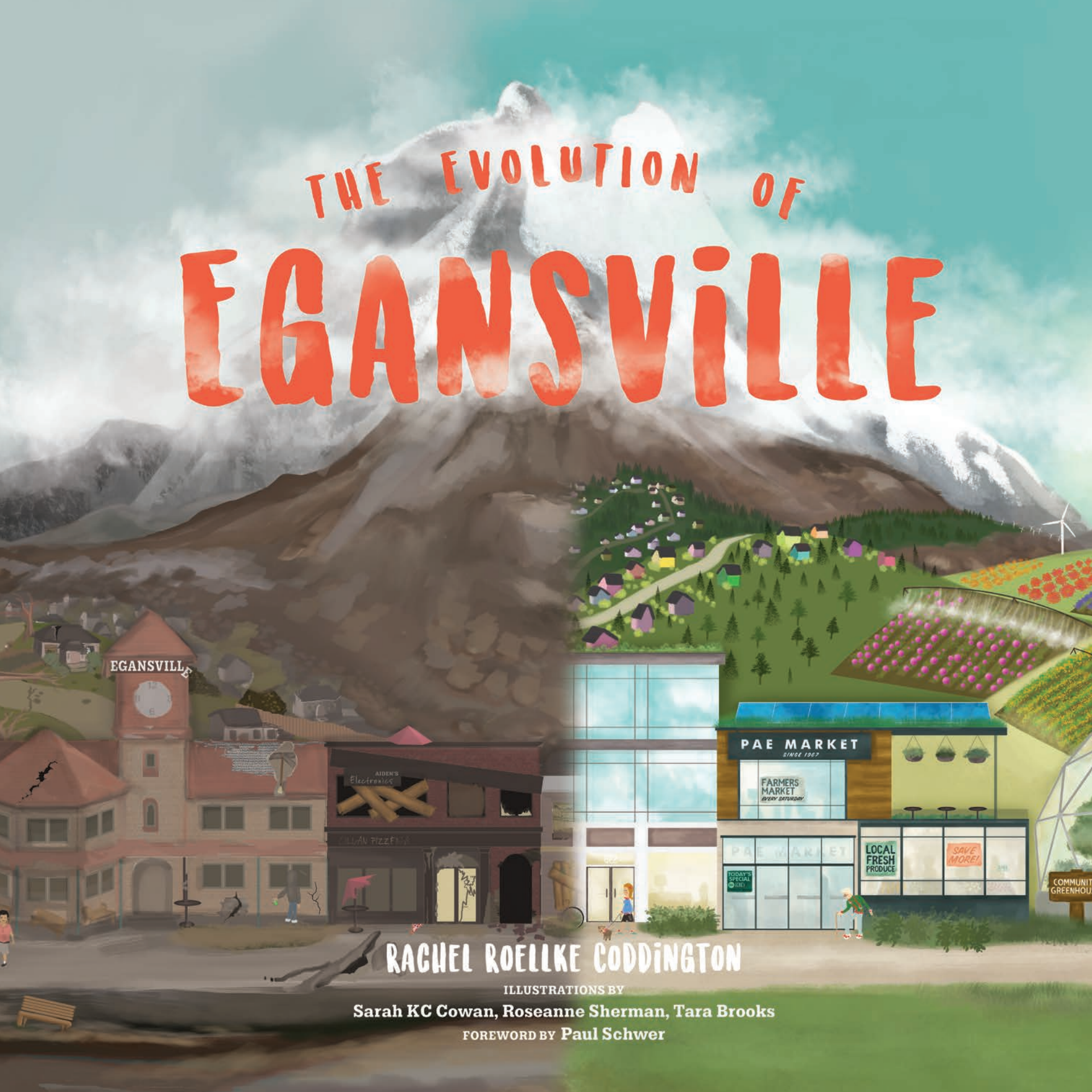
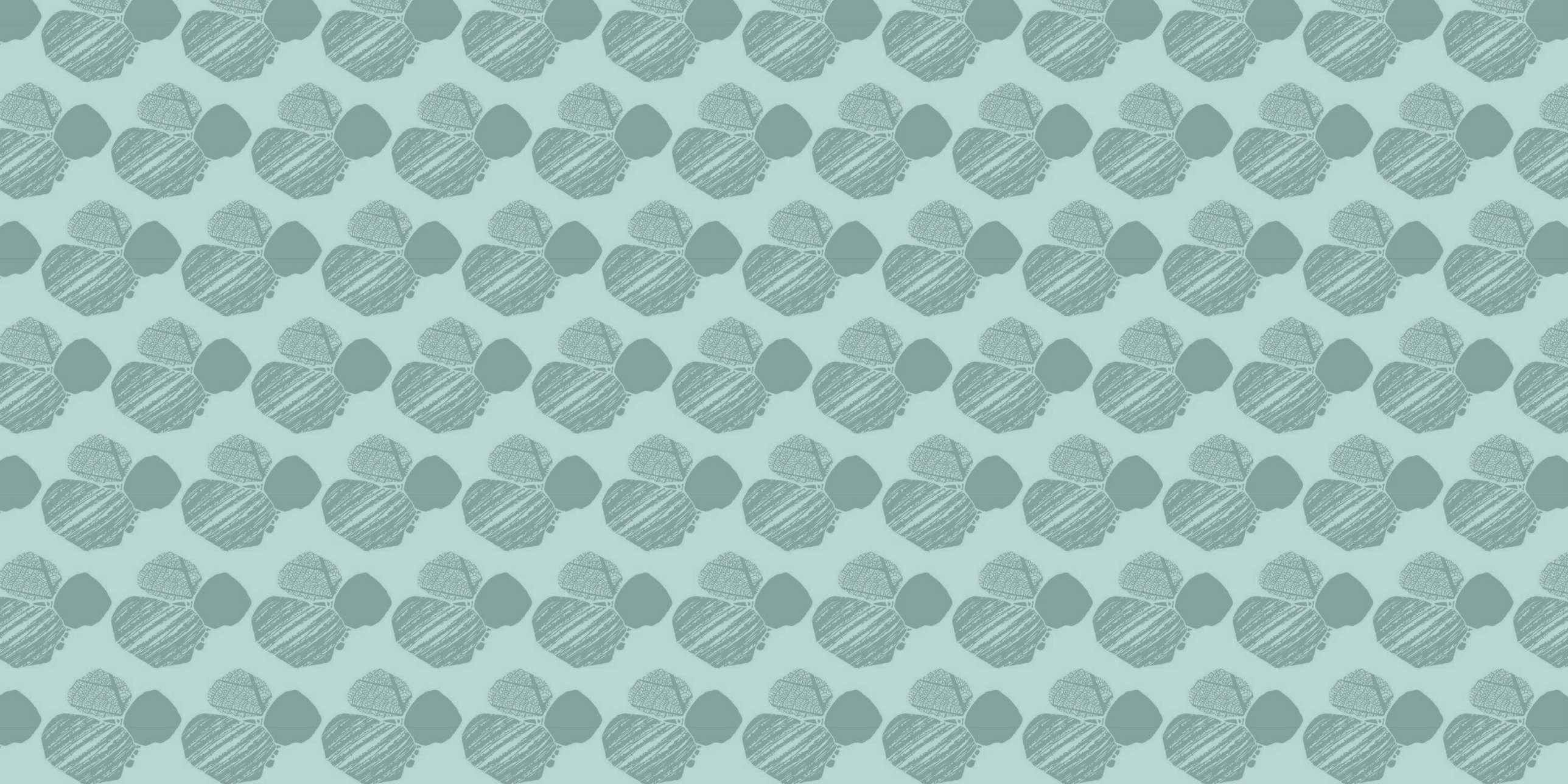
THE EVOLUTION OF EGANSVILLE



RACHEL ROELLKE CODDINGTON

ILLUSTRATIONS BY
Sarah KC Cowan, Roseanne Sherman, Tara Brooks

FOREWORD BY Paul Schwer



2BM, AC + Co Architecture Community, Adventist HealthCare, Align Real Estate, Amazon, Andersen Construction, Anderson Dabrowski Architects, Ankrom Moisan, Apollo, Arquitectonica, Atmosera, Axis Design, Bassetti Architects, BCRA Design, Beaverton School District, Bellarmine Preparatory School, Bellevue College, BioMed Realty Trust, BLRB Architects, Bohlin Cywinski Jackson, Bora Architects, Bremik Construction, Brick, California State University, Cambridge CM, Carleton Hart Architecture, Carlson Viet Architects, Chemeketa Community College, City of Portland, Clark Construction, Clark/Kjos Architects, CollinsWoerman, Columbia Memorial Hospital, C-Tran, Cupertino Electric, Cypress Equities, Dangermond Keane Architecture, Deca Architecture, DG Architects, Digital Realty, DLR Group, DOWA-IBI Group, Dynalectric, E&J Gallo Winery , EC Company, EHDD Architecture, Energy Trust of Oregon, Eugene School District, Facebook, Fern Ridge School District, FFA Architecture and Interiors, Flad Architects, Forest Grove School District, Form4 Architecture, Fortis Construction, GBD Architects, GBJ Architecture, Gehry Partners, LLP, Gensler, GGLO, gLAs Architects, Google, Gould Evans Architecture, Hacker , Harder Mechanical Contractors, HB Capital, Helix Electric, Hennebery Eddy Architects, Hermanson Company LLC, Hewitt Architects, Hewlett Packard, Hibiscus Properties LLC, Hillsboro School District, HNTB Corporation, Hoffman Construction Company, Holmes Electric, Holst Architecture, Housing Authority of Portland, Howard S. Wright, IA Interior Architects, Intel, Intuitive Surgical, Inc., JH Kelly, Johnson Controls, JRJ Architects, Kadlec Hospital, Kaiser Permanente, Kevin Daly Architects, KMD Architects, Knickerbocker & Associates, Laika, Lake Oswego School District, Lane Community College, Lanphere Construction & Development, Leagacy Health, Lease Crutcher Lewis, Leddy Maytum Stacy Architects, Lever Architecture, LinkedIn, LMN Architects, LRS Architects, LSW Architects, Lucchesi Galati Architects, Lydig, MacDonald Miller, Mackenzie, Mahlum Architects, Maximus Real Estate Partners, McBride Architecture, MCM Architecture, Merryman Barnes Architects, Mithun, Mortenson Construction, Multnomah County, Myhre Group Architects, NBBJ, Nike, Noll & Tam Architects, OAC Services, Oh Planning + Design, Olson Kundig , Olympic College, On Electric Group, Opsis Architecture, ORANGEWALLstudios, Oregon Health & Science University, Oregon Museum of Science & Industry, Oregon State University, Pacific Lutheran University, Pacific University, PeaceHealth, Peninsula College, Perkins+Will, Pivot Architecture, PKA Architects, PLACE Studio LLC, Point Defiance Zoo & Aquarium, Point32, Polycom, Port of Portland, Port of Seattle, Portland Community College, Portland Energy Conservation, Inc., Portland Public Schools, Portland State University, Prime Electric, Providence Health Systems, Pyatok Architects, Robertson Sherwood Architects, Rocky Mountain Institute, Rowell Brokaw Architects, Salem Hospital, Salem/Keizer School District, San Mateo Community College District, Schacht Aslani Architects, Schemata Workshop, Scott Edwards Architecture, Seattle Academy of Arts & Sciences, Seattle Aquarium, Seattle University, Seneca Group, SERA Architects, SHED Architecture, SHKS Architects, Skanska, SkB Architects, Skidmore, Owings & Merrill LLP, Skylab Architecture, Soderstrom Architects, Solomon Cordwell Buenz Architecture, South Seattle College, Southern Oregon University, SRG Partnership, St. Charles Health System, Stanford University, Steinberg Architects, Studios Architecture, Swinerton Builders, TCM Corp, Temp Control Mechanical Service, The Bullitt Foundation, The Bush School, The Evergreen State College, The Miller Hull Partnership, The Oregon Zoo, The Overlake School, The Sobrato Organization, Theranos, Tigard-Tualatin School District, Tiscareno Associates, Tishman Speyer, TLCD Architects, Total Mechanical, Trammell Crow Company, TriMet, Tuality Healthcare, Turner Construction, TVA Architects, Umpqua Bank, University Mechanical Contractors, University of California, University of Oregon, University of Washington, Urban Visions, Valley Electric, Vancouver School District, VECA, Veterans Administration, Vornado Realty Trust, Walker Macy, Washington School for the Deaf, Washington State University, Washougal School District, Waterleaf Architecture, Weinstein A+U, West Linn-Wilsonville School District, Western Washington University, Whitman College, William Wilson Architects, Woodland Park Zoo, Woods Bagot, Woofter Architecture, Works Progress Architecture, WRNS Studio, Yost Grube Hall Architecture, ZGF Architects



50 YEARS & FORWARD

This book is a celebration of PAE's 50th Anniversary. It has been an amazing journey: from a small mechanical and electrical engineering firm founded in 1967 in Portland, Oregon to a company with over 225 employees with 4 offices across the West Coast. We would not be here without our clients and industry partners. Collaborating with you, we have pushed the boundaries of sustainable design over the last 50 years to achieve some of the world's most high-performing buildings. Thank you for 50 years of teamwork, challenges, laughs and innovation.

I would also like to thank every PAE employee.
You are our not-so-secret sauce.
Together we have turned PAE into the industry-leading, creative, and fun firm it is today.

While looking back is important, looking forward is even more crucial. Over the next 50 years, the children reading this book will become the designers, the leaders, the decision makers and the ones who inherit our beautiful planet. I hope this book serves to inspire and motivate kids (and kids at heart) to help solve the planet's energy and water challenges. If we all do our job well, our planet will be powered by 100% renewable energy with clean water for all by the time PAE turns 100.

— Paul Schwer, PE
PRESIDENT OF PAE



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Violators will be subjected to a herd of angry engineers armed with slide rules.

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THE EVOLUTION OF EGANSVILLE

RACHEL ROELLKE CODDINGTON

ILLUSTRATIONS BY
Sarah KC Cowan, Roseanne Sherman, & Tara Brooks

The tiny town of Egansville is tucked away in the hills, right near the majestic Mount Boonie. Once, rosy-cheeked children and happy parents danced down the streets. Yards teemed with color, and farmland boasted patchwork quilts of vegetables, fruits, and flowers. Water pipes and power lines stretched from other cities, bringing life and energy to Egansville. Wide roads bustled with deliveries, repairmen, well-worn busses, bikes and sleek cars. Life was simple, and folks felt cozy and alive.



But one day, from high on the mountain, the townspeople heard a grumble, like a giant's empty stomach. The grumble turned to a groan and though they could see it, hear it, and **FEEL IT COMING**. . .
there was nothing they could do. They watched the top of Mount Boonie come sliding down the land like a sack of flour cut open.

The Great Landslide caused an endless pile of dirt and rocks. Water pipes burst under the weight. Power lines snapped like rubber bands. Roads disappeared. The townspeople looked on, flabbergasted, as The Great Landslide changed everything.



Then, as you can see, the town was a shadow of what it once was. Farmlands looked like faded postage stamps. Repairs were forever postponed. Years passed with the hope of clearing the landslide, but shovels were small and food was short. Temporary fixes turned permanent. Folks were trim and gaunt. And, over time, the bustling town of Egansville turned flat, dull, and quiet.

However, (as there always is in a good story),
there was a group of friends.



CHAPTER 1

Buggs

who (obviously) loved insects.



CHAPTER 2

Enna

who had so many siblings she lost count sometimes.



CHAPTER 3

Choplin

who loved exploring, and clean shoes.



CHAPTER 4

Freddy

who could fix anything.



CHAPTER 5

Gaucho

who loved animals.

The town of Egansville needed help.
And who better to save the day than a bunch of kids?

CHAPTER 1

Buggs



Buggs loved bugs.

She loved the creepy-crawlies, the fliers and the flappers, the teeny-tinies and the hairies, the leggy and the winged... she loved them all.



Buggs never got a fancy insect collecting kit for her birthday. She couldn't go down to a corner store and grab the right vials and tubes. But- (as kids like her tend to be) Buggs was resourceful. She saw potential. So, when she needed a bug collecting apparatus, you can bet she'd find a way to make one. Her desk was covered in jars, bottles and baggies. She saw the possibilities in these everyday objects and made them work for what she needed.

She was the kind of kid who would see a spider in her house, trap it carefully, and set it loose outside- but not before she checked to make sure there weren't any natural predators nearby. She kept a book of the bugs she found called The Insectopedia and updated it every day.

As she left her house that day, Buggs looked longingly at her collection of containers, wishing she could wash them better. But the tiny trickle of water that dripped from the faucet in their kitchen let Buggs know that her equipment would have to remain cloudy and dusty. And (just in case there was any question) her mother's voice sprang through the air:

"Don't use too much water!"

A tiny, perfect moth (with wings like a whisper) fluttered out from behind her front door as Buggs walked out.



As she followed it into the sky, something caught her eye.

In the soft morning sun, she saw a grassy cliff overlooking the town. "What a great place to have an adventure," she thought.

They settled into their familiar routine: Gaucho jetted about, looking for a fox he loved to follow, and Buggs scribbled notes in her Insectopedia as critters skittered by.





"My jacket is soaking wet!" Gaucho exclaimed.
"My shirt is, too," murmured Buggs.
"This fog is drenching us!"

A beetle, strangely shiny, walked into Buggs' view. She slowly slid her magnifying glass out from her belt and leaned in to get a better look. The beetle wasn't shiny naturally– there was a thin layer of water trapped on its back. She watched, eyes wide with wonder, as the beetle tipped its (extra long) back legs up and the water slid into its mouth.







Time seemed to slow down, and you could almost hear the gears in Buggs' head turning. She suddenly gasped out loud, and Gaucho popped up from behind a bush.

"Are you okay?" he asked quietly (always careful not to scare away shy creatures).

"Gaucho! This beetle... he... his legs!
It's **WATER!** He has **WATER!**
The cliff... Freddy!
We have to– it's **WATER!!"**

Buggs could barely get the words out as she clamored to put her supplies away and pull Gaucho down the road alongside her.



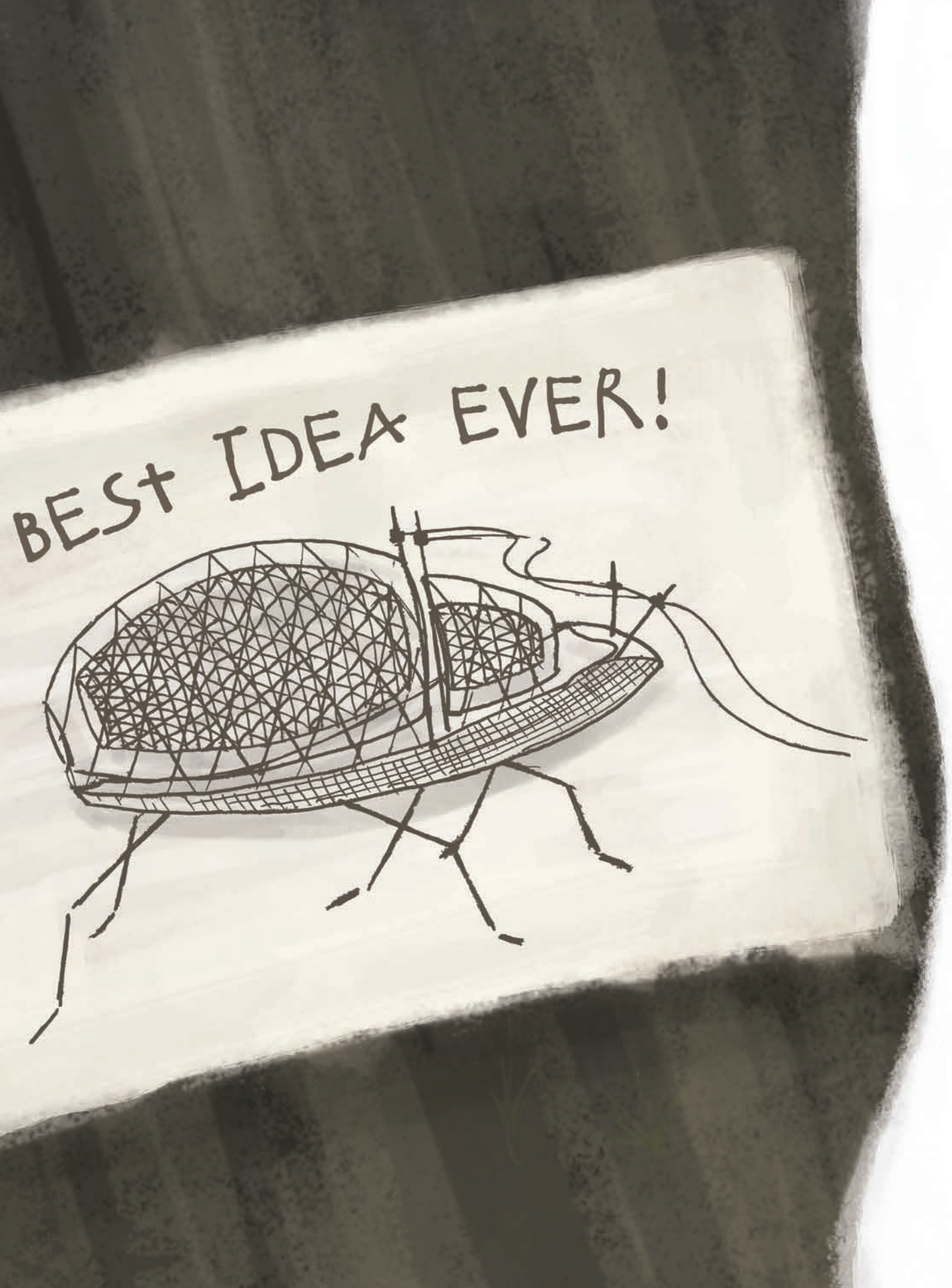
Now, you haven't met Freddy yet, but when you do, you'll understand why his name was on the tip of Buggs' tongue. He can fix anything– make anything– **SOLVE** anything.





Buggs showed him the beetle, and her wet shirt, and they stood under the cliff and peered up, furiously sketching, scheming, and mapping.



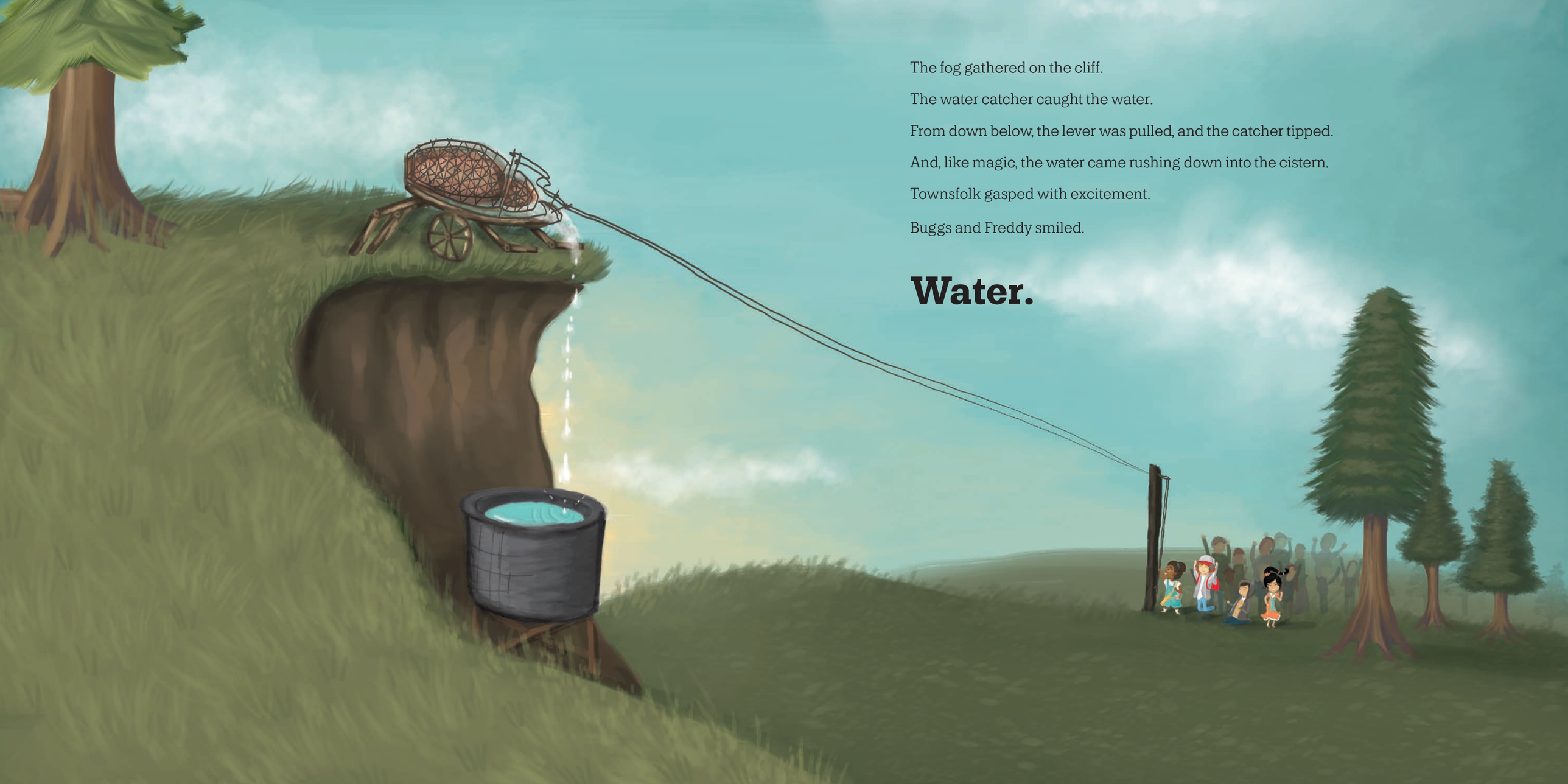




Once the weather dried up, they strapped their gear to their backs like camels and hiked up the side of the hill. They spent days setting it up. But it wasn't a quick fix– the first version collapsed when the fog gathered. The second version wouldn't tip.



The third one, however, worked like a charm.



The fog gathered on the cliff.

The water catcher caught the water.

From down below, the lever was pulled, and the catcher tipped.

And, like magic, the water came rushing down into the cistern.

Townsfolk gasped with excitement.

Buggs and Freddy smiled.

Water.

CHAPTER 2

Enna






Sis!
We're Hungry
GROWL




CORN
PEAS
!










Goodnight
Sigh...
WEEDS
YAWN


Arleta
Carl
Bobbi
Paul
Enna
GROWL
Harold

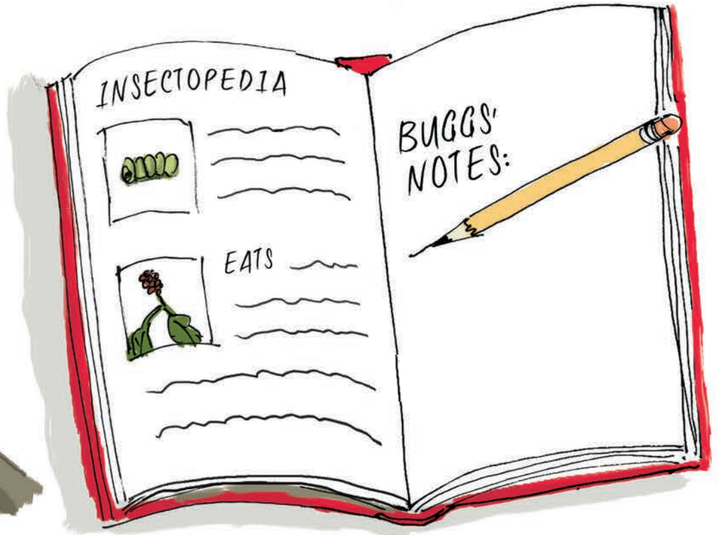





BUGGS' NOTES:
NOT A WEED!
Edible!
Must let it grow!


2 Weeks later




INSECTOPEDIA
EATS
BUGGS' NOTES:


4 Weeks later


8 Weeks later




Community Garden!
Fruit and Vegetables FREE

CHAPTER 3

Choplin



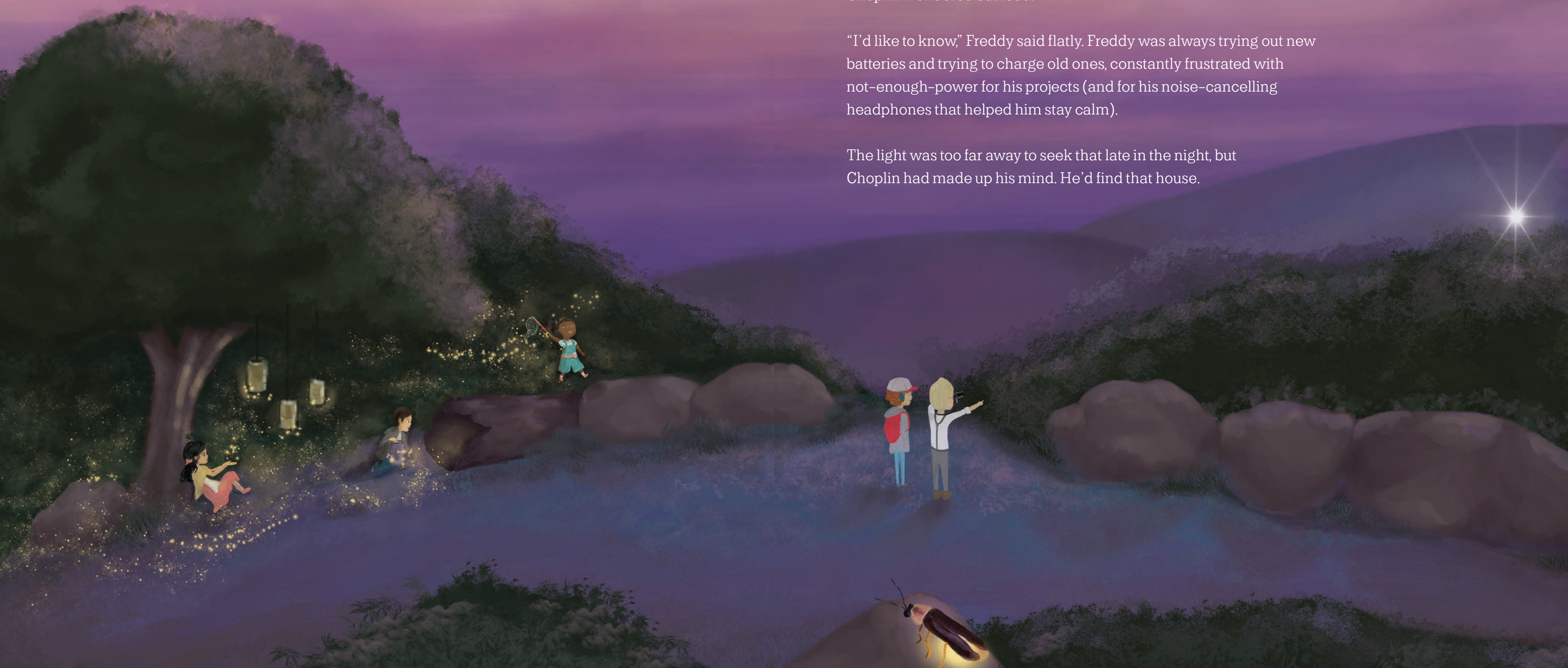
You might know a kid like Choplin.



He has a prized possession: his shoes. He loved to keep them spotless. He loved to keep everything clean, actually. Sparklingly clean. Here, you see Choplin cleaning his precious Chuck Taylors, like he did every morning. He watched, with dismay, as another wheelbarrow full of nasty, stinky trash came down his road to be flung into the dump.

Enna and Buggs were taking a mid-morning stroll with a couple of Enna's siblings (and her pet iguana, Harold). "Hey, Choplin! Want to look for fireflies with us tonight?" Buggs' eyes gleamed with excitement. "Maybe, it does sound like fun. Is it muddy out there?" Choplin looked down at his (now perfectly clean) shoes. "It sure is- you better wear your exploring boots!"

That evening, right at dusk (when the yellows turned to pinks and the blues turned to purples), the whole gang searched for fireflies at the edge of the forest. In the falling darkness, Choplin was amazed to see, in the distance a bright light coming from a strange window.



“Who has enough power to shine a light so bright?”

Choplin wondered out loud.

“I’d like to know,” Freddy said flatly. Freddy was always trying out new batteries and trying to charge old ones, constantly frustrated with not-enough-power for his projects (and for his noise-cancelling headphones that helped him stay calm).

The light was too far away to seek that late in the night, but Choplin had made up his mind. He’d find that house.

The next morning, he and Freddy set out (clean shoes and noise-cancelling headphones and all) to find it. It wasn't until the sun was high in the sky that they made it to the house, but boy, was it a sight for sore eyes. The garden was lush with greenery. The house was clean. There was fruit on the trees. Happy doo-wop lilted from a radio. A slender gentleman in overalls was leaning over a box of dirt when he noticed the two boys agape on his lawn.

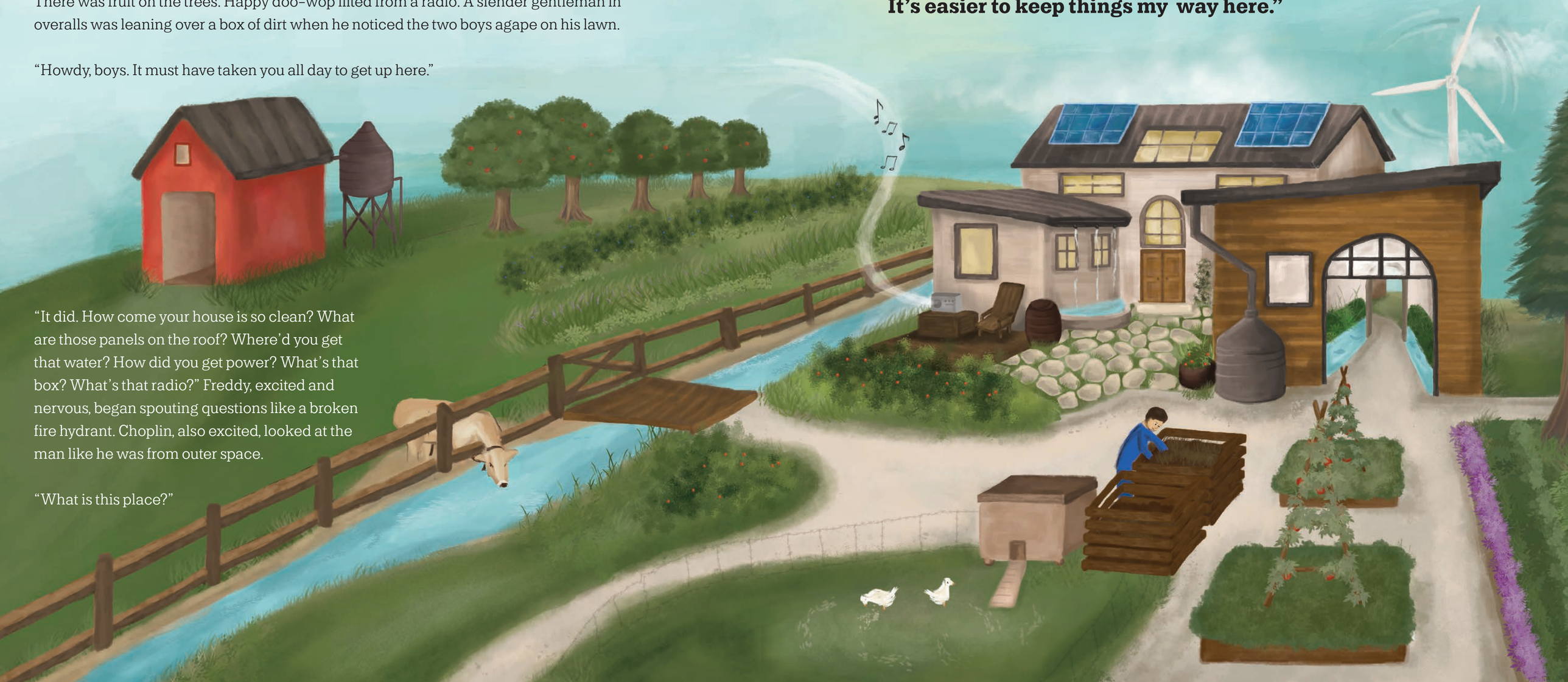
"Howdy, boys. It must have taken you all day to get up here."

"It did. How come your house is so clean? What are those panels on the roof? Where'd you get that water? How did you get power? What's that box? What's that radio?" Freddy, excited and nervous, began spouting questions like a broken fire hydrant. Choplin, also excited, looked at the man like he was from outer space.

"What is this place?"

"So many questions, boys! First of all, my name is Allan. Now, let's start with your question," he said, nodding at Choplin. "This place is my home. I don't feel as comfortable in town, so I stay up here on the hill.

It's easier to keep things my way here."



It took a few hours, but the man walked Freddy and Choplin through the steps of making a compost bin. He showed them the special tricks he used. They took notes and listened carefully and before they knew it, the sun began to creep near the hills.









Since it was getting late, they walked home with purpose, excited and empowered to start their new project. It took a while, and a few salvaging trips to the dump to get the right supplies, but they finally got it right. They made sure to visit Allan on the hill to tell him all about it, and he was so proud!

... and guess who wanted one? Yep, Enna. Then Buggs (all those worms!). Gaucho didn't want to be left out, so he wanted one... and then the neighbors.

In a few months, they spent all their free time finding wood and supplies to make compost bins for everyone. They started a small business, and folks came from all over Egansville to get a custom bin from the boys.

In time, Choplin saw fewer and fewer wheelbarrows coming down the road to the dump.

The dump didn't get any smaller, but it didn't get much bigger, either. He even saw folks removing usable items from the dump now and again. He felt like, one day, maybe the dump would shut down altogether. And, of course, sometimes he'd look out to the hillside and wave to the light in the distance.

CHAPTER 4

Freddy



Freddy loved to fix things,

and he loved to play with tools.
You could find him in his shed, before and after school.
Lots of people made Freddy nervous; he didn't love the crowds
It wouldn't be so bad except that crowds could be so loud.

See, Freddy liked the quiet, and liked to be "in the zone."
His friends understood this, and they let him be alone.
He often wore some headphones, to keep away the noise
And made the daily life of Fred something he could enjoy!



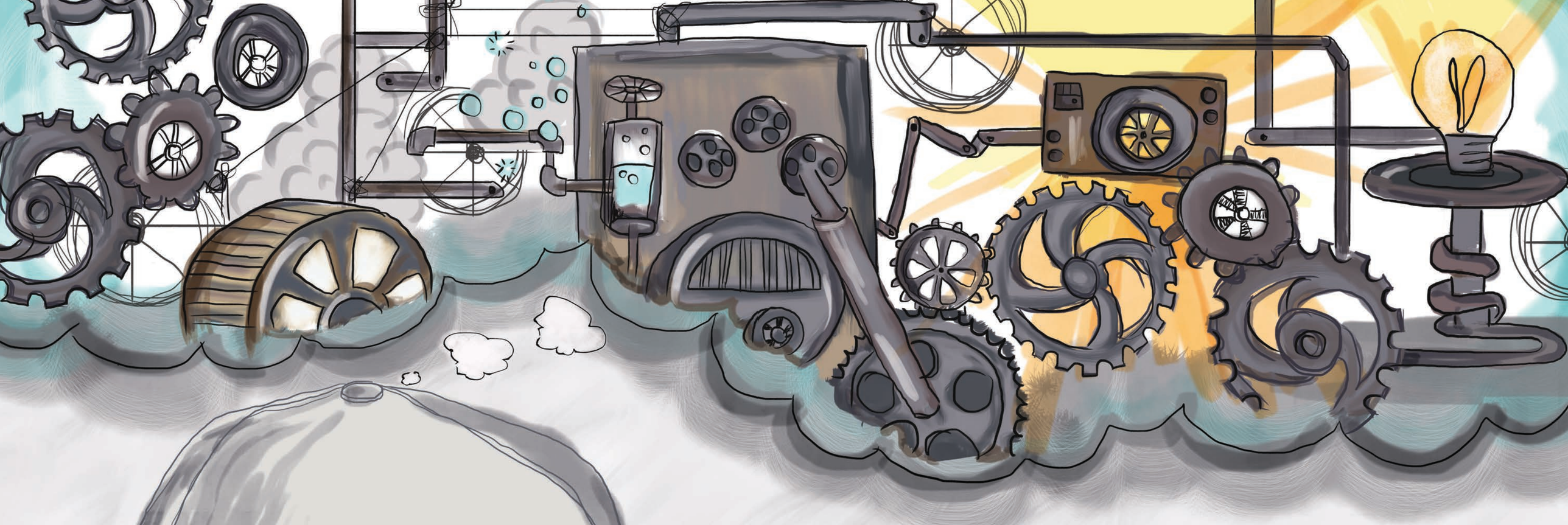


In school, the teachers got it! They found ways to help out Fred.
They built him a cardboard castle (the closest thing to a shed).

He stayed behind his paper walls and focused oh-so-well.
Then, when recess came, Freddy could come out of his shell.



Whenever something broke (a shoe, radio or chair)
EVERYONE knew just who to call– for this, Fred had a flair.
He took his time evaluating (to avoid any mistakes)
And with the tools inside his shed, he would fix that nasty break.



Besides the things he'd fix for friends, Freddy had projects of his own.
He fiddled around with batteries, and microwaves and phones.
But power was scarce, and boy-oh-boy, did this get Freddy's goat.
He'd love to run his power drill or his TV's old remote.

But batteries were hard to find, and real power was a joke.
So Freddy labored by candlelight whenever something broke.
Some kids dream of fame and fortune, or riding wild horses;
But Freddy dreamt of batteries and unlimited power sources.

CHAPTER 5

Gaucho





Gaucho leaned back in his rocking chair,

waiting for the gaggle of tiny humans to get settled on the carpet for storytime. Once they were still (as still as little ones can be), he started in.

"When I was little, like you, I used to go into the forest a lot. And the cliffs. And the desert. Your grandmother and I–"

"She was little too?!"

"Yes, she was little, too. She loved to look for– wait, who can guess what Gramma Buggs liked to find?"

"BUGS!" The children called out in an excited chorus.

"Nailed it. She loved bugs, and I loved animals, so we spent the afternoons looking for creatures. But one creature in particular had my heart... The Lavender Fox.

The fox was beautiful– had fur like a soft lavender sprig. He was shy and sly, and I could only catch a glimpse of him here and there. Behind a tree, I'd see his tail flip. Under a rock he'd shimmy out of my sight. The craziest part about this fox was that he was

out all the time.

He was out in the winter, when the other animals were hibernating.





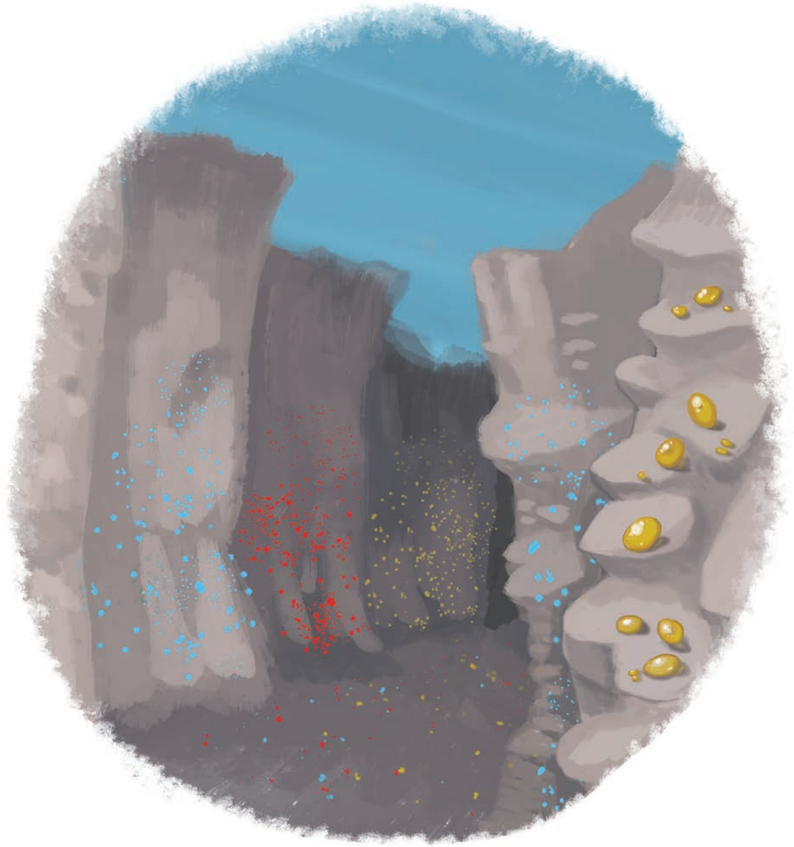
He was prancing around in the hot sun when the only other animals out were lizards relaxing on sun rocks.

He seemed to be comfortable– and happy– in any weather.

I tried to follow him home almost every time I saw him– and one day, I got lucky. I was stuck to him like gum on a shoe, and I followed him back to his strange little fox burrow.

You know what was so strange about it?
It was decorated.

Tiny, colored stones lined the edges of the opening to his home. This was in the winter, and those stones were crystal blue and shiny. There were hundreds of them– sitting out in the biting, cold air.



I followed him another time and saw where he got the stones– a sparkling quarry near the base of the hill.The quarry was full of rocks– red and blue and yellow. He never brought back the yellow ones, but always the blue in the winter and red in the summer.

What a curious little fox, I thought.

Then, one hot summer day, Grandma Buggs and I were out exploring. I thought we were alone, but we heard a scurrying in the bushes. By the time we got there, the sneaky fox was already gone– but he had left behind a few shiny blue stones.

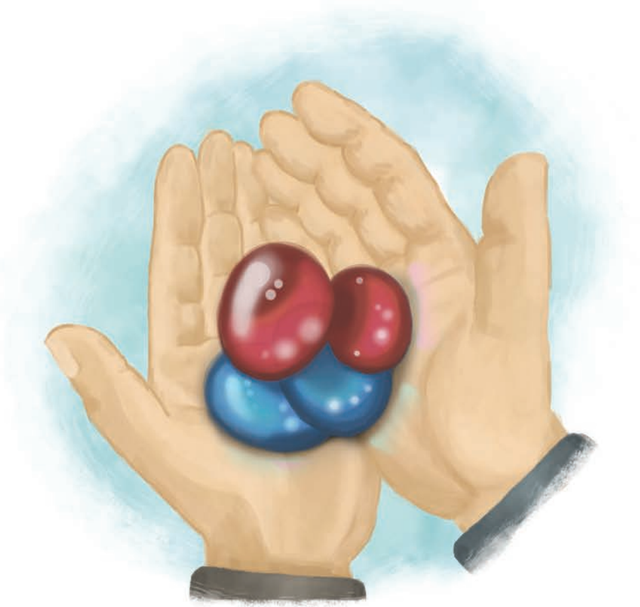
Can you guess how they felt?"



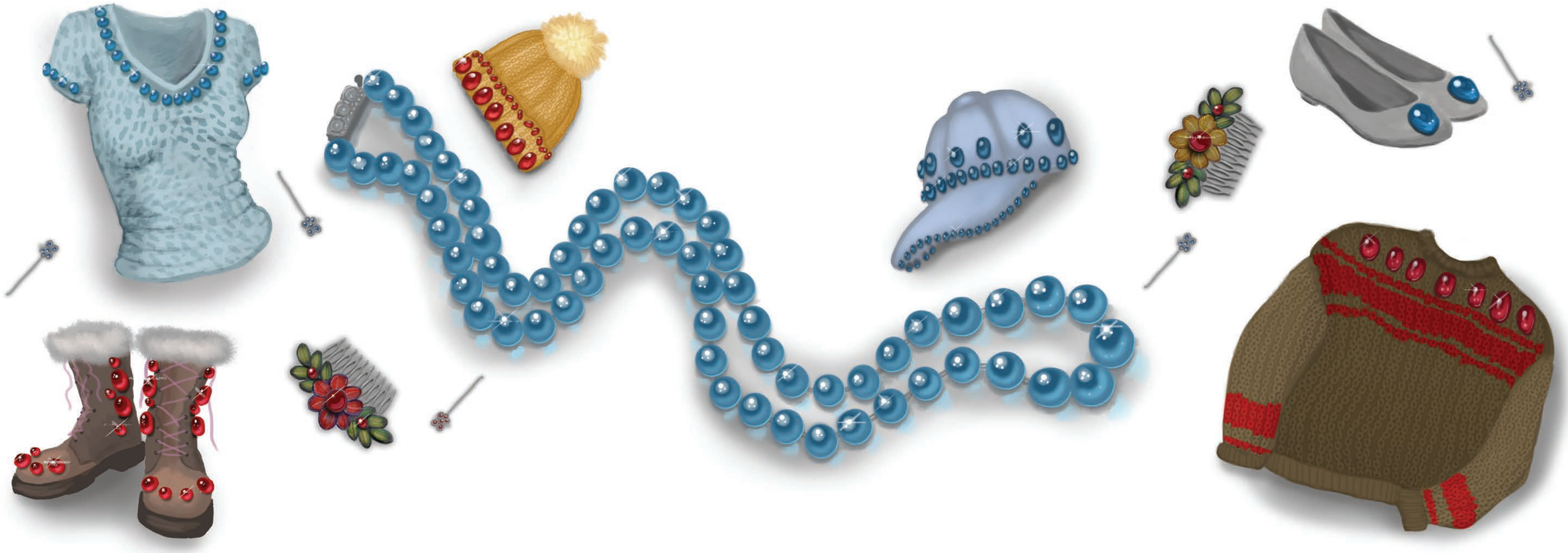
"That's right, they were **COLD.** Those stones had been nestled in the fox's fur, keeping him cool in the hot summer sun. It dawned on me– the blue stones left out in the chilling cold in the winter– were **STORING THE COLD.** And the red ones, in the summer, were **STORING HEAT.**



Grandma Buggs and I ran to get the rest of the gang and we ran down to the quarry like you kids run to the ice cream truck. We held the stones in our hands– the red ones were warm, and the blue ones were cold, and then there was a mysterious yellow stone, too. We collected as many of the red and blue as we could in our pockets (they looked like a chipmunk's cheeks full of nuts). Freddy collected the yellow ones for fun, too.



Who can show me how we use those red and blue stones now?



That’s right. We use the stones to help ourselves stay cool and warm when we need to– that’s why we don’t have to heat our houses or offices very much.

We focus on what the people need– not what the building needs.

But what Freddy found– now, that was really something. Uncle Freddy put those yellow stones on his table, and something amazing happened. He had a little exposed circuit he was working on– something to help repair a radio he had found– and one of the stones dropped onto the circuit. For a brief moment, the radio turned on. Freddy thought it was a mistake– it had to be! But when he placed the stone on the circuit, just like a battery, there was power. Real power. **STORED POWER.**

"Did Freddy make batteries?"

"You bet he did. He made batteries of all shapes and sizes. He helped figure out ways to mine the stones from the quarry. He found ways to generate energy and get it into the batteries. He made all the broken things in his shed work... and then started working on the rest of the town."



Freddy's stones changed the way things worked in Egansville. Not only the way the radios, and electric toothbrushes, and lights worked; the stones changed so much more than that. Folks were thinking differently. They were looking beyond their own bad habits. They were looking to nature. They were open to new ideas, like trapping fog, and growing food, and composting.



The townspeople transformed. And when they did, they discovered that the world had so much more to offer them.... and since the people changed, the town changed, too.

**Like a muddied wall into a garden,
or a foggy hill into a watery oasis; the confused,
dull town of Egansville came to life again.**

MEET THE AUTHOR & ILLUSTRATORS

Rachel Coddington
AUTHOR

Rachel Roellke Coddington lives in Portland, Oregon with her handy, handsome husband, her boisterous baby boy, and her dashingly dorky dog. She has had many jobs in her life: from creating custom dazzle for leotards to teaching elementary school to running huge festivals! Her favorite job of all, though, is being creative. She takes it very seriously. You can learn more about Rachel at www.rachelcoddington.com.

Sarah KC Cowan
ILLUSTRATOR

Sarah has always had a passion for art, from doodling on the walls as a child, creating designs as a landscape architect, and painting in her free time. At PAE, she's built a full-service graphics department from scratch and enjoys helping engineers illustrate complicated ideas in beautiful ways. Sarah lives in Portland, Oregon with her husband Michael and two art-loving kids, Aiden and Chloe.

Roseanne Sherman
ILLUSTRATOR

With a history of freelance writing, painting, and photography, Roseanne currently spends her time wrangling engineers and organizing projects at PAE. Her hidden skills include juggling and choosing just the right song at karaoke, two things she can't wait to teach her baby daughter. She lives in Portland, Oregon with her husband Sean and daughter Ruby.

Tara Brooks
ILLUSTRATOR

Tara arrived at PAE from the fields of Wisconsin to follow her passion for graphic design. She enjoys typography, female-fronted punk bands, tattoos, and any combination of the three. You can catch her at home in Portland curling up with her adorable cats and a comic, hunting for the best flea market find, or cross-stitching, knitting, and DIY-ing masterpieces.

ADDITIONAL ARTISTS

Karalie Juraska
Aiden Cowan (age 6) – Bee and Butterfly drawings in Buggs' room.

ADDITIONAL CONTRIBUTORS

Paul Schwer, Allan Montpellier, McKenzie Richardson, Stacy Riger, Dave Williams, Katrina Emery, Samantha Colasardo, Margo Botti, Nick Collins, Tim Elley, Lauren Rellinger, Rachel Wrublik, Matthew Peairs, Justin Stenkamp, Karina Hershberg, Joreigh Landers.

PAE 50 YEARS & FORWARD

WHO WE ARE

ABOUT PAE

We are the grown-up version of the characters you have read about in this book. We all started out curious and fascinated with our natural world and all the things people create in this world. As kids we took things apart and sometimes even put them back together again. We played with Legos and dolls and built forts in mine craft and in real life. As we got older we studied math and science and music and art. Eventually we found other people who wanted to design and build things together and those people became our clients, our collaborators and our friends. We found a way to keep doing what we loved as kids and made a career out of it. What a lucky group we are!

VISION

We help to solve the planet's energy & water challenges.

MISSION

WHAT WE DO

We work with clients to design the nation's highest performing built environments.

HOW DO WE DO IT?

We listen to our clients and deeply understand their goals

We hire and retain the best staff

We provide innovative engineering solutions that work.

BUGGS' BEETLE



The best part about Buggs' story is that the beetle is a

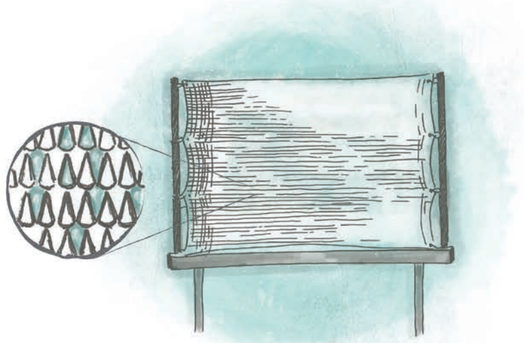
REAL LIFE CREATURE!

The Darkling Beetle (or Stenocara gracilpes) has a special covering on its back with bumps that gather water vapor or fog. When enough water has been collected, those long, beautiful beetle legs tip up (pushing the beetle's head down) and the water drains down to its head, where it can be lapped up like a cool glass of lemonade! This is how the beetle lives in the Namib Desert in Africa, one of the driest habitats in the world.

REAL WORLD:

Chungungo, Chile

In Chungungo, Chile, there was no running water for over 20 years after their water system was dismantled. Water was trucked in from 15 miles away over a dirt road, and each resident got only a small amount of water per day. Seventy five nets were installed to catch the fog on the mountains nearby. The water runs from the nets to troughs, and then gravity takes the water down to the village. Now, residents have running water!



REAL LIFE PAE:

Oregon Zoo Education Center

Opsis Architects

Humans have found ways to capture rainwater too. At the Oregon Zoo Education Center, in rainy Portland, all the rain that falls onto the roof of the Center is collected and funneled into a 10,000-gallon tank underneath the building. In addition to falling on the roof, water pools deep underground where it could cause a problem – even a landslide. The ground water is pumped into the same underground tank with the rainwater. Water stored in the tank is filtered with sand and treated with chlorine and UV light to get rid of any bacteria (germs), and is used for flushing the building's toilets.



ENNA'S LIVING WALL

Enna transforms her building into a lush garden. In real life, many buildings grow plants on the roof or walls (green roofs, living walls). We don't see a lot of buildings growing food in their walls like Enna, but we would love to move in this direction!



REAL WORLD:

There are also LOTS of reasons why incorporating plants into building design is beneficial. Indoor plants remove CO_2 in the air and release oxygen to help patients in hospitals heal more quickly, workers in offices produce better work, and students in school get higher test scores. When plants are on the roof (or walls), they can, store storm water, reduce air and noise pollution, provide habitats for wildlife, and cool the urban heat island created by the concrete, pavement and cars.

Enna was on the right track!



Remove CO_2 & Produce O_2



Reduce Noise Pollution



Create Habitats



430,000 Square Feet

REAL LIFE PAE:

Facebook

Gehry Partners

PAE collaborated with Frank Gehry to design Facebook's new headquarters which includes a 9-acre green roof (that's the size of seven football fields!!). The roof is a habitat for birds, and a place where employees can take a twenty minute walk in the fresh air!

CHOPLIN'S COMPOST

Your family might compost, or someone you know might have a bin.

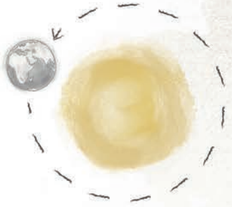
But did you know we can even compost human poop?



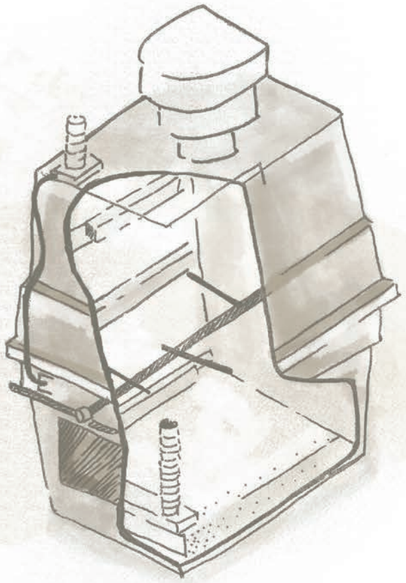
Heat



Wood Chips



One Year



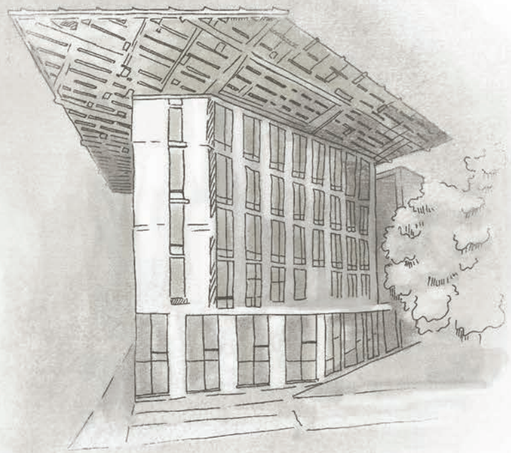
REAL LIFE PAE:

Bullitt Center

Miller Hull Partnership

At the Bullitt Center, composting toilets drain feces into big bins in the basement that turn it into compost over the course of a year by adding wood chips, mixing it and letting microbes generate heat to break the waste down. Once the process is complete, the compost can then be used in fields to help plants grow better. After being treated in the bins, it doesn't even smell!

Wouldn't Choplin approve?



FREDDY'S BATTERY

Energy can come from so many different sources. We can harness energy from the sun, the wind, water, movement, from dumps... the list goes on and on!



Sun



Water

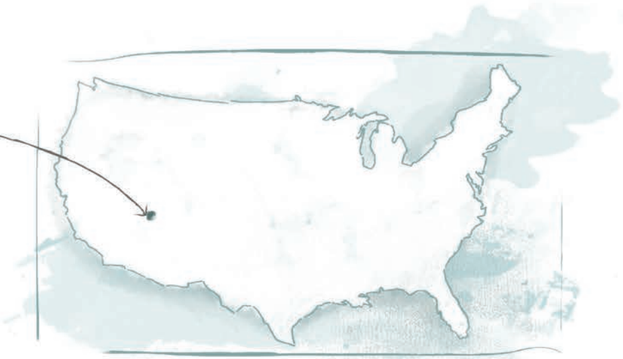


Wind

REAL WORLD:

How many square miles of PV do we need to power the entire United States with Renewable Energy?

~2,500 Sq. Miles, (50 miles by 50 miles) set in a location with an abundant amount of sun.





REAL LIFE PAE:

Rocky Mountain Institute

ZGF Architects

The coolest thing Freddy learned to do was store energy. Sometimes we have energy we don't need, and it's super important to find ways to keep it to use later. At the Rocky Mountain Institute Innovation Center, energy is generated by solar panels on the building's roof (and used to power the building). Whatever NOT used is stored in a battery to be used later (to charge batteries in cars and run the building when it's not sunny). The building makes so much energy they even sell some back to the utility company to use!

GAUCHO'S STONES



Gaucho was lucky enough to find stones in nature that could hold heat and cool. We don't have those stones in real life, but we do have something called "phase change materials." These can absorb heat (sometimes we put them on the walls of buildings to catch sun) and release it when the building cools down. This helps the inside of the building stay at a steady temperature.



Embr Wave

Fresh Air

Temperature

Some people do have clothes that help them stay cool and warm- it's not very common, though. A new bracelet called "Embr Wave" was developed by a team of MIT engineers at Embr Labs to do just that; similar to putting your hands by a warm fire or putting an ice cube on your skin in the summer.



REAL LIFE PAE:

Lowrie & Trillium Creek Primary School

DOWA-IBI Architects

Students at the Lowrie and Trillium Creek elementary schools are able to participate in controlling heating and cooling in their classrooms.

Thermometers measure the outside temperature, and when the temperature outside is nice (like in spring or fall) a green light on the wall turns on, and then the students know to open up the windows and let in fresh air. The forced air system turns off when the green light goes on. When the light goes off the students know it is time to close the windows and the air conditioning goes back on. Video monitors in the schools' library keep track of electricity used for heating and cooling, so that students can visit and see how much energy they have saved simply by opening the windows when the classroom is warm, and keeping them closed when the classroom is cool. Everyone wins, the students get fresh air when it is nice out as the classroom opens up and the school saves energy.

MORE REAL LIFE PAE



Chemeketa Community College

SRG Partnership

This community college building relies on natural light throughout the year. A system of windows, skylights and moveable louvers bounces sunshine around the room, so that they barely need to turn on the lights at all! It also has a natural ventilation systems that includes phase change materials very similar to Gaucho's stones.



Japanese Gardens

Kengo Kuma & Hacker Architects

Visitors to these gardens want to see the pretty plants and trees; not big power stations and pipes. Designers were able to hide most of the mechanical systems inside or underground. They also made them super quiet, so visitors aren't disturbed by noisy generators. Gardens are helpful not just for food, but for beauty. Being able to enjoy nature makes people happier.



Edith Green Wendell Wyatt Building

SERA Architects

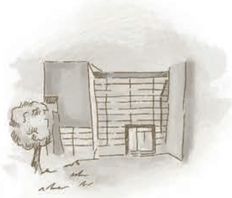
This building badly needed to be renovated and improved. It didn't get destroyed in a landslide like Egansville, but it was old and was using too much energy and water. The whole team that worked on it shared all their ideas and picked the best ones, working together to improve it. Now, with tricks like using plants to shade the west side (just like Enna's edible plant wall), it's 45% better at using energy and even generates some of its own energy with photovoltaic panels on the roof!



Orchards at Orenco

Ankrom Mosian Architects

These apartments are focused on staying warm in winter and cool in summer. They don't have Gaucho's stones to use, but there are lots of other ways they do that. One way is by making sure the walls and roof have lots of insulation and that all the holes around doors and windows are plugged up so warm air isn't leaking out in the winter. And in the summer, all the windows can open wide and let the breeze in. It sounds simple, but it helps people to not use as much air conditioning or heating inside!



Nordic Heritage Museum

Mithun Architects

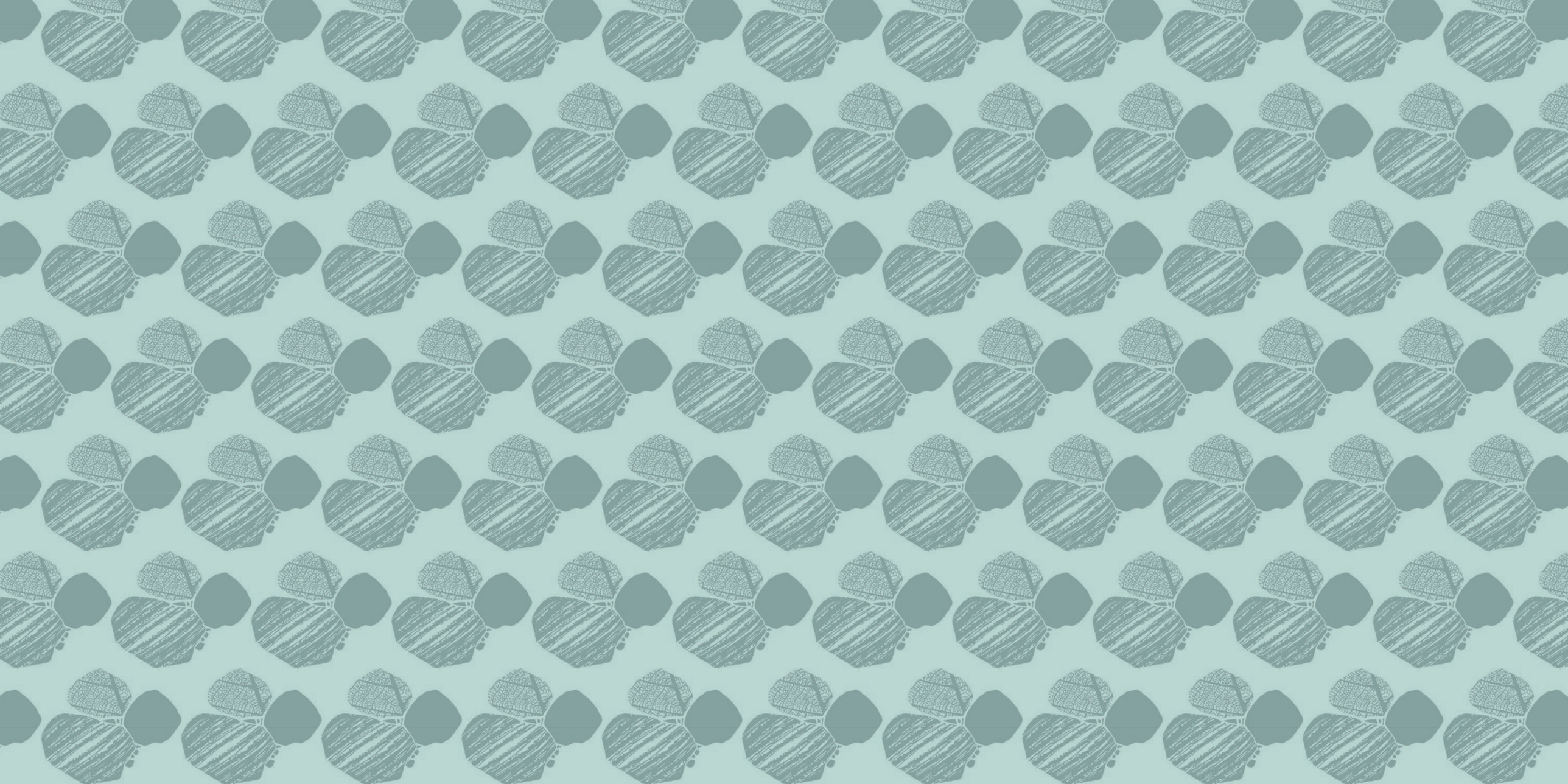
A museum designed to be a fjord? Fjords are long narrow channels of water; lots of them are in the Nordic countries. Many immigrants from those countries (Norway, Sweden, Finland, Iceland, and Denmark) came to the U.S. to build a new life, and this museum tells those stories and more. It saves energy by heating its main "fjord" hallway with radiant floors: hot water pipes under the ground warm up the floor, which uses less energy than heating with air. Do you think Freddy would approve of that clever design?



International Living Learning Center, Oregon State University

Mahlum

This building took a smart look at how they use energy and water. All of their faucets are low-flow, which means the amount of water leaving is much less than a normal faucet—that saves a lot of water every day, which is less work for Buggs' water-catching beetle. And the hot water that comes out of the faucets is all heated with the energy from solar panels on the rooftop!





The tiny town of Egansville is tucked away in the hills. When the Great Landslide hits, their power and water resources are almost completely destroyed! The townspeople do their best, but Egansville became a shadow of what it once was. Luckily, a resourceful and spunky group of kids come to the rescue, and with a little help from Mother Nature, Egansville is transformed!

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PAE