

The Great Company Adventures • Book 47 of 50

TSMC THE INVISIBLE CITY

seven doors, twelve mental models, and the microchip printed by a company nobody can name.

"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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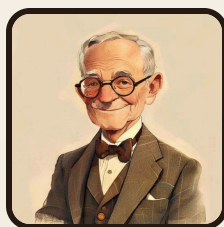
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MEET THE CHARACTERS



SIRI



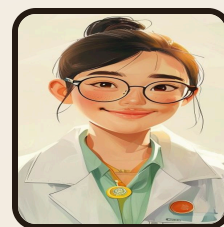
BEN



WARREN



CHARLIE



LING

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 NAME NOBODY KNEW

Midnight. Homework: not happening. Because Grandpa Ben's brass compass just started... trembling.

TIK-TIK

It spun. Locked. Pointing at the shelf where the family's broken old phone had been living for a year.

SPIN

THAT thing? It doesn't even switch on.

She lifted the back cover off. Inside: a green board, a hundred little components, and one dark square.

It's never done THIS before.

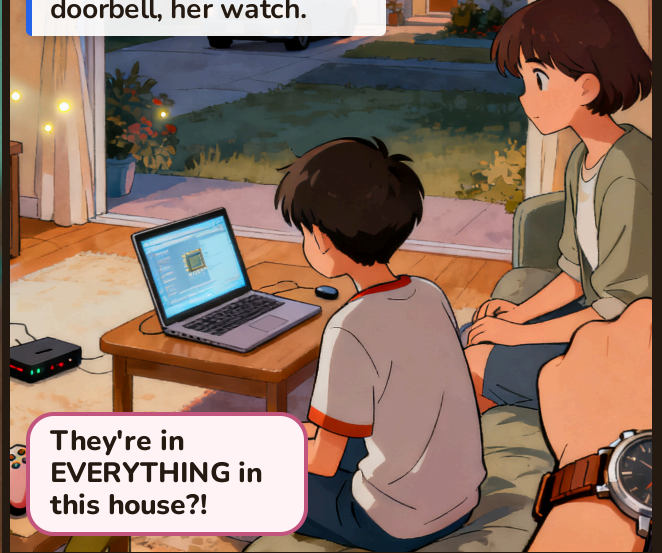
There's a whole tiny CITY in here.

On her fingertip it was smaller than her fingernail. Mirror-smooth on top. Colder than a spoon.



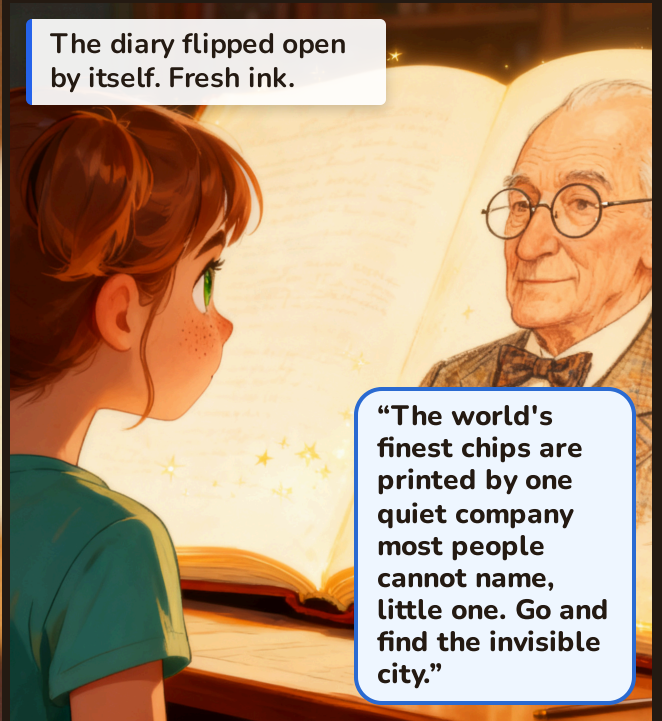
Who even MADE you? I've never heard the name.

And the same square was hiding everywhere: the television, the laptop, the car, the doorbell, her watch.



They're in EVERYTHING in this house?!

The diary flipped open by itself. Fresh ink.



"The world's finest chips are printed by one quiet company most people cannot name, little one. Go and find the invisible city."

★ WORTH REMEMBERING

Start with the strangest fact in this whole book: the company whose name is on your phone almost certainly did not **build** the chip inside it. Designing a chip and manufacturing one are utterly different jobs.

The chip glinted once — and a whirlpool of violet light yanked her in.

WHOOSH



Here we GOOO!



SIRI'S SECRET NOTEBOOK

Biggest mystery yet ☐

- ① If the phone company didn't MAKE this square... who did?
- ② Grandpa says one quiet company prints the finest chips on Earth. Find them, compass.

THE HALL WITH NO HORIZON

She landed on a walkway above a machine hall that simply did not end. Silver carriers glided overhead on rails.



This place goes past the HORIZON!

An engineer waved from below. *"I'm Ling. I help run a foundry — a factory that prints other people's chips."*



Best. Job. EVER.

"Picture a great kitchen. Cooks arrive with their own recipes. We cook every order perfectly — and sell nothing of our own."



You have no chip of your OWN?

Not one. That's the whole point.

★ WORTH REMEMBERING

A **foundry** manufactures chips designed by other companies. Because it never competes with its customers, fierce rivals can queue at the same door — and their orders together pay for machines no single one of them could afford.

Ling unrolled a parchment map. Seven glowing doors.
*"Open them all and you'll understand this square better
than most grown-ups."*



Seven doors. Deal.



SIRI'S SECRET NOTEBOOK • THE QUEST MAP

-  1 THE CITY — what's actually on the square?
-  2 THE SWITCH — why did it stand UP?
-  3 THE STENCIL — you print with light?!
-  4 THE STORM — where does that light come from?
-  5 THE FLOORS — a hundred storeys, in a chip?
-  6 THE TEST — why do some chips die?
-  7 THE HANDS — who does all this... and WHO prints for everyone? 🌍

DOOR ONE: THE INVISIBLE CITY

3a A city built for electricity to walk through

Door one swung open and the chip filled the wall. Copper avenues. Blocks of towers. Sparks racing like traffic.

"Lay one human hair down. Across its width you could park thousands of these little buildings."

There are **STREETS** in here!

A whole city on a **HAIR?!**

★ WORTH REMEMBERING

A leading chip carries **tens of billions of transistors** — switches thinner than a virus — in a space smaller than a postage stamp. No eye will ever see this city. It is built only for electricity to walk through.

A gloved hand lifted a mirror disc shimmering with rainbows. Hundreds of identical squares slept on its face.

Ling held the wafer flat on her palms. Siri saw her own face in it, floating over the sleeping cities.

One plate = hundreds of cities?

It's the shiniest thing I've ever touched.

Flatter than any lake on Earth.

 SIRI'S SECRET NOTEBOOK · DOOR 1 UNLOCKED

A chip = a city of tens of billions of switches, each thinner than a virus, all on a hair's width. And they're built hundreds at a time on one mirror plate.



DOOR TWO: THE SWITCH THAT STOOD UP

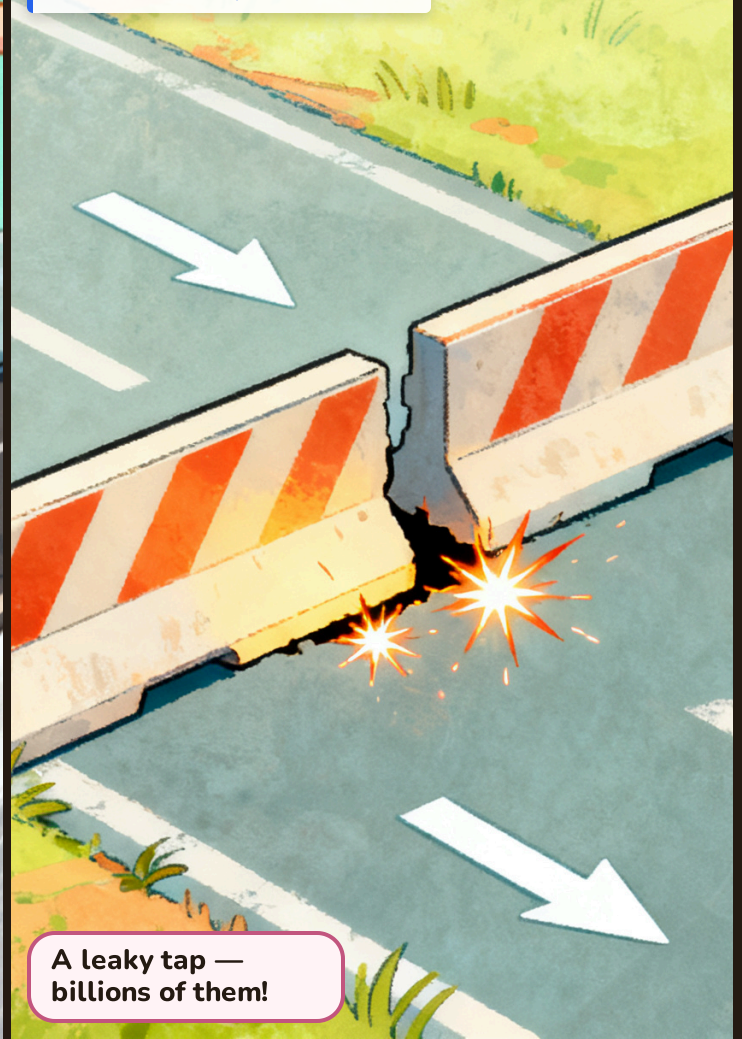
4a The problem nobody could shrink away

"For forty years the switch was a flat road with a barrier above it. Charge the barrier, the road opens."



Simple! So what went wrong?

"Shrink it far enough and sparks start sneaking under the barrier even when it's DOWN. A switch that never fully shuts."



A leaky tap — billions of them!

★ WORTH REMEMBERING

A leaking switch wastes power and heats the chip even while it is doing nothing. By the mid-2000s leakage — not printing — was the wall the whole industry hit.

"So we stood the road UP, like a shark fin, and wrapped the barrier over the top and down both sides."

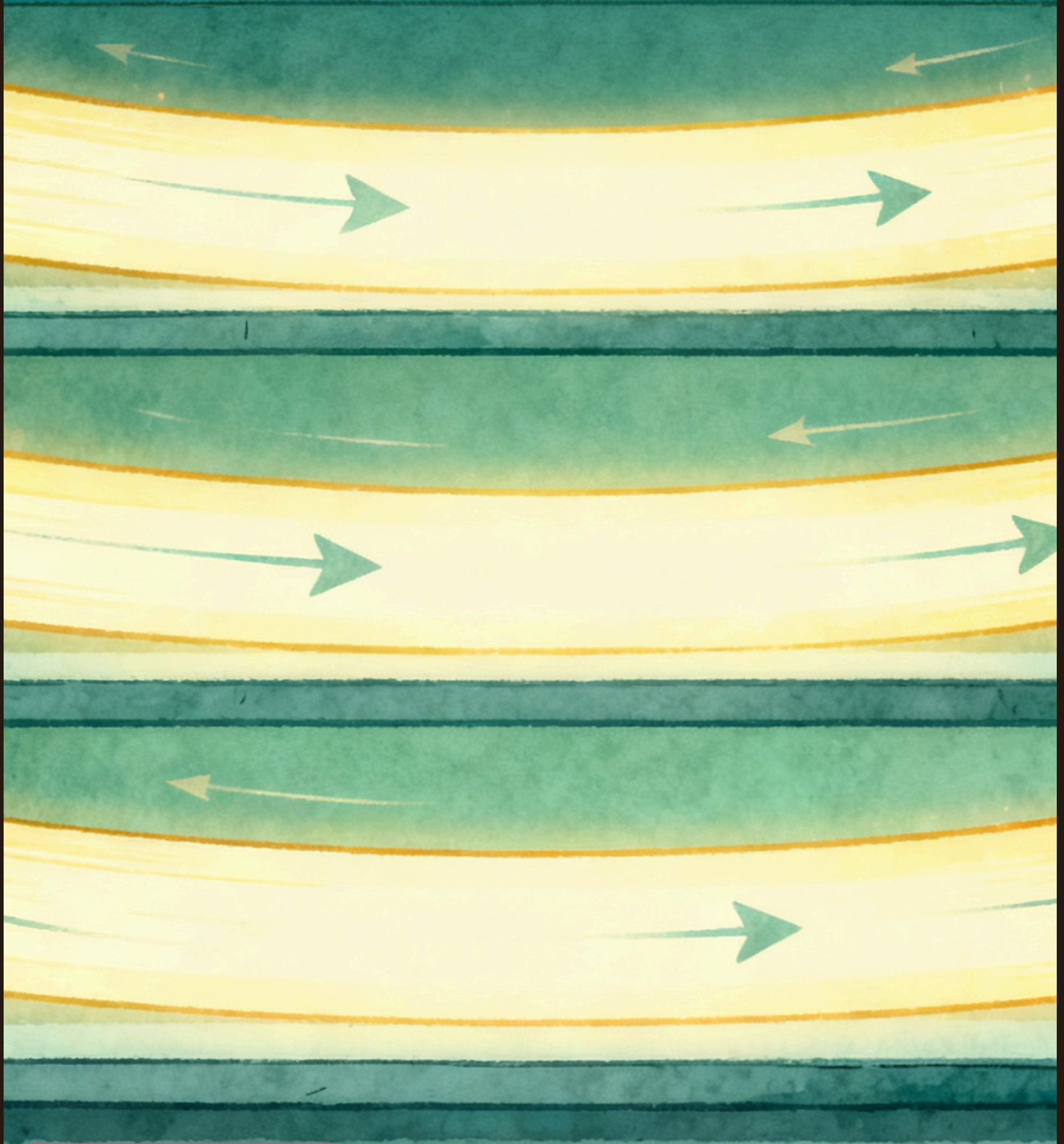


You gave the switch a SADDLE!

★ WORTH REMEMBERING

This is a **fin** transistor. The gate now touches three sides of the channel instead of one, so it can squeeze the channel shut properly. Same physics — better geometry. Shape bought the industry another decade.

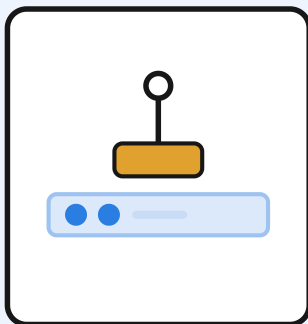
"Now we go further: thin ribbons stacked like shelves, with the barrier wrapped all the way around each one."



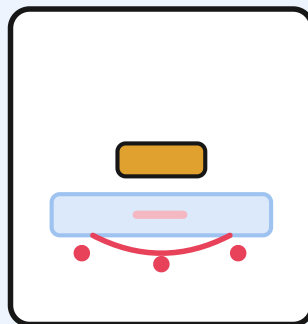
Wrapped on ALL FOUR sides?!



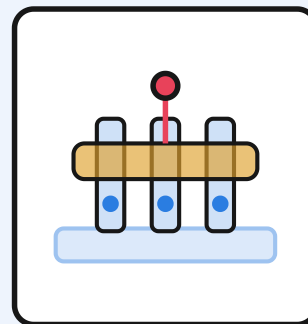
WHY SWITCHES STAND UP



FLAT SWITCH
gate touches one side



TINY: IT LEAKS
sparks sneak underneath



FIN: WRAPPED
gate hugs three sides



SIRI'S SECRET NOTEBOOK · DOOR 2 UNLOCKED

Flat switch → too small → LEAKS. Stand it up as a fin = gate hugs 3 sides. Then stack ribbons = gate hugs all 4. Nothing wiggles. Everything obeys. Shape is a superpower. ⚡

DOOR THREE: DRAWING A CITY TO SHRINK IT

Door three began with a quartz plate covered in fine abstract lines. *"The plan of one layer. We call it a mask."*

So you draw the city on GLASS first?

"You cannot carve something this small. So we don't carve. We shine light through the stencil."

The light IS the chisel!

First the wafer spun under a syrup that spread into a perfect glowing film. *"A coat that changes where light lands."*

You painted it with SUNBURN!

Then the big drawing dived through a stack of great lenses and landed on the wafer, shrunk and razor-sharp.

Draw it BIG, print it TINY!

★ WORTH REMEMBERING

This is **photolithography**. Light through a mask, shrunk through lenses, hardens a coating; the rest is washed away and the pattern etched in. The same trick as a school stencil — done at the scale of atoms.

★ WORTH REMEMBERING

The mask can be drawn comfortably large and shrunk on the way down. Mistakes big enough for a person to check become features far too small for any person to see. 🔍



SIRI'S SECRET NOTEBOOK · DOOR 3 UNLOCKED

Mask = the city plan on quartz. Wafer gets a light-sensitive coat. Light shrinks the plan through lenses and prints it. Then wash and etch. Print, don't carve! 🖨️

DOOR FOUR: THE LIGHT WE HAD TO INVENT

6a When ordinary light was too fat

"Finer lines need shorter light. So we make our own: a tin droplet, struck by a laser, bursting into a violet star."

ZAP

You built a STORM to print a BRAIN.

★ WORTH REMEMBERING

Extreme ultraviolet light has waves so short that no lens can carry it — glass swallows it whole. Fifty thousand of those tiny stars are made every second, and the machine catches the glow of each one.

No lenses, then. Instead the violet beam folded from one giant curved mirror to the next, down toward the wafer.



Mirrors instead of glass?

Polished smoother than anything else humans make.

"And air eats this light too. So the whole path is emptied. The beam travels through nothing at all."



A machine with its OWN vacuum sky!

The real thing was bus-sized, hummed like a hive, and cost more than a jumbo jet. Ling patted it fondly.



And every advanced factory on Earth queues for one?

Every single one.

 SIRI'S SECRET NOTEBOOK · DOOR 4 UNLOCKED

Shorter light = finer lines. Made from EXPLODING TIN DROPLETS, 50,000 a second. Glass swallows it → use mirrors. Air swallows it → use vacuum. This machine is a bottled lightning storm. ⚡

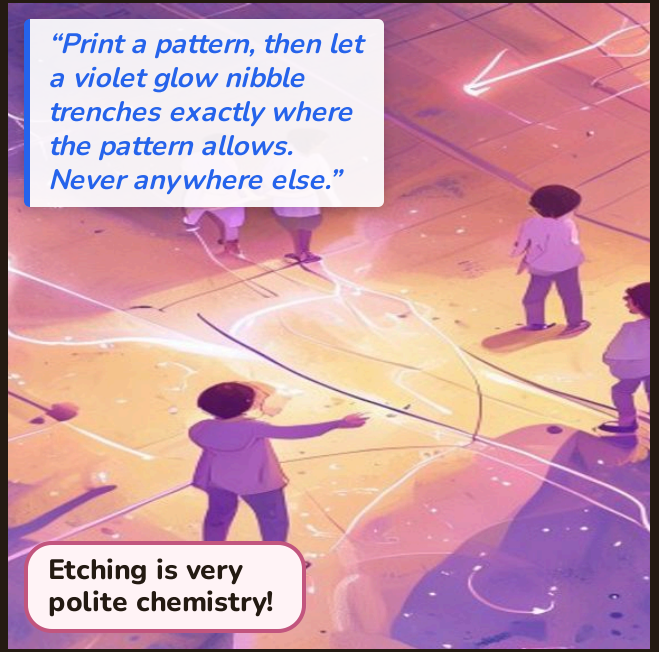
DOOR FIVE: A HUNDRED FLOORS OF COPPER

Door five opened downward. The chip was not flat at all — it was a hundred-storey city seen in cross-section.



There are FLOORS?! I thought it was a sticker!

"Print a pattern, then let a violet glow nibble trenches exactly where the pattern allows. Never anywhere else."



Etching is very polite chemistry!

"Fill the trenches with copper. Then polish the whole storey mirror-flat, so the next one can be printed on top."

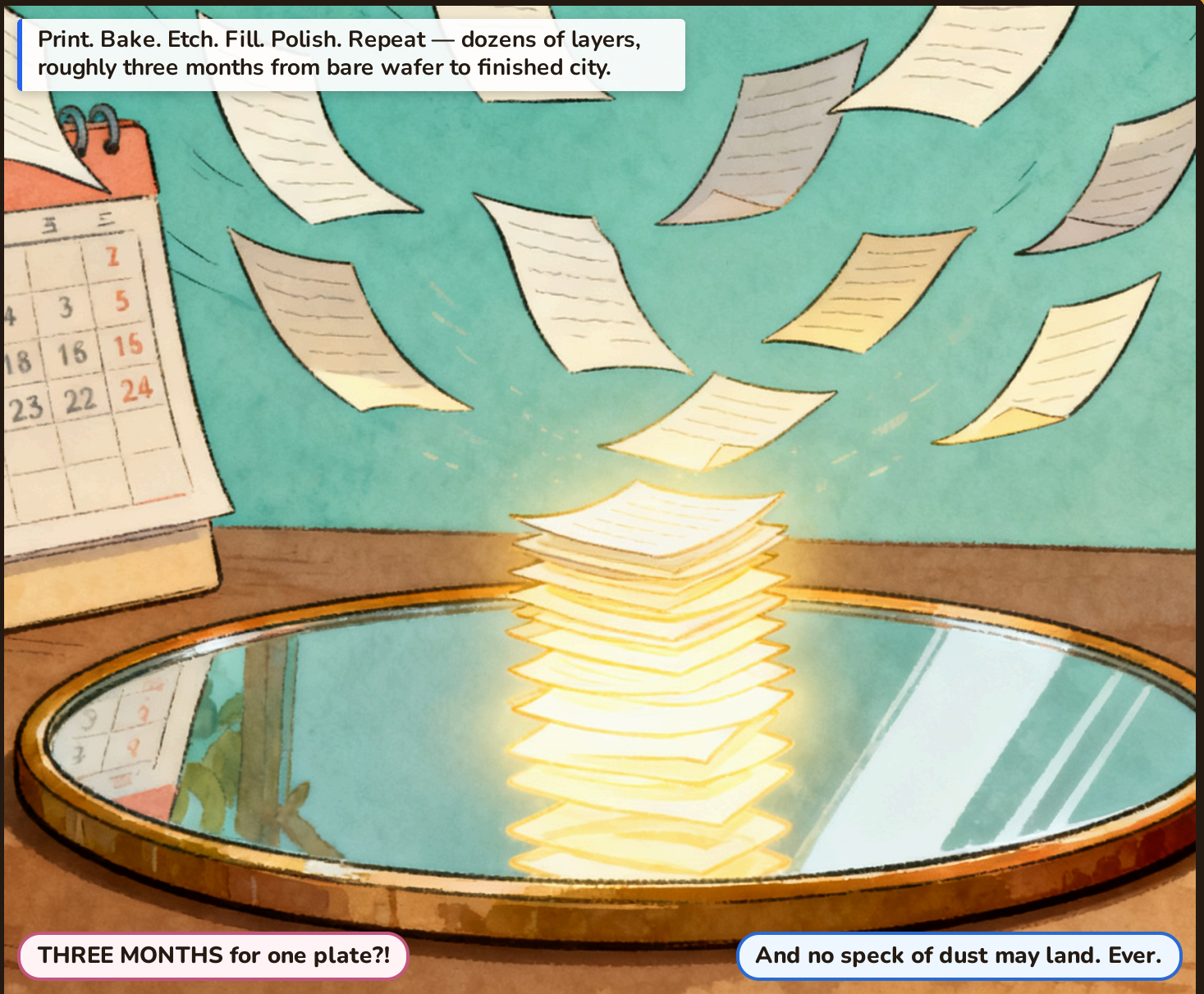


Flat enough to build on. EVERY floor.

★ WORTH REMEMBERING

Wires carry power and signals between the switches below. A single chip can hold more than a dozen levels of wiring, from threads finer than anything visible up to broad copper avenues at the top.

Print. Bake. Etch. Fill. Polish. Repeat — dozens of layers, roughly three months from bare wafer to finished city.



THREE MONTHS for one plate?!

And no speck of dust may land. Ever.

★ WORTH REMEMBERING

Nothing mechanical ever touches the pattern — only light, gas, chemistry and vacuum. Any factory that can do this reliably costs more than a large airport, which is a wall we will come back to. 🙄

📖 SIRI'S SECRET NOTEBOOK · DOOR 5 UNLOCKED

A chip is a TOWER, not a sticker. Print → etch trenches → fill with copper → polish flat → do it again, dozens of times, for 3 months. Every floor must be perfect or the ones above are wasted. 🏗️

DOOR SIX: THE TEST THAT NEVER BLINKS

Door six needed full bunny suits and a whooshing air shower. *"Here one dust speck is a falling mountain."*

WHOOOOSH



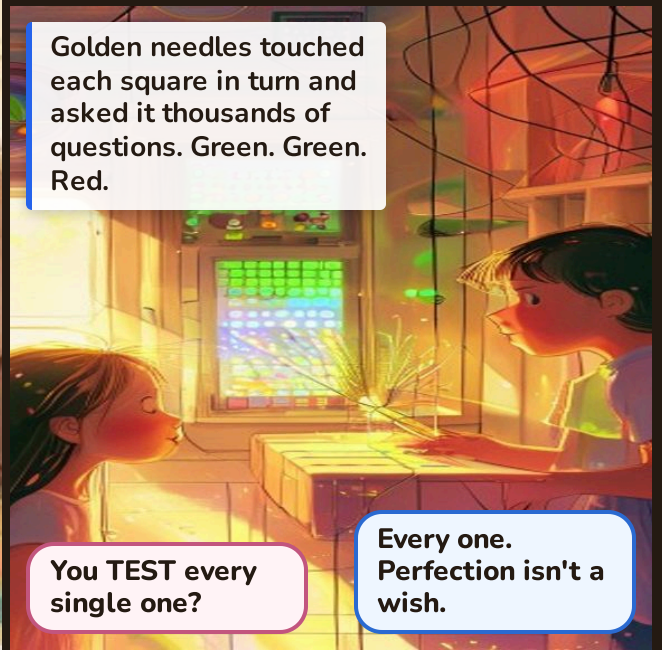
I'm a very clean marshmallow.

"One speck in the wrong street, one atom out of place — and that little city never wakes up."



A whole city, killed by DUST!

Golden needles touched each square in turn and asked it thousands of questions. Green. Green. Red.



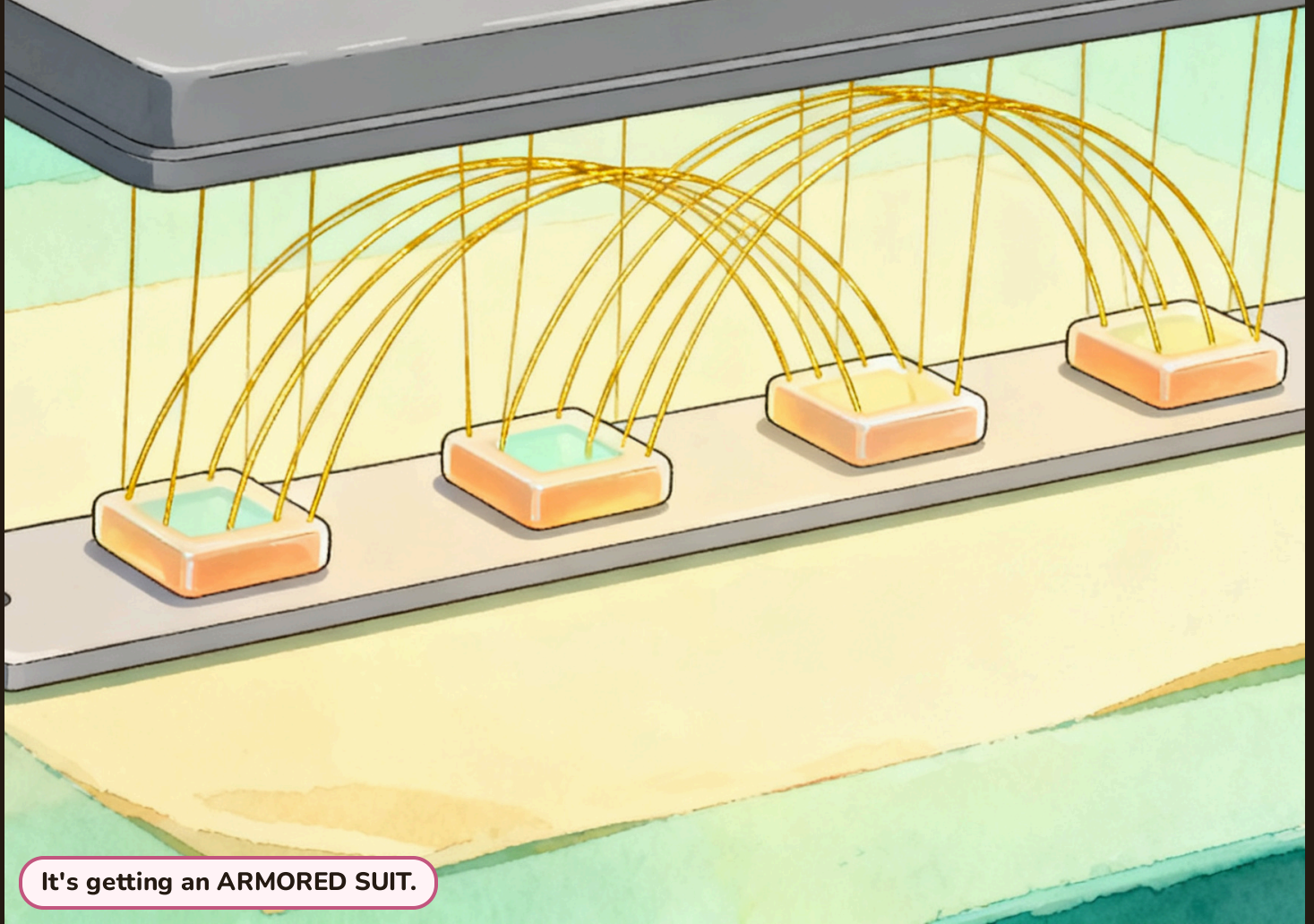
You TEST every single one?

Every one. Perfection isn't a wish.

★ WORTH REMEMBERING

The share of chips that work is called **yield**, and it is the quiet heart of this whole business. Two factories can run the same recipe and one earns far more, simply because more of its cities wake up.

Survivors were seated on carriers, joined by golden threads finer than hair, and given lids — sometimes several chips together.



It's getting an ARMORED SUIT.

★ WORTH REMEMBERING

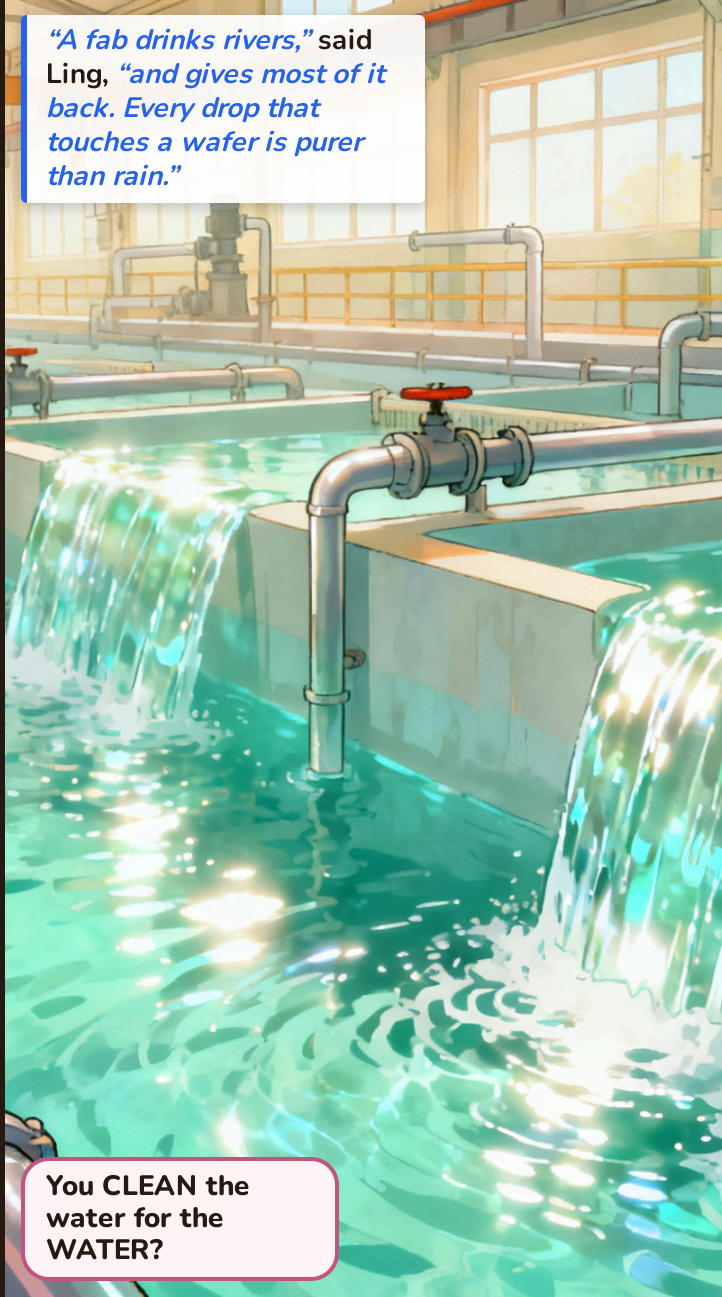
Packaging is no longer just a lid. Placing several chips side by side, or stacking them, lets them talk faster than any board could allow. When shrinking gets harder, **packaging becomes the new frontier**. 📦

📖 SIRI'S SECRET NOTEBOOK · DOOR 6 UNLOCKED

Dust kills cities. Every chip tested by golden needles. YIELD = how many wake up = who makes money. Then packaged — increasingly several chips in one suit, talking at close range. 🌀

DOOR SEVEN, PART ONE: WATER, POWER AND PATIENCE

"A fab drinks rivers," said Ling, "and gives most of it back. Every drop that touches a wafer is purer than rain."



You **CLEAN** the water for the **WATER**?

"And the lights must never flicker. A blink can spoil months of work sitting inside those machines."



One flicker = three months **GONE**?!

★ WORTH REMEMBERING

A leading fab runs every hour of every day, all year. Stopping is so costly that huge effort goes into the boring heroics: clean water, steady power, filtered air, and machines serviced before they complain.

At dawn the shifts changed. Two crowds greeted each other at the gate, one going in, one going home.



This place never SLEEPS?

It hasn't in decades.

★ WORTH REMEMBERING

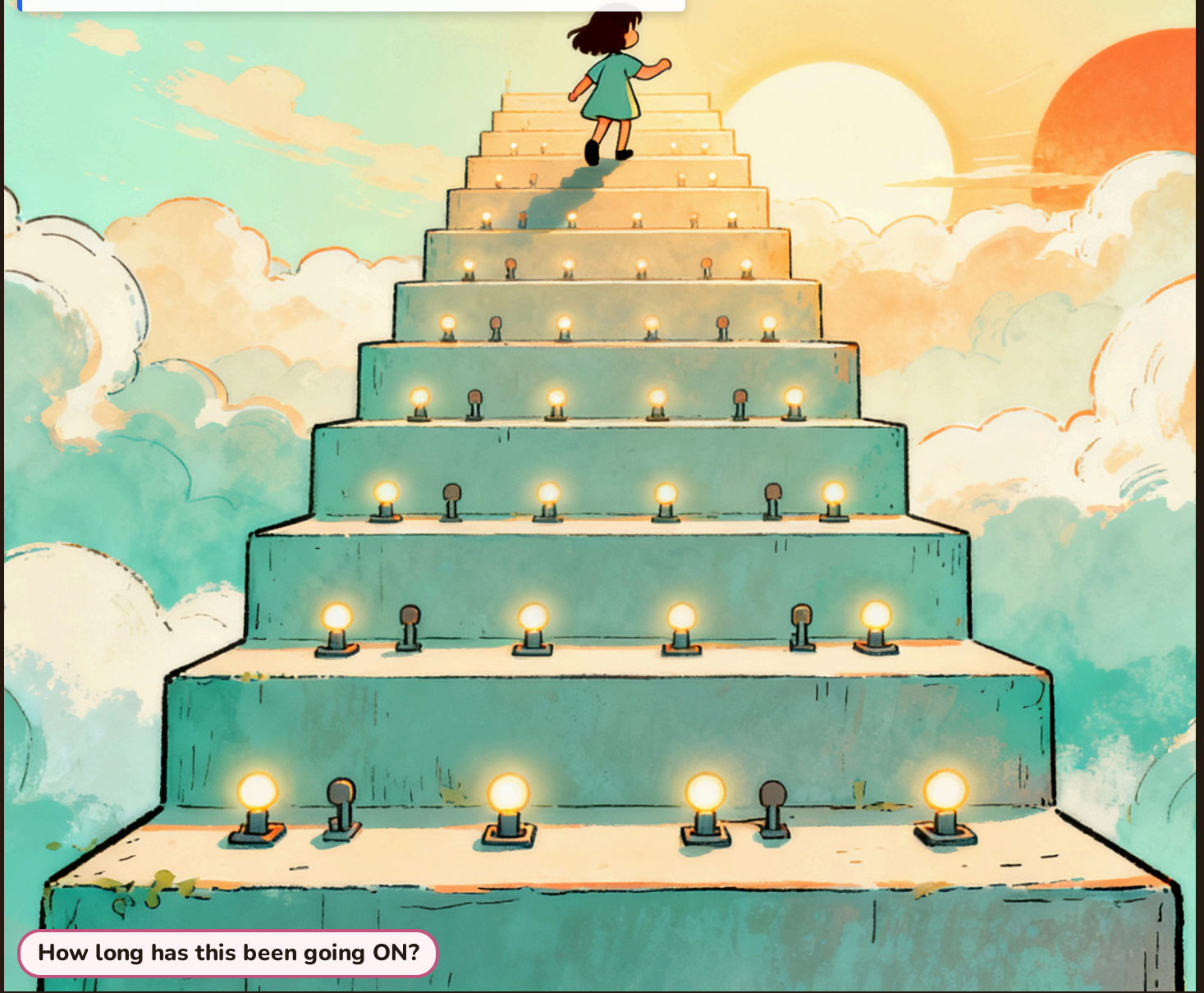
Excellence here is not one clever moment. It is **the same difficult thing, done identically, forever** — and that, oddly, is the hardest thing in the world to copy.

📖 SIRI'S SECRET NOTEBOOK • DOOR 7, PART ONE

Water purer than rain, power that never blinks, air filtered a thousand times, machines fixed before they break. The magic isn't a genius. It's NEVER STOPPING. 🕒

THE STAIRCASE EVERYONE CLIMBS

Ling drew a staircase into the sky. Each step: twice as many switches as the one below.

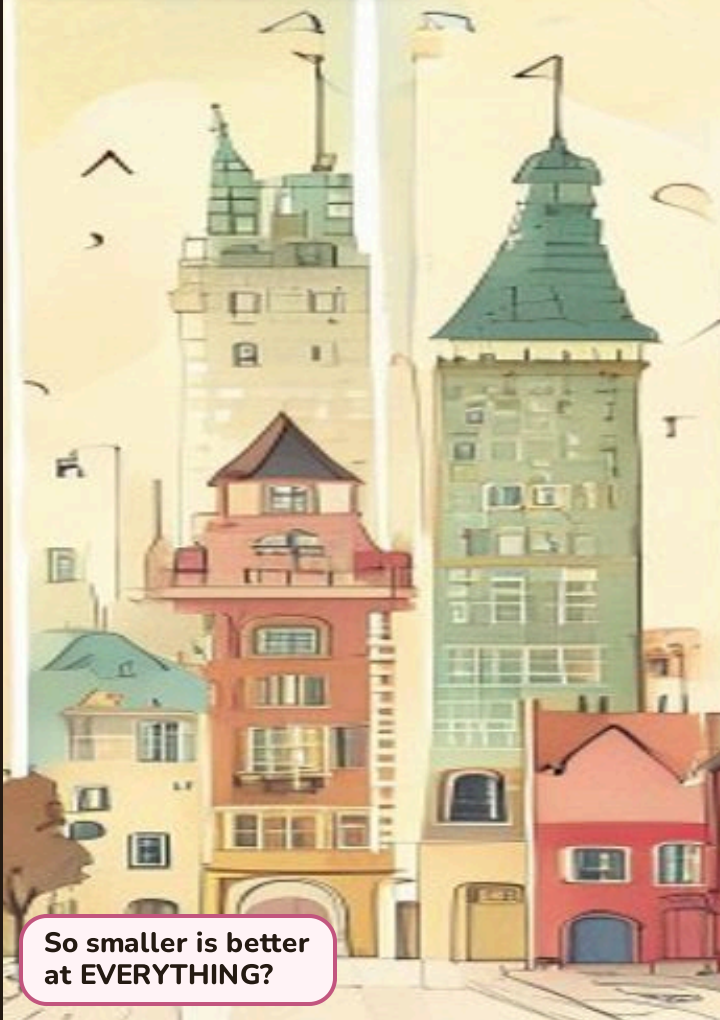


How long has this been going ON?

★ WORTH REMEMBERING

In 1965 Gordon Moore noticed that switches on a chip were doubling every year or two, and predicted it would continue. That guess, later called **Moore's Law**, became a schedule the whole industry agreed to keep.

"Each new generation prints finer lines, packs more switches, and sips less power per switch."



So smaller is better at EVERYTHING?

"But every step up the mountain costs more than the last. New machines. New chemistry. New everything."



The prize gets better AND the ticket gets dearer!

★ WORTH REMEMBERING

This is the quiet reason foundries exist. When each step costs billions, fewer and fewer companies can climb alone — so most of them share one climber and pay for the seats they use. 🦊

📖 SIRI'S SECRET NOTEBOOK

1965: Moore predicts doubling. Every generation = finer lines, more switches, less power each. But every step costs MORE. Expensive stairs → everyone shares one climber. That's the whole business, isn't it? 📈

A MILLION HANDS



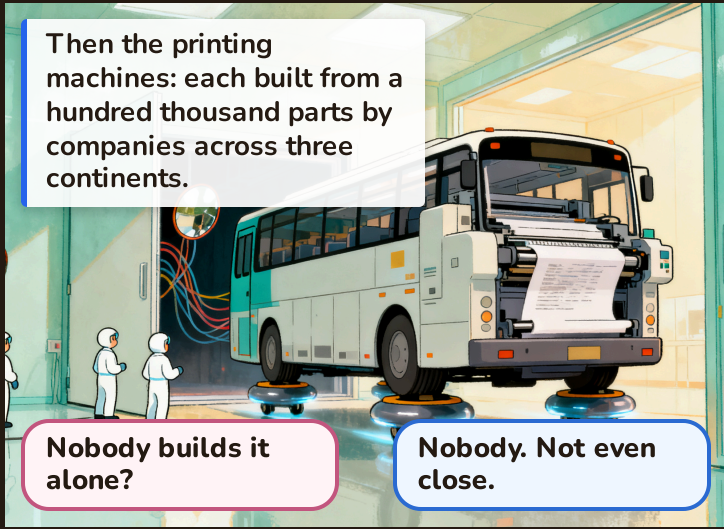
The last part of door seven filled the wall. Behind it: no machine at all. Just the world.

The last secret is PEOPLE?



Ultra-pure gases and liquids arrived by the tanker — each one clean enough to bathe a crystal in.

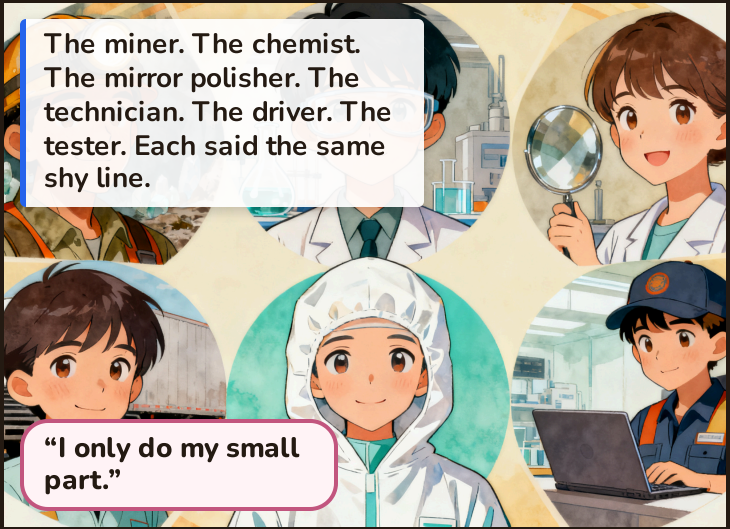
Even the AIR here is manufactured!



Then the printing machines: each built from a hundred thousand parts by companies across three continents.

Nobody builds it alone?

Nobody. Not even close.



The miner. The chemist. The mirror polisher. The technician. The driver. The tester. Each said the same shy line.

"I only do my small part."

★ WORTH REMEMBERING

Sit with that: **nobody on Earth knows how to make a chip.** Each person masters one sliver, and a great company conducts a million slivers into one object. The conducting, not the parts, is the real invention. 🎵

📖 SIRI'S SECRET NOTEBOOK · DOOR 7, PART TWO

Pure gases → giant printing machines from three continents → a million hands → one square smaller than my fingernail. Nobody knows the whole recipe. So WHO'S THE CONDUCTOR? ...I'm about to find out. 🗺️

THE WORLD BEFORE THE FOUNDRY

12a Siri's question Flips

Ling opened a museum door. *"Once, every chip company owned its own factory. If you had no factory, you had no chip."*



So a good idea just... DIED?

A wall of hopeful sketches hung behind glass — clever designs nobody could ever afford to build.



All these brains, and no HANDS.

★ WORTH REMEMBERING

Building and running a factory was the price of entry. That price kept the number of chip companies small, and kept a great many good ideas from ever leaving the paper they were drawn on.

"A few big firms rented out spare capacity — but only leftovers, and only when it suited them."



Borrowing
someone's oven
when they feel like
it!

"Worse: your landlord sold chips too. Handing your secret plan to a rival is a hard thing to sleep on."



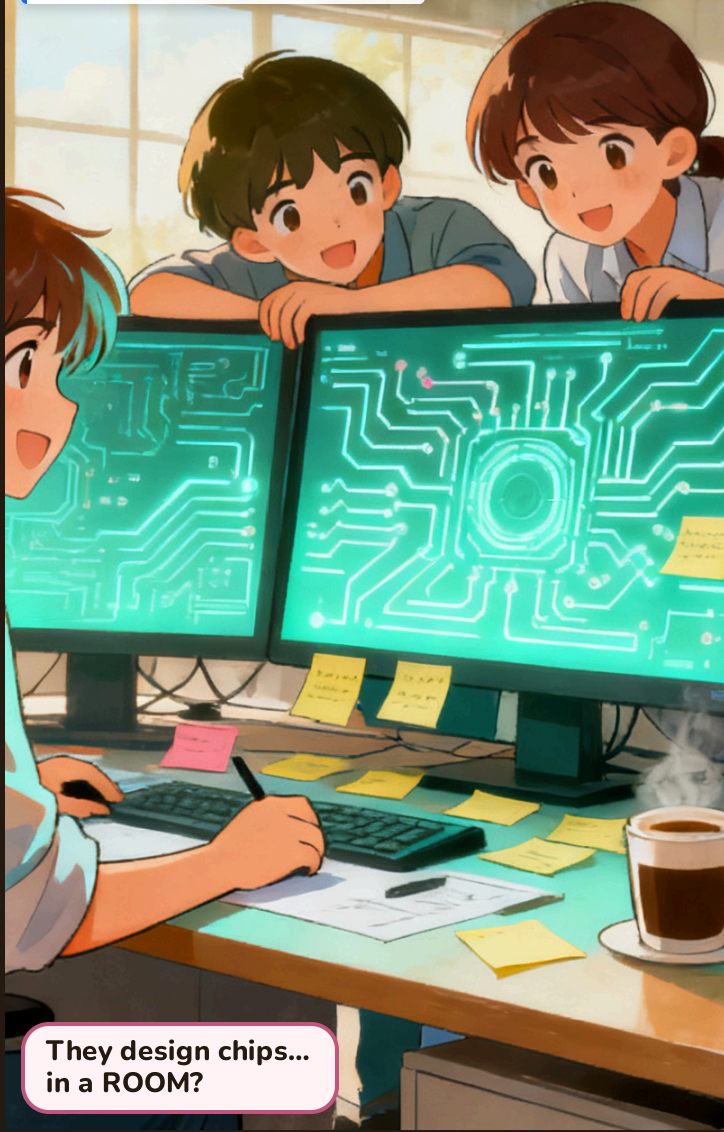
So the factory was
also your
COMPETITOR?

 SIRI'S SECRET NOTEBOOK

My question flipped: not 'how is it made' → 'why does one company make everyone's?' Before foundries: no factory = no chip. Spare ovens only. And your landlord was your rival. 

THE COMPANIES WITH NO FACTORY

Ling pushed open a sunny studio. Small teams at big screens, drawing glowing circuits. No factory in sight.



They design chips...
in a ROOM?

"Split the job in two. They imagine the city. We build it. Neither has to be great at both."



Two jobs, two
experts!

★ WORTH REMEMBERING

Companies that design chips and own no factory are called **fabless**. Once someone reliable would build for them, the cost of trying an idea collapsed — and the number of people allowed to try exploded.

In a rented office, four people shipped a chip that ended up in millions of devices. No factory. No permission needed.



FOUR people?!

★ WORTH REMEMBERING

This is **lowering the cost of trying**, one of the most powerful things a business can do for the world. Most of the chip designers you have heard of exist because somebody else agreed to do the manufacturing.

"And every customer teaches us something. Their hard problems become our next recipe."



Serving everyone makes you BETTER at everyone!

SIRI'S SECRET NOTEBOOK

Answer #1: THE SPLIT. Designers get freedom, the factory gets practice — from EVERY customer at once. Four people in a rented room can now ship a chip. 🧠

THE VAULT OF SECRETS

Down a bright corridor: rows of locked stalls, each glowing a different colour. One keeper walking between them.

"Two companies who fight each other every single day both build here. Neither can see the other's stall."

What's IN them?

Everyone's deepest secrets.

And they're OKAY with that?

★ WORTH REMEMBERING

They are, because of one promise: the foundry sells no chip of its own. It can never launch a product that competes with a customer — so trusting it costs nothing. **Neutrality is a wall a rival cannot copy while selling.** 🤝

"Trust is slow money," said Ling. "Thousands of kept promises, and one broken one ends it."



A promise you keep only when it's cheap isn't a promise.

And a second promise, just as quiet: capacity on the day you said, at the quality you said. Every time.



Being BORING is a superpower?

The most underrated one there is.

 SIRI'S SECRET NOTEBOOK

Answer #2: NEUTRALITY. No product of its own → rivals share the same roof → everybody's secrets are safe. Plus: deliver exactly what you promised, on the day. Boring = unbeatable. 🗝️

COPY EXACTLY

Two fabs, far apart,
identical down to the
layout of the pipes and the
colour of the floor.



Why copy the
FLOOR?!

*"Because nobody knows
which of ten thousand tiny
details makes the yield
good. So we copy them
ALL."*



You copy the things
you don't
UNDERSTAND?

★ WORTH REMEMBERING

A working process is treated as sacred: same tools, same order, same settings, same everything. Humility, written as an operating rule — and the fastest known way to make a new factory good on its first day.

"Then every month the recipe improves a little. Ten years of little improvements is a hill nobody can jump."



So the real product is the **LEARNING!**

★ WORTH REMEMBERING

This is a **learning curve**. The millionth wafer teaches what the first could not. A rival can buy identical machines and still be years behind, because they cannot buy your mistakes.

Then Ling showed her the price of one new fab. Siri sat straight down on the cleanroom floor.



More than an AIRPORT?

Years to build. Billions to fill. Every time.

SIRI'S SECRET NOTEBOOK

Answer #3: THE RECIPES. Copy the working fab EXACTLY, floor tiles and all → improve monthly → a decade of learning nobody can buy. Plus a fab costs more than an airport. Two walls in one.  

THE COMPANY THAT PRINTS FOR EVERYONE

The compass hauled her past misty mountains to a silver complex glowing at sunrise. She read the name from her phone chip.

"1987. Morris Chang, an engineer who had spent decades inside American chip companies, tried something nobody had."

A factory that builds only **OTHERS'** chips?

"Taiwan Semiconductor Manufacturing Company. Rivals called it the boring end of the business."

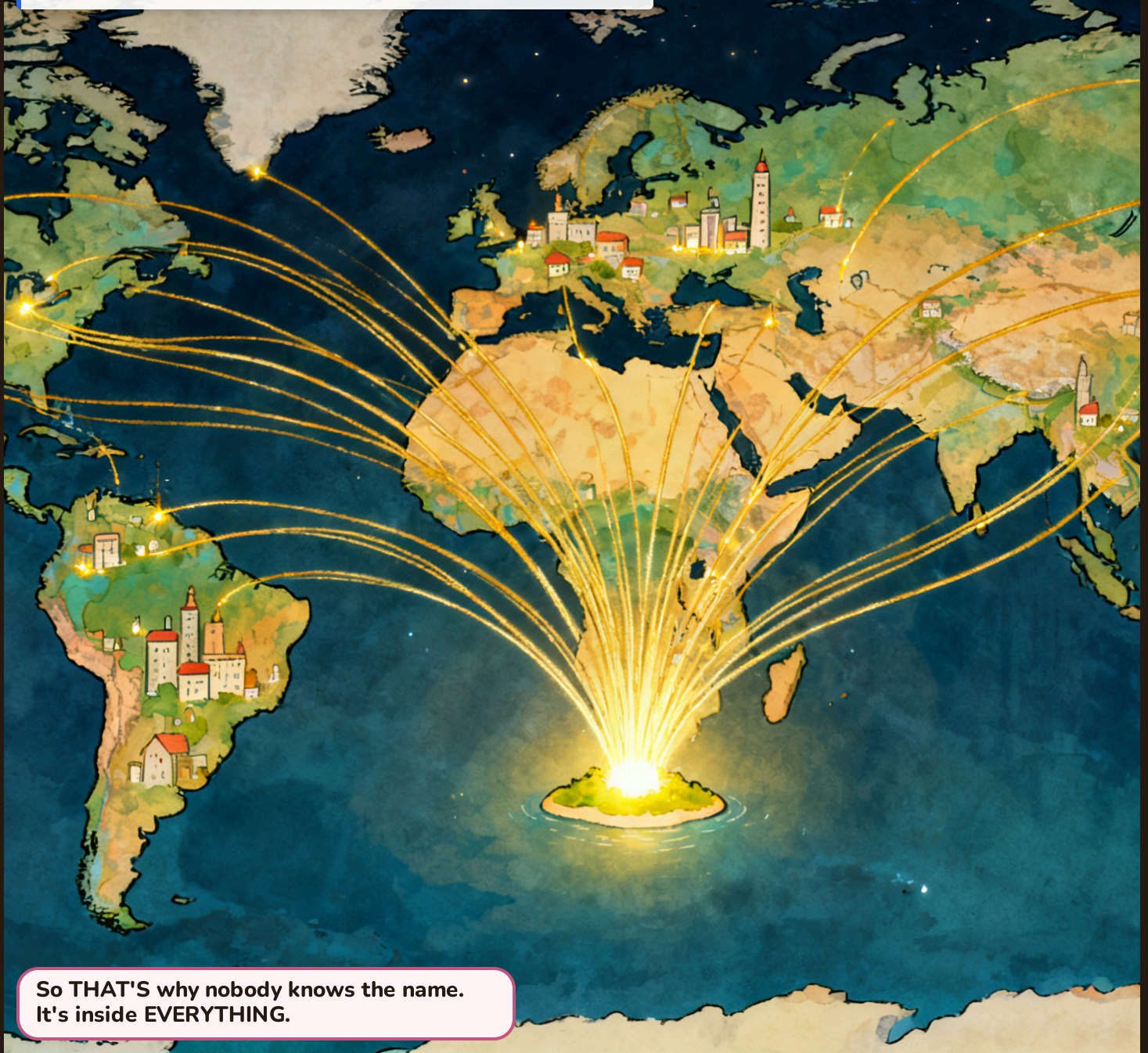
TSMC! The invisible city is **THEIRS!**

Boring? It's the **FLOOR** everyone stands on!

★ WORTH REMEMBERING

His insight was not a machine but a **business shape**: separate designing from manufacturing, and both halves improve. Designers stop paying for factories; the factory serves everyone and gets more practice than anyone alive.

Golden threads rose from every continent — phone brains, car chips, laptop processors — and landed on one island.



So THAT'S why nobody knows the name.
It's inside EVERYTHING.

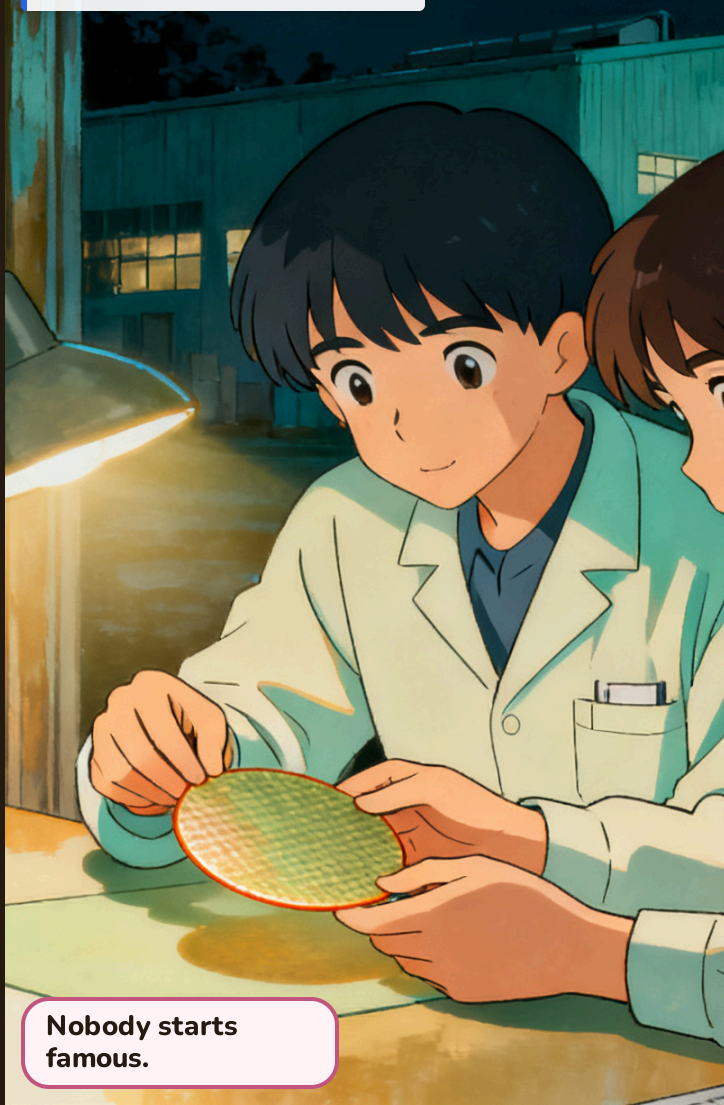


SIRI'S SECRET NOTEBOOK · THE REVEAL

TSMC. 1987, Morris Chang. Idea: SPLIT designing from building. Everyone said boring. It became the floor the whole digital world stands on. The most important company I'd never heard of. ☐

THE LONG QUIET BET

"The first years were small orders and long nights. Being trusted has to be earned one delivery at a time."



Nobody starts famous.

"And almost everything earned went straight back in: more machines, finer lines, another fab."



They spend the treasure on the NEXT castle!

★ WORTH REMEMBERING

A business like this **eats its own profits** on purpose. Each generation of machines costs more than the last, so standing still for two years is the same as falling behind by two years.

"The riskiest call: buying the violet-light machines early, when they were slow, unproven and terrifyingly dear."



And if they hadn't
WORKED?

They did work — and finer lines meant the world's most demanding designers had one obvious place to go.



Bet early, then be
the only one
READY.



THE STORY IN TIME

1987

Morris Chang founds TSMC — the first pure-play foundry.

1990s

Fabless design companies multiply because someone will build for them.

2000s

Foundry capacity becomes the shared backbone of the industry.

2011

Leading phone processors are built by foundries at huge scale.

2018

EUV violet-light printing enters volume production.

2020s

Advanced packaging stacks chips together for AI systems.

Today

New fabs rising in Taiwan, Japan, the United States and Europe.

Always

The founding rule: never compete with your customer. ☐



SIRI'S SECRET NOTEBOOK

Small orders → trust earned delivery by delivery
→ profits poured back into machines FOREVER
→ bet early on violet light → be the only one
ready. Patience with a budget. 📖

THE CASTLE OF LIGHT

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

Under a walnut tree the two old friends let her lay out the walls, one at a time. Nodding. Chuckling. Correcting.

One question matters for a hundred years: what keeps invaders OUT?

Walls! I've collected them ALL BOOK!

Scarier than any school quiz. And funnier.



THE CASTLE WALLS · WHY RIVALS CAN'T COPY IT



Wall One: Factories Few Can Build

A leading fab costs more than an airport and takes years to fill. Wanting to compete is easy; funding it every single year is not.



Wall Two: Ten Thousand Small Tricks

Yield comes from a decade of learning, copied exactly and improved monthly. You can buy the machines; you cannot buy the decade.



Wall Three: Neutral On Purpose

It sells no chip of its own, so fierce rivals trust it with their deepest designs. A competitor who also sells products cannot copy that promise.



Wall Four: The Village Around It

Design tools, packaging, testing and thousands of suppliers grew up beside it. Moving to another partner means moving a whole village.

Charlie tapped his thick glasses. *"Turn the telescope around. Don't ask how it wins — ask what would DESTROY it. Invert, always invert."*



Find every way to LOSE... then don't go there!



THE CASTLE WALLS · WHY RIVALS CAN'T COPY IT



Crack One: Hungry New Fabs

Enormous factories must be paid for years before they earn. Wonderful if demand arrives on time. Painful if it doesn't.



Crack Two: Customers Want Spares

Every big customer dreams of a second source, and cheerfully funds one. Being indispensable makes people want alternatives.



Crack Three: One Very Important Place

So much of the world's finest capacity sits close together. Weather, earthquakes and politics all care about that.



Crack Four: Depending on One Machine Maker

The violet-light machines come from a single supplier. A wall that leans on someone else's wall is only as strong as theirs.



★ WORTH REMEMBERING

Charlie's ruin-it checklist: fall behind by one generation. Break a customer's trust once. Build fads nobody needs. Now — **simply never do those.** Inversion turns worry into a checklist.

Warren raised his cola. *"Some companies charge a toll on a bridge, Siri. This one poured the bridge — and pours a new one every two years."*



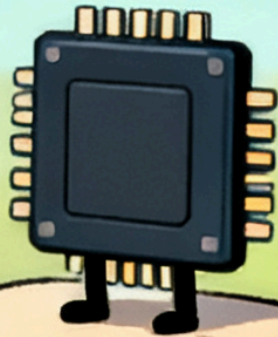
The treasure was never the chip!

SIRI'S SECRET NOTEBOOK · THE CASTLE

WALLS: fabs 🏠 recipes 🍷 neutrality 🤝 the village 🌐. CRACKS: hungry fabs 🏗️ customers wanting spares 🧭 one place 🌐 one machine maker ⚙️.
Charlie: INVERT. Warren: some castles must be rebuilt forever. 🏰

THE JUDGE'S QUESTIONS

Then Warren built a tiny courtroom in the grass — and put the CHIP on the witness stand.

TOK TOK

Siri banged the little gavel and fired Warren's five eternal questions at the witness.



Order in the court!

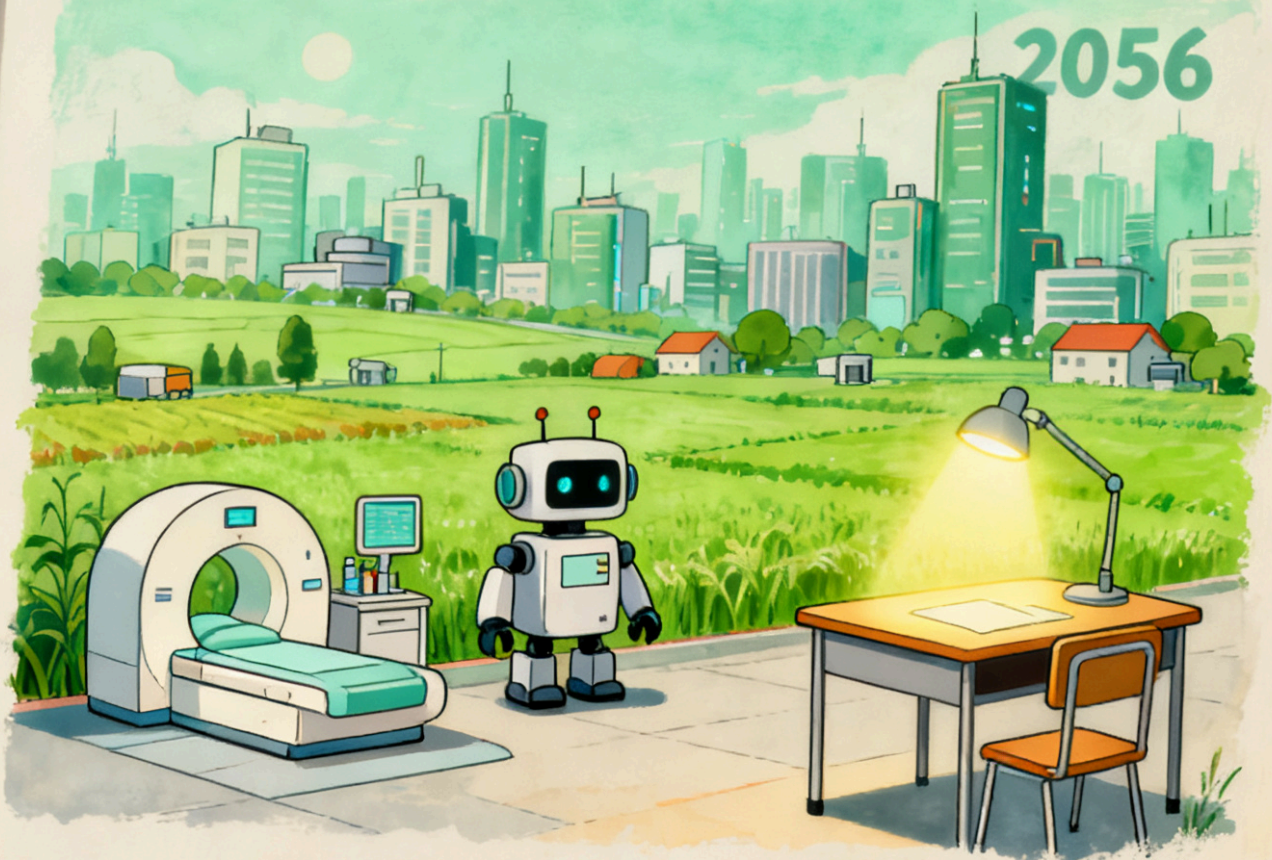
Question one: will people still **NEED** you in thirty years?



★ WORTH REMEMBERING

The Owner's Court: ⚖️ Enduring need? —
'Thinking machines, in everything.' ⚖️ Trust
earned? — 'Decades of secrets kept and
deliveries made.' ⚖️ Reinvesting wisely? —
'Almost everything, into finer light and more
fabs. That is the job.' ⚖️ Copyable with money?
— 'The machines, yes. The decade of learning
and the neutrality, no.' ⚖️ What breaks you? —
'Falling one generation behind. Nothing else
comes close.'

Last exhibit: a painting of 2056. Quiet machines everywhere, thinking. Not one of them made of nothing.



The shape changes. The NEED never does.

SIRI'S SECRET NOTEBOOK • JUDGE ANY BUSINESS

Warren's five: ① enduring need? ② trust earned? ③ reinvests wisely? ④ copyable with mere money? ⑤ what breaks it? Works on soap, railways, sneakers — anything. (He never mentioned a share price. The judge judges the BUSINESS.) 

THE NEXT THIRTY YEARS

"The fins become stacked ribbons, wrapped on every side. Then something after that, which nobody has named yet."



The shape keeps **CHANGING!**

"And when shrinking gets brutal, we place small chips side by side and stack them — a package that behaves like one giant chip."



LEGO for brains!

"The hungriest customer is new: machines that learn, eating more computing than anything before them."



AI needs an **OCEAN** of switches.

"Which is why fabs are rising on several continents. Everyone wants their brains built closer to home."



Chips are a country's **WATER** supply?

★ WORTH REMEMBERING

No crystal balls — just visible currents: ribbon switches, advanced packaging, shorter light, AI's endless appetite, and factories spreading across the map. Siri's rooftop rule: **don't bet on the square — bet on the needs.** 🌐

On the rooftop at dusk she added the honest last line: a thinking machine is a tool. Tools serve masters.



Best servant. Worst master. Same as fire.

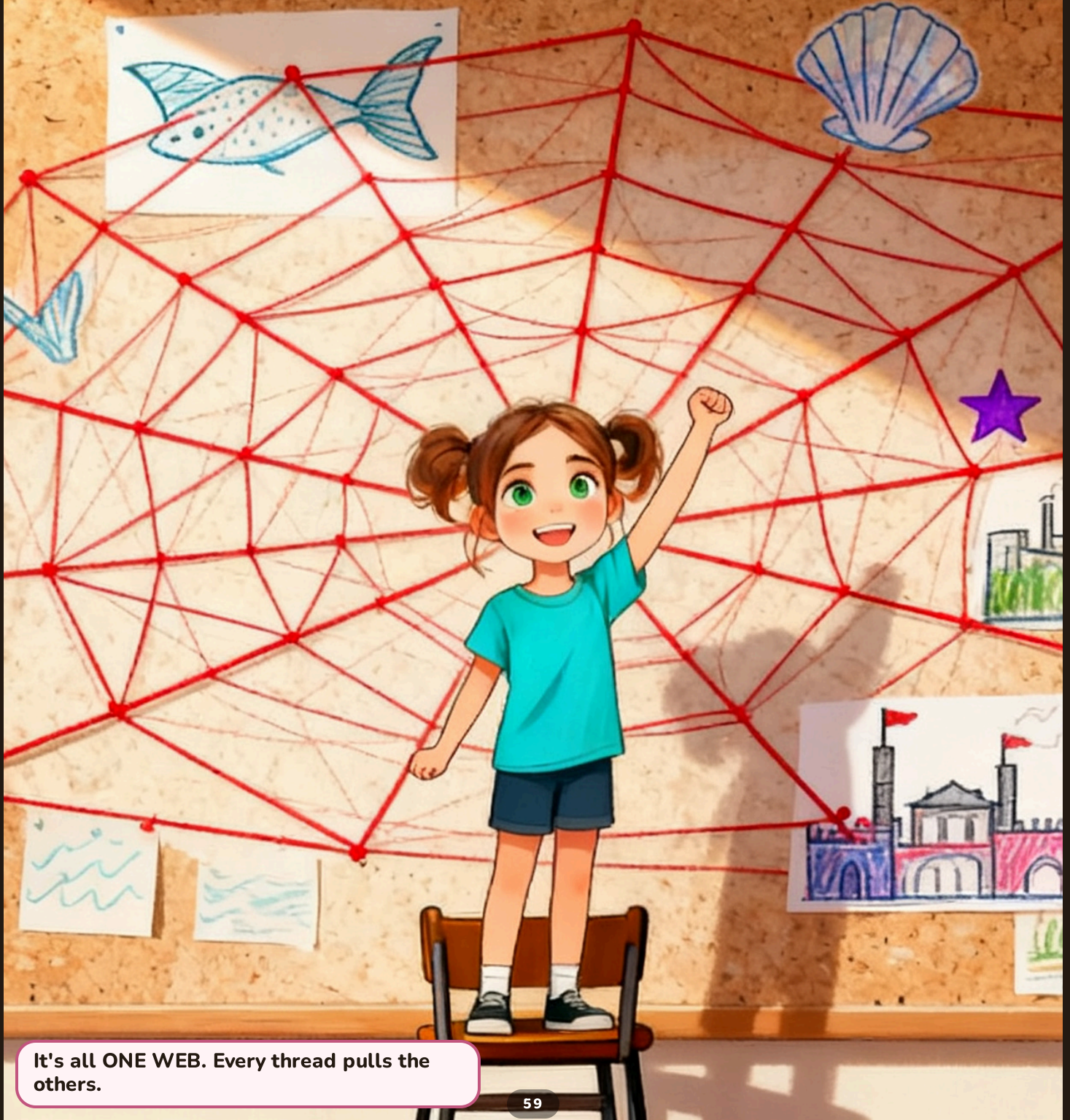


SIRI'S SECRET NOTEBOOK

2056 watchlist: ribbon switches, stacked packages, shorter light, AI eating computing, fabs on every continent. Rules: bet on needs not shapes · manufacturing IS the moat · stay the master. 🌟

THE SECRET NOTEBOOK

Home stretch. Siri pinned every discovery to her wall and joined them with red string.



It's all ONE WEB. Every thread pulls the others.



★ WORTH REMEMBERING

The Science Web, one breath: a city of billions of switches → flat switches leaked → stand them up as fins, then wrap them as ribbons → draw the plan on a mask → shrink it with light → make that light from exploding tin, bounced off mirrors, in vacuum → etch, fill with copper, polish, repeat a hundred times → test with golden needles → package.



★ WORTH REMEMBERING

The Business Web, one breath: split designing from building → designers multiply, the factory gets everyone's practice → stay neutral so rivals can share one roof → copy the recipe exactly and improve it monthly → pour the profits back in forever, patrolled by Charlie's inversion and judged in Warren's court.

The real test: she retold the whole thing to her little cousin. With a torch, a stencil and a bedsheet. He got it.



If you can't explain it with a torch, you don't know it yet.



SIRI'S SECRET NOTEBOOK · THE LATTICEWORK

Charlie's word for my string-wall: a
LATTICEWORK. Twelve models from ONE
square: shape-beats-shrinking · print-don't-
carve · make your own light · yield · copy exactly
· learning curve · lower the cost of trying ·
neutrality as a moat · shared climber · reinvest
forever · invert · the owner's court. 

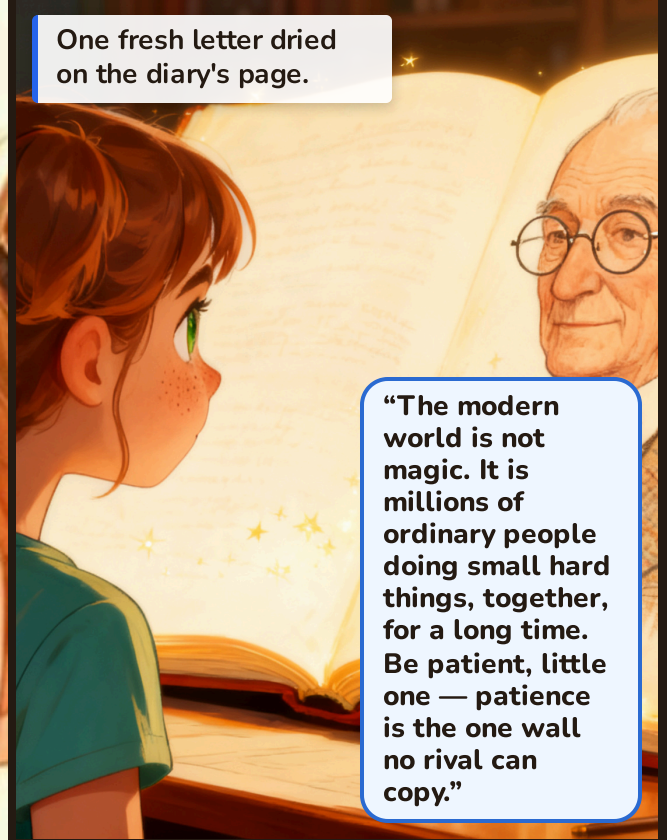
COMING HOME

Her own bed. Morning. The compass: quiet. The house: lit differently, somehow.



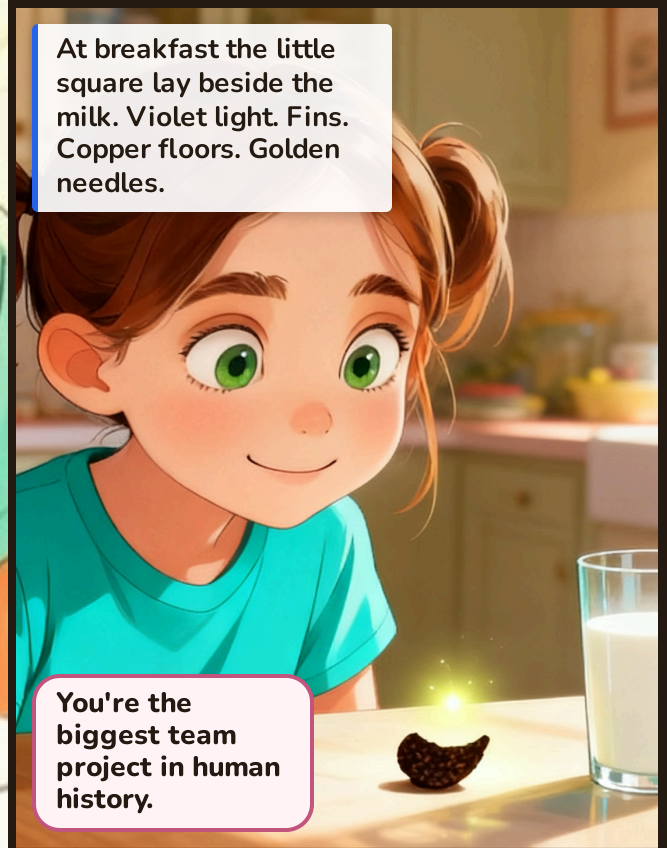
Was it real? It FELT real...

One fresh letter dried on the diary's page.



"The modern world is not magic. It is millions of ordinary people doing small hard things, together, for a long time. Be patient, little one — patience is the one wall no rival can copy."

At breakfast the little square lay beside the milk. Violet light. Fins. Copper floors. Golden needles.



You're the biggest team project in human history.

Then she went hunting: the television, the doorbell, the car, the game console. Nineteen invisible cities before lunch.



My house is FULL of cities nobody can see!

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



Show me the next one, Grandpa. 🧡

★ WORTH REMEMBERING

Feel the unlock: a city no eye will ever see, printed with storm-light in a vacuum, tested one square at a time, by a company that promised never to compete with the people it serves. **Nothing, from now on, is just anything.**

📖 SIRI'S SECRET NOTEBOOK · BOOK CLOSED

Seven doors. Twelve mental models. One castle rebuilt every two years by never competing with anyone it serves. But the compass is twitching at the bus-sized machine that printed it all — one company, one lamp, everybody queuing. 🧭



OUR PHILOSOPHY

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

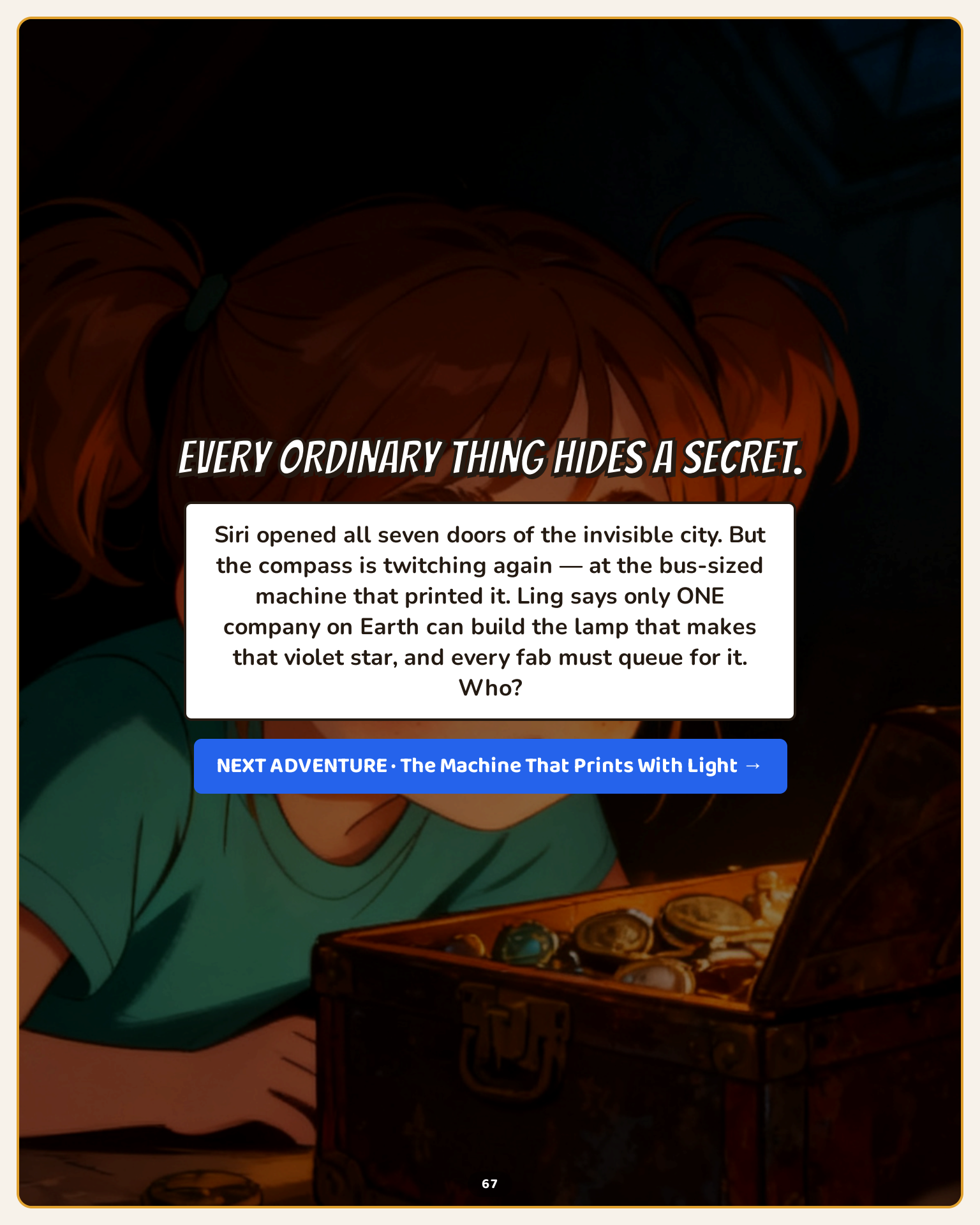
Inspired by the multidisciplinary thinking of [Charlie Munger](#) and the rational, long-term philosophy of [Warren Buffett](#), our comics connect science, technology, business, history, and human behavior to show how the real world works.

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 wooden treasure chest filled with gold coins and jewels. The scene is dimly lit, with a dark background.

EVERY ORDINARY THING HIDES A SECRET.

Siri opened all seven doors of the invisible city. But the compass is twitching again — at the bus-sized machine that printed it. Ling says only ONE company on Earth can build the lamp that makes that violet star, and every fab must queue for it. Who?

NEXT ADVENTURE • The Machine That Prints With Light →