



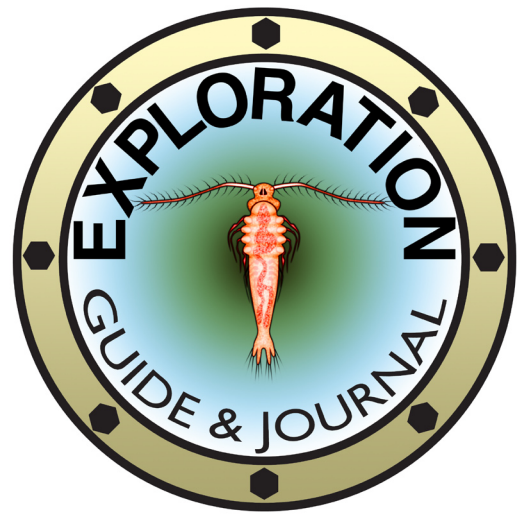
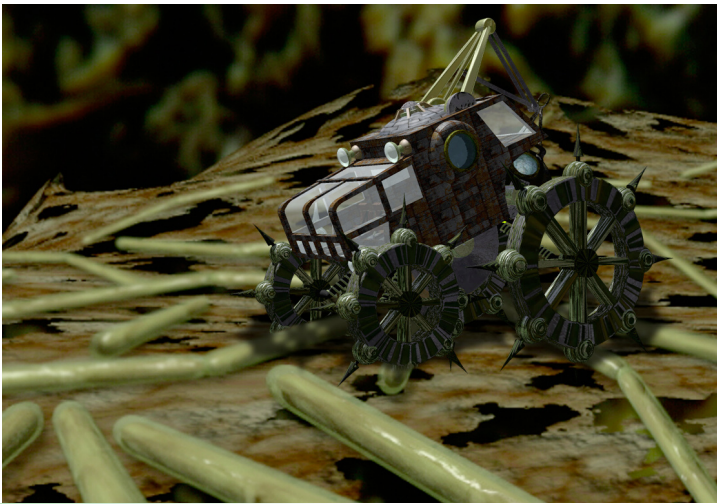
Accompanies Episode 9 of the 13-part video series

— Forest Floor Explore —

Written by Eric R Russell & Bruce J Russell

In this episode...

Washed onto a sand bar to make repairs, the *Cyclops* crew assembles their *Terra Rover* and enters the forest on a new voyage of exploration. Traveling through the top inch of **humus** they discover that the soil is alive. This is a world dominated by **mites**, **roundworms**, tiny **insects**, **bacteria** and **fungi**. The living humus creates a diverse **forest floor ecosystem** on which the trees and larger forest organisms depend.



Forest Ecology: Forest Floor

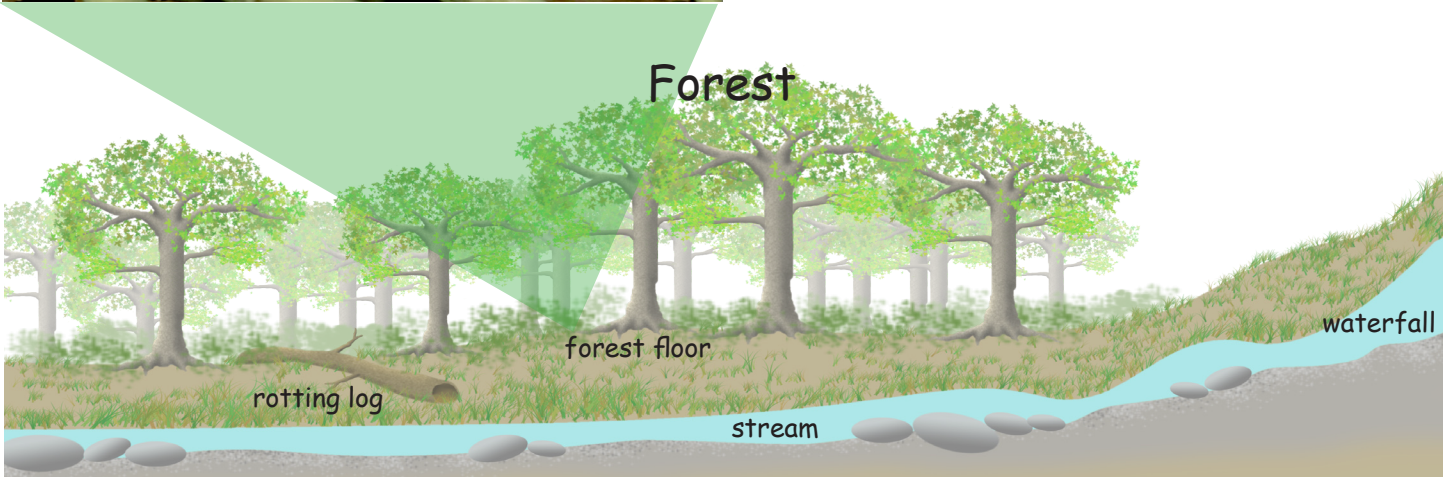
The Log of Captain Jonathan Adler

Day 15: 10:15 hours... After our adventure down the stream rapids, the *Cyclops* is in desperate need of repairs. I have ordered that the ship be secured along the shore so that my crew can begin the work.

Joining us is Tara, an explorer companion newly arrived from home base. Tara, also a naturalist, has an interest in the small life of terrestrial habitats. I am excited for this opportunity to explore the world of life on the land!

I have ordered the crew to assemble the rover so that while the *Cyclops* undergoes repairs Tara and I might journey into the nearby forest. We hope to discover what secrets lie in the upper levels of the soil, a region called the humus.

As the rover maneuvers through a dense mat of rotting leaves we can see layers of bacteria decomposing the dead plant cell tissue. This must be the beginning of the forest floor food chain!



Terra Rover

Terrestrial auxiliary to MS Cyclops

Vehicle Dimensions

| | |
|--------|--------|
| LENGTH | .35 mm |
| BEAM | .22 mm |

Vehicle Mission

| | |
|------------------|-----------------|
| Maximum speed | 3 cm per minute |
| Mission duration | 10 days |

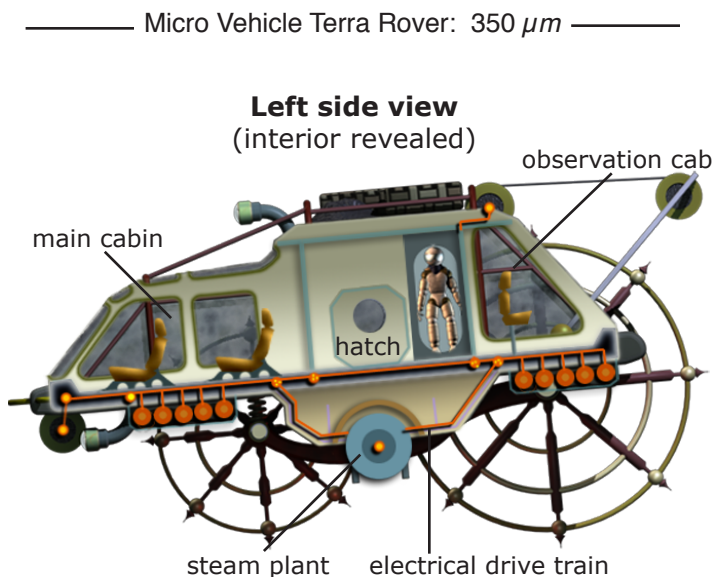
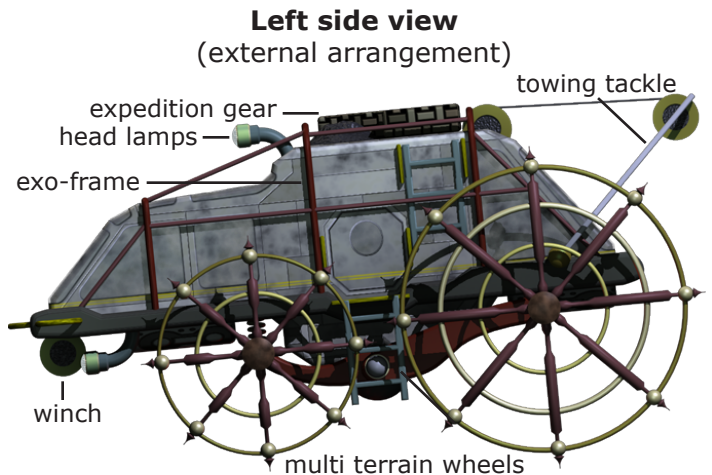
The *Terra Rover* is a durable vehicle designed for exploration of terrestrial surfaces with a minimum crew (2).

The rover's multi terrain wheels allow the vehicle to climb near-vertical surfaces of soil, wood, and soft plant tissue.

Power is generated from an onboard steam powerplant that uses alcohol as fuel. The alcohol is produced by decomposer bacteria aboard the *Cyclops* and carried in tanks on the rover.

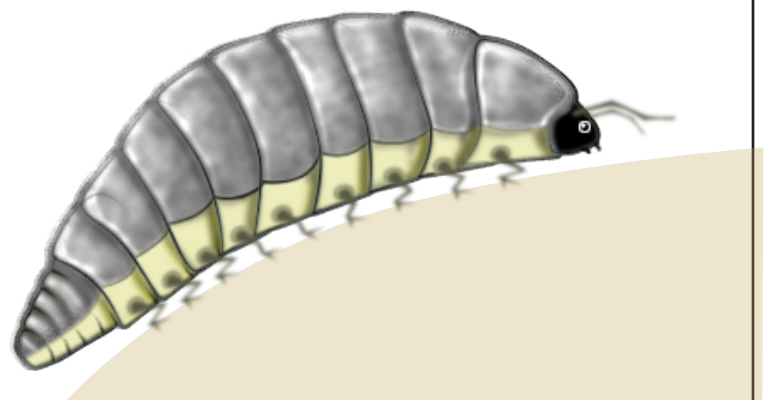
The *Terra Rover* carries equipment for exploration, including tackle for towing and climbing, and diving suits for immersion in fluid environments.

Protecting the rover are armored hull plates made of chemically resistant reinforced glass, in the unlikely event the vehicle is swallowed by some monstrous inhabitant of the terrestrial microcosm.



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The Log of Captain Jonathan Adler

Isopods: Sow bug, pill bug, and roly poly are some of the common names given to these terrestrial crustaceans. Land inhabiting isopods live in moist microhabitats. Look for them under boards, in forest floor humus, and in compost bins. Isopods tend to feed on detritus and decomposing material of all kinds. Their respiration is carried out through “book gills” located on their lower side. Most isopod behavior is about finding and remaining in humid conditions, where the danger of drying up is limited and where decomposing food can be found. Defensive behavior consists of rolling up in a ball.

Millipedes: Millipedes are worm-like animals with many segments, each equipped with two pair of jointed legs. They are plant and detritus feeders, often found in leaf piles, rotting logs, and occasionally in bathroom shower drains. Most species have a chemical defense system and some produce cyanide compounds that are poisonous to humans if ingested. However, there is little danger, for the smell is a powerful deterrent to munching a millipede.

Centipedes: Centipedes and millipedes belong to phylum *Arthropoda*. They were probably among the first arthropods to invade the land around 400 million years ago. Unlike the slow moving millipedes, centipedes are fast and predatory. The same sharp jaws that can skewer a cricket can deliver a painful bite to soft human skin.

Other Humus Inhabitants: The forest floor is literally crawling with other forms of life. It is a nematode stronghold, sometimes with thousands of tiny round worms per spoonful.

Mites of various kinds live around the particles of decomposing plant material. Earthworms till, process and mix the soil.

Snaking through the humus and absorbing nutrients, **fungal hyphae** are everywhere. Fungi and bacteria break down the leaves and other organic fallout to basic raw materials that can be recycled into living trees and other organisms.

10:45 hours... Almost immediately we encounter a common animal of the forest floor, a bug whose outer shell is made up of overlapping plates - the sow bug. The sow bug's only form of defense is to roll itself into a ball. For this reason the sow bug is often called a pill bug or roly-poly.

The sow bug can only live where there is moisture from soil and forest decay. We found them lurking beneath rotting leaves, feeding on the decaying plant tissue, gobbling up decomposer bacteria and leaf material.

The underside of the sow bug is where we find the animal's gills, which are arranged like pages in a book. This location keeps the delicate leaf-like membranes safe and moist, necessary for extracting oxygen from the air.

11:25 hours... Working the same habitat as the sow bug, we find two other inhabitants of the forest floor humus - centipedes and millipedes. They have similar body structure - many armored segments, but very different feeding habits.

The millipede has two pairs of legs for each of its segments. It feeds on rotting leaves and decaying forest floor matter.

The centipede is a hunter! Its long sharp jaws are ideal for capturing small insects like crickets and termites. It moves much faster than a millipede. Centipedes have one pair of legs per body segment.

13:40 hours... A short observation-stop proves treacherous when a fast-growing bundle of living threads entangles the rover. We are unable to proceed! The threads appear to be absorbing nutrients from the rich soil, transporting them... to who knows where.

Using our clippers to free the vehicle, Tara suggests that we follow the thread system. Much to our surprise we discover that the threads converge into a single organism that rises up from the forest floor - a mushroom! The mushroom, we realize, is how a fungus reproduces. It sends spores drifting away on air currents, where they will land and start a new growth of the thread-like fungal hyphae.

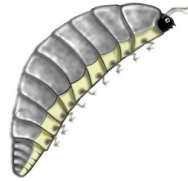
Key to Organisms

Common Forest Floor Organisms

Decomposer bacteria



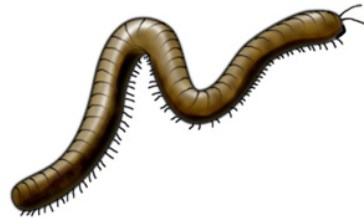
Sow bug



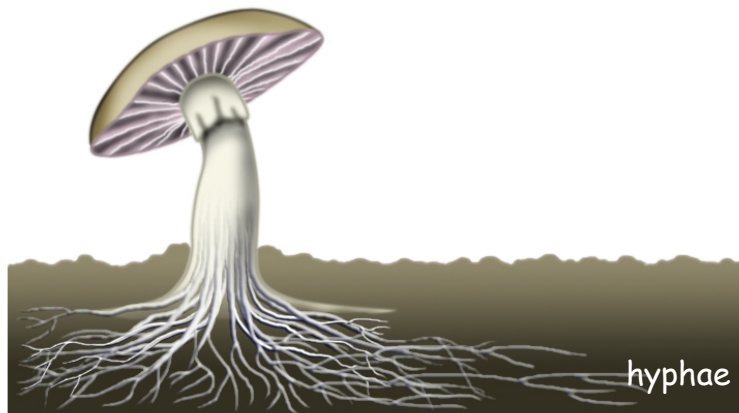
Centipede



Millipede



Fungi





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