

The Great Company Adventures • Book 46 of 50

INTEL THE FIRST THINKING CHIP



A curious girl, three wise mentors, and the fleck of sand that learned to follow orders.

"Discovering the businesses that built the modern world"

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THE GREAT COMPANY ADVENTURES

Discovering the businesses that built the modern world.

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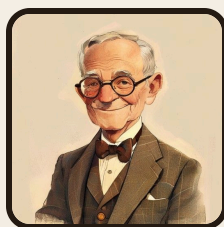
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MEET THE CHARACTERS



SIRI



BEN



WARREN



CHARLIE



IRIS

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 LITTLE SQUARE IN THE SHOEBOX

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

SPIN

The needle swung to a shoebox of broken gadgets. Out fell one tiny grey square with silver legs.

It's never done **THIS** before...

This? It's a dead **BUG!**

On her notebook it looked like nothing at all. Smaller than a stamp. Lighter than a coin.

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

YOU can't do anything. You're a chip!

"Every screen you have ever loved was obeying one of these. Go and meet the first thinking chip."

★ WORTH REMEMBERING

This little square is a **microprocessor** — a whole computer squeezed onto a fleck of silicon. Before it, a computer filled a room and cost a house. And silicon is just **sand**. So who taught a grain of sand to follow orders?

The chip's silver legs sparked. A whirlpool of blue light grabbed her.

WHOOSH



Here we GOOO!



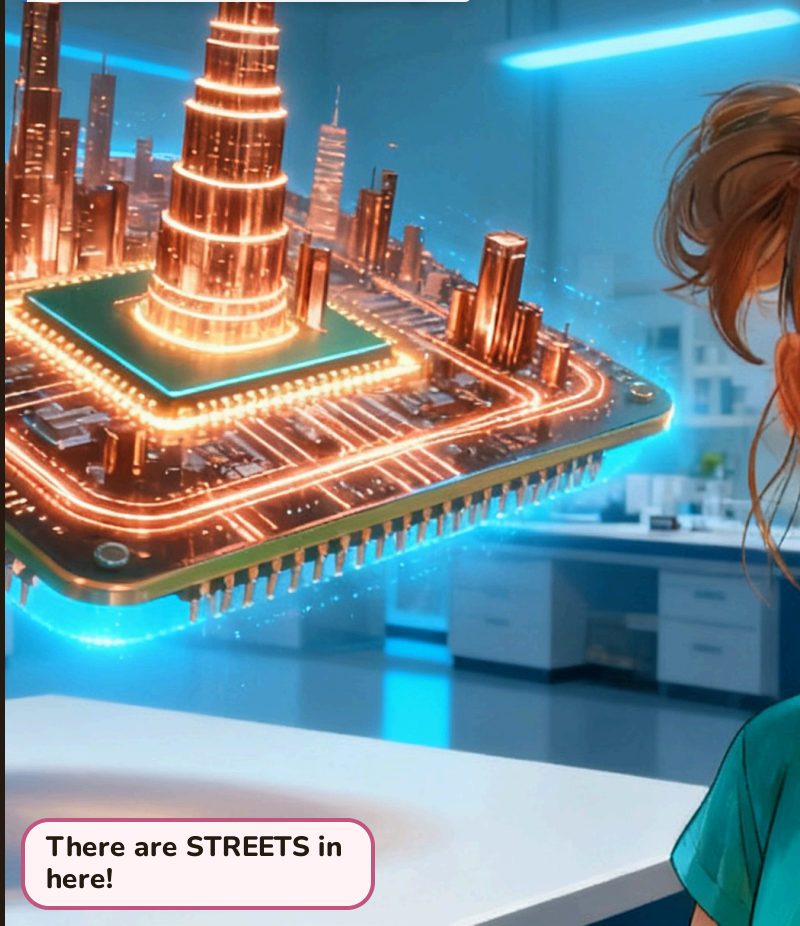
SIRI'S SECRET NOTEBOOK

New mystery! ☐

- ① How can a flake of sand THINK — or at least obey?
- ② Grandpa says this square shrank a whole room into my pocket. Prove it, compass.

THE CITY TOO SMALL TO SEE

She landed in a lab where the chip floated, magnified — and it was not a square. It was a CITY.



An engineer stepped out of the glow. *"I'm Iris. I help design the cities inside chips."*

Best. Job. EVER.

Copper avenues. Blocks of identical towers. Sparks of light racing along the roads like traffic.

Who LIVES in this city?

Switches. Billions of them.



★ WORTH REMEMBERING

A modern processor holds **billions of switches** in a space smaller than your fingernail. Each one is far thinner than a virus. Stretch one chip's wiring end to end and it would run for miles.

📖 SIRI'S SECRET NOTEBOOK

A chip = a city of billions of switches, roads made of copper, all in a stamp. 🔍 Iris says every street hides a secret. First up: how do you make a city out of BEACH?

SAND GROWN PERFECT

3a The purest rock on Earth

"All of this starts here," said Iris. Quartz sand. Melted, cleaned, and cleaned again.

My computer was a BEACH?!

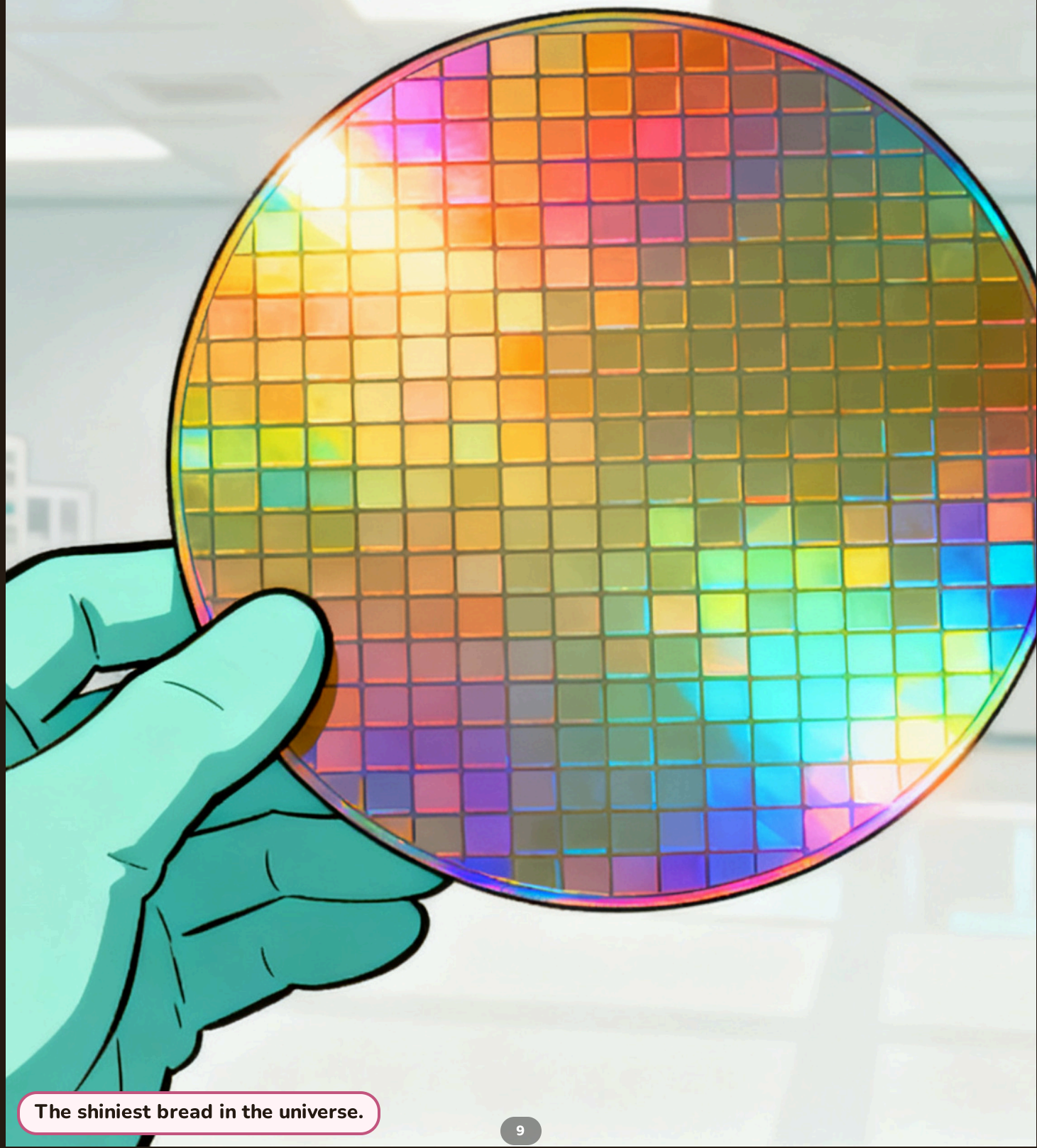
In a dark chamber, a silver crystal rose slowly from molten silicon, copying one perfect pattern.

It's growing like a backwards icicle!

★ WORTH REMEMBERING

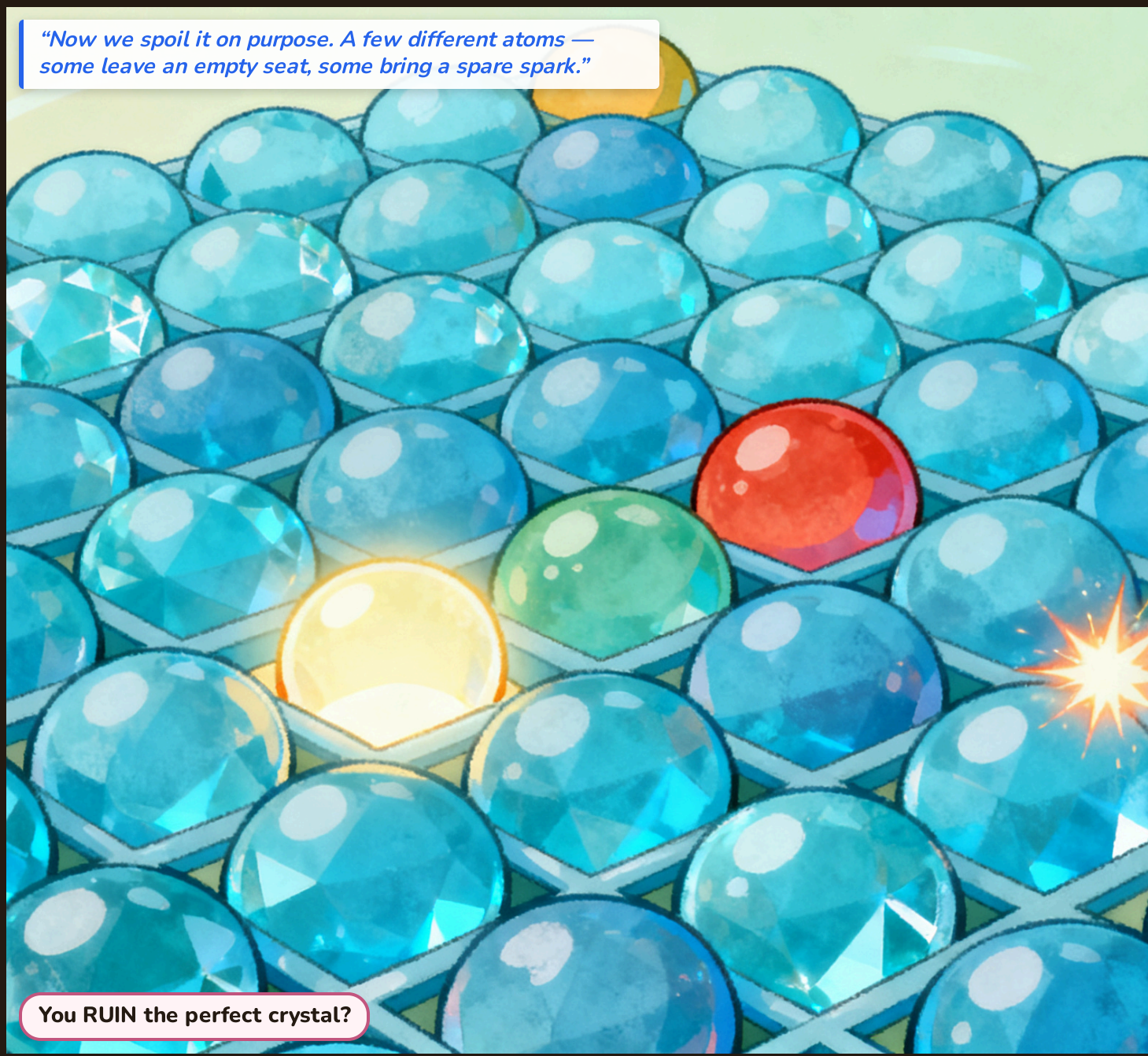
Chip silicon is purified to **99.9999999%** — nine nines. Picture a mountain of sugar with one spoonful of anything else allowed. Electricity must flow in perfect silence, and one stray atom is a boulder in the stream.

A diamond wire sliced the crystal into mirror discs. Each disc: room for hundreds of chips.



The shiniest bread in the universe.

"Now we spoil it on purpose. A few different atoms — some leave an empty seat, some bring a spare spark."



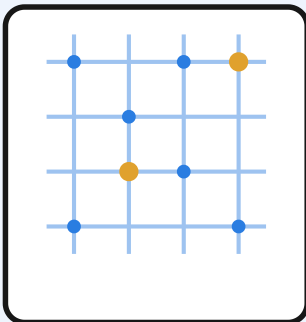
You RUIN the perfect crystal?

★ WORTH REMEMBERING

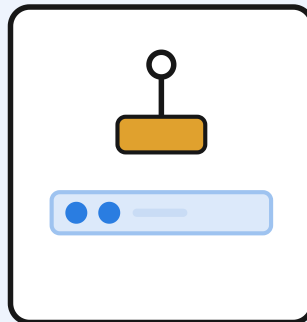
This is **doping**, and it is the whole secret. Pure silicon barely conducts. Add a pinch of one neighbour element and it carries spare sparks; add another and it carries empty seats. Put the two kinds side by side and electricity learns to obey rules.



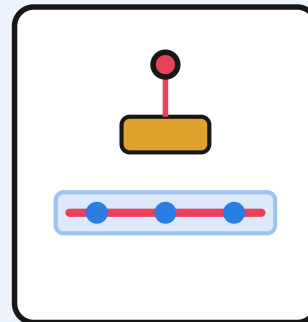
HOW ONE SWITCH OBEYS



DOPED SAND
a pinch of other atoms



LEVER UP: SHUT
no sparks may cross



LEVER ON: OPEN
now the sparks flow



SIRI'S SECRET NOTEBOOK

- ① Sand → nine-nines silicon → one perfect crystal → mirror wafers. 🪨
- ② Then they ADD a pinch of other atoms on purpose. Spare sparks + empty seats = a crystal that follows rules! ⚡

TWENTY BILLION SWITCHES

Iris zoomed into one street. One gate. A little bridge that lifted when a spark touched the lever above.



A gate that opens with **ELECTRICITY!**

★ WORTH REMEMBERING

That gate is a **transistor**: a switch with no moving parts, flipped by electricity itself. Because a switch can be flipped by the same stuff it controls, switches can command other switches. That one fact built the modern world.

*"Wire two gates in a row:
the spark passes only if
BOTH open. Side by side:
EITHER will do."*



Two dumb gates...
make a RULE!

Then a great drum began
to beat, and the whole
switch-city flipped
together on every tap.



What's the DRUM
for?

So nobody moves
early. That's the
clock.

★ WORTH REMEMBERING

Here is the whole secret of computers: **switch** → **decision** → **anything**. Billions of switches, obeying a drumbeat billions of times a second, make music, maps and games. No magic — which somehow makes it more magical. 🧠

📖 SIRI'S SECRET NOTEBOOK

Transistor = a switch flipped by electricity. Gates in rows = RULES. A clock drum keeps billions of them marching in step. My games are just... very disciplined sparks. 🥁

PRINTING A CITY WITH LIGHT

Through an air shower into a hall like a cathedral. Air a thousand times cleaner than a hospital.



It's so quiet. Like it's **CONCENTRATING**.

A machine the size of a bus fired violet light through lenses at the wafer. *"Too small to carve. So we PRINT."*



The light **IS** the chisel!

★ WORTH REMEMBERING

Chips are made by **photolithography**: light shines through a patterned mask, shrinks through lenses, and hardens a coating so the pattern can be etched. Print, bake, wash, repeat — dozens of layers, about three months per wafer.

At the end, golden needles touched each tiny square and asked it questions. Some passed. Some didn't.



You TEST every single one?

Every one. Perfection isn't a wish.

★ WORTH REMEMBERING

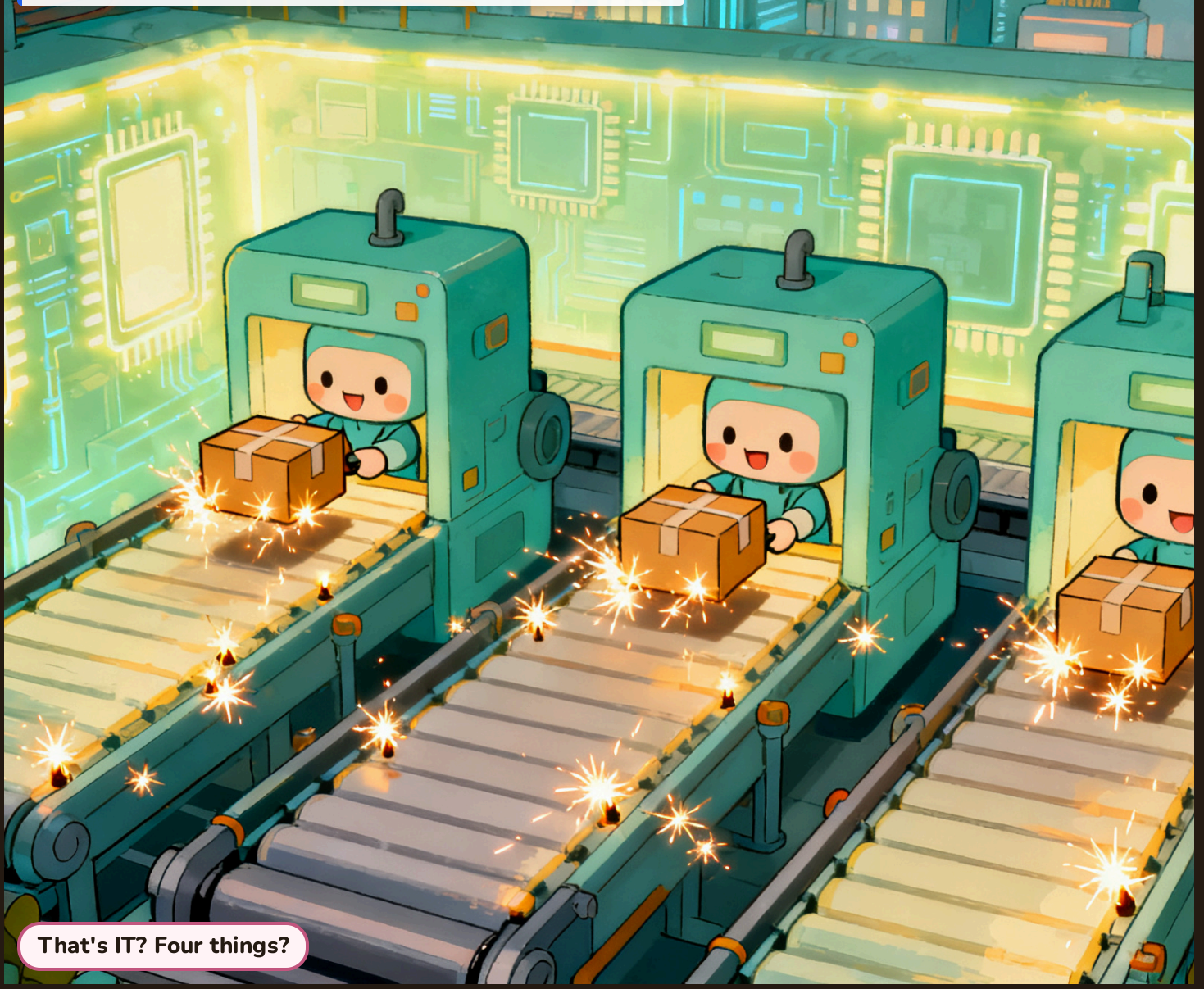
Nothing mechanical ever touches the pattern — only light, chemistry and vacuum. A single dust speck lands like a falling mountain, which is why a chip factory costs more than an airport.

📖 SIRI'S SECRET NOTEBOOK

Don't carve the invisible — PRINT it with light, layer after layer, for 3 whole months. Then test every chip with tiny golden needles. One dust speck = one dead city. 🌩️

HOW A CHIP OBEYS

"A processor does four things forever," said Iris. "Fetch an order. Understand it. Do it. Write it down."



That's IT? Four things?

★ WORTH REMEMBERING

Fetch, decode, execute, store — repeated billions of times a second. Better still, the chip works like an assembly line: while step four finishes one order, step one is already fetching the next. Nobody waits.

She pressed a power button. Light spread from the chip out to the screen like sunrise filling a valley.



It's WAKING UP!

★ WORTH REMEMBERING

Every app, song and game is a huge pile of tiny orders the chip already knows: add, compare, jump, remember. Programs are not magic spells — they are very long, very patient **to-do lists**.

📖 SIRI'S SECRET NOTEBOOK

Fetch → understand → do → write down. Forever, billions of times a second, on an assembly line. Software = an enormous to-do list for a very fast, very obedient beach. 📝

THE COMPANY THAT BET ON SAND

Beyond the orchards: a windowless silver factory glowing at sunrise. Siri knew the name on the gate.

INTEL! The first thinking chip was theirs!

"1968. Two scientists, Robert Noyce and Gordon Moore, left a safe job to build memory out of silicon."

They quit to sell...
SAND?

"In 1971 came the 4004 — the first microprocessor sold to anyone. A whole computer, 2,300 switches, on one chip."

One chip replaced
a CABINET?!

"Ten years later a personal computer chose an Intel brain, and the world's offices and classrooms filled up."

So THAT'S why
they all look alike!

★ WORTH REMEMBERING

Then the bravest move in the company's history. In 1985 memory chips were Intel's original business — and losing money against fierce rivals. Intel **walked away from its own founding product** to bet everything on processors.



THE STORY IN TIME

1968

Robert Noyce and Gordon Moore found Intel to build silicon memory.

1971

The 4004 — the first microprocessor anyone could buy: 2,300 transistors.

1978

The 8086 begins the x86 family that software still speaks today.

1981

A famous personal computer picks an Intel brain. Offices fill up.

1985

Intel quits memory chips — its founding business — for processors.

1991

'Intel Inside': the hidden ingredient puts its name on the outside.

1993

The Pentium era. Chips become household words.

Today

Billions of switches per chip — and new fabs still rising. 

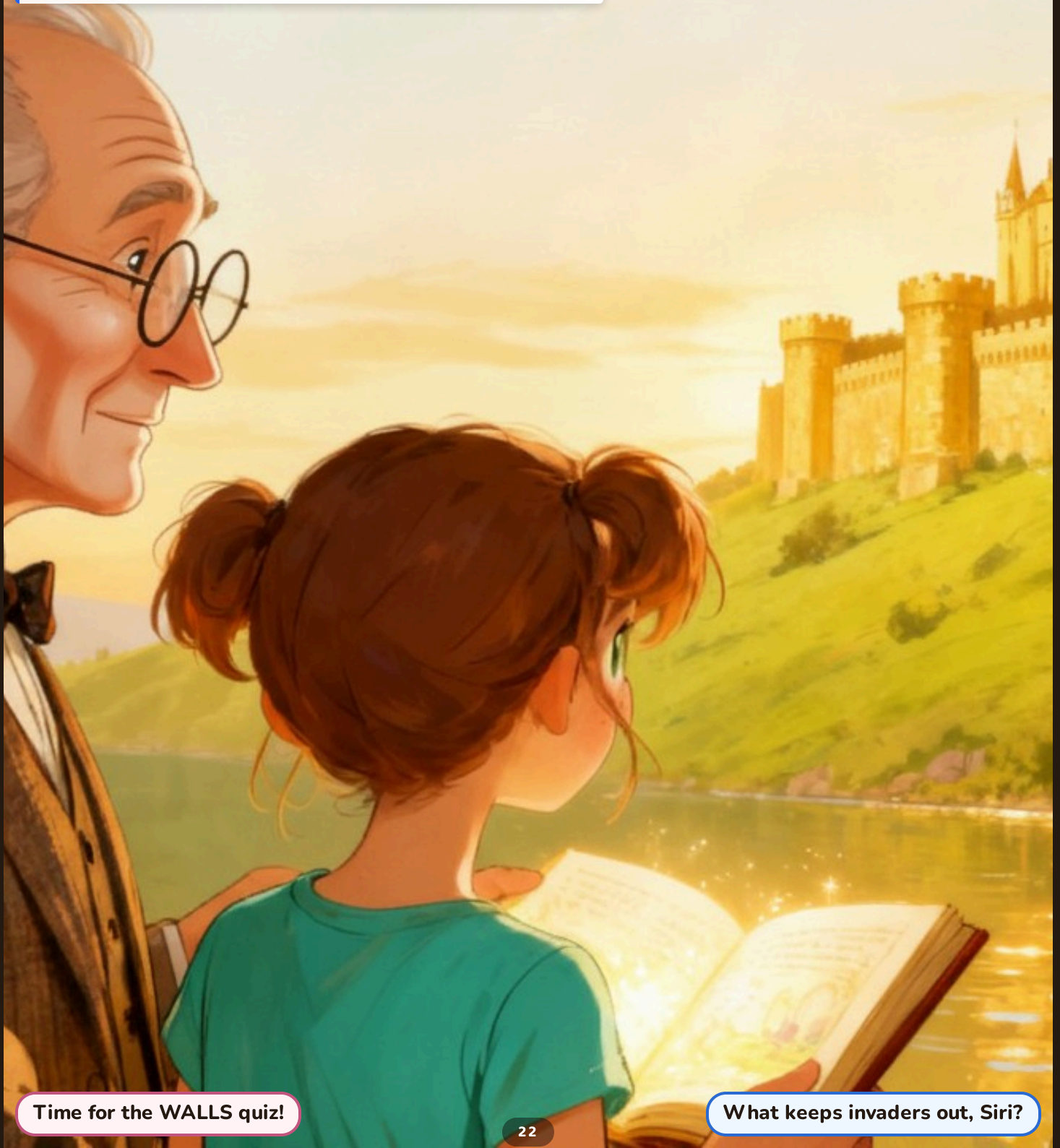


SIRI'S SECRET NOTEBOOK

INTEL. 1968 two scientists → 1971 the 4004
(2,300 switches!) → PCs everywhere → 1985
they QUIT their first business to save the
company. Founders' rule: bet on the future, not
the habit. ☐

THE CASTLE OF SAND

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



Time for the WALLS quiz!

What keeps invaders out, Siri?



THE CASTLE WALLS • WHY RIVALS CAN'T COPY IT



Wall One: Factories Few Can Build

A modern chip factory costs more than an airport and takes years. Wanting to compete is easy; funding it for decades is not.



Wall Two: A Language Software Speaks

Millions of programs were written for Intel's instruction family. Change the language and every program must be rewritten.



Wall Three: Recipes Learned the Hard Way

Yield comes from thousands of tiny tricks, copied exactly from fab to fab. Knowledge like that cannot be bought in a shop.



Wall Four: The Trusted Ingredient

Buyers who never see the chip still ask for it by name. An ingredient people request is a wall of its own.



The Cracks in the Silicon

Intel missed the phone wave. Rivals now print finer lines, and a specialist foundry makes chips for everyone else. New factories swallow money before they earn it. Castles need defending — daily.

Charlie tapped his glasses. *"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 a chip company: fall behind in manufacturing. Miss the next kind of computer. Believe old success proves future success. Now — simply never do those. Worry, turned into a to-do list.

Warren raised his cola. *"Wonderful and hard are different words. This one earns its living by out-building everybody, forever."*



So the treasure isn't the chip. It's the **FACTORY.**

 SIRI'S SECRET NOTEBOOK

Walls: factories 🏭 + a language software speaks 📖 + hard-won recipes 🍴
+ a trusted name 🤝. Cracks: missed phones, finer rivals, hungry new fabs.
Charlie: INVERT. Warren: some castles must be rebuilt every few years. 🏰

THE NEXT THIRTY YEARS

"Last question," said Iris.
"What does this become in thirty years?" Data halls, solar fields, helpers on desks.



Chips might end up
 in EVERYTHING.

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



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

★ WORTH REMEMBERING

The visible currents: chips built as stacks of smaller chiplets, machines that print with even shorter light, factories rising on new continents, and AI eating more computing than anything before it. Shapes change; the hunger for thinking does not. 🧠

📖 SIRI'S SECRET NOTEBOOK

2056 watchlist: chiplet stacks, shorter light, new fabs everywhere, AI eating computing.
 Rule: bet on needs, not shapes. (Also: a chip in my toothbrush is objectively funny.)

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 the little chip lay beside the milk. Beach sand. Doped crystal. Billions of switches.

You're the biggest team project in human history.

She hugged the diary tight. Far away, a silver factory caught the morning sun.

Show me the next one, Grandpa. ♡

★ WORTH REMEMBERING

Feel the unlock: sand grown perfect, spoiled on purpose, printed with light into billions of switches marching to a drum. A chip is no longer just a chip.

Nothing, from now on, is just anything.



SIRI'S SECRET NOTEBOOK · WHAT I LEARNED

- ① Chips are sand grown into one perfect crystal.
- ② Doping = adding a pinch of the wrong atom on purpose.
- ③ A transistor is a switch flipped by electricity.
- ④ Switches make rules; a clock keeps them in step.
- ⑤ Chips are printed with light, then tested one by one.
- ⑥ Quit your first business if the future is elsewhere.
- ⑦ Invert! And some castles must be rebuilt forever. 🧡



OUR PHILOSOPHY

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

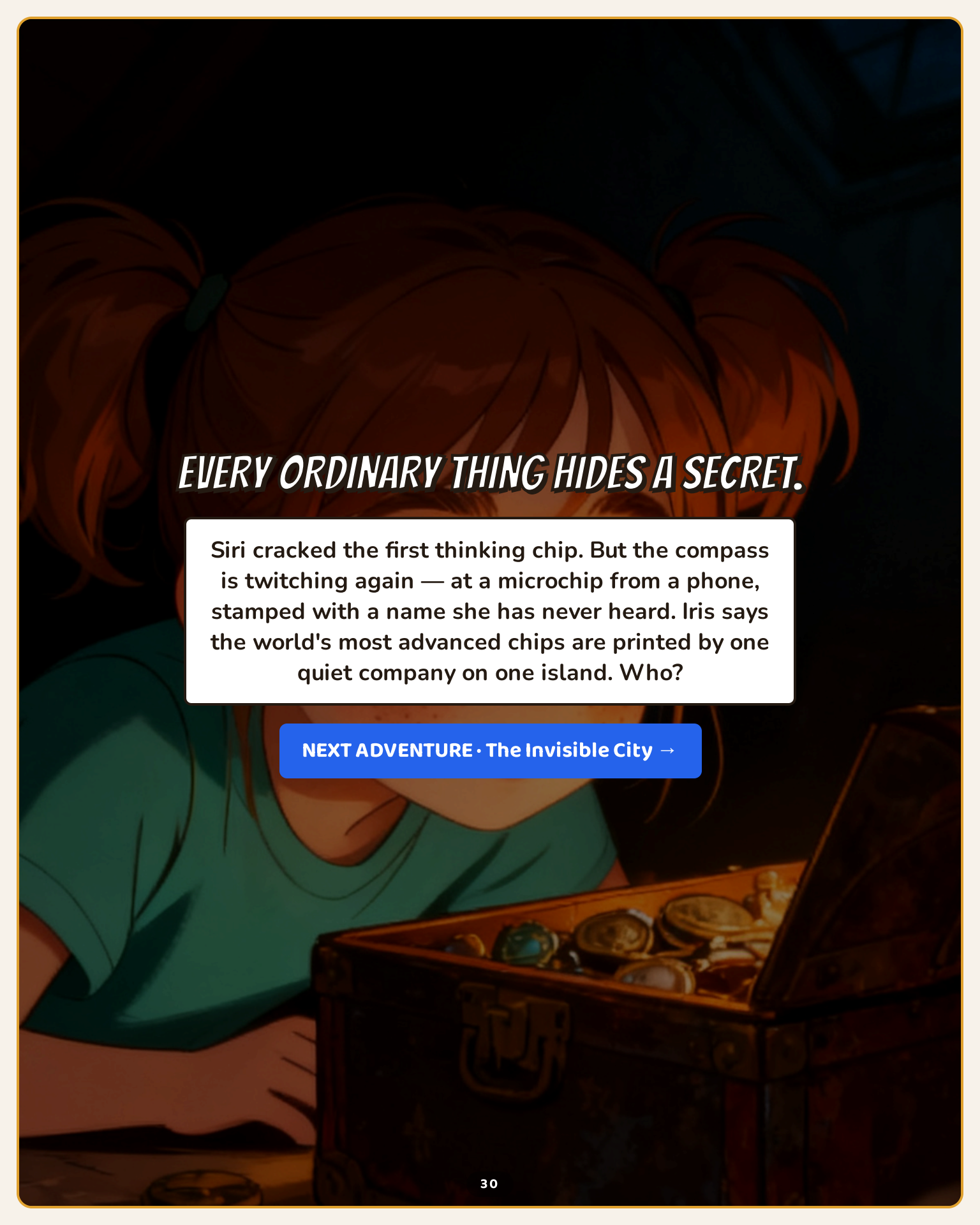
Inspired by the multidisciplinary thinking of [Charlie Munger](#) and the rational, long-term philosophy of [Warren Buffett](#), our comics connect science, technology, business, history, and human behavior to show how the real world works.

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.



EVERY ORDINARY THING HIDES A SECRET.

Siri cracked the first thinking chip. But the compass is twitching again — at a microchip from a phone, stamped with a name she has never heard. Iris says the world's most advanced chips are printed by one quiet company on one island. Who?

NEXT ADVENTURE · The Invisible City →