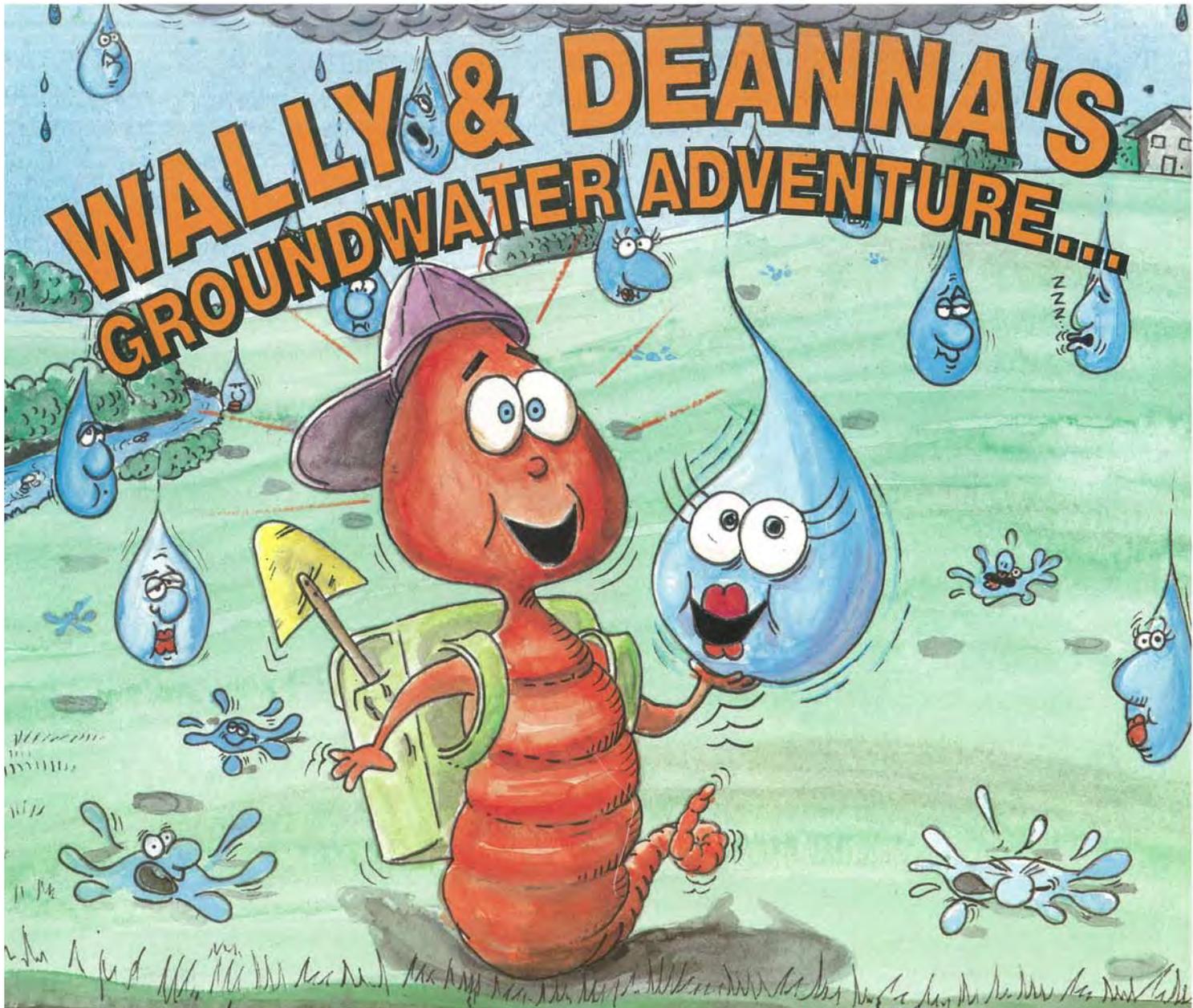


WALLY & DEANNA'S GROUNDWATER ADVENTURE...



TO THE SATURATED ZONE

Story by Leanne Appleby & Peter Russell
Illustrations by Fortunato Restagno

© 1993 Leanne Appleby, Peter Russell (text)

© 1993 Fortunato Restagno (art)

1st printing November, 1993

2nd printing, March, 2017

All rights reserved
Earth Sciences Museum

ISBN 0-9697833-0-2

Distributed by:
Earth Sciences Museum
University of Waterloo, Ontario, Canada N2C 3G1

Printed by New Media Services, University of Waterloo

Wally and Deanna's Groundwater Adventure... *to the saturated zone.*

Story by Leanne Appleby & Peter Russell
Illustrations & book design by Fortunato Restagno

Our thanks to
Deanna Armstrong
of Youngstown, Alberta
for giving us a worm's eye view
of groundwater.



Wally the worm popped out of the ground carrying his knapsack. "It's a great day for an adventure," he exclaimed. The clouds were starting to gather. "Hum, looks like rain," Wally thought as he wriggled faster across the field.



High above Wally, in the clouds, Deanna Waterdroplet and her friends gathered for a new adventure.



Wally looked up just as Deanna was about to land. He put out his hands to catch her. Other water droplets splashed around and percolated into the ground.



Imagine Deanna's surprise that she wasn't percolating.



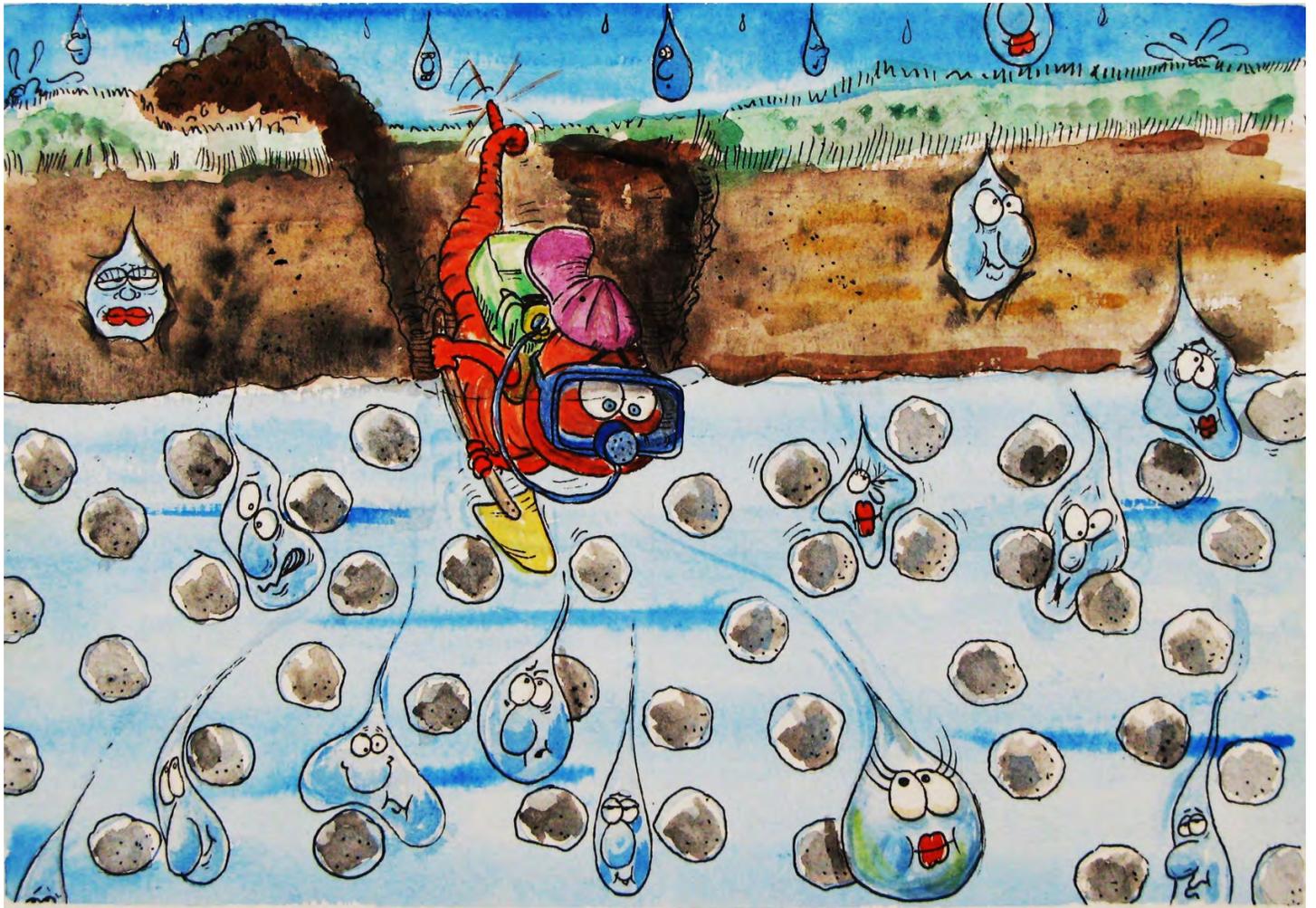
"I'm Deanna Waterdroplet and I must go on a groundwater adventure and percolate with my friends!"
"Percolate?" asked Wally. Deanna bounced from Wally's hands and explained, "When water droplets slip and slither into the ground, it's called percolating! Would you like to come along?"



"Wait for me, Deanna." Wally pulled his shovel from his knapsack and quickly dug into the ground. It was easy digging through dry sandy soil. Then, the soil started to get heavier. "My, this is hard work!" said Wally.



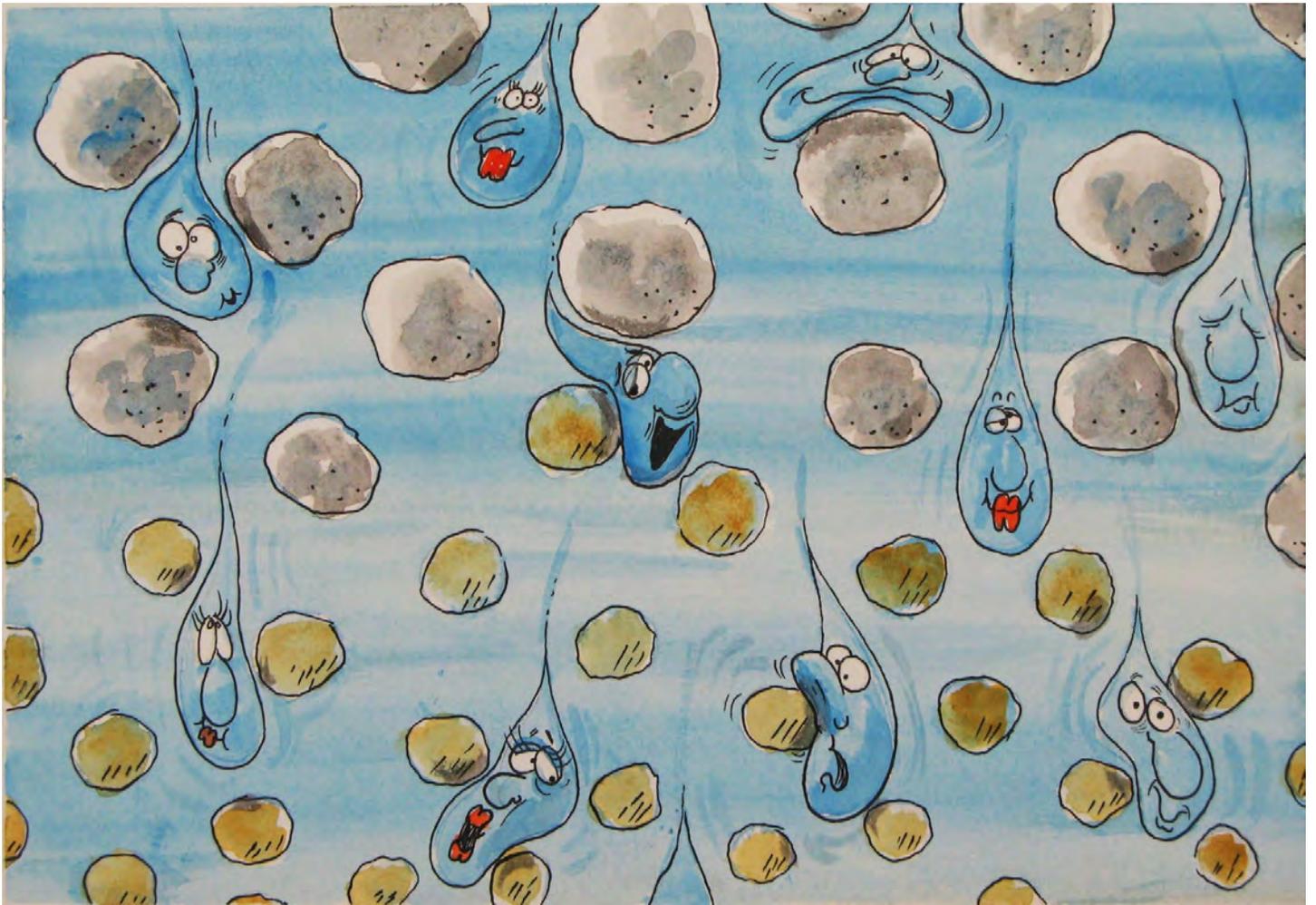
The hole began filling with water. "I've never been through a water table before," said Wally. He quickly put on his breathing mask so that he could catch up with Deanna.



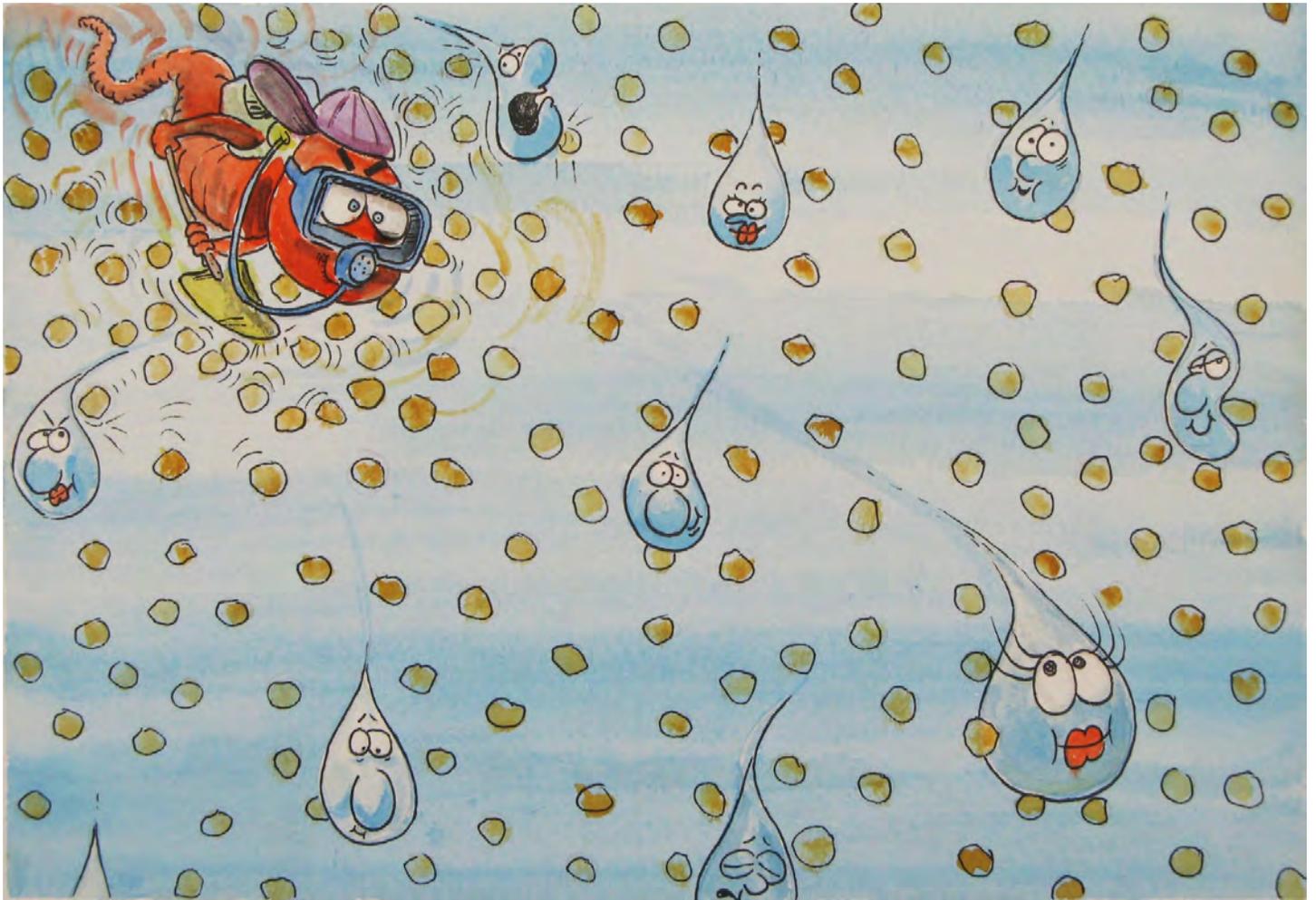
"This is easy to dig through," Wally said as he pushed the pebbles aside.



"Welcome to the saturated zone, Mr. Worm," said Deanna. "Please call me Wally." "Alright Wally," said Deanna. "take a look around. We are now in a gravel aquifer where all the pebbles are surrounded by water."



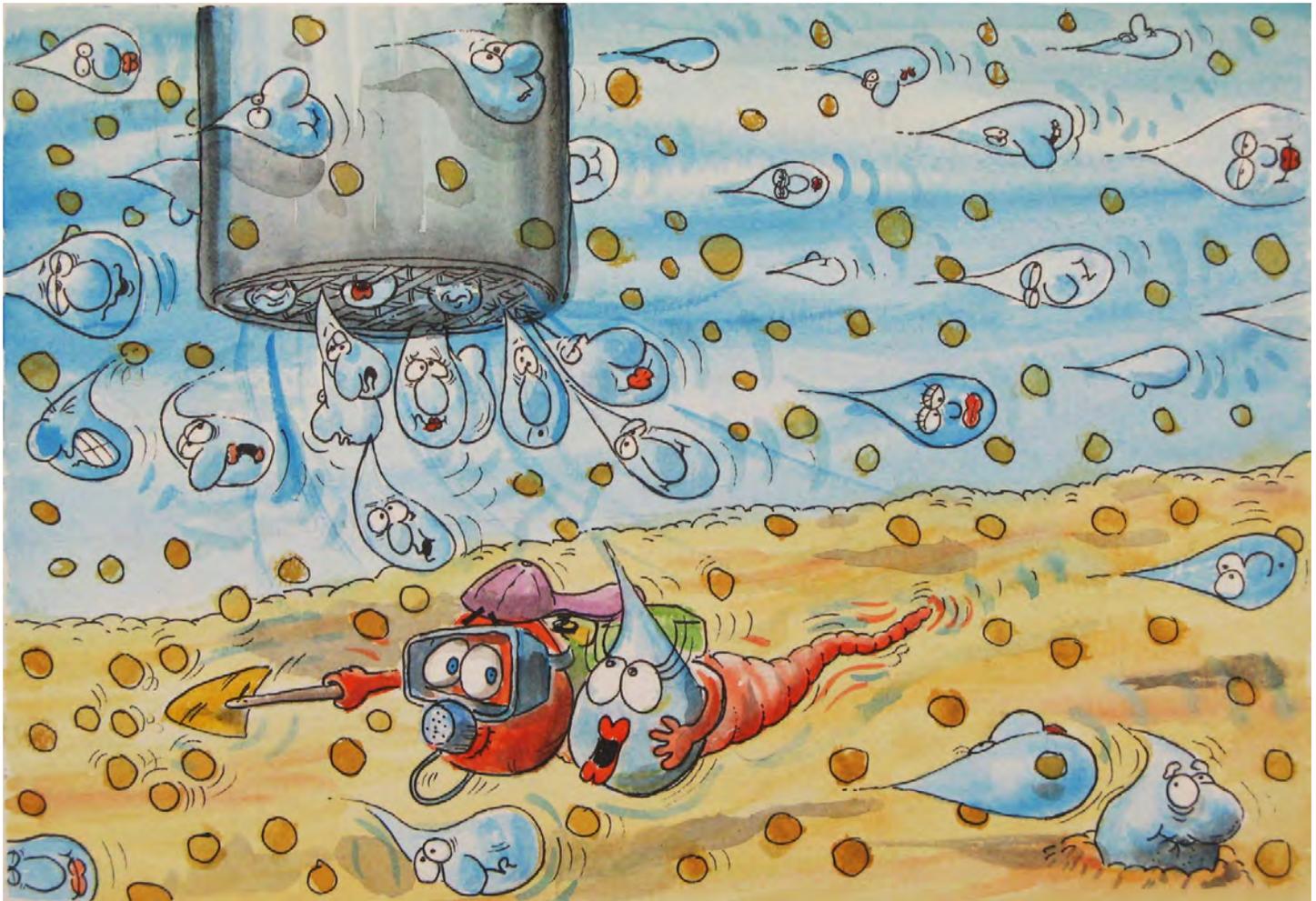
Deanna's friends passed between gravel pebbles and then fine sand grains. They twisted and bumped as they moved through the aquifer.



Wally dug and dug as fast as he could through the fine sand, trying hard to keep up with Deanna.



Wally and Deanna reached a layer where the water droplets had been sitting around for a long time. "What's this stuff, Deanna?" Wally asked. "It is an aquitard." Deanna explained. "When the grains become very fine, they are called silt and clay. The spaces between the grains in an aquitard are so small that water droplets cannot travel through them. Some of the water droplets try, but it takes a long time."



As they continued their adventure, they started moving faster near a tube in the sand. "Help," Deanna shouted, we are being drawn into a well." "A well?" asked Wally.



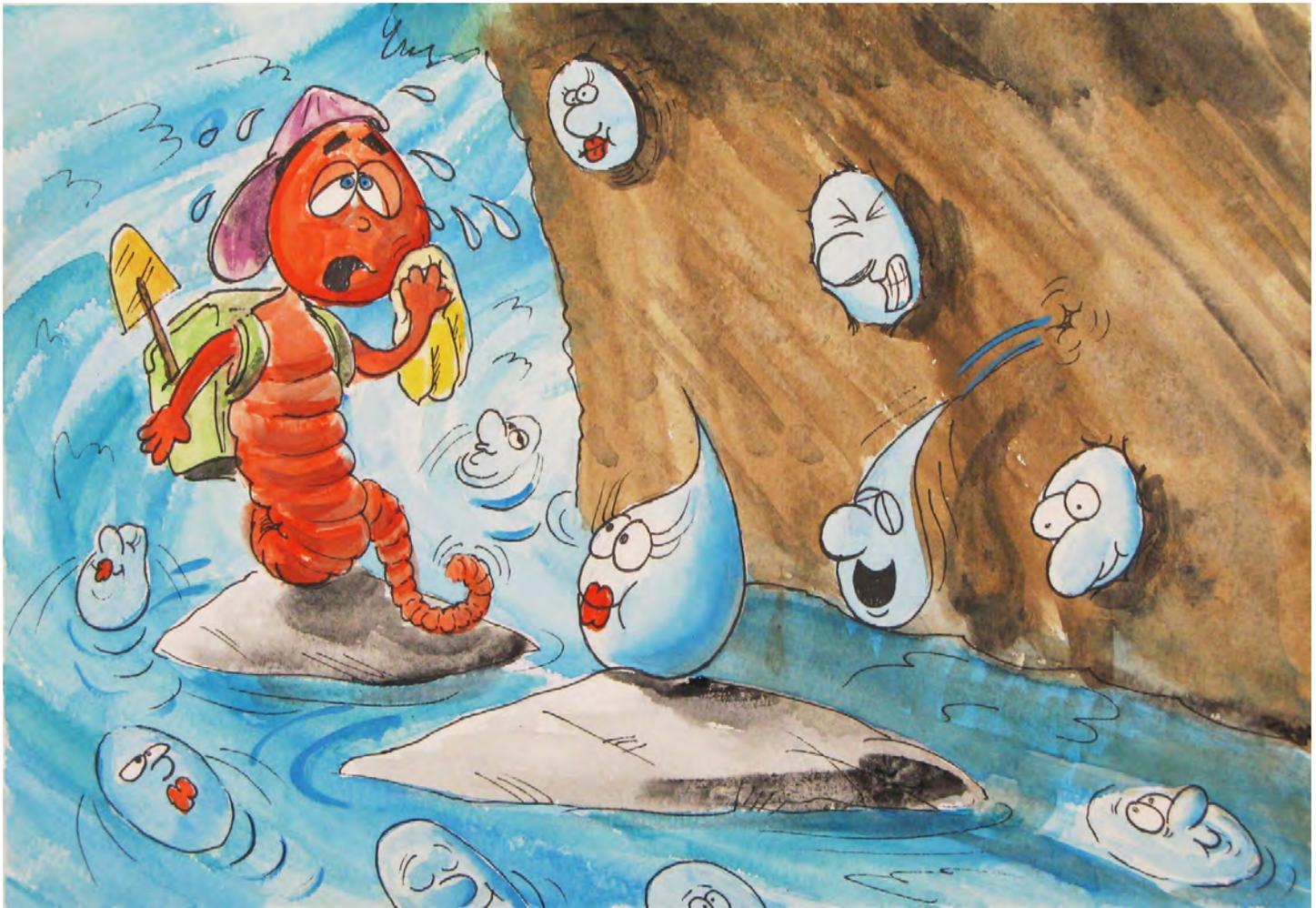
"Some animals up on the ground surface put a metal tube into the ground and take water droplets out," said Deanna. One of the animals called Mr. Martin was filling a bucket with water for his pigs to drink. Some water droplets bounced over the top of the bucket to percolate into the aquifer once again.



They safely passed the well. "My friends are seeping out of the aquifer into a stream of water droplets," said Deanna. Can you swim, Wally?" "No," Wally replied. Well then, "Deanna said, "let's go up to the unsaturated zone again where your friends live."



"Oh, fresh air! It's stopped raining." said Wally as he took off his mask.



They plopped out onto a nice warm rock. "How long was this adventure?" Wally asked. "Not long this time," Deanna explained, "if we had been travelling at the same speed as my friends, it could have taken from weeks to many years to reach here."



Deanna started to get that warm, light-headed feeling. "Oh, I'm evaporating!" said Deanna. "Don't worry, this is part of the adventure. See you again soon!"



Deanna evaporated as water vapour faster and faster up into the clouds. "Thank you," Wally called out, "thank you for a great adventure. Come back soon!"



After Deanna had evaporated, Wally pictured their adventure in his mind. He now knew how the water cycle worked and was sure he would see Deanna again.

Glossary of Terms

Aquifer

An underground zone of rock or soil that will provide enough water from a well for use by one house, a farm, village or city. Water usually moves quickly through aquifers.

Aquitard

A layer of rock, silt or clay that will not allow water to pass through it fast enough to be used as a water supply. Water moves very slowly through aquitards.

Evaporate

The change of water from a liquid to a vapour (a fine mist of water suspended in air). This happens at the ground surface where soil can dry out between rains.

Percolate

The downward movement of water droplets through gravel, sand, silt or rock.

Saturated zone

The area below the water table where the spaces in gravel, sand, silt or rock are filled with water.

Transpiration

Water is used by plants and animals and sent out into the air as tiny droplets of vapour. You can see the water you transpire (breath out) in cold weather, or watch water vapour condense on a glass mirror or window by breathing on it!

Unsaturated zone

The gravel, sand, silt or rock above the water table where the pores and spaces are filled by both air and water. Water travels through the unsaturated zone to the water table.

Water moving down through the unsaturated zone can cause the water table to rise closer to the ground surface after rain or when the snow melts. In dry weather, the water table will move down.

Water cycle

Water moves in a never-ending natural cycle. The water in the atmosphere falls to the earth as rain and snow, and it returns to the atmosphere when it evaporates from the ground, streams, lakes, rivers and oceans.

Water table

The place under the ground surface where water will stand when a hole is dug. All pores and open spaces are filled by water below the water table.

Water vapour

Water vapour condenses into droplets high in the atmosphere forming clouds and returns to the earth again from the clouds, continuing the water cycle.

Well

A hole dug or drilled into the ground to pump from an aquifer. Usually a well looks like a pipe at the ground surface.

Published by the Earth Sciences Museum, University of Waterloo, Waterloo Centre for Groundwater Research, and Edviro Enterprises Inc., Waterloo, Ontario, Canada. ©1993.

Story by Leanne Appleby and Peter Russell, illustrations by Fortunato Restagno.



Published by
Earth Sciences Museum
as part of it's 50th Anniversary



EARTH SCIENCES
museum
UNIVERSITY OF WATERLOO

<https://uwaterloo.ca/earth-sciences-museum/>

Printed in Canada

Made in Canada