

The Great Company Adventures • Book 48 of 50

ASML
**THE
MACHINE THAT PRINTS WITH
LIGHT**

A curious girl, three wise mentors, and the machine of light that draws every chip on Earth.

"Discovering the businesses that built the modern world"

An independent, unofficial educational work • not affiliated with, endorsed by, or sponsored by ASML.



THE GREAT COMPANY ADVENTURES

Discovering the businesses that built the modern world.

© 2026 Omaha Investments. All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form without the prior written permission of the publisher, except for brief quotations in reviews and other uses permitted by U.S. copyright law.

This is an independent, unofficial publication. It has not been authorized, sponsored, endorsed, or approved by ASML. ASML and related marks are trademarks of their respective owner; used solely for identification, education, and commentary. All marks are used solely for identification, education, and commentary (nominative fair use).

Warren Buffett, Charlie Munger, and Benjamin Graham appear as fictionalized storybook mentors. Their dialogue and actions are imagined for storytelling purposes and do not represent their actual words or views, nor any endorsement of this book by them.

This book is a work of educational fiction for young readers. It is not investment, financial, or professional advice, and nothing in it is a recommendation to buy or sell any security.

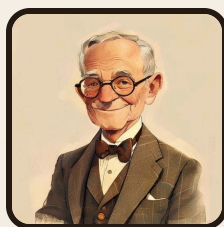
Illustrations were created with AI image tools; the text was written with AI assistance. All content is reviewed and edited by our editorial team.

For readers aged 7 and up. First Kindle edition, 2026.
Published by Omaha Investments.

MEET THE CHARACTERS



SIRI



BEN



WARREN



CHARLIE



FEMKE

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 LAMP IN THE ATTIC

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

SPIN

It's never done THIS before...

Siri switched it on and slid a paper cut-out under the beam. A crisp shadow printed itself below.

Wait. Light can DRAW things.

The needle locked onto the attic — onto Grandpa's dusty old photo lamp with one round glass eye.

A LAMP? You brought me up here for a lamp?

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

"Every chip on Earth is drawn by light. One company builds the lamp. Go and find the machine of light."

★ WORTH REMEMBERING

Chip cities are far too small to carve with any tool. So nobody carves them. They are **printed** — patterns of light, shone onto a coated wafer, over and over.

The lamp flared violet. A whirlpool of light grabbed her.

WHOOSH



Here we GOOO!

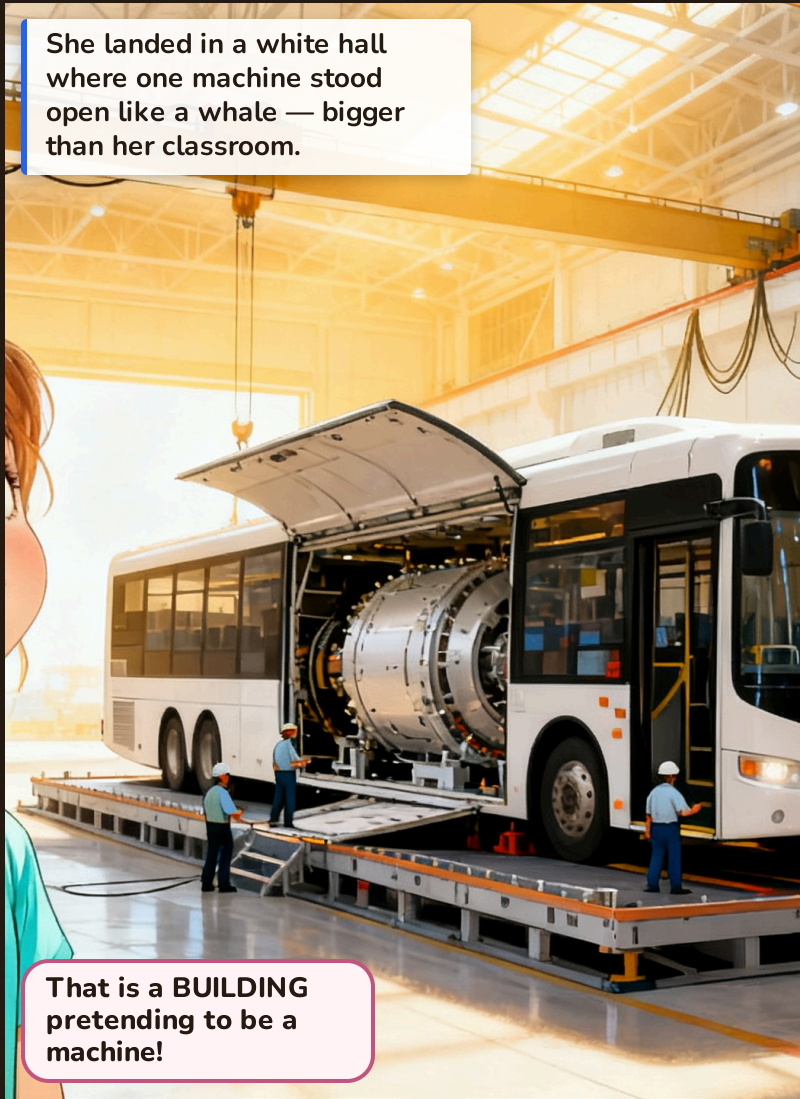


SIRI'S SECRET NOTEBOOK

New mystery! 💡

- ① How does LIGHT draw streets thinner than a virus?
- ② Grandpa says one company builds the lamp for the whole world. Find it, compass.

THE MACHINE AS BIG AS A BUS



She landed in a white hall where one machine stood open like a whale — bigger than her classroom.

That is a **BUILDING** pretending to be a machine!

An engineer waved from the platform. *"I'm Femke. We build the printers that print chips."*

Best. Job. EVER.

Inside the cutaway: a tower of lenses, a stage carrying one shining wafer, pipes, and a chamber of pure emptiness.

So chip factories don't **MAKE** their machines?

Almost none of them. They buy ours.

★ WORTH REMEMBERING

Every chip factory begins as a shopping list. The most expensive item is the printing machine — a **lithography scanner**, weighing as much as two buses and shipped in dozens of crates.

📖 SIRI'S SECRET NOTEBOOK

The chip factory doesn't build its printer — it **BUYS** it. 🔍 Femke says the whole mystery is one question: how small a line can light draw?

HOW LIGHT DRAWS

3a Syrup that remembers light

A wafer spun. One drop of glossy syrup spread into a coat thinner than a soap bubble.



"Photoresist," said Femke. "It changes wherever light touches it."

Paint that REMEMBERS being lit!

Then a stencil dropped in above — a glass plate patterned with one layer of the chip's map.

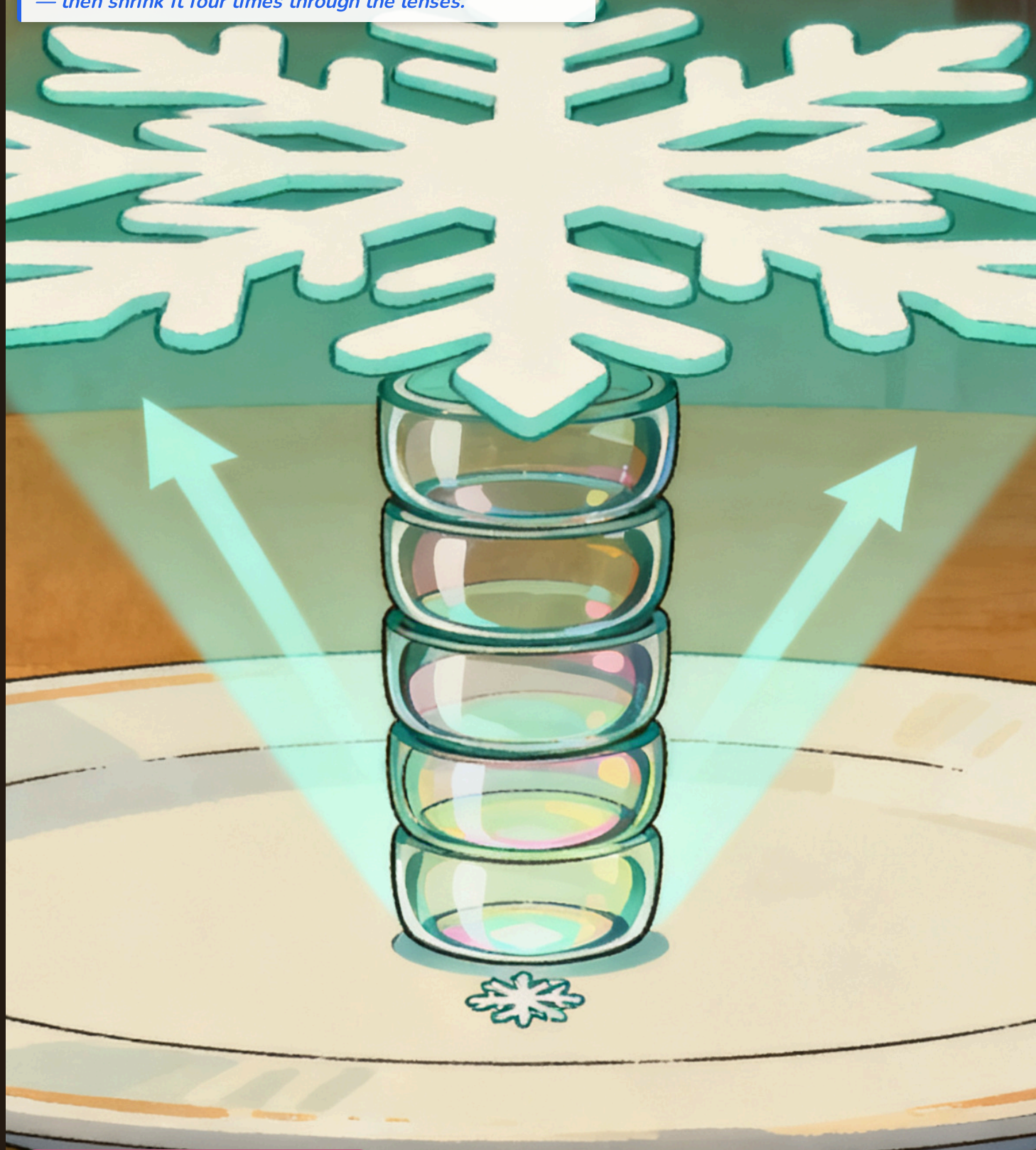


So the light traces the map onto the syrup!

★ WORTH REMEMBERING

Light hardens (or softens) the resist exactly where it lands. Wash the changed part away, etch what is uncovered, strip the rest — one layer done. A chip needs a hundred layers. 🧪

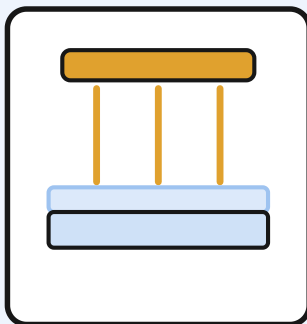
"Here's the trick," Femke grinned. "We draw the map BIG — then shrink it four times through the lenses."



Big mistakes shrink into tiny ones!

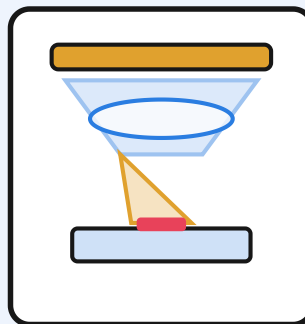


HOW LIGHT DRAWS A CHIP



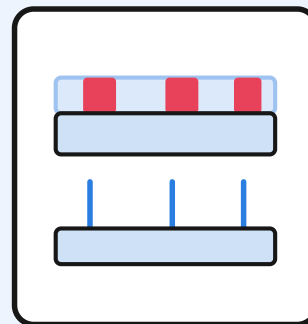
STENCIL

light through a pattern



SHRINK 4x

lenses make it smaller



WASH + ETCH

one layer of a hundred

★ WORTH REMEMBERING

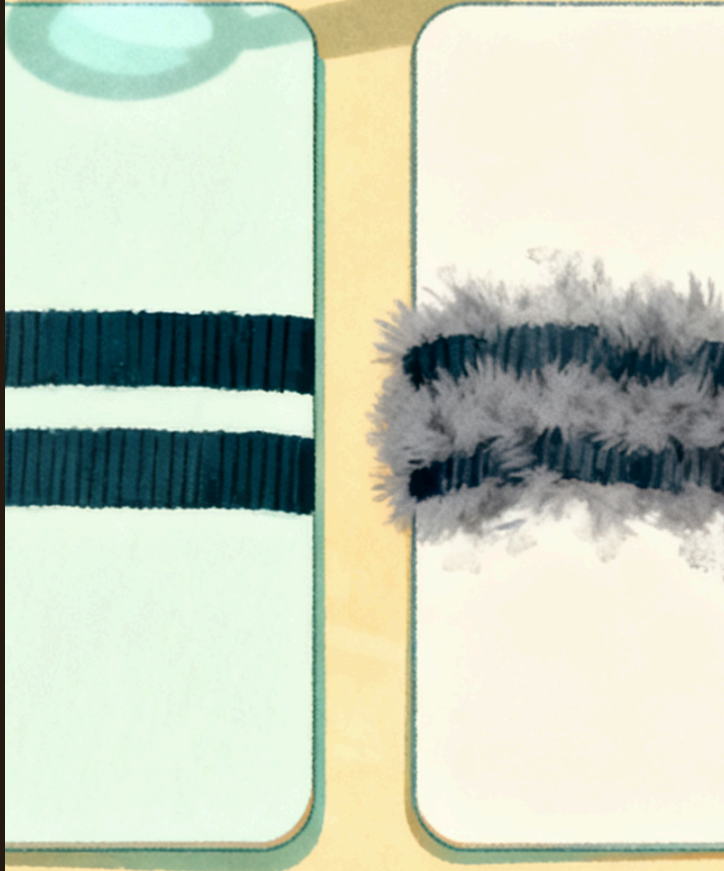
Drawing big and shrinking is why chipmaking works at all. A speck on a big stencil becomes a quarter-sized speck on the wafer — and stencils are far easier to make big than perfect. 🔍

📄 SIRI'S SECRET NOTEBOOK

- ① Coat wafer in light-memory syrup → shine a stencil → wash → etch. Repeat 100x. 🧪
- ② Draw the map BIG, shrink 4× through lenses. Clever people cheat with geometry! 🔍

THE BLUR PROBLEM

Femke squeezed the stencil lines closer. Closer. Then the two crisp stripes smeared into one grey smudge.



NO! It went BLURRY. Why?!

At a pond, she dropped pebbles. Long slow ripples bumped the reeds. Tiny quick ripples slipped straight through.



Light is a WAVE. Big waves can't fit!

★ WORTH REMEMBERING

Light spreads as waves, so a lens can never draw a line much finer than its own wavelength allows. Two ways out: use **shorter waves**, or gather the light from a **wider angle**. 🌊

"Trick one," said Femke. "Fill the gap under the lens with pure water. Light bends harder in water."



You put the wafer in a PUDDLE?!

A moving puddle. It follows the lens.

★ WORTH REMEMBERING

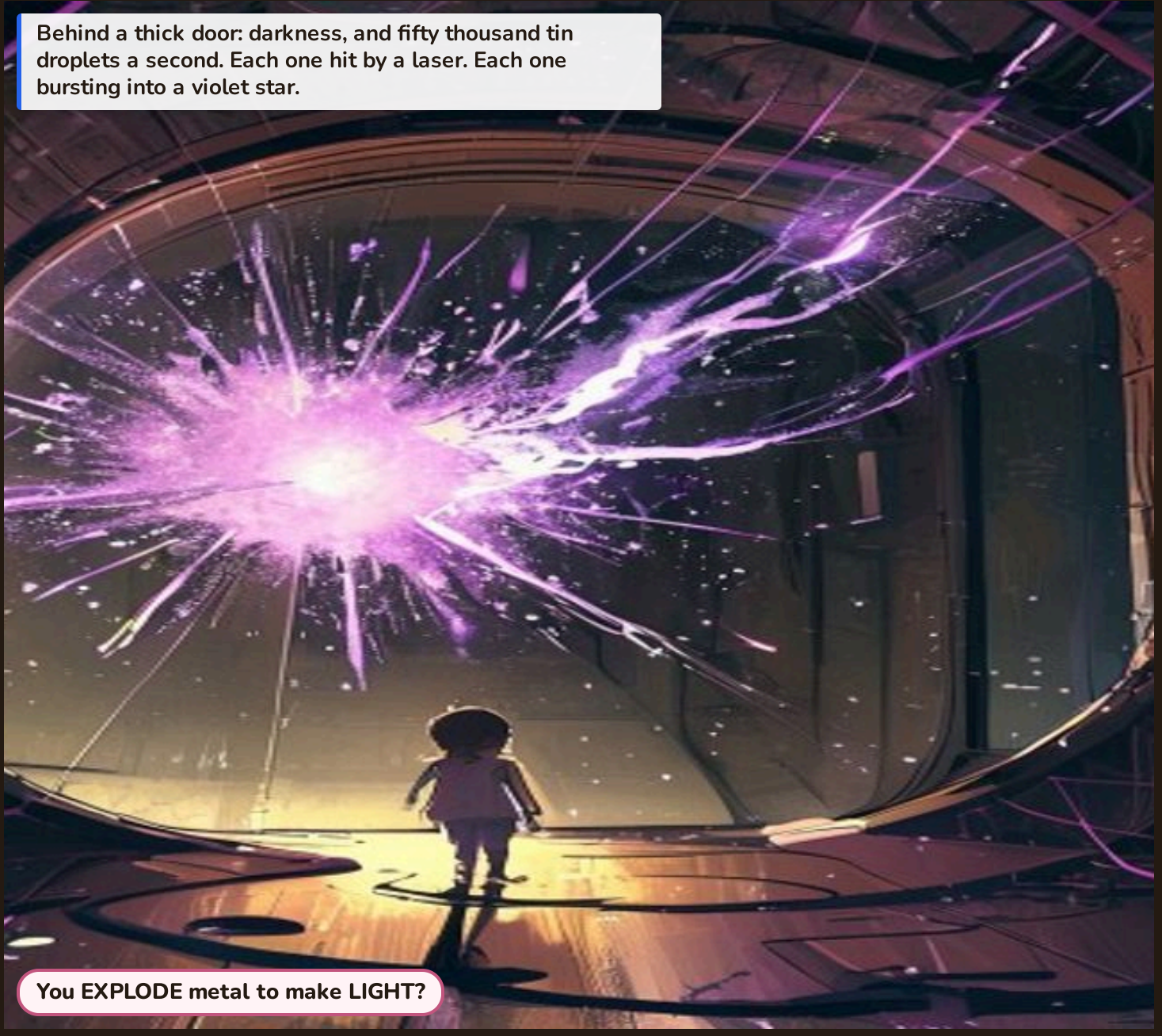
This is **immersion lithography**: a thin film of ultrapure water between lens and wafer widens the angle of light the lens can use, sharpening the print — with no new colour of light at all. 💧

📖 SIRI'S SECRET NOTEBOOK

Blur isn't sloppiness — it's PHYSICS. Waves spread. Fixes: shorter waves, or a wider light-gathering angle. Water under the lens = sharper lines. 💧 But even that ran out...

A STAR IN A BOTTLE

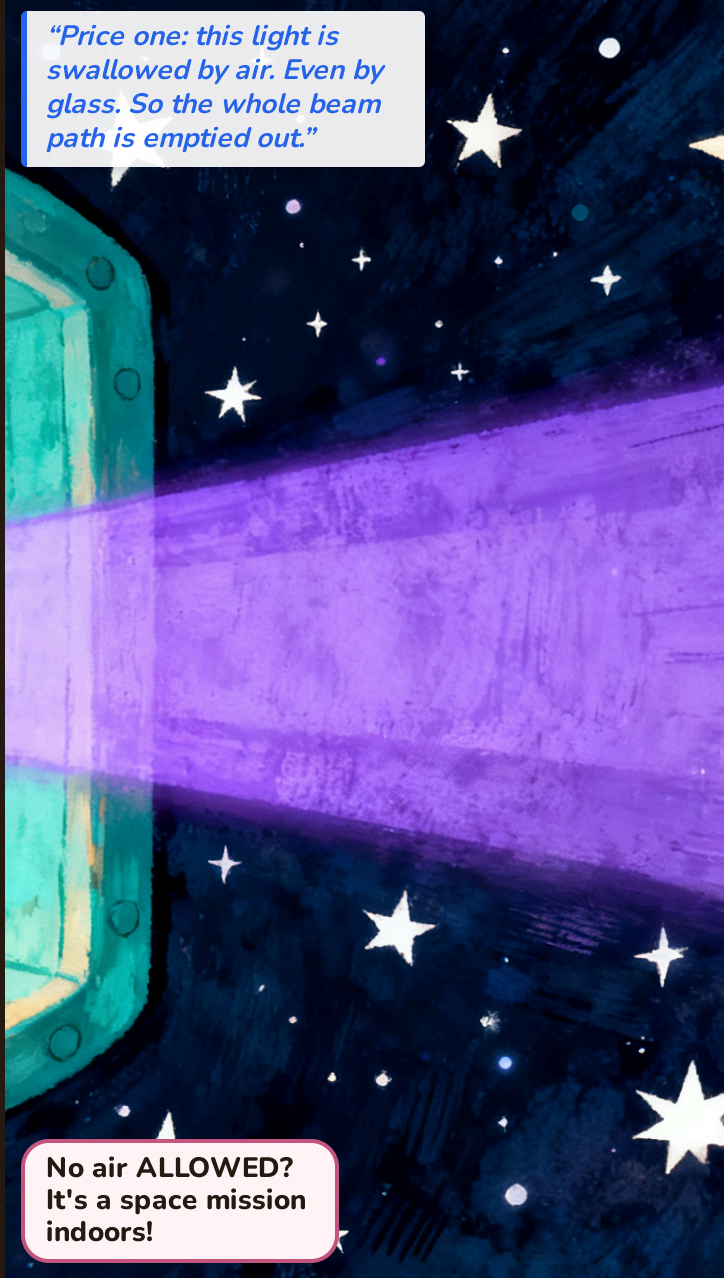
Behind a thick door: darkness, and fifty thousand tin droplets a second. Each one hit by a laser. Each one bursting into a violet star.



You EXPLODE metal to make LIGHT?

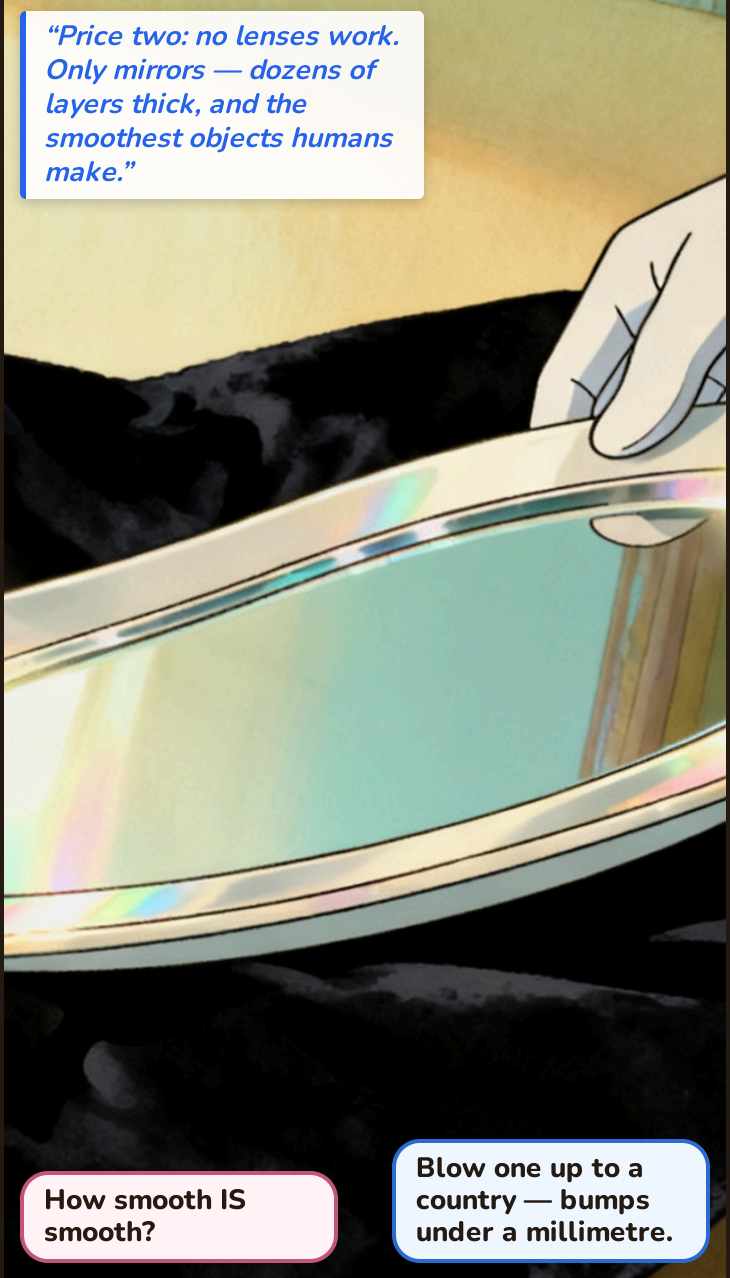
★ WORTH REMEMBERING

That plasma glows in extreme ultraviolet — a wave about **fourteen times shorter** than the old light. Shorter waves, sharper lines. Nature charged a steep price for the upgrade.



"Price one: this light is swallowed by air. Even by glass. So the whole beam path is emptied out."

No air ALLOWED?
It's a space mission indoors!



"Price two: no lenses work. Only mirrors — dozens of layers thick, and the smoothest objects humans make."

How smooth IS smooth?

Blow one up to a country — bumps under a millimetre.

★ WORTH REMEMBERING

Each mirror loses some light, so most of the starlight never reaches the wafer. Engineers answered by making the star brighter, year after year, until it was finally enough. ✨

📖 SIRI'S SECRET NOTEBOOK

EUV = light 14× shorter. Made by zapping tin droplets 50,000 times a second. Air eats it → vacuum. Glass eats it → mirrors so smooth they're basically miracles. ✨

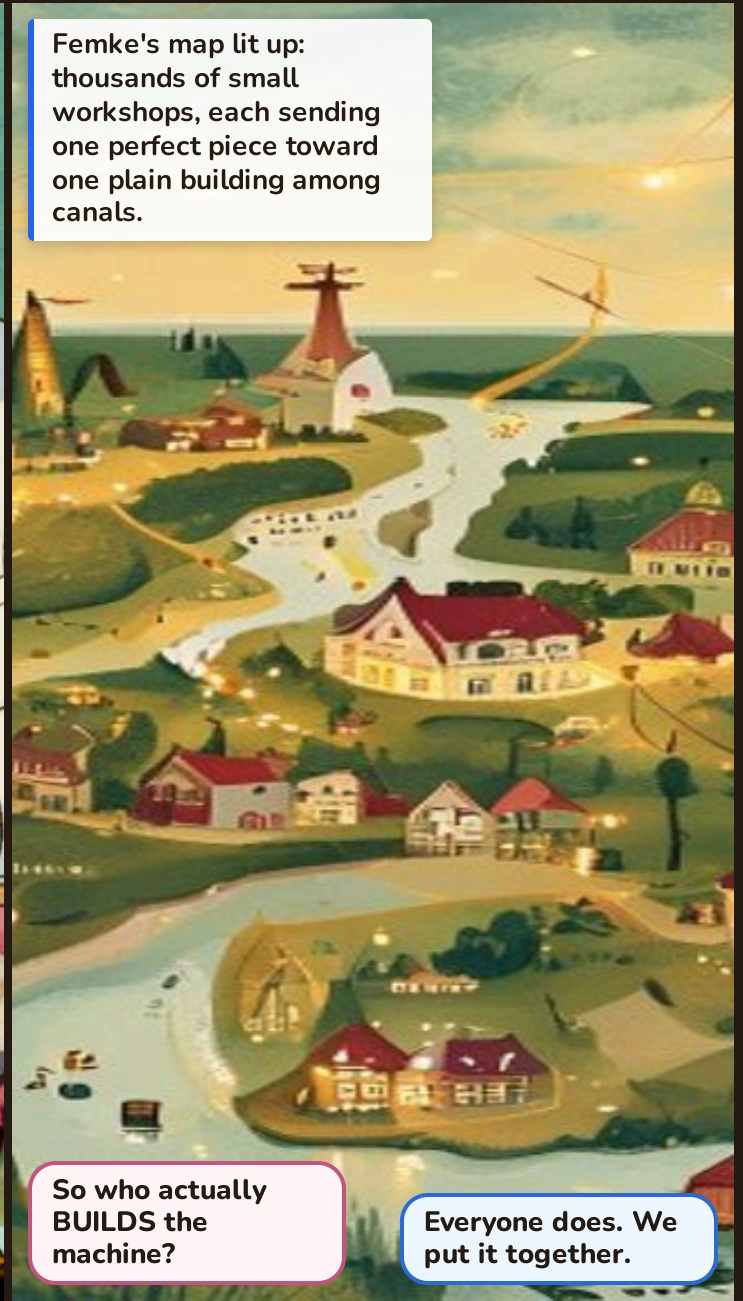
NOBODY BUILDS IT ALONE

In a quiet German workshop, one technician polished a mirror for months, measuring, polishing, measuring again.



MONTHS on ONE mirror?

Femke's map lit up: thousands of small workshops, each sending one perfect piece toward one plain building among canals.



So who actually **BUILDS** the machine?

Everyone does. We put it together.

★ WORTH REMEMBERING

The company designs and integrates — and buys most parts from a network of thousands of suppliers, some of whom make one component for nobody else on Earth. 🤝

The mirror polisher. The vacuum engineer. The laser technician. Each said the same shy sentence: *"I only do my small part."*



But **NOBODY** builds the whole thing alone!

★ WORTH REMEMBERING

Then the machine ships in dozens of crates, and engineers spend months installing it inside the customer's cleanroom — and often never really leave. Selling it is only the beginning.

📖 SIRI'S SECRET NOTEBOOK

Thousands of suppliers → one machine → dozens of crates → months to install. Nobody builds it alone, and nobody else can assemble it. Who ARE these people? 🕒

THE SHED BESIDE THE WINDMILLS

Sunrise over flat green fields, canals and cyclists. A long glass campus. Siri finally read the name on the machine.

ASML! The machine of light is **THEIRS!**

"1984. A joint venture of two Dutch companies. The first team worked from a prefab hut in a car park."

A HUT built the world's finest machine?

"For years they nearly failed. Then, in 2001, two stages: measure one wafer while printing the other."

Measure **AND** print? Twice the work per hour!

And around 2018, the impossible light finally went to work — printing chips in factories on three continents.

So the whole chip world waits on this one door.

★ WORTH REMEMBERING

The deepest choice was patience: the company bet on extreme ultraviolet for roughly **two decades** before it earned a single good chip. Most companies cannot stay pointed at one hard thing that long. 🕒



THE STORY IN TIME

1984

ASML begins as a Dutch joint venture, in a hut beside a factory.

1991

The PAS 5500 scanner finally wins serious customers.

2001

TWINSKAN: one wafer measured while another is printed.

2007

Immersion printing — water under the lens — sweeps the industry.

2013

It buys its light-source partner to master the hardest part.

2018

Extreme ultraviolet enters real, high-volume production.

2024

The first High-NA machines ship, bigger and sharper still.

Always

One rule: keep pointing at the hard thing. 💡

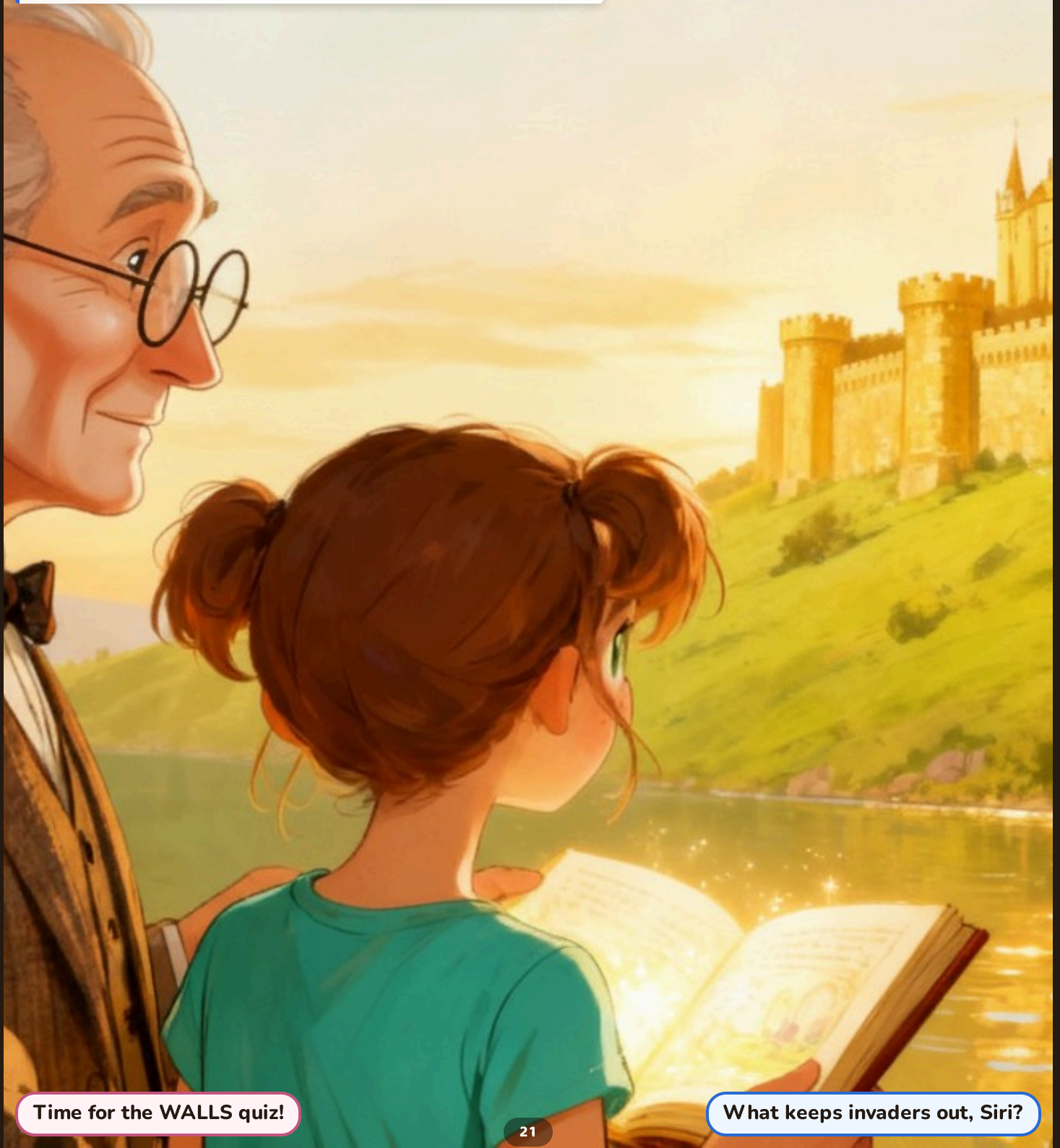


SIRI'S SECRET NOTEBOOK

ASML. 1984, a prefab hut in the Netherlands.
Nearly failed. Bet 20 YEARS on light nobody
could use yet. Now every advanced chip on
Earth starts here. 💡

THE CASTLE OF LIGHT

A warm glow. A smell of cherry cola. Warren and Charlie, the partners from Omaha, stood 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: Twenty Years of Trying

Rivals cannot buy the two decades of failed attempts that taught this machine to work. Time is the one thing money can't hurry.



Wall Two: A Village of Suppliers

Thousands of specialists, some making one part for nobody else. Copying the machine means copying the village around it.



Wall Three: Living Inside the Fab

Engineers install, tune and upgrade the machines for years. Service and spare parts earn steadily, long after the sale.



Wall Four: Learning From Everyone

Every customer's hardest problem teaches the next machine. Serving the whole industry means learning from the whole industry.



The Cracks in the Beam

Chip demand swings hard, and a bad year hurts. A handful of customers buy nearly everything. Governments decide who may buy at all. And the mirrors come from essentially one partner. 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 this business: stop spending on research in a bad year. Let a machine become unreliable. Squeeze customers who have nowhere else to go. Now — simply never do those.

Warren raised his cola. *"Some businesses sell a product. This one sells the next twenty years of everyone else's progress."*



So the treasure isn't the machine. It's the
WAITING LIST.



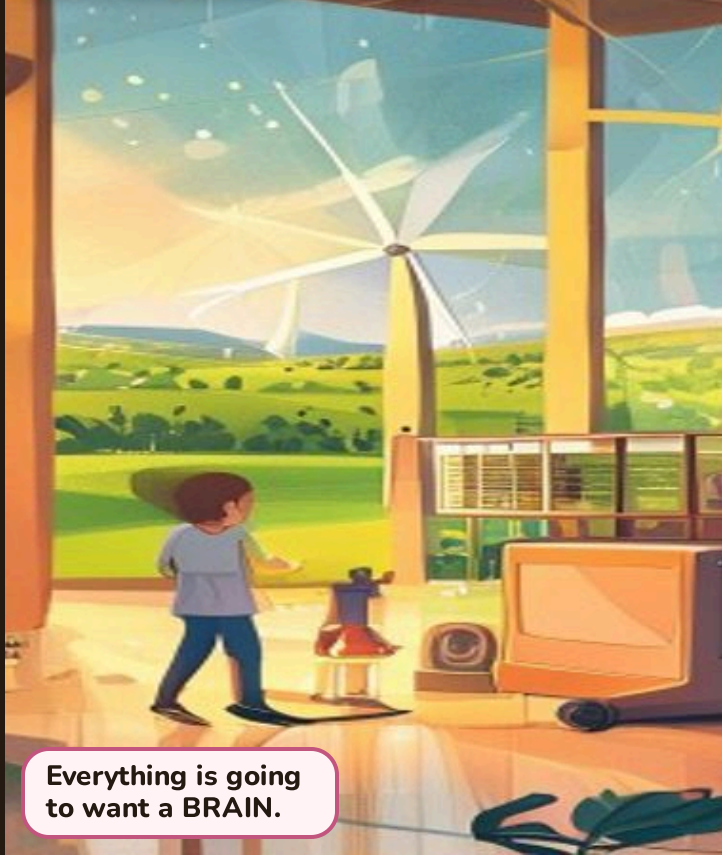
SIRI'S SECRET NOTEBOOK

Walls: 20 years of trying ⌚ + a village of suppliers 🤝 + living in the fab 🔧
+ learning from everyone 📖. Cracks: wild cycles, few customers, export
rules, one mirror partner. Charlie: INVERT. Warren: patience is a wall. 🏰

THE NEXT THIRTY YEARS

"Last question," said Femke. "*What does this become in thirty years?*"

Bigger machines, quieter data halls, helper lights on desks.



Everything is going to want a BRAIN.

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



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

★ WORTH REMEMBERING

The visible currents: High-NA machines with wider mirrors and sharper prints, brighter light sources, chips stacked and packaged together, and AI wanting more computing than anything before it. 🧠

📖 SIRI'S SECRET NOTEBOOK

2056 watchlist: High-NA, brighter stars, stacked chips, AI eating computing. Rule: bet on needs, not shapes. (Also: I want to hold one of those mirrors. Carefully.)

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. Stencils. Water. Tin stars. Mirrors polished for months.

You were DRAWN. By light. By people.

She hugged the diary tight. Far away, past canals and windmills, a long glass campus caught the morning sun.

Show me the next one, Grandpa. ♡

★ WORTH REMEMBERING

Feel the unlock: a wave of light too short for air to survive, born from exploding tin, bounced off mirrors smoother than anything in nature, drawing streets no eye will ever see. **Nothing, from now on, is just anything.**



SIRI'S SECRET NOTEBOOK · WHAT I LEARNED

- ① Chips are printed with light, not carved.
- ② Light-memory syrup + a stencil + a shrinking lens.
- ③ Blur is physics: waves spread.
- ④ Water under the lens sharpens the print.
- ⑤ EUV = exploding tin, vacuum, mirrors.
- ⑥ A village of suppliers builds one machine.
- ⑦ Invert! And patience can be a wall. 💛



OUR PHILOSOPHY

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

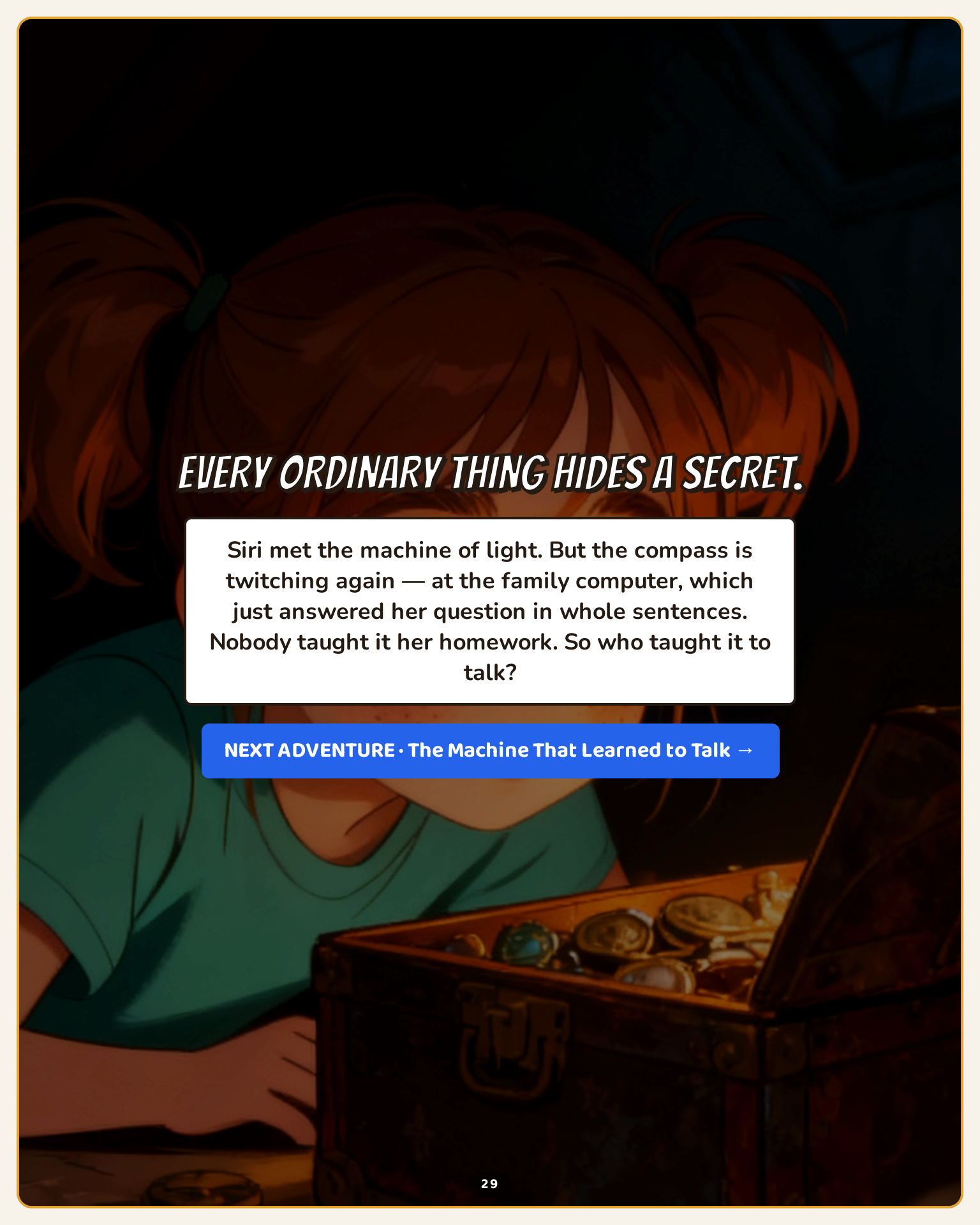
Inspired by the multidisciplinary thinking of [Charlie Munger](#) and the rational, long-term philosophy of [Warren Buffett](#), our comics connect science, technology, business, history, and human behavior to show how the real world works.

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 warm, orange glow emanating from the chest. The background is dark and indistinct.

EVERY ORDINARY THING HIDES A SECRET.

Siri met the machine of light. But the compass is twitching again — at the family computer, which just answered her question in whole sentences. Nobody taught it her homework. So who taught it to talk?

NEXT ADVENTURE · The Machine That Learned to Talk →