

The Great Company Adventures · Book 16 of 50

ABB
**THE
ARMS THAT NEVER TIRE**

A curious girl, three wise mentors, and the tireless steel arms that quietly build the modern world.

"Discovering the businesses that built the modern world"

An independent, unofficial educational work · not affiliated with, endorsed by, or sponsored by ABB.



THE GREAT COMPANY ADVENTURES

Discovering the businesses that built the modern world.

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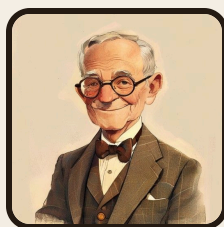
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MEET THE CHARACTERS



SIRI



BEN



WARREN



CHARLIE



JONAS

A curious girl named Siri, a wise old teacher named Ben, and his student Warren with Warren's partner Charlie — together discovering the businesses that built the modern world, one adventure at a time.

THE GLOBAL 50

One great company per volume · Fifty adventures, one modern world

SPACE & EXPLORATION

1. SpaceX — *“The Fire That Comes Back”*

MANUFACTURING & ENGINEERING

2. Toyota — *“The River That Builds Cars”*
3. Siemens — *“The Factory That Builds Factories”*
4. Caterpillar — *“The Machines That Move Mountains”*
5. Boeing — *“The Bird With Six Million Pieces”*
6. Airbus — *“The Plane Four Countries Built”*

ENERGY & INDUSTRY

7. Shell — *“The Sunlight Buried at Sea”*
8. ExxonMobil — *“The Ancient Sunlight Machine”*
9. GE Vernova — *“The Wheel That Makes Lightning”*

COMMUNICATION

10. AT&T — *“The Voice Inside the Wire”*
11. Qualcomm — *“The Whisper in the Air”*
12. Ericsson — *“The Towers That Talk”*

TRANSPORTATION

13. Tesla — *“The Car With No Engine”*
14. John Deere — *“The Machine That Feeds the World”*
15. UPS — *“The Promise in a Brown Truck”*

INFRASTRUCTURE

16. ABB — *“The Arms That Never Tire”*
17. Schneider Electric — *“The Guardian of the Grid”*

MATERIALS

18. Corning — *“The Thread of Light”*
19. DuPont — *“The Inventors of Almost Everything”*

SCIENCE & TOOLS

20. 3M — *“The Factory of Ten Thousand Ideas”*
21. Bosch — *“The Spark in Every Machine”*
22. Honeywell — *“The Dial That Tames the Weather”*

MEDICINE & BIOTECHNOLOGY

23. Pfizer — *“The Shield in a Tiny Vial”*
24. Roche — *“The Detectives of the Blood”*

25. Novo Nordisk — *“The Key to a Billion Locks”*

26. Johnson & Johnson — *“The Little Bandage That Grew”*

FOOD & AGRICULTURE

27. Nestlé — *“The Cup That Wakes the World”*
28. Cargill — *“The Invisible Harvest”*

FINANCE & COMMERCE

29. Visa — *“The Handshake Inside the Card”*
30. Mastercard — *“The Two-Second Trust Machine”*
31. Walmart — *“The Store That Never Runs Out”*
32. Costco — *“The Treasure Warehouse”*
33. FedEx — *“The Race Against the Sun”*

CONSUMER INNOVATION

34. Disney — *“The Factory of Dreams”*
35. LEGO — *“The Brick That Builds Anything”*
36. Sony — *“The Pocket Full of Music”*
37. Coca-Cola — *“The Secret in the Red Can”*
38. Nike — *“The Shoe That Learned to Fly”*

LUXURY & CRAFTSMANSHIP

39. Rolex — *“The Heartbeat on Your Wrist”*
40. LVMH — *“The Suitcase That Conquered the World”*

COMPUTING & DIGITAL CIVILIZATION

41. Apple — *“The Glass That Thinks”*
42. Microsoft — *“The Invisible Machine”*
43. Google — *“The Library With No Walls”*
44. Amazon — *“The Box That Crossed the World”*
45. NVIDIA — *“The Brain Made of Sand”*
46. Intel — *“The First Thinking Chip”*
47. TSMC — *“The Invisible City”*
48. ASML — *“The Machine That Prints With Light”*
49. OpenAI — *“The Machine That Learned to Talk”*

THE FINAL DISCOVERY

50. The Company Yet to Be Built — *“The Adventure You Will Build”*

THE ARM THAT MOVED IN THE DARK

Midnight. Homework: unfinished. And Grandpa Ben's old brass compass? Spinning like crazy.

SPIN

The needle stopped. Pointing at... her little toy robot arm. The most boring gadget on her shelf.

YOU? You just wave around!

The magic diary flipped open by itself. Fresh ink. Grandpa's handwriting.

It's never done THIS before...

"Time to meet the businesses that built the modern world. Start with the arms that never tire."

★ WORTH REMEMBERING

Look around your room. Your phone, your shoes, your snacks, the car outside — almost none were touched by a human hand. Tireless metal arms built them, day and night. So... **who taught steel to work?**

The toy arm swung up. A whirlpool of orange light grabbed her.

WHOOSH



Here we GOOO!



SIRI'S SECRET NOTEBOOK

New mystery! 🕵️

- ① How can a metal arm be strong AND gentle, tireless AND perfect?
- ② Grandpa says these arms built a giant company. Prove it, compass!

THE FACTORY THAT NEVER SLEEPS



She landed above a factory the size of a town. Hundreds of orange arms, all frozen mid-move.

It's an ARMY of arms!



A young engineer waved. "I'm Jonas. I teach robots how to build cars."

Best. Job. EVER.



A whistle blew. The arms woke — welding, lifting, twisting a car together in a shower of sparks.

They're DANCING!

And they never take a break.

★ WORTH REMEMBERING

One of these arms can lift a whole car, then turn around and place a screw softer than you set down a butterfly. Same arm. It works all day, all night, forever — and never once gets tired.

📖 SIRI'S SECRET NOTEBOOK

Hundreds of arms. One car every minute. Zero coffee breaks. ☕🚫 Jonas says every arm hides a secret. First up: how does metal MOVE?

MUSCLES MADE OF LIGHTNING

3a The muscle: turning electricity into a push

"No muscles in here," said Jonas. He cracked one open. Just copper wire and a magnet.

"Electricity spins it fast but weak. So gears trade the speed for strength. Small fast gear, big slow muscle."

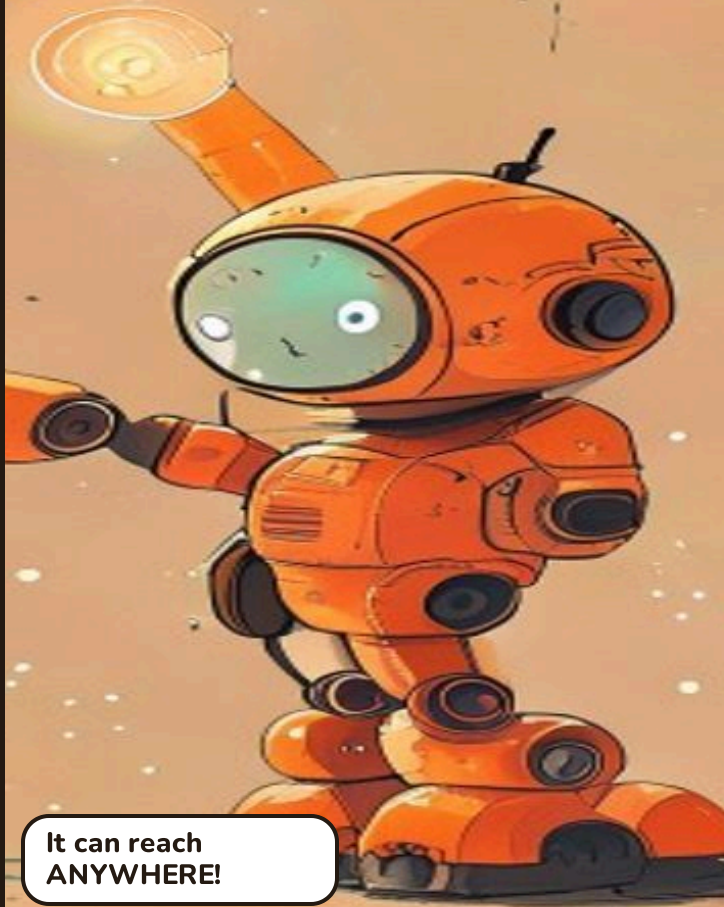
THAT lifts a car?!

Fast becomes
STRONG!

★ WORTH REMEMBERING

Run electricity through a coil and it becomes a magnet — push and pull, push and pull, and the shaft spins. That's an **electric motor**. Add gears and a fast little spin becomes a slow mighty lift. 💪

"Watch. Base, shoulder, elbow, and a wrist that rolls three ways. Six joints." The arm touched six far corners.



It can reach ANYWHERE!

Then, softly, the same arm picked up an egg. Didn't crack it.



Strong enough to lift a car... gentle enough for an EGG!

★ WORTH REMEMBERING

Your own arm bends at six or seven places — that's why your hand can reach any point around you. Give a robot **six joints** and it gets the same superpower: any spot, any angle.

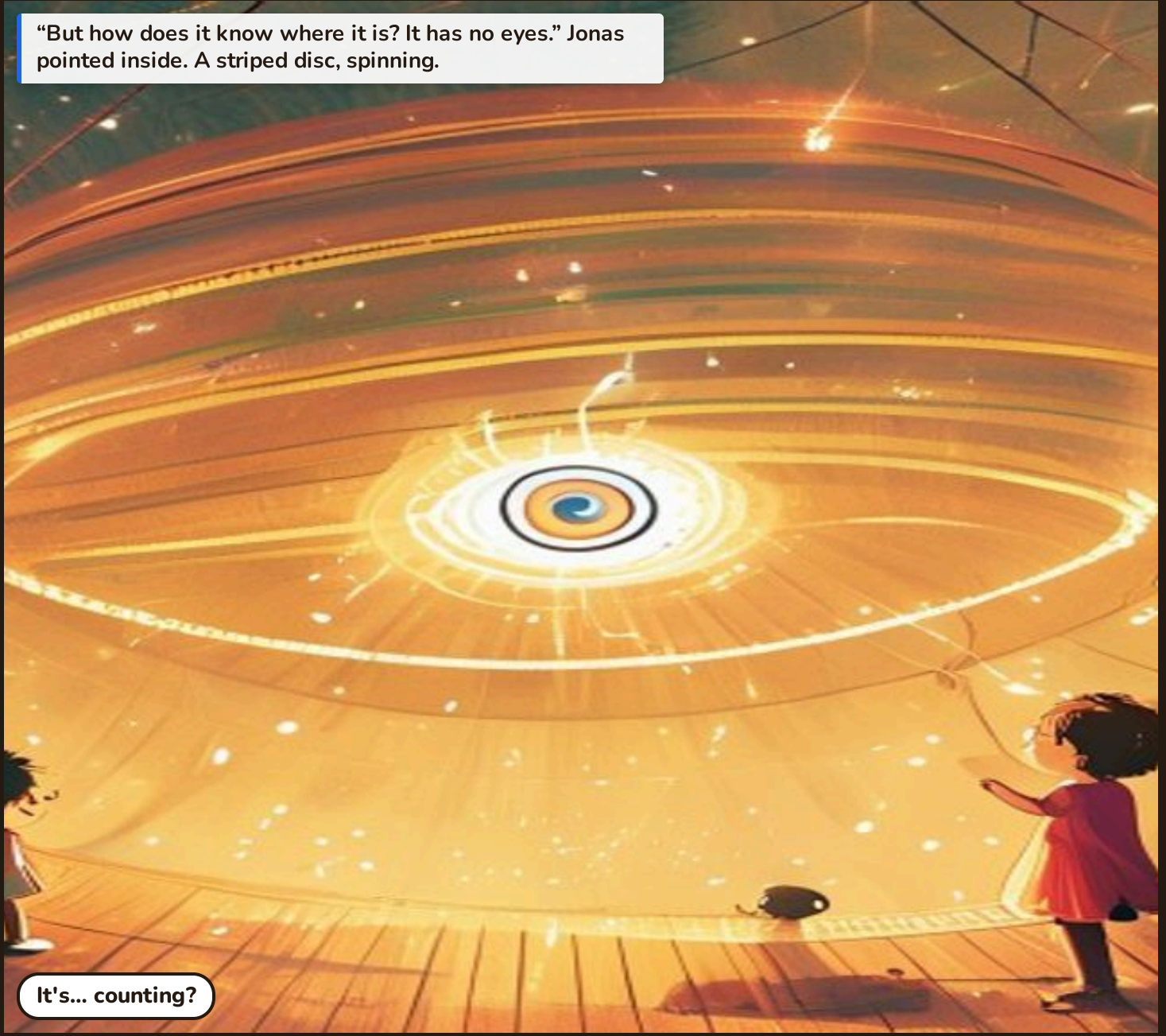


📖 SIRI'S SECRET NOTEBOOK

- ① Motor = electricity + magnet = spin. Gears trade speed for **STRENGTH**. 💪
- ② Six joints = reach anywhere, any angle. Just like my own arm!

HOW IT NEVER MISSES

"But how does it know where it is? It has no eyes." Jonas pointed inside. A striped disc, spinning.



It's... counting?

★ WORTH REMEMBERING

Every joint hides a **counting wheel** called an encoder — thousands of tiny stripes. Count the stripes as it turns and you know the exact angle, down to a whisker. It can't see. It **counts**.

1 2
3 4

The tip hovered over a glowing cross. Check. Nudge. Check. Nudge. A thousand times a second.



It keeps
CORRECTING
itself!

It stamped the same dot ten thousand times. Every dot landed exactly on the last.



Not even a **HAIR**
off!

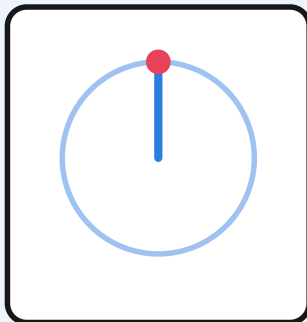
Closer than a hair.
Every time.

★ **WORTH REMEMBERING**

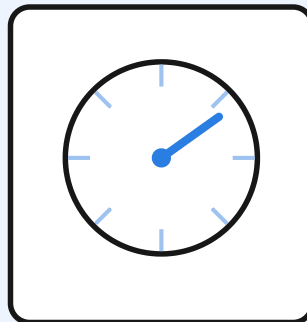
Here's the whole trick, and it runs the world: **aim, measure, fix the gap — repeat.** A thousand times a second. That endless little loop is why robots never wobble and never get bored. 🎯



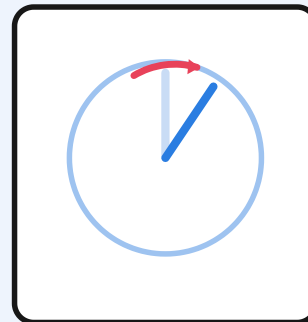
HOW THE ARM NEVER MISSES



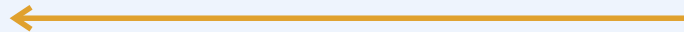
AIM
set target angle



MEASURE
count the stripes



CORRECT
nudge the motor



repeat 1,000× a second



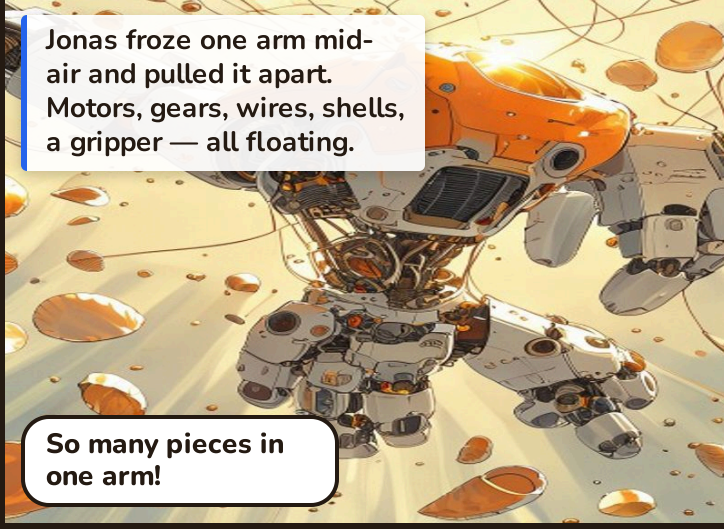
SIRI'S SECRET NOTEBOOK

No eyes — it COUNTS stripes to feel its angle.



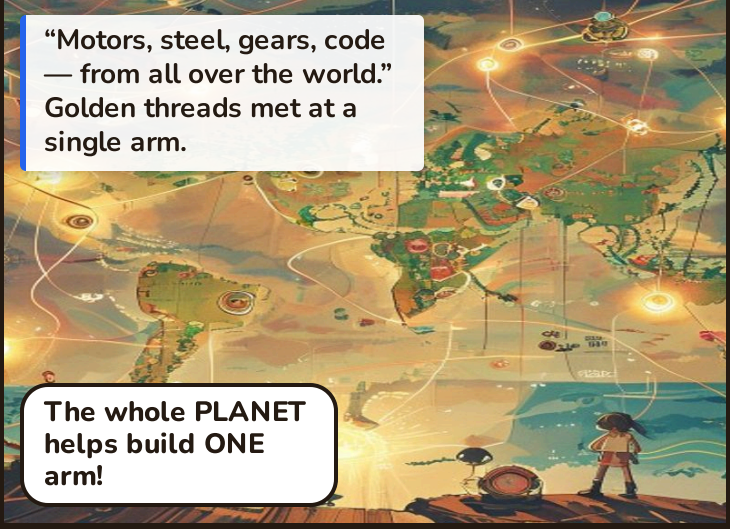
Then it checks and fixes itself 1,000× a second. That loop = perfect, forever. Same dot 10,000 times. 🎯

A THOUSAND HANDS, ONE ARM



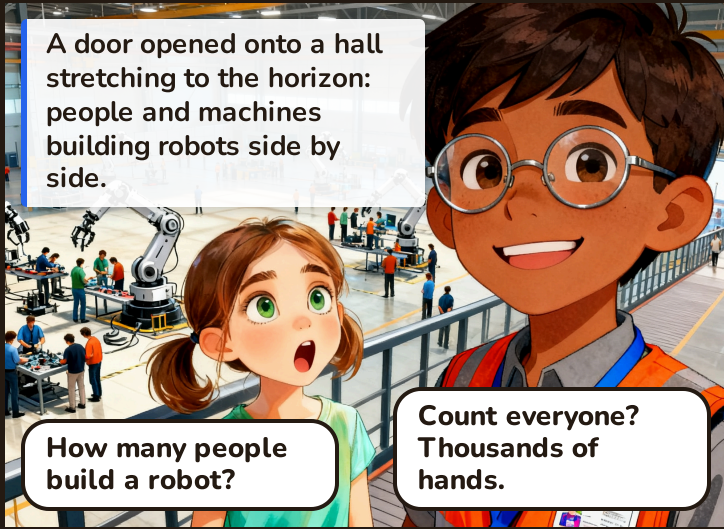
Jonas froze one arm mid-air and pulled it apart. Motors, gears, wires, shells, a gripper — all floating.

So many pieces in one arm!



"Motors, steel, gears, code — from all over the world." Golden threads met at a single arm.

The whole PLANET helps build ONE arm!



A door opened onto a hall stretching to the horizon: people and machines building robots side by side.

How many people build a robot?

Count everyone? Thousands of hands.



The winder. The gear-cutter. The coder. The welder. The tester. The mechanic. Each did one small part.

Nobody builds the whole thing alone!

★ WORTH REMEMBERING

Here's the surprise: **nobody on Earth builds a robot alone**. Each person masters one sliver. And robots don't replace people — they take the heavy, dull, dangerous jobs so humans can do the clever ones. 🙌

📖 SIRI'S SECRET NOTEBOOK

Motors + gears + steel + code + thousands of hands = one arm. 🌍 Robots grab the boring/scary jobs. Humans get the interesting ones. So who's the CONDUCTOR of all this? 🎵

WHY EVERY FACTORY SAYS YES

"Why buy an arm?" Jonas grinned. "It works noon and midnight. Never sick. Never bored. Same perfect move, forever."

"And we don't just sell it. We look after it for twenty years — checkups, spare parts, tune-ups."

Like a doctor for robots!

"Once a factory runs on our arms and our software, everything is built around them. Ripping them out? Nightmare."

A worker that never needs a day off!

The whole factory leans on them!

★ WORTH REMEMBERING

Why spend a fortune on these arms? ① Tireless, precise, safe — huge **value**. ② Once your whole line is built on them, swapping brands means rebuilding everything — so factories stay for **decades**. Selling the arm is just the start; caring for it earns for years.



📖 SIRI'S SECRET NOTEBOOK

Factories say yes because arms = tireless + perfect + safe. And once installed, they're **STUCK** (in a good way). The real gold: 20 years of service. Grandpa smiles at that. ❤️

THE COMPANY TWO COUNTRIES BUILT

Through the dawn light: a gleaming campus, orange arms waving from glass halls. Siri read the name on the gate.

ABB! The arms that never tire are ABB's robots!

"It began in Sweden, 1883. A company called ASEA taught electricity to do real work."

1883?! That's ancient!

"And in Switzerland, 1891, Brown Boveri built giant turbines and generators — machines that made power."

Two countries, two electric giants!

"In 1974, ASEA built the world's first all-electric robot arm — run by a computer brain. This started it ALL."

The great-grandparent of every arm here!

★ WORTH REMEMBERING

Then, in 1988, the bravest handshake in engineering: two century-old electrical giants — Swedish ASEA and Swiss Brown Boveri — **joined into one**. Two letters each. **A-B-B**. A company built to electrify and automate the whole world. ⚡



THE STORY IN TIME

1883

ASEA is born in Sweden — putting electricity to work.

1891

Brown Boveri is born in Switzerland — turbines and power.

1974

ASEA builds the first all-electric, computer-run robot arm.

1988

ASEA + Brown Boveri merge into ABB.

1990s

ABB robots spread through car factories worldwide.

2015

YuMi — a friendly two-armed robot made to work beside people.

Today

Millions of ABB machines run factories, ships and power grids. ⚡

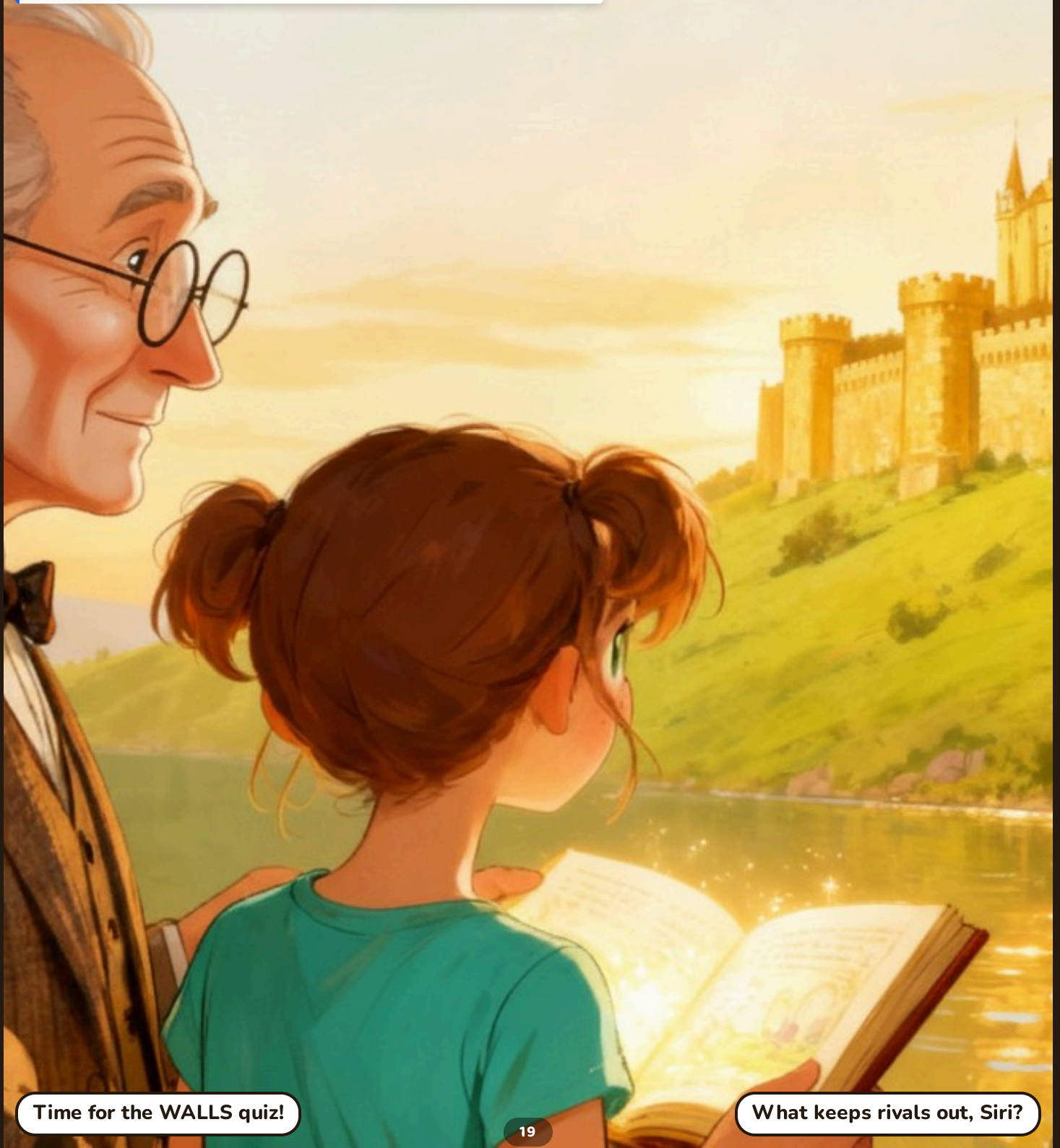


SIRI'S SECRET NOTEBOOK

ABB = ASEA (Sweden, 1883) + Brown Boveri (Switzerland, 1891), joined 1988. Built the FIRST electric robot arm in 1974. Their job: electrify and automate the world. ⚡🤖

THE CASTLE OF STEEL

A warm glow. A smell of cherry cola. Warren and Charlie, the partners from Omaha, stood before a steel castle.



Time for the WALLS quiz!

What keeps rivals out, Siri?



THE CASTLE WALLS • WHY RIVALS CAN'T COPY IT



Wall One: Built-In For Life

A factory's whole line is built around ABB's arms and software. Switching brands means rebuilding everything. Almost nobody does.



Wall Two: The Twenty-Year Promise

ABB doesn't just sell a robot — it keeps it running for decades. Spare parts, tune-ups, trust. That bond earns money long after the sale.



Wall Three: The Whole Toolbox

Robots, motors, drives, grid gear — all under one roof. A factory can buy its whole electric world from one trusted maker.



Wall Four: A Century of Know-How

140 years of taming electricity and motion. Rivals can copy a robot in a year. They can't copy a century of hard lessons.



The Cracks in the Steel

When the world slows, factories stop buying big machines — sales dip. Rivals like Fanuc and KUKA are fierce. And a company this huge must fight to stay quick. Castles need defending — daily.

Charlie tapped his glasses. "My trick: don't ask how to WIN. Ask what would DESTROY it. Then don't do that. **Invert, always invert.**"



Find the ways to lose... then don't!

★ WORTH REMEMBERING

Charlie's checklist for ruining ABB: let the robots get unreliable. Grow so big and slow that a nimble rival darts past. Bet everything on one industry, then watch it slump. Now — just never do those. Worry, turned into a to-do list. ✓

Warren raised his cola. "Machines a factory would hate to live without, sold once and served for twenty years. A business like that — steady, needed, patient — is the kind I most admire."



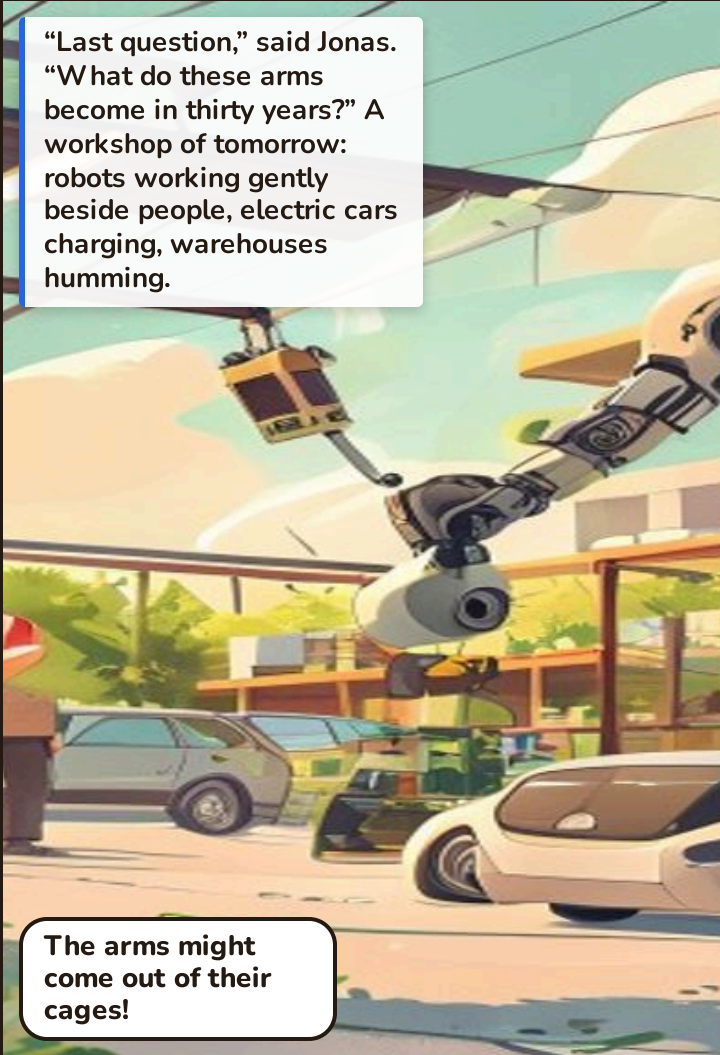
So the treasure isn't the robot. It's the WALLS.

SIRI'S SECRET NOTEBOOK

Walls: built-in for life  + 20-year promise  + whole toolbox  + a century of know-how . Cracks: slow years, tough rivals, staying nimble.
Charlie: INVERT. Warren: admire steady, needed businesses. 

THE NEXT THIRTY YEARS

"Last question," said Jonas. "What do these arms become in thirty years?" A workshop of tomorrow: robots working gently beside people, electric cars charging, warehouses humming.



The arms might come out of their cages!

On a rooftop at dusk, Siri thought it through the way Grandpa taught her.



Don't bet on the robot. Bet on the NEEDS.

★ WORTH REMEMBERING

The deep currents: robots learning by watching, not just by rules. Gentle 'cobots' working shoulder to shoulder with people. And as the world runs on electricity, ABB's motors and grid gear guide the flow. Shapes change — but building, moving, powering? Forever. 🌐

📖 SIRI'S SECRET NOTEBOOK

2056 watchlist: cobots beside people, robots that LEARN, an all-electric world. Rule: bet on needs, not shapes. (Also: I want a homework-folding robot NOW.)

COMING HOME

Her own bed. Morning. The compass: quiet. The house: somehow different.

Was it real? It FELT real...

One fresh line dried on the diary's glowing page.

"The modern world is not magic. It is millions of ordinary people doing small hard things, together, for a long time."

At breakfast, a car key and a chocolate bar lay by the milk. Electric muscles. Counting wheels. Tireless arms. A thousand hands.

You're the biggest team project in human history.

She hugged the diary tight. Somewhere far away, an orange arm caught the morning sun.

Show me the next one, Grandpa. 🧡

★ WORTH REMEMBERING

Next unlock, feel it: electric muscles geared into strength — a counting wheel checking its angle a thousand times a second — a century of no's guarding the promise. A robot arm is no longer just an arm. **Nothing, from now on, is just anything.**



SIRI'S SECRET NOTEBOOK • WHAT I LEARNED

- ① Motors + gears = strong gentle muscle.
- ② Six joints = reach anywhere.
- ③ Counting wheels + fix-the-gap loop = never miss.
- ④ Nobody builds a robot alone — companies conduct.
- ⑤ Value → built-in → service → castle.
- ⑥ Invert! And admire steady, needed businesses. 🧡



OUR PHILOSOPHY

We believe the greatest gift we can give a child is the ability to think.

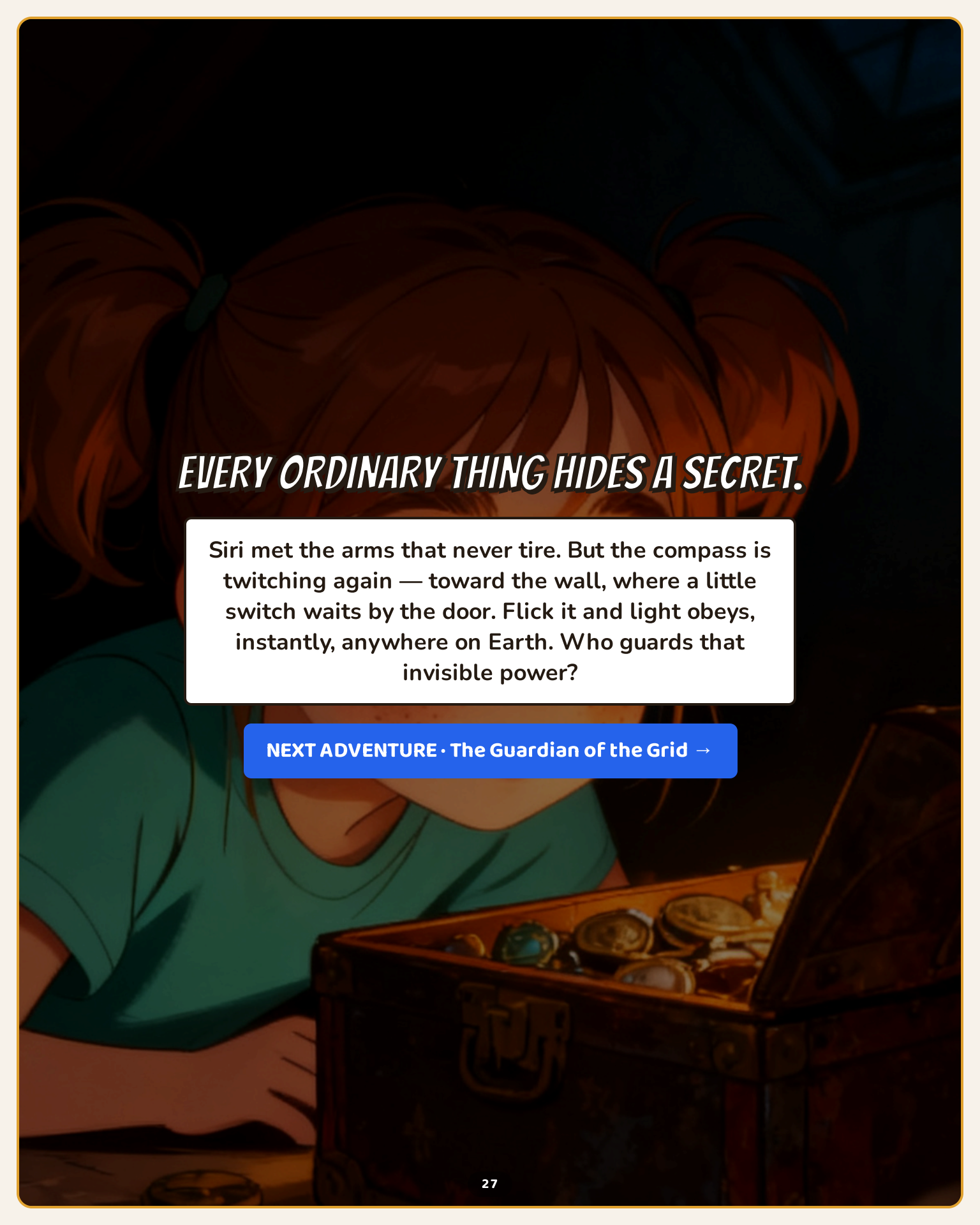
Inspired by the multidisciplinary thinking of [Charlie Munger](#) and the rational, long-term philosophy of [Warren Buffett](#), our comics connect science, technology, business, history, and human behavior to show how the real world works.

Every story begins with a scientific idea and follows its journey into innovation, industry, and the businesses that create value for society. Along the way, children learn that great companies are built on curiosity, experimentation, integrity, and long-term thinking.

Our goal is not to teach children how to invest, but to help them build the mental models needed to understand the world, ask better questions, and think independently.

The companies featured in *The Great Company Adventures* are educational case studies—not investment recommendations. They show how knowledge, innovation, and perseverance turn ideas into products, services, and enduring businesses.

LEARN THE SCIENCE. • UNDERSTAND THE BUSINESS. • THINK FOR LIFE.

A girl with red hair in pigtails, wearing a green shirt, is looking into an open treasure chest filled with gold coins and jewels. The scene is dimly lit, with a dark background.

EVERY ORDINARY THING HIDES A SECRET.

Siri met the arms that never tire. But the compass is twitching again — toward the wall, where a little switch waits by the door. Flick it and light obeys, instantly, anywhere on Earth. Who guards that invisible power?

NEXT ADVENTURE • The Guardian of the Grid →