINOSAUR DESERT



Written by  
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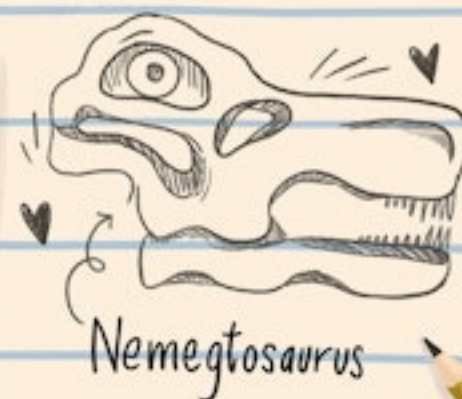
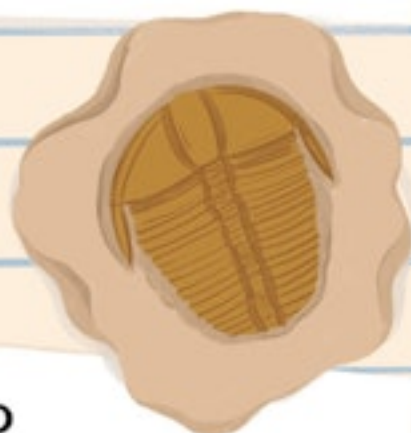
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Zofia's first fossil!



Nemegtosaurus



Devonian  
416 MYA



Triassic  
252.2 MYA



Jurassic  
199.6 MYA



Cretaceous  
145.5 MYA



Paleocene  
65.5 MYA



PALEOZOIC

MESOZOIC

CENOZOIC

MYA = million years ago



The sun burns slowly across the sky, as it always had and as it always will. Below the vast blue sky, a *Parvicursor* fills its belly full of delicious termites while a *Catopsbaatar* scurries home to its mate.



Gradually, life returned to old places in new shapes...



Until, millions of years later, the world irrevocably changed once more.





## FROM ONE WAR TO ANOTHER

## A NEW GERMAN CHANCELLOR

The year is 1933 and Adolf Hitler has risen to power in Germany. His speeches, his writings, his films – all his propaganda has convinced Germans that they are the rightful rulers of Europe. And that they should 'take back' what they lost following World War I.

**DEVASTATING LOSS:** World War I (1914–1918) was one of the deadliest global wars in history. 40 million people died. It was fought between the Entente Powers (France, the United Kingdom, Russia, the United States, Italy and Japan, among others) and the Central Powers (Germany, Austria-Hungary, the Ottoman Empire and Bulgaria).



**JOBS NEEDED:** Germany and the Central Powers had been defeated in this brutal and devastating war. In 1919, the Treaty of Versailles made Germany pay for the war, reduce its army and lose territory. Soon after, the Great Depression of the 1930s meant that millions were out of work and the country faced starvation and misery.



Many Germans quickly fell under the spell of the Nazi party. Hitler promised to bring Germany back to greatness by giving people jobs and ridding the country of anyone 'who was not like them'. To the Nazis, this meant People of Colour, Roma and Sinti people, men who loved men, women who loved women, people from Slavic nations like Poland and Russia and, above all else, people of the Jewish faith.

This hatred was built on hundreds of years of anti-semitic lies, and Hitler used it to unite people to vote him into power. When they made him leader of Germany, he did everything he could to destroy the Jewish people...

## HITLER INVADES POLAND

But ruling over Germany was not enough for Hitler, who wanted complete control over Europe. So, in 1939, Nazi Germany invaded Poland and set in motion a chain reaction that eventually pitted the United Kingdom, the United States of America, France, Belgium, Greece, and many other countries against the Nazis and their allies. Hitler's war destroyed families, crushed cities, and ended the lives of over 80 million people.



## 1933

Hitler appointed Chancellor of Germany

Boycott of Jewish businesses and Jewish people no longer allowed jobs at universities.

Public burning of books written by Jews.

Concentration camps are built.

## 1935

The Nuremberg Laws: Jewish people no longer considered German citizens; cannot marry non-Jewish people or fly the German flag.

## 1938

Kristallnacht (Night of Broken Glass):

200 synagogues destroyed;  
7,500 Jewish shops looted;  
30,000 Jewish people sent to concentration camps.

All Jewish pupils expelled from German schools.

Germany expands its power by gaining territory in Czechoslovakia and Austria.

## 1939

Germany advances into Prague and invades Poland on 1 September. France and Great Britain declare war on Germany. World War II begins.



Europe – and almost the whole world – was now at war, ever since Nazi soldiers had marched into Poland: the first step in their rampage of invasion.

Warsaw, Poland's capital city, had been overtaken in just three weeks, and its people trapped. Almost half a million Jews were forced to live in a small neighbourhood – the Warsaw Ghetto – in terrible conditions. Many of those trapped fought back in the Warsaw Ghetto Uprising, a brave defiance against the Nazis despite overwhelming odds. But to no avail. Many thousands died on the streets of their city or were deported to concentration camps.

And now, Warsaw was on its knees. The Nazis had taken control. Its goal: the complete destruction of the Polish people and its culture. Day by day, Polish people were sentenced to death on the streets. Families were driven from their homes, forced into labour and imprisoned in concentration camps. Museums, libraries and theatres were closed or destroyed, and Polish children were banned from attending school.

But the Polish people would not give up easily. For years, ordinary people – shopkeepers, bankers, teachers and artists – secretly did what they could to resist the Nazis. An underground government, over one hundred secret societies, and an invisible army were sabotaging trains carrying goods and soldiers, freeing captives from Nazi prisons, blowing up bridges and fighting against their occupiers in the streets.

And somewhere in the chaos of the once beautiful city was Zofia. A girl whose life, like all those around her, had been paused while the world raged its war.



## My name is Zofia Kielan...

I was born in 1925 in Sokółów Podlaski.  
These are my parents Franciszek and  
Maria, and my sister Krystyna.



## Fun at scout camp

Krystyna and I spent our summer vacations  
as part of the Polish Scouting Movement.  
We loved spending time outdoors, camping,  
and learning how to start fires!



## Move to Warsaw

In 1934, my dad got a job in Warsaw so we  
all moved to a district called Żoliborz. I  
was very happy growing up there. I loved to  
read (sometimes even at parties) and often  
squabbled with Krystyna...



## Poland is invaded!

When the Nazis stormed my city  
in 1939, I was only 14. My world was  
turned upside down.



## Polish Resistance

I was proud to serve as a medic as part  
of the Polish resistance. I was in the  
Grey Ranks and Krystyna joined "Help to  
the Soldiers". We were on the front line  
of bottles being waged in our city.



## Secret Studies

We weren't allowed to go to school but we kept  
on with our studies in secret, hidden in people's  
houses. If we had been discovered, we would have  
been shot! In my secret classes, reading my ancient  
biology textbook, I could escape the bullets and  
soldiers. I forgot the danger and the fear and  
travelled in my mind to worlds before dictators,  
before nations, before wars.

## Jana joins the family

In 1941, I was so happy because Jana Prot joined our  
class and we became great friends. But then one day,  
Jana was separated from her family and had to leave  
her home. Could it be because her father was Jewish?  
And an important factory director from Pionki? There  
was no question of what we should do: Jana came to  
live with us. My parents were so scared because keeping  
her safe was a crime in the eyes of the Nazis.





The war in Europe changed in 1944. Soldiers from all over the world, intent on stopping the Nazis, landed in France on 6 June and began a mission to save the continent from oppression, sending a wave of hope across Europe.



In Warsaw, Polish people took up their weapons and began a final fight for their home. Zofia and Jana stopped studying and worked as medics, helping the wounded through the shattered city streets.

They had hoped to fight for just a few days until the forces of the Soviet Russians came to help them. But the Polish people fought in the streets for more than two, brutal months.



The Warsaw Uprising had ultimately failed and the Nazis ordered the entire city to be emptied. Hundreds of thousands of people, including Zofia, her mother, and Jana, were moved to a transit station in Pruszków, where they were either sent to death camps or to other parts of Nazi-controlled Poland.



Zofia, as a healthy young woman, was sent to work in a camp, but by chance a doctor working in Pruszków recognised her and gave her a fake medical certificate to convince the Nazis she was carrying the terrible disease tuberculosis.



Jana pretended to be pregnant, tying a pillow around her waist, and so the two girls, along with Zofia's mother, were sent away onboard an open-topped train carriage usually used to move cattle.

Under the cover of a rainstorm, Zofia, her mother and Jana escaped, jumping over the wagon's sides and hiding with a railway worker friendly to the resistance.



They boiled their clothes to kill the lice from the journey, and hid with others who had escaped from the Nazi trains until Zofia's father tracked them down.



Together, at last, although far from their home, they were finally safe.



By 1945, the terrible war in Europe was finally over. After five years of oppression, Germany and the Axis powers had been defeated.



As the Nazis began to lose the war, they had scattered, running from the cities they had captured. But Warsaw was different. Hitler was determined to destroy the city following the Warsaw Uprising. So, at the end of 1944, as the Nazis' defeat across Europe seemed certain, they left the already wounded city, but then turned their weapons back on it.



They set fire to churches and smashed down schools, demolished museums and stole from art galleries. They shot and crushed, tore and toppled and in just a few months, Warsaw, Zofia's beautiful home, was almost wiped from the face of the Earth.

Zofia walked back to the remains of her city, but in Żoliborz she found her beautiful home had been destroyed. Almost nothing had survived except, incredibly, her bicycle.



She peddled through the ghostly city. Street after street lay ruined but, to her surprise, she discovered that the Museum of Zoology was still – just about – standing.



Sharing space with the museum's homeless curators and volunteers, Zofia slept among the bottles of collected animals and drawers of fossils, a refuge built from knowledge. Reading book after book from the surviving library, *Zofia the Freedom Fighter* slowly became *just Zofia*, learning about the natural world that had always been there around her, hidden by the noise of war.



Zofia's time spent among the curators and specimens of the museum had convinced her: she would study biology at her city's university. But the university had barely any buildings still standing; its classrooms had been levelled, its libraries lay in ruins.



Instead, Zofia was taught wherever her teachers could find space. It was in one such place, in the apartment of Professor Kozłowski on Wilcza Street, where her life changed forever.

Professor Kozłowski stood behind his table and drew on his blackboard, speaking quickly as he taught Zofia's small class about the countless species that had lived throughout the history of life on Earth.

And it was in this room, in this small apartment, that Zofia learned about the daring expeditions of Roy Chapman Andrews, twenty years ago.



This American palaeontologist and his team had been on a mission to find human fossils but had, miraculously, found dinosaur bones instead!

Zofia learned about dangers of working in the desert, about the wonderful people they had encountered, and the dinosaur eggs and mammal skulls they had prised from the sandy rocks of Bayn Dzak.



Zofia was entranced.





Where the Gobi Desert now stretched – endless, barren, inhospitable – there had once been a bustling, ancient shoreline. In her mind, Zofia waded in freshwater rivers and explored the conifer forests, rich with the scents of the Earth's first flowers. The humid air was thick with the chatter of insects overhead, while the shadows of dinosaurs passed between the trees and her mammal ancestors scampered underfoot.

Where there was nothing, there had once been everything.





Following the war, travel was near impossible so Zofia started to look at ancient animals she could find far closer to home.

As Poland began its next difficult chapter, Zofia became a paleontologist and spent the next 14 years in her home country, climbing the heights of the Holy Cross Mountains – and travelling 360 million years back in time to the Devonian period.

This was the age of huge, armoured fish, of the first early plants on land, and the very beginnings of the backboned animals that would eventually take slippery steps up out of the water.

Back then, most of what is now Poland was underwater, so the fossils Zofia found had all settled at the bottom of an ancient ocean.



Zofia found and studied trilobites – hard-shelled, aquatic relatives of insects and crabs – that had once thrived in this underwater world. By the Devonian period, these ancient creatures had existed on Earth for over one hundred million years. Their bodies, sometimes elegant, often gnarled or covered in bumps, reflected countless adaptations to their marine habitats.

After becoming an expert on these ancient invertebrates, Zofia began excavating the fossils of polychaete worms. These creatures had once burrowed through the long-lost seabed, leaving behind only their tiny jaws, preserved in the rocks she carefully dissolved in acid.

Zofia was learning the history of the Earth and how to read the secret stories held in the smallest of fossils.



Zofia longed to visit museums in other countries, to see famous fossils with her own eyes. But travelling outside Poland was not easy.



Her country had changed again since the end of war, and even had a new name: the Polish People's Republic. But this was a 'satellite state', controlled by the Soviets – the same politicians who had stolen Polish land and abandoned the Polish people during the Warsaw Uprising.

Zofia did manage to travel to Western Europe but it was much easier to visit other Soviet countries. Her bosses were keen to show off Soviet science to the world, and she saw her chance for adventure! Mongolia – another Soviet satellite state – was the country Zofia had longed to visit for so long.



Zofia didn't think that anyone would give her the money to mount an expedition to the Gobi Desert. After all, she was an expert in trilobites and ancient worms, not dinosaurs. But, thanks to her talent for finding fossils and her knowledge of where the Americans had (and had not) dug in the 1930s, she was given the funds to visit Mongolia and work with scientists there – tasked with bringing back to Warsaw the city's first dinosaurs.

UNION OF SOVIET

SOCIALIST REPUBLICS (USSR)

Moscow



Zofia thought of herself as a young woman studying in Professor Kozlowski's apartment and could barely believe it: she would soon be sitting on a plane to Mongolia's capital city, Ulaanbaatar.

Ulaanbaatar

MONGOLIA

The Soviets were powerful, spreading their ideas and beliefs across Eastern Europe, cutting themselves off from America and the rest of Europe to the West. This was known as the Iron Curtain. Although there was no fighting between these two groups of nations, the world was locked in a cold war with both sides distrusting the other.

The Iron Curtain was an invisible boundary separating the East and West.

After the war, Germany was divided among the Allied forces – West Germany was controlled by the USA, UK, and France, while East Germany was under Soviet control. In 1961, the Berlin Wall was built, physically separating East Germany from West Germany – breaking up families, creating further divides.

London

Paris

Naples

East Germany

West Germany

Polish people's Republic

1.08.68  
WARSAW

Polish Airline

LOT

FLIGHT NR.  
157 09





But first, there was a lot to do. Zofia assembled a small band of fellow scientists who would arrive by train – just before her – in Mongolia in the spring of 1964.

Throughout the winter in Warsaw, they prepared for their journey. They were going to have to take more than just their passports and sunglasses. Zofia's team crammed everything into wooden crates, hammered them shut, and sent them about 7,000km over land on the Trans-Siberian Railway.

Everything they would need would be waiting for them when they arrived.

#### THEY WOULD NEED:

- pens and ink for drawing and typewriters for writing up their findings
- 40 hammers, 20 pickaxes, 33 spades, 40 hammers, 100 chisels, 50 paint brushes and 1 hand pulley for excavation
- 2 tonnes of plaster for protecting any bones they found
- wood, nails, screws and tools for building crates to transport fossils
- 120 litres of liquid polystyrene and 200 square metres of corrugated cardboard for packing fossils
- 150 square metres of canvas
- 14,000 litres of petrol, and a repair kit for their enormous trucks
- food, knives, forks, spoons, and a field kitchen for the whole team over four months
- tents, sleeping bags, blow-up-matresses
- light clothes for the blistering heat of the day, and warm layers for the freezing desert nights
- a medicine chest
- flashlights and candles



Zofia knew that they could bring all the finest equipment, the newest tools and the biggest trucks, but the most important thing they could take with them couldn't be packed in a box. If she didn't understand the country she was visiting, they would have no hope of finding their way out of the airport, let alone finding fossils. So, in the months before she left, Zofia invited two of Mongolia's finest palaeontologists, Naidan Douchin and Demberel Dashzeveg, to brave the Polish winter with her in Warsaw.



Zofia learned how to read Mongolian maps and speak a few phrases in their language. They taught her about gers – the traditional homes of Mongolia's nomadic people – which were strong enough to withstand sandstorms but light enough to be carried from valley to valley; about the Traditional clothes called deel still worn on the steppe, and about the delicious hevin boov cookie. They read microfilms about dinosaur fossils discovered in the 1920s and planned their trip.

They spoke together for days about their country, Mongolia, about its history – not only of dinosaurs, but of the ancient Xiongnu empire, Buddhist monks and Chingis Khaan.

Сайнуу

Hello

Миний ачааны машин эвдэрсэн

My truck has broken down

Zofia knew how lucky she was that these experts would be guiding them through their country and into the desert, and she could only hope they would be able to offer something in return.

The winter passed and soon it was time for Zofia to leave. With a head full of facts, and a heart full of excitement, she boarded the plane that would carry her, finally, to the desert.



Zofia was finally here.

She was standing in the capital city of Ulaanbaatar, her skin burning under the clear sky and her throat sore from the dry, thin air. She was soon to begin the long, difficult journey to the Nernegt Valley and Tsoagan Khushuu, and then north to Bayanzag, the graveyard of the dinosaurs.





The next day, Zofia, Mr. Dagva and Batochir met the rest of the team who had set up camp in Naranbulag, sheltered by a dune overgrown with tamarisk shrubs, in the southern part of the Nemegt Valley.



Damba and Khorloo (drivers) with Zofia

Zofia had assembled an amazing team of young adventurers, and they were joined by an equally brilliant group of Mongolian scientists. As no one from Zofia's Polish team had seen the desert before, they watched and listened to their new Mongolian friends, learning how to survive in this new – but ancient – world.

The valley ran for over 160km from east to west through the Gobi Desert and formed a split into the Earth. It was here they hoped to discover the animals, preserved since the Cretaceous, in the sandy rocks.

\*In Mongolia, people used to have just one name. It was only after the 1990s, that many started using both a first and last name.





## A DAY IN THE LIFE OF THE DESERT CAMP

Life in the camp was not going to be a holiday. They woke at seven each morning after a freezing night, the frost on their tents crackling as they unzipped the doors.



After a speedy breakfast of Mongolian tea boiled in milk they set off on their work.



Moving slowly across the dusty ground, their eyes close to the sand, they 'prospected' for fossils. No matter what they found, they would have to stop by lunchtime when the temperatures rose to over 40 degrees. Forced into the shade, they returned to their work in the late afternoon until the light began to fall.



Each night as the sun set, they discussed what they had prized from the sandy rocks. They would build a fire from the paper-dry desert shrubs, which grew around their camp, to boil water and cook the canned food they had shipped from Europe.



There was no tap for fresh water, and any rain they collected quickly evaporated (sometimes before it even hit the ground). Instead, all their water for cooking, drinking, washing, and cooling their trucks, had to be collected from a well 40km away – so everyone was only allowed to drink a few cups per day.

In the light of their evening fires, they were surrounded by clouds of biting insects so thick that they had to sit down to their evening meals with their heads and faces wrapped in scarves.

They made the most of it – laughing at how silly they looked, singing songs to raise their spirits and drinking kumiss (fermented horse or camel milk) that their Mongolian friends shared with them.





Despite their laughter, working on the camp could be dangerous. Mongolia was five times the size of Poland but home to less people than lived in the whole of Warsaw. With no one to ask directions from and no radio communications, if they got lost, they might never find their way back.

But Zofia and her team were not alone in the Gobi. Beside them as they worked were the desert's non-human inhabitants...

### Gobi jerboa (*Allactaga bullata*)

These nocturnal mammals avoided the devastating temperatures by burrowing under the ground during the day.



Zofia had to look out for scorpions and spiders to avoid bites or stings, but a far greater danger could descend from the skies: it wasn't long before she lived through her first sandstorm.

She had been working inside her tent when she saw a grey thunder cloud. Within minutes, the breeze grew faster and stronger, until their tent ropes snapped and their equipment scattered. A tower of speeding sand blotted the sun from the sky and in near darkness Zofia and her team threw themselves on top of their tents, holding them down while the sand whipped their skin and tore at their eyes.

### Gobi pit vipers (*Gloydius halys*)

Like all pit vipers, this snake, difficult to see against the brown sands and rocks of the desert, was venomous. Although some members of the team thought these snakes should be destroyed, Wojciech preferred picking them up by their tail and carrying them to safety far away.



### Gobi scorpions (*Mesobuthus eupeus*)

Although not deadly, the venomous sting of a scorpion's sting was extremely painful!



### Camel-spiders (*Solifugids*)

Fast, aggressive and armed with powerful jaws, these arachnids appear to be a mix of spider and scorpion – no one wanted to find one of these in their sleeping bags!



### Long eared hedgehogs (*Hemiechinus auritus*)

Like many other desert-dwelling mammals, this hedgehog's ears were very long to help it draw heat away from its body. These hedgehogs had a habit of raiding the expedition's rubbish, making a mess in the process.



### Tarvaga marmots (*Marmota sibirica*)

Despite their cuteness, everyone tried their best to stay away from these rodents, as they could carry pneumonic plague – a deadly disease for humans.



Sandstorms could last longer than an hour and, after the wind had calmed, the camp always looked like a battle site and would take days to be repaired.



Soon all the hardship began to pay off.

Zofia and Guidon discovered the fossilised skull of a dinosaur: it's tell-tale snout, its eye sockets, the shape of its teeth, all revealed the story of its ancestry.

As they gradually removed fragments of stone, the team freed an animal wondrous to behold in its preserved sleep. The slender, powerful skull lay at the end of a curved neck, and they soon discovered ribs, small arms, powerful hips and legs, and a long tail, balancing the weight of the dinosaur's muscles, stomach and head.

Slowly and carefully they began to expose the delicate bones – first with spades, picks and chisels, and then with spatulas and eventually paint brushes.

After only a few days in the field, they had discovered an almost complete *Tarbosaurus*, a 10m predator, cousin of *Tyrannosaurus rex*, that had hunted prey through the seasonal wetlands before being encased in rock for 70 million years.



As the expedition continued, magnificent fossils appeared day after day, including a gigantic 12-tonne sauropod skeleton, so large it would take two weeks to free it from its sandstone prison.



Discovering dinosaurs was only the first step. After recording and photographing the fossils, there remained the enormous task of protecting the remains in plaster and shipping them back to Ulaanbaatar to be studied in the museum.

After a skeleton was found, a wooden frame was built around it and plaster poured in on top of the fossil. After leaving the plaster overnight to harden, a lid was nailed on the crate and trench dug around the base.



Then, after rope had been attached to the corners, all members of the expedition would pull or push the crate until the rocky stem it sat on cracked and the fossil, safe in its protective casing, snapped off.



When skeletons were spotted in a place too difficult for the trucks to get close to, the dinosaurs had to be cracked from the ground and transported by foot (either being carried or pulled on metal sledges) to wherever the trucks could reach. Freed from their rocky bed, the fossils then sped off to their final destinations, safely bouncing along on the hidden roads.



Zofia's first expedition was a fantastic success. She had led an international group of scientists into the heart of the desert, and despite the heat of the day, the cold of the night, and the back-breaking hard work, they had pulled wonders from the Earth that had been held secret for 70 million years.

But one adventure wasn't enough and over the next seven years, Zofia and her team returned to the Gobi five more times, exploring more of the desert, expanding their gateway to the Cretaceous. Each time they faced new challenges, but every year their amazing discoveries made it worth the sandstorms, sunburns and scorpion stings.



## FOSSIL DISCOVERIES

### 1. Tsagaan Khushuu (South Nemegt)

The fast-running *Gallimimus*, an ostrich-like dinosaur, was discovered at this site. Its bones were later found to be highly radioactive due to uranium-rich groundwater!

### 2. Bayanzag

Nine beautifully preserved skulls of Cretaceous mammals were found here, providing important clues about the evolution of our furry ancestors.

### 3. Khulsan

An unknown ankylosaur was discovered within the basin. Difficult to reach, the team needed scaffolding to scale the cliff side.

### 4. Tugruglin Shiree

In 1971, Teresa Maryańska and the team discovered a *Velociraptor* and *Protoceratops* fossilised as if in battle. Did they die fighting or was the *Velociraptor* scavenging for a meal?



**BULGAN VILLAGE**  
The only post office for hundreds of kilometres.



**ALTAN UUL**  
"The Café" at Altan Uul was close to the Polish-Mongolian camps.



**DALANZADGAD**  
The capital of the Southern Gobi province where food and tools were stored.

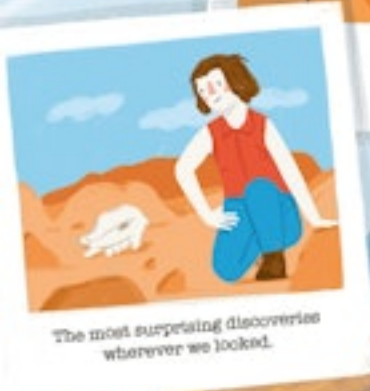
Some of the dinosaurs they discovered were enormous, but others were much smaller, like *Homalocephale* (a tiny relative of the dome-headed *Pachycephalosaurus*) that Zofia discovered when she turned over an interesting looking block of stone, only to find a couple of eye sockets looking back at her!



*Gallimimus*



Transporting the fossils was not always easy...



The most surprising discoveries wherever we looked.



An amazing discovery, but difficult to reach!



It was in Altan uul that Zofia would make one of her greatest discoveries...

It was the Festival of Naadam – the Mongolian national holiday – and everyone was celebrating.



Folk songs had been sung around the fireplace, while they ate argali with rice washed down with lots of cups of kumiss. Chief geologist Ryszard had stunned everyone by walking barefoot over the hot coals of the fire.



It had been a wonderful change of their routine, but the next day would be even more unusual. It was, for one thing, raining.



Rain in the Gobi was very rare and Zofia didn't think she would have much luck spotting anything in the darkened, soaked sand.



But soon she was stopped in her tracks as, lying in front of her, half-exposed to the overcast sky, stretched a collection of thin bones. As she started to clear the sand from the fossils, she couldn't believe her eyes. She had found an arm, a hand, and then a 20cm-long curved claw...

Back at the camp, no one quite believed her when she described what she had found. This was no tiny-armed *Tarbosaurus*. This was enormous. This was... what was this?



The next day, with Edmund, Halszka, and Barsbold's help, she found more: a shoulder bone longer than she was tall, and an arm 2.4m long, tipped with three, knife-like claws.

After a dusty day of excitement and confusion, Halszka, Teresa, Henryk and Zofia tore through the expedition's library, but none of their books helped at all.



Zofia's dinosaur arm wasn't just unusual, they didn't even know what sort of dinosaur it was from.

On that rainy morning, Zofia had stumbled upon what would become one of the greatest mysteries of palaeontology in the twentieth century...



This terrifying fossil would be named *Deinonychus* meaning 'horrible hand' but they had no idea who the arms had belonged to. In fact, the whole world would have to wait almost fifty years for the rest of the dinosaur's skeleton to be discovered...

*Deinonychus*' stupendous arms were attached to an almost unbelievable animal. Standing at almost the same height as *Tyrannosaurus rex* and at 11m long, it was an 'ostrich-like dinosaur' so large it probably couldn't run.

It was a theropod (a member of the same group of dinosaurs as *T. rex*, *Velociraptor* and *Allosaurus*) but it had no teeth in its wide, metre-long duck-like beak. A sickle-clawed giant with a pot-belly and, probably, a glorious covering of feathers descending over a towering humped-back.

Its vast claws would have helped it draw down branches to eat or scoop huge quantities of soft aquatic plants from the streams of freshwater it waded through. Its shovel-like mouth would munch the plants down into its enormous stomach, where stones it had swallowed helped smash up the hard-to-digest greens.

*Deinonychus* was an omnivore, swallowing the occasional fish along with its water-salads, but this was the extent of its meat-eating. Its 'horrible hands' were the dinosaur's cutlery, not the devastating weapons decades of paleontologists thought they must have been.



At the end of each expedition, the fossils, safe in their plaster cocoons, were divided between the Mongolian and Polish teams. The Polish collection travelled by train to Warsaw, and the remaining fossils stayed in Ulaanbaatar to be studied by Dashzeveg, Douchin, Barsbold and their students.

#### Gallimimus

Found: Tsagan khushuu  
Size: 6m long  
Species description: Fast-running.  
Probably omnivorous.

#### Saurolophus

Found: Nemegt basin  
Size: 15m long  
Species description: Large,  
duck-billed herbivore.

It took years to remove the last of the desert rock from the fossilised bones. Until finally it was time to hoist them up and show everyone what they had discovered. In 1968 at the Palace of Culture, dinosaurs from the Gobi Desert astonished the people of Warsaw.

#### Deinocoelurus

Found: Altan uul  
Size: 11m long (when finally  
discovered)  
Species description:  
(unknown until 21st century)

Wide-eyed children squealed beneath the awe-inspiring grin of *Tarbosaurus* and the extraordinary might of *Opisthocoelicaudia*, while their parents pondered on the mysterious arms of *Deinocoelurus* and the wonderful remains of *Protoceratops*.

#### Saichania

Found: Khulsan  
Size: 7m long  
Species description:  
Medium sized, heavily  
armoured herbivore

#### Tarbosaurus

Found: Nemegt basin  
Size: 10m long  
Species description:  
Carnivorous  
Tyrannosaurid

#### Opisthocoelicaudia (reconstruction)

Found: Altan Uul  
Size: 18 m long  
Species description:  
Herbivorous sauropod

#### Prenocephale

Found: Khulsan and  
Nemegt  
Size: 5m long  
Species description:  
Spedal herbivore

#### Nemegtosaurus (skull)

Found: Nemegt basin  
Size: Unknown  
Species description: Herbivorous  
sauropod

#### Protoceratops

Found: Bayanzag  
Size: 2.6m long  
Species description: Herbivorous  
ceratopsian

But Zofia wasn't looking at the dinosaurs – she had other animals on her mind.



Ever since she had first seen drawings of *Deltatheridium* and *Zalambdalestes* in Professor Kozłowski's apartment, Zofia had dreamed of discovering mammals from the age of the dinosaurs.



Before her first expedition, only 11 mammal skulls from the Cretaceous period had ever been found but, by the end of 1965, Zofia and her team had almost doubled that number, just from Bayanzag!



But the pursuit of early mammals was no picnic. Dinosaur fossils were often much larger than the humans digging them up, whereas ancient mammals had tiny, fragile bones that often broke away from their skeletons. Zofia would spend hours on her stomach, her face close to the ground looking for millimetre-long teeth glinting in the sunlight or fingernail-long jaw bones.



On one expedition, Zofia took her team to the dark-red rocks of Hermiin Tsau where they quickly began finding mammals thanks to their slow, steady, head-down approach. Then, when exploring Khulsan, they struck scientific gold. No human had ever before seen the animals they were to discover, and these fossils would help change how the world thought about the first mammals...



Zofia was fascinated by these multituberculates and would spend the next fifty years studying them. After first evolving during the age of *Diplodocus* and *Stegosaurus* in the Jurassic period, they had bloomed by the Cretaceous into the most common and varied mammals on Earth.

*Nemegtosaurus*

*Opisthocoelicaudia*

*Nemegtbaatar*

*Alioramus*

*Catopsbaatar*

*Shuvuuia*

*Saichania*

*Taeniolabis*

*Kennalestes*

*Kryptobaatar*

They burrowed beneath the feet of *Velociraptor*, hopped on two legs away from the snapping jaws of *Shuvuuia*, and clung to branches above the heads of *Alioramus*.

*Velociraptor*

*Chukambaatar*

These creatures didn't live in the shadows of the dinosaurs, but were a fascinating branch on the tree of life that bred and battled, hunted and flourished, surviving for a further thirty million years after the dinosaurs disappeared.



Zofia had spent eight summers in the Gobi and it was now a home-away-from-home. She recognised faces everywhere she went and places that had once sounded mysterious – Bayanzog, Altan uul, Dalanzadgad – were now as familiar to her as the streets of Warsaw.



Zofia and her team had been the only humans in the desert for hundreds of kilometres around but each summer more and more people began exploring the rocks around their dig sites. Russia was sending its own scientists into the desert to hunt for dinosaurs. They took larger teams, had better tools and trucks, and more money to pay local guides.



The Mongolian scientists could only help one group at a time and so, sadly, in 1971, after years of working together, Zofia and her team finally waved goodbye to their friends as they travelled back to Poland. Sunburnt and sad to be leaving, Zofia cradled the collection of mammal fossils they had uncovered together – the greatest collection ever to have been discovered from the age of the dinosaurs.



Zofia returned to the concrete and drizzle of Warsaw but also the warmth of her family. Although she was home, she never truly left the desert where she and her friends had made their discoveries.

To celebrate their finds, Zofia and the expeditions' technician Wojciech Skarżyński recreated life-size constructions at the Silesian Zoological Park in Chorzów for everyone to enjoy!





Zofia wrote books about her expeditions and appeared on TV (sneaking dinosaur eggs into the studios in her handbag), talking about the wonders of the natural world.



In labs, she tried to make sense of the rocky fossil puzzles from the Gobi Desert, alongside young students who were as captivated by her stories of adventures as she had been listening to the tales of Roy Chapman Andrews in her war-torn youth.



And despite the war, Zofia connected with people - no matter who they were, where they lived, what language they spoke or what they believed in - through the shared joy of discovery. She uncovered the secrets of a world before ghettos, iron curtains or cold wars. Recognising that science cannot be done in isolation, she made sure her work travelled outward across nations, uniting us in our shared history on this planet...





