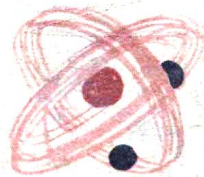




HOW MAN BECAME A GIANT



by M. ILYIN
Y. SEGAL



SOVIET LITERATURE FOR YOUNG PEOPLE

M. ILYIN, Y. SEGAL

**HOW
MAN
BECAME
A
GIANT**

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М. ИЛ Ы И Н, Е. С Е Г А Л
ҚАҚ ЧЕЛОВЕК СТАЛ ВЕЛИКАНОМ

На английском языке

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Man Is a Giant

There is a giant on this earth.

His hands can easily pick up a locomotive.

His feet can cover thousands of miles in a day.

His wings can take him over the clouds, higher than any bird can fly.

His fins are stronger than those of any fish.

His eyes see the invisible, his ears hear words spoken at the other end of the world.

He is so strong he can tunnel through mountains and stop waterfalls in mid-air.

He is changing the face of the earth, planting forests, joining seas, bringing water to the deserts.

Who is this giant?

Man.

But how did he become a giant, how did he become master of the earth?

This is the story of this book.

CHAPTER ONE

The Invisible Cage

There was a time when man was a dwarf, not a giant, a humble slave of nature, not its master.

He had as little power over nature and as little freedom as a beast of the forest, a bird of the air.

There is a saying: as free as a bird.

But is a bird really free?

True, it has wings. And its wings can take it anywhere, over forests, mountains and seas. How often have we envied the birds flying south in autumn. High in the bright sky the live formation wings past, and people standing below with their heads thrown back in wonder say: "Look at the birds! They can fly anywhere!"

But is this really so? Do birds fly thousands of miles just because they like to travel? No, it is necessity, not pleasure, that drives them onward. These migratory habits evolved through a struggle for survival of endless generations of birds over thousands of years.

Since a bird can easily fly from one place to another, it is only logical to wonder why every species of bird is not to be found in every part of the world.

If this were so, our northern pine woods and birch copses would be full of gaily-feathered parrots and skylarks. But this is not so, and can never be so, because birds are not as free as they seem to be. Each bird has its place in the world. One lives in the forest, another in the field and a third along the sea coast.

Just think how powerful the eagle's wings are! Yet it will never cross an invisible boundary (which can actually be charted on a map) when choosing a nesting place. A golden eagle will not build its huge nest in the open, treeless plains, and an eagle of the plains will never make its nest in the forest.

An invisible barrier seems to separate the forest from the plains, a barrier not every beast or bird can cross.

You will never find such true forest dwellers as hazel-grouse, kinglets, or squirrels in the plains. And you will never find a real plain-dweller like a bustard or a jerboa in the forest.

Besides, each forest and each plain has many smaller invisible barriers which divide it into many tiny worlds.

A Walk Through the Forest

As you wander through the woods, you keep crossing invisible barriers. And when you climb a tree, your head breaks through many other invisible barriers. The entire forest is divided into floors and apartments like a huge house. All of them really exist, even though you can't see them.

You may notice, for instance, that suddenly the firs give way to pines, and that the pines grow taller in some places than in others. Here you walk on a carpet of moss, while over there the ground is covered with grass or white lichen.

A city dweller spending the day in the country will tell you he is in the forest. But if you ask a forester, he will say that there are four forests here, not one. There is the fir-grove in the damp hollow with a thick springy carpet of moss underfoot. Farther along, on the sandy slope, is a grove of green-moss pines with blueberry and bil-



Two forest dwellers, a woodpecker and a crossbill

berry bushes everywhere. Higher up on the sandy hills is a grove of white-moss pines, and in the damp spot farther along, the ground under the pines is covered with grass.

You have just passed through three walls separating four little forest worlds without having noticed them at all.

If there were nameplates in the forest, as there are in houses, you would see the following signs on the trees of a fir forest: Mr. Crossbill, Mr. Siskin, Mr. Kinglet, Mrs. Three-toed Woodpecker. In a leaf-bearing wood you would see the following nameplates: Mr. Green Woodpecker, Mrs. Goldfinch, Miss Blue Titmouse, Mr. Flycatcher, Mrs. Chiff-Chaff, Mrs. Mockingbird, Mr. Blackcap, Mr. Black Woodpecker, and many others.

Each forest has several floors.

A pine forest has two, and sometimes three floors. The bottom one consists of moss or grass. The middle one is made up of bushes. The pines form the top floor.

There are seven floors in an oak forest. The top one, made up of the crowns of oaks, ash-trees, lindens and maples, is high up in the air, forming a green roof in summer and a golden-red one in autumn. Reaching halfway to the crowns of the mighty oaks are the tops of the mountain ashes and the wild apple and pear trees.

Below them is a tangle of underbrush—nut-groves, hawthorns and spindle trees. Beneath the bushes are flowers and grasses. They, too, grow in layers, with the blue-bells towering over the other flowers. Beneath them, among the ferns, are lilies-of-the-valley and cow-wheat, and closer to the ground are the violets and wild strawberries that grow on the soft mosses of the leaf-bearing forest.

The forest cellar is underground, as it should be. This is where we find the roots of the trees, the bushes, and the flowers.

Each floor of a pine or leaf-bearing forest has its own inhabitants. The hawk builds its nest highest. Beneath it, in a hollow of a tree, is the woodpecker and his family. The blackcap has made its nest in a hawthorn bush. The woodcock, who lives on the ground floor, walks about below. Under the ground, in the cellar, forest mice have their tunnels and homes.

There are all kinds of apartments in this huge house. It is sunny and dry on the top floors. It is dark and damp on the ground floor. There are cold apartments that can only be used as summer homes. There are warm apartments which can be used all year round.

A burrow in the ground is a warm apartment. Scientists measured the temperature of a burrow that went five feet down. This was in winter, when it was -18° (Centigrade) outside, but in the burrow the thermometer registered $+8^{\circ}$.

It is much colder in the hollow of a tree. An animal can freeze here in winter. In summer, however, it is a lovely place, especially for owls and bats who are always on the "night shift" and like to spend their days dozing somewhere in a dark corner, hidden from the sun.

People often change their apartments and move from one house to another, from one floor to another. But in the forest this is practically impossible.

The woodcock will never exchange his dark, damp house for a dry, sunny attic. And the hawk, who likes the attic, will never agree to move his nest to the ground at the foot of the tree.

Prisoners of the Forest

Let's imagine that a squirrel decided to exchange its apartment with a jerboa (a jumping rodent). A squirrel lives in the forest, while a jerboa lives in the open steppe or desert.

The squirrel's house is high up in a tree, in a hollow or among the branches. The jerboa lives in a burrow in the ground.

In order to get to his new home, the jerboa would have to climb the tree. But he would not be able to do this, since his paws are no good for climbing.

The squirrel, on the other hand, would never be able to live underground. All its habits and ways are those of a tree-dweller.

We need only look at its tail and paws to guess where it lives.

A squirrel's paws are made for grasping branches and plucking nuts and pine cones from trees. Its tail is a regular parachute which supports it in the air when it jumps from branch to branch. The squirrel's tail comes to the rescue when it has to dart and leap to escape a marten.

But the jerboa, who lives in the steppe, has a very different set of paws and a tail quite unlike the squirrel's. There is not a bush to hide under or a tree to offer safety in the flat, open steppe. The only way to escape from an enemy is to flee, to disappear, to actually drop through the ground. And that is exactly what the jerboa does. As soon as it notices an owl or eagle-owl circling overhead, it leaps away as fast as it can and disappears into one of its many underground tunnels. That is why it has such paws. It uses its long hind legs to push away from the ground when it leaps, while its short front legs do the digging. It hides from its enemies in its burrow, which protects it from heat in summer and cold in winter.

And what about its tail? A jerboa's tail is its paws' best helper. When the little animal sits up on its hind legs to look around, its tail serves as a support, as a sort of third leg to lean on. And when it jumps, its tail guides the jump like a rudder. If not for its tail, the jerboa would do a somersault in the air every time it jumped, coming smack down on the ground.

Therefore, if the squirrel and the jerboa were to exchange homes, to exchange the forest for the steppe and a hollow for a burrow, they would also have to exchange tails and paws.

If we were to study the other inhabitants of the forest and steppes closely, we would discover that each of them is tied to its place in the world by an invisible chain, a chain that is very difficult to break.

The woodcock lives on the ground floor of the forest, because its favourite food is in the cellar. Its long bill seems especially made to pull up earth-worms. Since there is nothing of interest to a woodcock on a tree, you will never find one there.

But you will rarely see a three-toed or large spotted woodpecker on the ground. The woodpecker spends its days pecking away at the trunk of a fir tree or birch.

What is it pecking at? What is it looking for?

If you pull a bit of bark off a fir tree, you will see crooked white lines going in all directions. These are the tunnels chewed into the wood by the typographer bark beetle, a permanent tenant and boarder in all fir trees. Each of the crooked lines ends in a little dent, and in each dent the larvae of the bark beetle turns into a chrysalis, and then into a beetle. The beetle has adapted itself to the fir tree. And the woodpecker has adapted itself to the beetle. The woodpecker's hard bill can easily pierce the bark of the tree. And its tongue is so long and flexible that it wiggles along the crooked lines and gets the larvae.

And so we have a chain: fir tree—bark beetle—woodpecker.

This is only one of the many chains that bind the woodpecker to the tree and to the forest.

There on the tree it finds its food: not only the bark beetle, but other insects and their larvae. In winter the woodpecker plucks the nuts from pine cones with great skill: it wedges a cone between the trunk and a branch to keep it steady. The woodpecker hollows out a nest for its family in a tree trunk. Its firm tail and strong claw-like toes are perfect for climbing up and down the trunk. How then can it ever exchange its life among the trees for anything else?

We see that the woodpecker and the squirrel are prisoners, not inhabitants, of the forest.

How Fish Came Ashore

The little world of the forest is but one of the many little worlds that make up the big world.

There are not only forests and steppes on earth, there are mountains, tundras, seas and lakes.

On each and every mountain invisible barriers separate one tiny world from another.

Each and every sea is divided into underwater floors by invisible ceilings.

In the tidal area at the water's edge the rocks are covered with countless shellfish. They are so firmly attached to the rocks that not even the wildest storm can pry them loose.

Farther down, in the sun-brightened water, colourful fishes dart in and out among the green and brown seaweed, transparent jelly-fish float about, and starfishes slowly creep along the bottom. The underwater rocks are covered with weird animals that are as motionless as plants. They do not have to search for their food. It finds its way into their mouths itself. These are the red ascidia which look like double-necked pitchers. They get their nourishment from the tiny beings they suck in with the water. The bright sea anemones catch the fish that swim too close to them with their petal-like tentacles.

There is a very different world on the bottom, on the dark floor of the sea where night never turns into day, where it is always gloomy. There is no light in the depths of the sea, and that means there is no seaweed, for seaweed needs light.

The ocean bed is a dark graveyard where the remains of animal and plant life filter down from above.

Ten-legged crabs with long tentacles wander about the loose silt. Fishes with wide mouths swim by in the darkness. Some have no eyes at all. Others have two eyes that stick up like telescopes. There are fishes with fiery dots along their bodies. They look like tiny ships with brightly-lit portholes. There are fishes that have their own beacon which shines on a high stem growing from their head.

How unlike our own is this strange world!

But then, how unlike dry land the shallow strip along the coastline is, though they are separated but by a single line, the line of the beach.

Can the inhabitants of one world move to another? Can a fish leave the sea and move to dry land?

This seems quite impossible. A fish is adapted to a life in water. In order to live on land it would need lungs instead of gills and feet instead of fins. A fish could exchange its life in the sea for a life on dry land only if it ceased being a fish.

But can a fish cease being a fish?

If you ask a scientist this question, he will tell you that many millions of years ago some species of fish actually did come ashore and stopped being fishes. This transition from water to land took not a year and not two, but millions of years.

In the Australian rivers that are gradually drying up there is a species of hornfish whose swimming bladder resembles a lung. When, during the dry period of the year, the water level begins to fall, turning the rivers into strings of muddy puddles, all other fish die, and their rotting bodies pollute the water. Only the hornfish survives the dry period, for it has lungs besides its gills, and when it wants air it simply sticks its head out of the water.

There are some species of fish in Africa and South America that can do without water altogether. They bury themselves in silt during droughts and lie there motionlessly, breathing with their lungs until the rainy season sets in again.

That means fish could have developed lungs.

But what about legs? Yes, and legs too, and there are living examples to prove it. There are mud skippers in the tropics which can not only skip along the shore, but can climb trees as well. Their paired fins serve as their legs.

All of these strange beings are living proof that fish could have emerged from the water and come up on land. But how can we tell if this really happened?

The bones of extinct animals tell us the story. Archaeologists digging in ancient deposits found the bones of an animal that was very much like a fish, yet was no longer a fish. This was an amphibian, something like a frog or a triton. This animal was called a *stegocephalus*. It had regular five-toed feet instead of fins. When it came ashore