

STATELESS SOCIETY

A Society Without a Single Point of Failure



NOSTAD

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NOSTAD

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From the Author

“You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.” — Buckminster Fuller¹

For fifteen years I earned my living by translation. Not between languages, no—between people.

Picture a meeting room: a long table, coffee gone cold. Hour three of the same conversation going in circles. On one side of the table, a tired, wound-up client who cannot explain what he wants. He explains, of course, but in his own language: “make it convenient,” “make it the way normal people have it.” He can almost physically feel where the hull of his business is leaking. But he cannot show the breach in words that will be understood here. And so he talks ever louder, ever sharper. On the other side sit the engineers, and they need something else entirely: what exactly to build, which fields, what logic, what load. They have it no easier. In front of them is a living person with a real problem; they sincerely want to help him, but not a single line of a spec will assemble out of his heated words, and with every hour the room accumulates more mutual despair. Between these two sides stands a blank wall. The most painful part is that the people on both sides of it are allies; they simply have no common language. The client is not at fault for not knowing how to state the task: he lives in the world of his problem, and solutions are not found in that world. The engineers are not at

¹ The aphorism is traditionally attributed to Buckminster Fuller (1895–1983), engineer and inventor, creator of the geodesic dome. The attribution is stable, but an exact source in his own writings has never been pinned down—which for well-worn formulas is the rule rather than the exception; see Quote Investigator for a breakdown of its origins. I give it as verified for attribution, with this caveat about provenance.

fault for hearing emptiness. What they were brought is a wish, and a blueprint will not assemble out of a wish.

My job was to stand in the opening in that wall and translate. To hear, behind “make it convenient,” the concrete system the person cannot name himself, and to lay it before the engineers in their language. In drawings, diagrams, visualizations—and endless conversations and revisions. Almost every time it turned out along the way that the request the client had walked in with was not the real one. Behind a simple “build me a report” hid the fear of not noticing that the business was already sinking. Translate it right, and you can see the engineer’s face change on the spot. Now he understands what to build. Understands what is wanted of him. And that is the moment I came to love most in the profession.

This book is the same craft, only the object is bigger.

A state, after all, is also a system that somebody built for a specific task. It has its own “spec.” It is written down in textbooks and in the preambles of constitutions: protect your people, give them order and justice. And then there is what actually runs. The way the thing is in fact assembled. Between the first and the second stands the same wall as in that meeting room—between what people expect from the state and what it really does. Only there is almost no one to translate this system into a language we can understand. Power talks about itself in the words of power: “sovereignty,” “stability,” and somewhere close by, always, “national interests.” That is client language, and in it the desired has long been confused with the built.

I will try to do the job I am used to. Take the tools engineers use to pick apart complex distributed systems—assembled from unreliable parts, living under constant load—and train them on the state. Translate power out of the language in which it sells itself and into a language in which it can be seen as a blueprint. And a blueprint can be read, and contested. In the end—redrawn.

Engineers who live with large systems have a professional habit, and here it is the main tool. When any such system goes down, the engineer does not rush off to find a culprit. He looks at how it is built and asks: what in the design itself made this failure possible, or even inevitable? A culprit may well turn up, but punishing him will not change the design. And if the design does not change, the failure will come back. This is a different worldview. The gaze shifts from the actors to how the system as a whole is built: from “who is to blame” to “how it works.” That is the method of this book. A method like this drains away a lot of habitual anger. What remains in exchange is the chance to repair.

Neutral, though, I will not be; pretending would be a lie. I will say up front where I am looking from.

I have lived my life between states. Born in one, grew up across several. Some became my own. But I do not belong wholly to any. The first chapter is about that. Here I will say only that my vantage point is from the edge. From the edge you can see the seams: the places where what is written ends and someone’s discretion begins. At the border, everything is decided by the mood of the officer on duty. Whatever the law may say. Rules get changed retroactively. Belonging is issued and taken away with a stroke of the pen. From the center these places cannot be seen; from there the system looks seamless, like air. From the edge you do not need to hunt for the seams: life itself drags you along them.

Stateless is a word from my trade. In the world of software it names a system that keeps no state: it remembers no one between calls; every request to it is self-contained. That is why such a system has no irreplaceable node. Any part can be replaced; the whole will stand. The word has direct political kin: *stateless* also means without a state, without citizenship. English folds both meanings into one word, and this book lives exactly at that junction. Can a society be assembled without a

single irreplaceable center—so that it has no point at all that, knocked out, drops everything? The idea is an engineering one. Further on I will take it apart in earnest. For now—intuition is enough.

There is a personal coincidence too. I myself am almost stateless. I live between countries and belong to none. So I am writing this from the inside: I live in the very state I am taking apart.

Why do I see the state as a mechanism at all, and not a given? Partly biography: the edge instead of the center. Partly the way my head is wired.

It is wired differently from most people's, and for this book that is a working tool. Where an ordinary person sees a finished picture and takes it for the only one possible, I see, by default, the schematic on top of it: joints, nodes, wires, assumptions somebody once baked in and forgot. For a long time I considered this an inconvenience. Then I understood it is a lens. In large part this book is that very lens turned outward: what I am used to seeing alone, I want to show you.

The plan is this. First, the failure: the human being, and how and where the system fails him. Then the design: how the machine of power is assembled, why it works the way it does, and why "it has always been this way" is actually an illusion. Then the tools that twenty-first-century engineering has already road-tested: systems without an irreplaceable center, trust without an intermediary. And feedback—the kind that repairs. Then the reassembly of it all: what an order built around the human being might look like; what such an order will cost, and by what road to get there. At the end, the human being again—the one all of this was started for.

Anger is bad fuel; it will not take you far. That is why the book ends with a blueprint. And that is why the epigraph is the one it is: you do not defeat the obsolete by fighting it—you make it unnecessary by building, next to it, something that works bet-

ter.

And it all begins where it began for me: on the seam between two states—on the form of a country that was about to cease to exist.

Chapter 1. Born Stateless

“We became aware of the existence of a right to have rights... only when millions of people emerged who had lost and could not regain these rights.” — Hannah Arendt²

On the night of January 19–20, 1990, the Soviet army entered Baku. Not an enemy capital—a city that it itself considered its own. Heavy armor from five directions, gunfire in the streets, and by morning, in the hospitals and morgues, more than a hundred dead residents—shot by the soldiers Moscow had sent.³ There was no armed rebellion in the city of the kind armies are supposed to put down. The troops did not come because someone had taken up arms. They came because power in the republic was draining out of the Moscow center’s hands. For the center, that is the only truly unbearable threat. Next to it, human lives become small change.

One detail explains the logic of this center more precisely than the assault itself. Several days before the troops went in,

² Hannah Arendt, *The Origins of Totalitarianism*, ch. “The Decline of the Nation-State and the End of the Rights of Man.” The exact wording (1958 ed., pp. 296–297): “We became aware of the existence of a right to have rights (and that means to live in a framework where one is judged by one’s actions and opinions) and a right to belong to some kind of organized community, only when millions of people emerged who had lost and could not regain these rights because of the new global political situation.” The epigraph gives the quotation in abridged form.

³ Human Rights Watch / Helsinki & Inter-Republic Memorial Society. *Conflict in the Soviet Union: Black January in Azerbaidzhan* (eds. Robert Kushen, Aryeh Neier). New York: Human Rights Watch, May 1991, ISBN 1-56432-027-8, pp. 3–4: on the night of January 19–20, 1990, Soviet troops stormed Baku “as though it were an enemy position intended for military destruction”; “more than 100 people” were killed, most of them civilians shot by soldiers. No armed action that would justify the assault was recorded.

bloodshed was already sweeping the city. There was wrecking and killing in the streets. Forces that could have stopped it were in the city. And they received orders not to intervene.⁴ Not because they could not. Because the center needed someone else's calamity. Let the chaos grow, without interfering. Then come in to "restore order." And under that smokescreen, do what the whole thing was started for: break the republic that wanted to leave. Disorder deliberately left unextinguished becomes an entry ticket.

And Baku is neither the first in this series nor the last. Budapest, 1956. Prague, 1968. Tbilisi, April 1989. Baku, January 1990. Vilnius and Riga, January 1991.⁵ Different decades, different countries, different peoples, different pretexts. And one and the same answer from the center to one and the same motion. As soon as a territory tries to slip out of control, the army enters it. And every time, the entry is packaged in words about "restoring order" and "protecting citizens." When the same thing repeats six times in a row, it is not a chain of tragic accidents. It is the design.

And an order is no way to wave this off. Nuremberg closed that loophole. "I was following orders" does not remove respon-

⁴ Ibid., pp. 7–8: the forces present in the city during the preceding days of street violence did not step in to stop it ("had orders not to intervene"); the state of emergency was applied against the republic's independence movement. Non-intervention at the moment when intervening was possible turned, for the center, into the pretext for sending in the troops.

⁵ One and the same answer from the center to a move out from under its control: Budapest, 1956—the Hungarian uprising crushed by the Soviet army, thousands dead; Prague, 1968—the invasion by Warsaw Pact troops and two decades of "normalization"; Tbilisi, April 9, 1989—a peaceful rally dispersed by the army, 21 dead; Baku, January 20, 1990—see above; Vilnius, January 13, 1991—the storming of the TV tower, 14 dead; Riga, January 1991—OMON raids on the barricades, dead among the defenders and journalists. In every case, the official packaging: "restoring order," "protecting citizens," "at the request of the working people."

sibility. Every man who fired that night had a choice, and every man made it. But here is what matters to understand about the way power is built: it is constructed so that the default choice is to obey. It is stronger than any lone person. Resisting it costs dearly—sometimes life itself. The majority chooses this “default.” And here the choice is their own, and so are its consequences; and at the same time it is the predictable product of a design that makes obedience easy and refusal a feat. This is how we will look at things for the whole book: at power—not as the evil or good will of individual people, but as a mechanism that reliably squeezes one and the same result out of ordinary people. And if it is a mechanism, then we can ask how it is built and whether it could be otherwise: so that, by default, something other than this would come out of the same people. The first entry in this book is simple: when the survival of power diverges from the lives of people, the center chooses power. That is how it is built.

The state, after all, sells itself as a tool for its own people. Its entire right stands on that: to collect tax from you, to judge you, to hold the monopoly on violence—all of it, supposedly, in order to protect you. That January night put this promise in doubt. The book will keep asking this question again and again. What does a tool become when it trains an army on its own people? And—separately, because this is colder still—what does it become when, before that, it calmly waits for calamity to do its dirty work? For whom, in the end, does a system work in which citizens’ lives, at the right moment, are so easily outweighed by a consideration of power?

And now, where I come into this. I was born in that city in 1991, in an already independent Azerbaijan. But the form I was entered on at birth was still Soviet: at the top of it stood a country with mere months left to live.⁶ Linger on this small detail.

⁶ Azerbaijan adopted its constitutional act on state independence on October 18, 1991; the USSR was officially dissolved on December 26, 1991,

The state on the first piece of paper in my life was already disappearing. The state in which I physically came into the world had only just come into being and did not yet understand itself. I was born exactly in the gap between the two—where one state is already gone and the other has not yet set.

Hence the title of the book, and the title of this chapter. “Born Stateless” is not a pretty figure of speech. It is literally my starting address: a person who appeared in the interval when the place where you are has no stable state. The word *stateless* has a second layer as well—an engineering one, load-bearing for the whole book; I will unfold it in the third chapter. But the first layer is right here, and it is simple: it is possible to be born at a point where the state is not an eternal backdrop but a thing that is changing its state of matter before your eyes, like water. And if the first thing you saw was steam, you will find it hard to believe that it is about to freeze into ice and remain ice forever.

Hannah Arendt, who opens this chapter, wrote that there is one right at the foundation of all the others. The right to have rights: simply put, to belong to some political community that counts you as one of its own.⁷ Those deprived of it—people without a state—fall out not of one particular freedom but of the very frame within which freedoms are handed out at all. Around me, that frame was being reinstalled at the very moment I appeared. Probably that is why I never took it for a given.

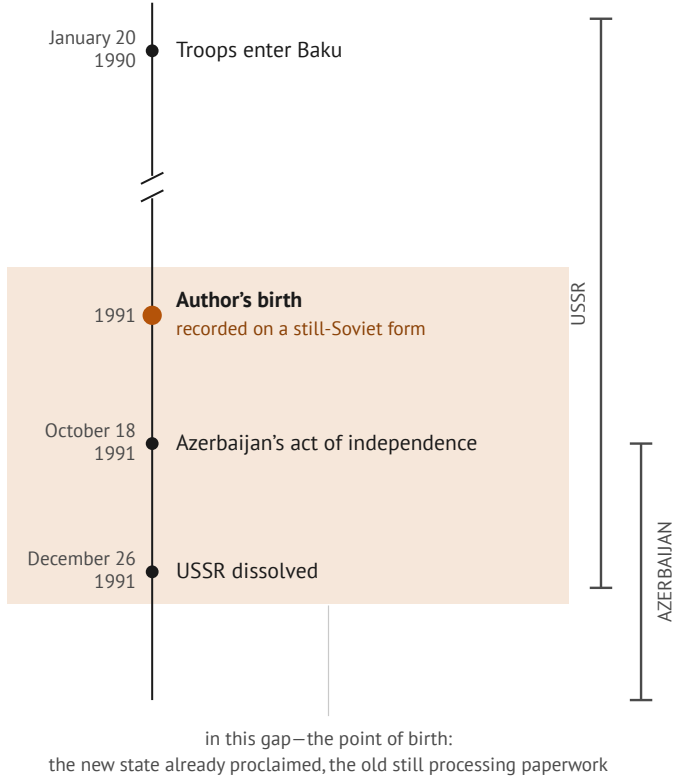
Whoever is born in the gap is spared one very widespread

and Soviet documents and forms remained in use through the transition period. The author was born in 1991; the record of his birth was drawn up on a still-Soviet form (the author’s own certificate).

⁷ Hannah Arendt, *The Origins of Totalitarianism*, ch. “The Decline of the Nation-State and the End of the Rights of Man.” The exact wording (1958 ed., pp. 296–297): “We became aware of the existence of a right to have rights (and that means to live in a framework where one is judged by one’s actions and opinions) and a right to belong to some kind of organized community, only when millions of people emerged who had lost and could not regain these rights because of the new global political situation.” The epigraph gives the quotation in abridged form.

FIGURE 1.1

The seam between two states



*States change, but the record does not break:
the new state registered a citizen on the old state's form.*

illusion—that the state is a phenomenon of nature, eternal and good by default. From the very beginning I saw in it neither a parent nor a fate but a mechanism. And you do not take offense at a mechanism. You take it apart. And this missing illusion turns out to be an optic: where for others everything is seamless, I see the seams.

Then came a geography easier to list than to live through. In earnest—three cities: Baku, Moscow, Kyiv. Between them and around them, shorter stops: Dubai, Turkey, Estonia, Europe.⁸

Moscow deserves a separate word, because the dates here work like a diagnosis. I moved there in 2008. That same year, Russia invaded Georgia. The thought that I had to leave appeared, in essence, right away; by the spring of 2011 it had ripened into a decision, and I returned to Baku. Not over daily life and not over career. Over the trajectory: from the way the country talked about its neighbors and about itself, you could see where the curve was going. Which is why neither 2014 nor 2022 came as a surprise to me. This is not prophecy in hindsight. These are points lying exactly on a curve whose beginning I had seen from the inside.

Estonia deserves a separate word too, but for the opposite reason. Of all the stops, it is the only one where the design of the state stirred something like an engineer's admiration. A small country assembled a digital state earlier and more honestly than the big ones. The book will return to its experience more than once. I did not leave because of Estonia. I left because of the map. Narva stands flush against the Russian border, the whole Baltic bundle hangs on the narrow Suwałki Gap, and after 2022 the risk of ending up inside a blockade stopped being theoretical. I said goodbye to Estonia as to a fine project standing in

⁸ The author's biographical anchor points—a geography without belonging. Principal: Baku, Moscow (2008 to spring 2011), Kyiv; shorter stops—Dubai, Turkey, Estonia, EU countries. See the book's design document, §3.

the wrong neighborhood.

Different countries, different passport windows, different sets of rules to adjust yourself to. Anyone who has not lived between countries rarely guesses what a separate profession it is—to exist legally. A visa, a stay permit, a residence permit, an immigration permit: every country calls it its own way, it means almost the same thing everywhere, and it is regulated completely differently everywhere. In one place the status is tied to an employer, in another to an address, in another to the number of days spent inside the borders. And every move means learning a new body of rules by which you are permitted to be where you already are. And through it all, one feeling, which I long chalked up to a personal flaw until I understood that the property was not mine but the structure's: nowhere was I one of them all the way. My documents were always in order. This is not about documents. It is about belonging. Some of these countries became my own. But full, mutual belonging never happened with any of them.

This is not the touching homelessness they write about in *émigré* novels. It is colder and more useful. In every country, sooner or later, you are given to understand (sometimes politely, sometimes not) that there are the “real ones,” and there is you, and the line between them was not drawn by you. And here is what a long passage through many such lines does to a head: you stop believing in the division itself. Because to one country you are foreign by one criterion, and to the country next door by the exact opposite one, and at some point it sinks in that the criterion is not the point at all. The point is that the system always has a line at the ready: on one side of it you are useful, on the other, expendable. That line has been drawn through me so many times and in so many different ways that I stopped taking it for something natural. It is a drawn line everywhere. And a drawn line can be erased and drawn another way.

That is what the entire position “from outside” comes down

to—and why I begin the book with myself at all. When you live your whole life inside one country, it feels like air: the only one possible, eternal, because there is nothing to compare it with. But when you pass through several systems and put down roots in none of them, states stop looking like phenomena of nature. They become what they are: man-made structures, assembled by people, at a specific time, for specific tasks, with specific mistakes inside. What for most people is a familiar given is, for an observer outside the system, a blueprint. And a blueprint, unlike a fate, can be revised. That is the whole hope that will drive the second half of the book: if the state is a structure and not a verdict, it can be assembled differently. Better. Around the human being, not around the throne.

And this same way of seeing, incidentally, defuses the January night I began with—without canceling it. As long as people see in it only a clash of nations, they stay stuck in the eternal “who did it to whom first,” which has no bottom. But look at it the way an engineer looks at somebody else’s failed node (calmly, schematic in hand), and where the roster of villains and victims stood, a failure class shows through: a center for which its own people, at the critical moment, turned out to be material. We will meet the same failure class later, on far older pages. The dates and the flags change. The design repeats.

But before anything can be reassembled, the structure has to be read. And the first thing to read is not power. First, ourselves. Because almost everyone who has reached this line has already quietly thought: all of this is about a crumbling empire and a distant 1990, whereas I live in a normal country and am not into politics anyway. That cozy position—“I’m home free, none of it touches me”—is the next illusion we will take apart. By the end of the next chapter, the phrase “I’m not into politics” will sound different.

Chapter 2. “I’m Not Into Politics”

“We do not say that a man who takes no interest in politics is a man who minds his own business; we say that he has no business here at all.” — Pericles, as recorded by Thucydides⁹

Imagine a man who saved for years. Not for a yacht—for a normal grown-up cushion: so that, if anything happened, he could hold out for six months; so there would be money for the kids’ schooling; so that at forty he would not be calling his parents for cash. He saved in the local currency, kept it in an account, and was quietly proud of not being a spendthrift. Ask him on any of those evenings what politics had to do with it, and he would have shrugged: “Nothing. I work, I pay my taxes, I don’t bother anyone. Politics is over there, on TV.”

And then, in a single morning, his savings shed a quarter of their weight, and by the end of the year, half.

Not a robbery, not a fire. Just an announcement one day: we are letting the rate go. In Kazakhstan this happened twice in two years. In February 2014, the tenge was knocked down by a fifth in a single day. In August 2015 it was set afloat: minus a quarter by evening, and by the following winter the dollar cost twice what it had before the first devaluation.¹⁰ In Ukraine, in

⁹ Thucydides, Pericles’ Funeral Oration, *History of the Peloponnesian War*, Book II, §40; the epigraph follows Rex Warner’s translation (Penguin Classics). A caveat: the popular line “you may not be interested in politics, but politics is interested in you” (attributed now to Pericles, now to Trotsky) is apocryphal, with no reliable source; the genuine Pericles is quoted instead. Condemning the “I’m not into politics” stance is no invention of our century: it is two and a half thousand years old.

¹⁰ The devaluations of the Kazakh tenge. On February 11, 2014, the National Bank of Kazakhstan weakened the tenge by about 19% in one step

those same years, the hryvnia tumbled from eight to the dollar to twenty-odd—minus two-thirds.¹¹ The man did nothing. He did not play the market, did not get into politics, did not follow oil or the war. He was simply asleep. And while he slept, a few people he had not chosen, in an office where he had never been, made a decision. And half of what he had put aside penny by penny for ten years dissolved. Imports went up first, the rent got rewritten, the vacation was canceled, and the “cushion” he had been so proud of now held not for six months but for three.

He was not into politics. Politics did not notice.

In the last chapter I left you exactly on this threshold. Almost everyone who reads about a city shot up by its own army quietly thinks: this is about a crumbling empire and a distant 1990, whereas I live in a normal country and am not into politics anyway. Well, the same logic that trained the army on Baku works in peacetime too—thinner and quieter, through your wallet. And I will start with the unpleasant part: the phrase “I’m not into politics” cancels nothing. The decision gets made anyway. Just on your behalf, and not in your favor.

(from ~155 to ~185 per dollar); on August 20, 2015, it moved to a free float, and the tenge lost about a quarter in a day (from ~197 to ~255); by January 2016 the rate was going past 350–380 tenge per dollar. The backdrop: the collapse of world oil prices in 2014–2015 and devaluations among trading partners. Sources: Reuters, February 11, 2014; BBC/Reuters, August 20, 2015; National Bank of the Republic of Kazakhstan.

¹¹ The devaluation of the Ukrainian hryvnia in 2014–2015: the rate fell from about 8 to 26 hryvnias per dollar (a loss of roughly 70% of its value); in February 2015 alone the hryvnia collapsed by about 30% in a month after the National Bank abandoned its currency auctions. The backdrop: the war in the east, capital flight, loss of reserves. Sources: VOA/Reuters; OSW Centre for Eastern Studies; CEPR.

What This Phrase Actually Says

People say it modestly: “I stay out of it, I mind my own business.” And what it means is this: “Let someone else make the decisions about my money, my housing, my medical care, my tomorrow. Anyone at all.”

That sounds abstract, so here is the everyday specifics. The retirement age: one amendment, and you work five years longer than you planned. The school curriculum: what will and will not end up in your child’s head is approved by an agency, not by the family. The list of approved medicines: it decides what you will be treated with and which drug will quietly vanish from the pharmacies. Banking rules: the cap on cash withdrawals, the fee on a transfer, the duty to explain where your own money came from. The duty-free threshold on parcels: one line in a decree, and everything you order from abroad gets a third more expensive. The blocking of a service your work or your contact with loved ones depends on—one regulator’s decision, made without you. None of this is “politics from the TV.” These are the parameters of your tomorrow, and each of them has an author.

And here is the first cold piece of news: you cannot unsubscribe. From a newsletter, you can; from a carrier, you can switch to another; from a bad café, you just stop going. But from the fact that someone controls the exchange rate of your currency, the laws you work under, and the threshold below which you get treated for free—you will not unsubscribe as long as you live among people. The only way out is feet first. One thing remains: to choose how you take part in this—with your eyes open or with them shut.

“I’m not into politics” is the eyes-shut choice. And like every choice, it has a recipient. Stay silent, and your vote gets picked up by whoever showed up. You did not tear up the ballot; you handed it over. Just without looking at whom. This is what is

called delegation by default: the thing that switches on by itself when you have not chosen. You bought a phone and never went into the settings. It sends data wherever the manufacturer finds convenient, not you. You kept quiet about power. You agreed to a setting that was set without you. And the one who set it, rest assured, was not the most selfless person in the room.

“I’m not into politics” has a sister: “let them watch, I have nothing to hide.” It sounds just as modest and rests on the same mistake—the belief that the rules by which your data is read today will remain the rules forever. But data does not age, and rules change. Today your messages are harmless; tomorrow the law changes, or the people in power, or simply the wind. And the same messages get read differently, retroactively. “Nothing to hide” is a bet that you will never, on anything, part ways with those who have access, and that the access itself will never change hands. Both premises are about luck, not about design. And notice the asymmetry: transparency is demanded of you, while they have closed offices; to them you are an open book, to you they are a sealed one. One-way transparency is called not honesty but surveillance.

Here is a case where the whole mechanism is visible in full, and there is neither politics nor malice in it. The company 23andMe took a tube of saliva from a person and returned a readout: where the ancestors came from, who the relatives are, what the predispositions are. The privacy promise stood in a prominent place, and until June 2022 the wording was direct: individual data is not sold or rented to third parties. In March 2025 the company filed for bankruptcy. And the database of millions of genomes turned out to be what, from the standpoint of procedure, it had always been: an asset in the bankruptcy estate. All legal. The user agreement had long contained a clause that in the event of bankruptcy, merger, or sale, the information passes to the new owner along with the rest of the property. The court-appointed privacy ombudsman

put it more bluntly: it is unlikely that an ordinary customer, reading that agreement, understood what they were agreeing to.¹²

Formally, no one lied. The promise simply had an expiration date, written into it in fine print. The owner of the access changed by ordinary procedure, and not a single political decision was required for it. And there is no rolling this back. A password can be changed; a genome cannot. And what a person hands over is not only his own: DNA speaks of the relatives too, who signed nothing.

That is why this phrase is naive to the point of danger. It describes a world that does not exist: as if there were a separate little room called “politics” that those who wish go into, while

¹² 23andMe is an American consumer-genetics company: from a saliva sample it produced a report on ancestry, family connections, and predispositions. In October 2023 a breach (guessed passwords to user accounts) affected about 6.9 million users. On March 23, 2025, the company filed for bankruptcy under Chapter 11 of the US Bankruptcy Code in the court for the Eastern District of Missouri; the customer database went in among the assets put up for sale. In May 2025 the auction was won by Regeneron Pharmaceuticals with a bid of \$256 million, but on June 4 the bidding was reopened, and the winner was a \$305 million bid from TTAM Research Institute, a nonprofit founded by 23andMe co-founder and former CEO Anne Wojcicki. The deal closed on July 14, 2025. The clause on the transfer of personal information in the event of bankruptcy, merger, acquisition, or sale of assets was in the user agreement; at the same time, until June 8, 2022, the same agreement carried a promise not to sell, lease, or rent individual-level data to third parties for research purposes. The court-appointed privacy ombudsman concluded that it was “highly unlikely that a typical 23andMe customer acting reasonably knew or understood what they were agreeing to” as regards the sale of data in bankruptcy. The attorneys general of a number of states objected to the transfer without each customer’s express consent; the court approved the deal. Sources: 23andMe press release, March 24, 2025; Regeneron press release, May 19, 2025; the consumer privacy ombudsman’s report in the case of 23andMe Holding Co.; Loeb & Loeb and Foley Hoag reviews, July 2025; CNN Business, March 24, 2025.

you simply never enter it and are therefore free. There is no such little room. There is one big room, with everyone in it. And the question is not whether you are inside or outside: you are inside by the fact of birth—we took that apart in the first chapter. The only question is whether your eyes are open or shut.

The Invisible Wire

Here you are entitled to interrupt. “Pretty words about proxies and blindfolds. But you promised an engineering book—show me the connection. Where is the wire between that office and my kitchen? I can’t see it; maybe it isn’t there?”

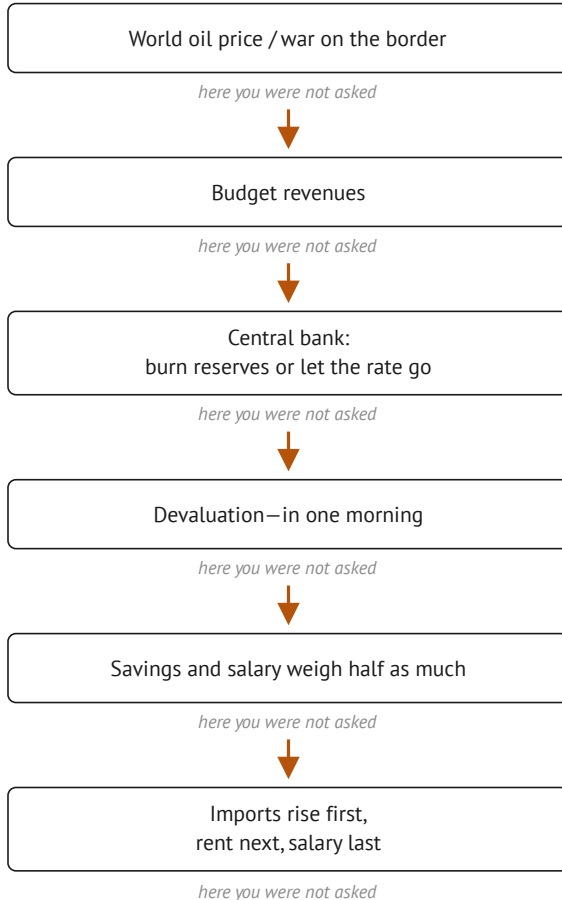
Fair enough. Let’s take that same devaluation and walk along the wire, skipping no splices.

Somewhere far away—the world price of oil, or a war on the border. You are not there, you do not follow it, you have other things on your mind. But your country’s budget hangs on that price: oil falls, and foreign currency stops flowing into the treasury. Next, the central bank, a handful of appointed people, faces a choice: burn the reserves propping up the rate until they run out—or let go, and let the currency fall. Sooner or later, they let go. In a single morning. And now your salary, your savings, your “cushion” are worth half as much—not because you started working worse, but because the unit in which all of it was counted was devalued by decision. Imports get pricier first: the phone, the medicines, the coffee, the spare part for the car. The rent catches up next. Salaries in the new money will be raised last of all, if at all. Between “oil fell somewhere” and “I can no longer afford what I afforded a month ago” there are three or four links, and at none of them were you asked.

One caveat, so as not to embellish. In the wealthy West, the same wire more often runs through a different link—the interest rate on a loan. Mortgages there usually carry a floating rate, and the moment the central bank raises its rate, the monthly pay-

FIGURE 2.1

The invisible wire



*The chain reaches your income,
passing through none of your choices.*

ment creeps up by itself, by the formula in the contract. With us it is different: loans are more often taken at a fixed rate, and the old payment cannot be rewritten so easily.¹³ That is why, in our parts, a decision from above catches up with you through the exchange rate and prices. The link is different—the wire is the same. In both cases, at the start there are a few people you did not choose, and at the end, your dinner.

And do not think this is a disease only of poorer countries with soft currencies. Cyprus, 2013, the prosperous eurozone. A rescue package is being put together for the island, and someone behind a closed door decides: let the depositors pay for it themselves. At one bank, clients with sums above one hundred thousand euros had almost half of their uninsured deposit taken and converted into shares of the sinking outfit. At the other bank, everything above the insured hundred thousand was taken.¹⁴ A man went to bed with money in his account and woke up without half of it. Between “went to bed” and “woke up” there was neither a court nor his signature. Devaluation at least hits everyone at once and looks like an “act of nature”; here specific accounts were reached into, by decision, with precision.

¹³ In the countries of the post-Soviet space, consumer and mortgage loans are, as a rule, issued at a rate fixed when the contract is signed; the central bank’s key rate affects the price of new loans and deposits and the exchange rate, but does not rewrite a payment already taken on—unlike the floating-rate loans widespread in the West. That is why the decisions of the monetary authorities reach an ordinary household first of all through the exchange rate and prices. Sources: Bank of Russia (key rate); Expatica, “Mortgages in Russia.”

¹⁴ The Cyprus crisis, March 2013 (bail-in—a “rescue at the depositors’ expense”): clients of Bank of Cyprus with uninsured deposits above €100,000 had 47.5% of their funds converted into shares of the bank; depositors of Cyprus Popular Bank (Laiki) above €100,000 received nothing beyond the guaranteed minimum. The €100,000 state-guarantee threshold was in force at the time under Directive 2009/14/EC (which raised coverage to €100,000 by the end of 2010; later consolidated into Directive 2014/49/EU). Sources: BBC News, March 31, 2013; CEPR, “Failing banks, bail-ins, and the Cypriot crisis.”

Different hands—one essence: your money is yours exactly until the day the one in charge of it agrees to consider it so.

There it is, the invisible wire. Invisible not because it is not there, but because it does not spark. You were not arrested, no letter came, there was no dramatic minute in which you could say: now politics has touched me. You were taxed quietly, and the bill came without a return address. “Life just got more expensive” is a passive voice with someone always standing behind it. Every decision has an author; sometimes he simply took care to remain unnamed.

The Theater You Walk Out Of and the Building You Remain In

Now the main distinction of this chapter—the reason it stands between the first and the third. Because you have a legitimate objection: “I’m not a fool, and I’m not saying nothing affects me. I’m saying I don’t want to get into the farce—parties, slogans, talk shows where red-faced people shout over each other, elections where everything is decided in advance. That is what I’m ‘not into.’”

And in that you are right. The trouble is that a single word, “politics,” names two entirely different things, and once you uncouple them, the phrase falls apart.

The first—let’s call it the theater. Faces, parties, slogans, debates, who ousted whom. A noisy stage, a play about power. Keeping away from the theater is normal and even good for the nerves. The circus has every right not to interest you.

The second is governing. English has a precise word for it: *governance*—the machinery itself that runs the shared household and writes the rules. No longer a play about power—power itself at work: who decides, and by what rules, what the exchange rate will be, who gets the budget, under what law you are judged, at what threshold you are treated. This is not a stage.

It is the wiring in the walls of the house you live in.

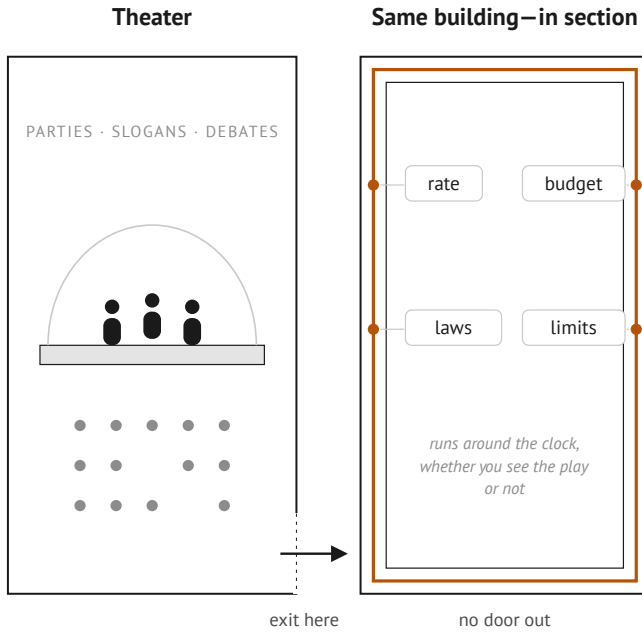
The language, incidentally, already keeps these two senses apart: *politics* is the fight for power, the stage; *policy* is a rule by which a system runs. And you are surrounded by policies long before any state enters the picture. Any company has a security policy, a return policy, a remote-work policy. Programmers even have a garbage-collection policy—the rule by which the runtime decides which objects in memory are still alive and which are due to be thrown out. Nobody says “I’m not into my company’s security policy.” It applies to you regardless of whether it interests you. State policy is exactly the same thing, only the circuit is bigger: the rules by which you are dealt with. The difference is that a corporation’s feedback is shorter: a dissatisfied customer goes to a competitor, and the policy gets fixed. A state has no competitor next door. And its policies can work against you for years without breaking.

In purely everyday terms. The theater is a TV show about utilities: deputies argue, the host winds up the audience. You can leave it off; you lose nothing. Governance is the pipes and radiators themselves in your apartment. As long as you live there, you are inside that system of pipes, whether or not you go to the residents’ meeting. By not going, you did not leave the building. You handed the meeting to those who came. That is the substitution: you proudly walked out of the theater and think you walked out of the building. You refused to watch the play about governance. And decided that you had thereby refused governance itself. But governance is not on the stage. It is in the walls. And it works on you around the clock.

And notice whom this suits. The louder and more vulgar the stage, the stronger a normal person’s urge to turn away from all of it at once—from the play and from what is being done backstage. And whoever turns away gets worked on without witnesses. The filth on stage is sometimes not a side effect but a function: to scare off the audience. So walk out of the hall, but

FIGURE 2.2

The theater and the building



Exit the hall ≠ exit the building

The hall has an exit, the building none.

do not walk out of the building—they are different doors.

What Silence Costs

The last objection remains, and it is the most honest one: “Fine. But what use is there in me personally? One vote, one opinion. The machine is huge, and I am tiny.”

I will answer with the mechanism. Any system that does something to you needs, so as not to cripple you blindly, a signal from you: this works, and this one is hurting me—fix it. That is feedback. Without it, the one who governs is not evil—he is blind. He cannot see where his decision landed, because the only one who feels it stays silent and considers himself “outside.”

Imagine a surgeon who operates without test results, without complaints, without the beeping of the instruments—simply by a plan written in advance. Let him be a genius who means well; he will still cripple the patient, because the only link that says “stop, not there” has been cut. Governance without feedback is exactly that: a surgeon with the monitor switched off. And everyone who says “I’m not into politics” pulls one little wire out of that monitor. One at a time—fine, nothing terrible, the instrument will trace its line without you. But when they are all pulled at once, the monitor goes dark, and the cutting is done blind—on everyone at once. You included. Silence does not take you out of the system; it only deprives the system of the signal that it is time to repair itself. You did not save yourself any nerves. You paid for a future failure in installments.

I once saw this mechanism up close—on a system the size of a website, and the one keeping silent was me. There is a Ukrainian platform for hiring in IT, djinni.co.¹⁵ It had a verifi-

¹⁵ djinni.co is a Ukrainian online platform for hiring in IT. Diia is Ukraine’s state mobile app and portal of electronic services, which among other things provides digital confirmation of identity based on state-issued

cation checkmark, and it meant a specific, dearly bought thing: the candidate had actually made it through a probation period, and the employer had paid the platform a fee for the hire. An expensive signal. Behind it stood someone else's money and someone else's risk; you cannot paint one like that on your own. Employers read that checkmark at a glance and trusted it.

Then a second checkmark appeared next to it—from Diia, the state app. Anyone with documents issued in Ukraine gets it in a couple of minutes: it confirms identity, nothing more. An honest signal, but a cheap one, and about something else entirely. And both marks were the same color; to tell which was which, you had to hover the cursor and read the tooltip. By eye—indistinguishable. The expensive “someone has already paid for this one” and the cheap “this person exists” merged into a single icon. And the first was instantly devalued: an employer could no longer rely on the checkmark as before. There was a filter by source in the settings, but by default the two sources still blended into one picture.

I felt it at once. And did nothing: zero motivation, a heavy workload, and five minutes on a letter to support are five minutes taken away from my own project or from rest. There it is, the cost of a signal, the thing that makes silence the default setting even for someone who sees the breakage through and through and, on top of that, is writing a book about it. I pulled my own little wire out of the monitor deliberately. I got away with it only because the platform has many users: had I been the only one, djinni would never have learned of the problem. But that is how everyone reasons, and on the day everyone decides so at once, the monitor goes dark. This time it did not: a

documents. The episode of the two verification checkmarks (one marking a completed hire, the other a confirmed identity), their matching color, and the subsequent separation by color is given from the author's personal observation as a user of the platform; the interface details and timing may have changed.

few weeks later the checkmarks were given different colors, and now they can be told apart at a glance. Someone sent a signal, it got through, and the system fixed itself—quickly and in plain view. That is what wins me over about Ukraine: the path from “it pinches here” to “fixed” is short and transparent.

This arithmetic has human testimony as well—perhaps the most quoted confession of the twentieth century about the price of “I’m not into politics.” The German pastor Martin Niemöller, who went through the Nazi concentration camps, put it in the first person: “First they came for the Communists, and I did not speak out—because I was not a Communist. Then they came for the trade unionists, and I did not speak out—because I was not a trade unionist. Then they came for the Jews, and I did not speak out—because I was not a Jew. Then they came for me—and there was no one left to speak for me.”¹⁶ This is not a poem about cruelty. It is a record of silence: everyone who considered the latest misfortune “not his politics” pulled his own little wire out of the monitor, until the instrument went dark altogether. And the strongest thing in this text is that Niemöller was speaking about himself: he was one of those who kept silent.

You Cannot Unsubscribe—So You Have to Learn to Look

Let’s tie the ends together. “I’m not into politics” turned out to be an action, and a loss-making one at that: you did

¹⁶ Martin Niemöller (1892–1984) was a German Lutheran pastor, a member of the anti-Nazi Confessing Church, and a prisoner of Sachsenhausen and Dachau (1938–1945). The formula “First they came...” comes from his postwar speeches and has no single canonical version: the order and the set of groups (Communists, Social Democrats, trade unionists, Jews) differ from one version to another. A widespread variant is quoted, in its common English wording; for the history of the text, see Harold Marcuse (UC Santa Barbara), “Martin Niemöller’s famous confession.”

not choose—the choice was made for you, and not in your favor. There is no unsubscribing from being governed: it is the air. The theater you walked out of with relief is only the noisy shop window of governance; having left the hall, you remained in the building. And your silence is not neutrality but a little wire pulled out of the instrument.

One thing remains: to learn to look at this machine straight on. Not gazing up from below at “those at the top,” as at distant weather that can only be endured. And not hunting for villains, to find them, curse them, and rest easy on that—which, as we will see, is the most deceptive of endings. But the way an engineer looks at someone else’s system: calmly, by the schematic, asking not “who is to blame” but “how is this built, and why does it keep producing exactly this result.” The state as a blueprint, not as a fate.

That is what the next chapter will do. It will give names to what I have been pointing at here from a distance: both the design that puts your whole life into one irreplaceable node, and the failure that sets in when a system stops hearing itself. One thing you now know for sure: you are not “outside.” No one has ever been “outside.” The only question is whether you will look at this machine with open eyes—or put the blindfold back on and call it peace.

Chapter 3. An Architect Looks at the State

“Every system is perfectly designed to get the results it gets.” — Paul Batalden¹⁷

Fall 2019. I am somewhere outside Kursk, all alone, and for about an hour now I have not belonged to myself.

I am ferrying my car from Baku to Kyiv on its own wheels—across the entire south of Russia and onward into Ukraine, along a road that two and a half years later will become one of the axes of the invasion. The routine check I have already passed—if the word “routine” has any place here at all. The Russian border (of all the borders I have crossed, and there are more than a dozen) seems to be the only one where they make you pull every suitcase out of the car, down to the last plastic bag. And when you have laid out every last thread on the tables, the inspector runs his eyes over one or two bags and tosses off: now pack it all back. The point of the procedure is not the search—there is, as you see, no search. The point is for you to stand over your unpacked belongings for a while and remember who decides here. At passport control, the same: questions that have nothing to do with the trip, and a tone that shifts with the type of passport, the color of its cover, the name inside. Nothing “by the rules, predictably” about it—every

¹⁷ The phrase “Every system is perfectly designed to get the results it gets” is documented as belonging to Paul Batalden (who adapted an earlier idea of Arthur Jones’s); in public circulation it is most often misattributed to W. Edwards Deming and Donald Berwick. See: Institute for Healthcare Improvement, “Like Magic? (‘Every system is perfectly designed...’); Susan Carr, *Patient Safety & Quality Healthcare*, “A Quotation with a Life of Its Own.”

crossing of this border was roulette: whom you would land on and what mood he would turn out to be in. That time the wheel gave me the works. They stamped me out—formally, I had already left Russia. But they did not give the passport back. The border guard, when he was done, did not hand the document back but muttered: park and come inside the building. There, behind a government-issue desk, an FSB officer was waiting for me—and my passport was already lying in front of him.

And now, to get my own document back and simply drive on, I had to make this man like me. Not comply with a rule—the rule I had already complied with. Be liked. He was in no hurry. He leafed through my papers and asked questions that look routine on paper and, in the flesh, feel like someone probing for the sore spot. Did I have friends in the military, in the Ukrainian army. What had I been doing in Russia. Where did my Ukrainian documents come from. What was I doing in Ukraine at all, what connections did I have there. What did I do for a living. What had I done in Baku. Round and round, in varying order, with theatrical pauses in which you are supposed to get nervous and blurt out something extra. I am alone. No one behind me, no one to hurry him, and he has exactly as much time as he chooses to allot himself. And my passport is lying in front of him, and we both understand perfectly well what that means.

And let me not pretend this is normal. It is not normal. A grown man who has done nothing to anyone is held for an hour in a government room and gutted over nothing—because they can. Not for a violation: there is no violation, the papers are in order, formally I have already left. Simply because I happened to fall into the hands of someone who had been issued the power to decide another man's fate for an hour and had not been issued a single reason not to abuse it. It is humiliating. And doubly humiliating because you cannot be angry out loud: snap back, and you will be driving not to Kyiv but in an entirely

different direction. So you sit, you smile, and you swallow it, and the anger stays with you. It is with me still, and in a sense this book grew out of it.

But while he was leafing through my passport, on top of the anger, the engineer in me switched on too. Because by then I had been building software systems for fifteen years. And this exact design—“everything runs up against one node, and the node decides by mood”—I can recognize with my eyes closed. It has a precise name. And there is a reason engineers abandoned it long ago, deliberately and with relief.

Here is what matters—and why I keep this scene at the very start of a book about how systems are built. Discretion at this border did not begin with the FSB officer—it was smeared along the entire conveyor belt: how many suitcases you unload, which questions you get asked and in what tone—none of it was decided by rules; it was decided by whoever was on shift that day. The office with my passport in it is the same discretion, boiled down to a concentrate: if he feels like it, he lets you go; if he doesn't, he doesn't; and there is nowhere and no one to appeal to. There is no second such office, no other officer you can walk in to if this one is out of sorts today. The enormous machine of the state, at that moment, collapsed into one man with your passport lying on the desk in front of him.

That is what this chapter is about. Because if you learn to look at the state the way an engineer looks at somebody else's system (not as a stage for the battle of good and evil but as a blueprint), then a good half of what used to look like either a mystery or malice turns into boring, predictable architecture. And with architecture, unlike malice, something can actually be done.

Two Words This Book Rests On

Let's begin with two words. Both are English, and both come from engineering. I promise to explain them so that they make sense to a person who has never written a line of code in his life.

Stateful and *stateless*. Literally, “with state” and “without state.” “State” here is simply the system’s memory of what came before: who you are, what you have already done, where the two of you left off last time.

Picture a theater coat check. The first kind keeps on staff a man with a phenomenal memory: you hand him your coat, he memorizes your face, and at the end of the evening he returns the coat by that same face. There are no tags. The entire link between you and your coat lives in the head of one employee. As long as he is at his post, alert, and remembering, everything is fine. But let him fall ill, step out for a break, mix you up with a similar-looking gentleman, or simply get tired toward the end of a long evening. And your coat turns into a problem that has no solution. The whole system rested on one man’s memory. With that memory, it falls.

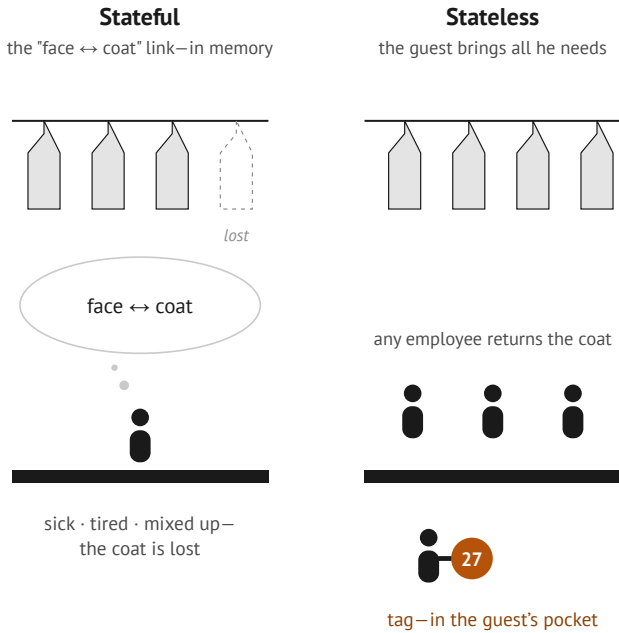
The second kind of coat check is set up in a duller, more reliable way. You are handed a numbered tag. Now all the necessary information is on that piece of plastic in your pocket, not in someone’s head. Any employee will return the coat, even if the shift has changed three times over the evening, because you bring everything needed for it with you. The system no longer depends on who is on shift today and what mood he is in.

That is the difference between *stateful* and *stateless*. In the first case, the state (the memory of you) is stored inside the system, in one specific node of it. In the second, every request you make is self-contained: you bring the context with you, and anyone at all can serve you.

This is not a pretty metaphor of mine after the fact—it is lit-

FIGURE 3.1

Two coat checks: stateful and stateless



*State inside a single node—
versus state in the client's hands.*

*State inside a node is lost along with the node;
state in the client's hands is not.*

erally the decision software engineering made around the turn of the 2000s, when the internet began to grow explosively. An architect named Roy Fielding described “stateless” as one of the key constraints on which the modern Web stands: the server must remember nothing about you between requests; every call carries everything it needs inside itself.¹⁸ It sounds like a minor technical quibble. In fact, it is the reason a website used by millions of people at once works at all.

Why? Because *stateful* does not scale and does not survive. If one single server “remembers” you specifically, you are chained to it: it gets overloaded—you wait; it breaks—you are lost; there are many who want in—the line to it grows, and the neighboring, idle servers cannot help, because they do not remember you. But if the system is *stateless*, any of a thousand identical servers will serve you, and you will not even notice that the previous one just died. That is by design.¹⁹

Here anyone who has built such systems himself is obliged to interrupt me: the memory has not gone anywhere, and the tag works exactly as long as, somewhere, there is a shared list—which tag goes with which hook. The server stopped remembering you personally. A shared database remembers, the one the whole thousand servers go to. The state did not disappear. It moved.

The objection is correct. More than that, it leads straight to the book’s central question. Suppose the shared list lies in a single room, the room has a single owner, and he is the one who

¹⁸ Roy T. Fielding, “Architectural Styles and the Design of Network-based Software Architectures.” Doctoral dissertation, University of California, Irvine, 2000. The *stateless* constraint in the REST architectural style: each request from client to server “must contain all of the information necessary to understand the request, and cannot take advantage of any stored context on the server.”

¹⁹ Andrew S. Tanenbaum, Maarten van Steen, *Distributed Systems*, 3rd ed., 2017 (freely available at distributed-systems.net)—on replication, fault tolerance, and designing systems without a single point of failure.

decides what stays in the list and what will one day vanish from it. What have we done, then? Moved the single point of failure one floor down. From the outside the system looks cured: there are many windows, any one can stand in for any other. Inside, there is still one book. And whoever holds it holds you.

That is exactly how most government digital services are assembled. Which is why a slick app on top of an old registry changes far less in your life than the presentation promises. The screen is new. The book is old.

So the job is half done. Removing the irreplaceable window is the first half. The second half is to make the shared book stop being the only one: to multiply it across many hands, where the entries are checked against one another and can no longer be quietly rewritten, after the fact, by one person alone. Such a design exists, and we will get to it. For now, note that there are two parts here. The window, and the book behind it.

Now back to that officer outside Kursk. He is the first kind of coat-check attendant. Everything left between me and the road rests on his mood and his presence. There is no tag that any other officer would accept exactly the same way. Only him. I do not depend on rules. I depend on a man.

You may never have driven a car across a border and may not care for stories of this kind at all. But everyone has his own version of this window. The one official who has “your file,” and he is on vacation, and nobody else is handling it. The one signature that only one specific person is entitled to put down, and while he is away, the signature does not exist either. The bank operator who “sees” your problem on the screen but “can’t do anything,” because someone else decides—someone you will never be shown. Every time it is one and the same design: your whole task has run up against a single node, and as long as that node is out of sorts, out of the office, or uninterested, you stand and wait. Not because the world is cruel, but because that is how the blueprint is drawn.

The Single Point of Failure

A node without which the whole system stops has an engineering name: a single point of failure. It is the part whose breakdown takes everything down. A good engineer hunts for such points deliberately and clears them out. A system that has even one is exactly as reliable as that one part.²⁰

My officer is a single point of failure for me alone, for one day. But step back and look at the state as a whole. The same figure stands at the top. The leader and his team are the node through which distribution passes: of goods, decisions, access, truth. A superfluous middleman between what society has produced and the people who produced it. And he himself decides how much to let through. And when this node is overloaded, captured, incompetent, or simply uninterested, everything downstream stumbles.

And here is the nastiest part. Most often the problem is not even villainy. Very often the repair is obvious and costs almost nothing. The trouble is that the node has power but no incentive to repair anything: no competition, no feedback, no second window that would force it to be good. An attendant who has the only line there is, and who cannot be fired, will not suddenly become brisk. Why would he? The line is not going anywhere. Neither are you.

The economist Albert Hirschman described this more precisely than anyone, half a century ago. A person dissatisfied with a system has, in essence, two levers. The first is “exit”: leave, take what is yours, go to a competitor. The second is “voice”: complain in a way that has consequences. A market is repaired by “exit”: a bad restaurant quietly empties out, and the owner either changes or goes broke. A democracy is sup-

²⁰ Andrew S. Tanenbaum, Maarten van Steen, *Distributed Systems*, 3rd ed., 2017 (freely available at distributed-systems.net)—on replication, fault tolerance, and designing systems without a single point of failure.

posed to be repaired by “voice”: the dissatisfied are heard at elections, and power has a reason to listen. But a monopoly window allows neither. There is nowhere to exit to—there are no competitors. And there is, in essence, no one to complain to either: the complaint goes into the very same window you are complaining about.²¹ And then the node loses its last reason to get better.

From there it escalates. The heaviest systems took both levers away from the individual at once: they made emigration difficult or shameful, and protest dangerous. This is not cruelty for cruelty’s sake, and not paranoia out of nowhere. It is the self-preservation instinct of a badly designed node. It muffles “exit” and “voice” because both are feedback, and feedback is the only thing that could force it to change. Remember this thought; it will keep coming back: **a system that has muffled its own feedback does not become strong. It becomes blind.**

What Engineers Do Instead

If the single point of failure is the disease, what is the cure?

The cure is called distribution. Instead of one irreplaceable node, the function is smeared across many equal ones. Any of them can die. The system shrugs and keeps running on the rest: it does not rest on any single one.²²

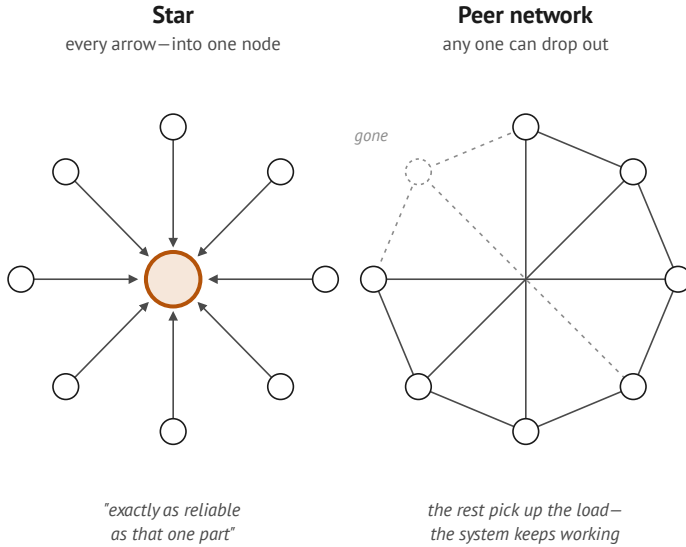
And here is what such a system cannot live without. Without that same feedback. The nodes check one another continu-

²¹ Albert O. Hirschman, *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States*. Harvard University Press, 1970. A system is disciplined by two mechanisms—“exit” (leaving for an alternative) and “voice” (voicing discontent with consequences); a monopoly deprives a person of both.

²² Andrew S. Tanenbaum, Maarten van Steen, *Distributed Systems*, 3rd ed., 2017 (freely available at distributed-systems.net)—on replication, fault tolerance, and designing systems without a single point of failure.

FIGURE 3.2

The single point of failure versus distribution



Trust shifts: not "this person behind the glass"—
but verifiable rules that everyone follows alike.

The star fails as a whole, the network node by node.

ously: is the neighbor alive, is it lying, is it keeping up. If one starts to fail, the others notice on their own and stop relying on it. Automatically. Without a boss who comes and punishes. The idea that a system survives only while it constantly hears itself is, in fact, an entire science—cybernetics, invented back in the 1940s.²³ My officer had no feedback whatsoever. Not one of his bad days ever came back to him as a consequence. In a well-designed system, feedback is built into the foundation.

Here it is important not to be fooled. Distribution is **not** anarchy and not the absence of rules. On the contrary, there are even more rules, and here is why: everything that used to live in the head of the keeper of the window (“depends how I look at it,” “what I’ll ask,” “whom I’ll hold back”) has to be written out explicitly, case by case, exception by exception. Discretion, after all, is not a surplus of power on top of the rules but a deficit of the rules themselves: where the rule is left unwritten, mood decides. The examples are all around. The e-gates at airport passport control: the face is matched against the chip, and the panels open without asking about your name or the color of your cover; there are more rules inside that procedure than in “talk to the officer”—they are just all written down and the same for everyone. The ATM versus the teller: it hands out money to anyone who enters the right code, and it is never in a bad mood. The traffic light versus the traffic cop: the light’s rule-book is stricter, which is exactly why an intersection with a light is predictable. A written rule can be read in advance, checked, and contested. A mood cannot. Now picture a border built like those gates rather than like that window: all the necessary information travels with you instead of living in someone’s head, and any inspector will apply one and the same rule to it. No one “decides your fate.” The system executes a clear procedure,

²³ Norbert Wiener, *Cybernetics: Or Control and Communication in the Animal and the Machine*, 1948. The foundational work on the role of feedback in control and in the stability of systems.

known to you in advance. Exactly how to achieve this technically, without sliding into a new and even worse centralization, is a separate big conversation, and we will get to it in the second half of the book. For now, it is enough to see that the alternative exists and that it is not science fiction.

Stop Hunting for Villains—Read the Architecture

Now for the main shift of the optic.

My officer was not a cartoon villain. He was a node that behaved exactly the way the architecture rewarded. Give one man unlimited power over another man's day and give him no feedback whatsoever, and you will get arbitrary, mood-dependent behavior from almost anyone you seat in that chair. Change the man, keep the architecture—you get the same result with a new face.

This is where the epigraph of this chapter kicks in. “Every system is perfectly designed to get the results it gets.” That is not pessimism. It is a diagnosis. If a system consistently produces rudeness at the border, cronyism in the courts, or poverty amid plenty, then that is what it is designed for—not by evil intent, but by the fact of how it is built. (Incidentally, the phrase itself is a fine example of what this book is about: for decades it has been attributed to the famous W. Edwards Deming, because that sounds more respectable, although another man said it. Even quotations behave like systems—they migrate to where it is more comfortable for them, not to where the truth is.²⁴)

In life it looks like this. A reformer arrives, jails the previous

²⁴ The phrase “Every system is perfectly designed to get the results it gets” is documented as belonging to Paul Batalden (who adapted an earlier idea of Arthur Jones’s); in public circulation it is most often misattributed to W. Edwards Deming and Donald Berwick. See: Institute for Healthcare Improvement, “Like Magic? (‘Every system is perfectly designed...’); Susan Carr, *Patient Safety & Quality Healthcare*, “A Quotation with a Life of Its Own.”

“thief,” promises that now things will be different. A year or two passes. And the new man in the same seat behaves suspiciously like the old one. The people throw up their hands: “they’re all the same.” But the point is not that all people are equally bad. The point is that the chair stayed the same: the same unchecked power, the same closeness to the flow of money, the same impunity, the same absence of a second window. The chair molds the man faster than the man can change the chair. That is why swapping faces without swapping the blueprint is not reform. It is replacing light bulbs during a short circuit: the lights will keep going out again and again until somebody gets to the wiring. There is even an engineering law about this—Melvin Conway’s observation: systems inevitably copy the structure of those who build them.²⁵ If you want to understand why an agency works the way it does, look not at the faces but at how it is built and what it rewards.

At that border I did not become a hero. I did what any user does when he runs into a badly designed system: I found an input that suited it. I put together for the officer a set of answers after which it was easier for him to let me go than to keep me—and drove off as fast as decency and the suspension allowed. I did not out-argue the system. I went around it. That is exactly what millions of people do every day: they go around bad systems instead of fixing them, because they are given no lever to fix them with. And every such detour is a small piece of evidence that the node is designed wrong.

²⁵ Melvin E. Conway, “How Do Committees Invent?,” *Datamation*, 1968. “Conway’s law”: organizations that design systems “are constrained to produce designs which are copies of the communication structures of these organizations.”

A Small System of the Right Breed

So that none of this sounds like a pretty abstraction, let me tell you about a system I once built myself—tiny, but of that very breed, the right one.

2015, Baku, the first European Games—the debut continental multi-sport event, held from June 12 to 28; about six thousand athletes from some fifty countries.²⁶ Hundreds of foreign delegations converge on the city at once, and each brings its equipment: walkie-talkies, wireless microphones, cameras, transmitters—everything that wants to occupy the same radio frequencies. And the number of frequencies is limited. If two delegations go on air on the same wavelength, both get interference: at best, a crackle in an earpiece; at worst, a commentator's dead microphone during the live broadcast of the opening ceremony, with all of Europe watching. Someone has to divide up the radio spectrum so that no one collides with anyone.

I was working on contract in the team that built the system for this allocation: record-keeping, control, and work “in the field”—a mobile app, QR-code scanning, equipment checks right on the spot. And here is what was right about it. Decisions were not made by one tired man behind glass, by mood, each case by hand. They were made by rules and by a shared, verifiable registry: who had been allotted which frequency, who had already taken what, where there was room. Any operator in the field could check and act on his own, because all the necessary information traveled with the task instead of being stored in a boss's head. Hundreds of independent participants coordinated without a single person as the bottleneck.

The mark of good infrastructure is that nobody notices

²⁶ Baku 2015 European Games—the first European Games, June 12–28, 2015, Baku; about 6,000 athletes from 50 countries. Association of National Olympic Committees (ANOC) / European Olympic Committees (EOC).

it. The opening ceremony went by, the microphones did not crackle, and no one in the stadium gave a thought to the system quietly working somewhere that had just sorted hundreds of transmitters onto their frequencies without a single scandal. A bad system is visible to everyone—it is that superfluous man who, for some reason, was handed your passport. A good one is visible to no one. Compare the two scenes: the border—one man, his mood, his discretion, and no way to check or appeal; the Games—rules, a shared verifiable registry, and not one window whose mood is load-bearing. Both are the management of a scarce resource—which is to say, at bottom, governance. Only one of them scales, survives the replacement of any employee, and treats you the same whoever is on shift—while the other flips a coin every time.

Where the Title Comes Together

And now the title of the book comes together too.

Stateless is, on the one hand, that very software pattern: a system that does not keep your state in one irreplaceable node. And on the other, it is “without a state”—without belonging to one. The bet of this book is that the second has a great deal to learn from the first. That a society is, in principle, capable of keeping its rules without keeping a single trusted window whose mood turns out to be the load-bearing structure of your life.

It sounds utopian—right up until you notice that pieces of it already exist. I, for one, hold Estonian e-residency: in 2014, Estonia became the first country in the world to start issuing a verifiable digital identity to people who are not its residents and who, for the most part, have never been there.²⁷ Part of my

²⁷ e-Residency of Estonia—a cross-border digital identity program launched on December 1, 2014; Estonia became the first country to offer a digital identity to non-citizens. Republic of Estonia, e-resident.gov.ee.

“statehood” (in the paperwork-and-business sense) runs on the server of a country where I have lived about half a year in total and of which I have never been a resident. This is not the whole answer, and no cause for rapture. But it is a hairline crack of the future, already breaking through into the present.

And still—before you redesign a system, you read it. No one in his right mind rewrites from scratch a mechanism he does not understand: first you work out what inside it is load-bearing and what is simply old and holding on out of habit. So the book’s next movement is exactly that kind of reading. We will open the legacy code of power and walk through it layer by layer: power, money, information, faith. Not to admire it. To understand it well enough that it becomes visible which beams hold up the whole structure and which can be taken out.

And as I drove away from that checkpoint outside Kursk, I was thinking exactly one thought, which is the right one to carry into this reading: no human being should be anyone’s single point of failure. Not at a border, not in a country, not in a life.

Chapter 4. Power: The Monopoly on Violence

“A state is a human community that (successfully) claims the monopoly of the legitimate use of physical force within a given territory.” — Max Weber²⁸

Take any rule you live by and trace it all the way down.

A parking ticket. A slip of paper under the wiper, the sum about the price of a dinner out. You decide not to pay: small stuff, it will be forgotten. It is not forgotten. A reminder arrives, and the sum creeps up. Then a sterner letter, with a mention of court. You put that off too. A court ruling arrives—the one you never showed up to contest. Now you have not a fine but a debt. And people come for it who are permitted to inventory your property. If you stand in the doorway and do not let them in, other people will arrive who are permitted to move you aside physically. And if you raise a hand against them, the last and main thing comes out: the law is on their side, and under it they may use force on you, and you may not use force on them.

Beneath the petty parking slip, if you dig to the bottom, lies a man with a club, and the state has permitted him to use that club. And he lies beneath every other rule too—beneath taxes,

²⁸ Max Weber, “Politik als Beruf” (lecture, Munich, 1919; first published Munich and Leipzig: Duncker & Humblot, 1919). In the original, the definition carries Weber’s own mid-sentence aside—that the “territory” is itself part of the criterion—which the epigraph omits. German original: “...das Monopol legitimer physischer Gewaltsamkeit für sich (mit Erfolg) beansprucht.” The epigraph follows the standard English translation by Gerth & Mills (*From Max Weber*, 1946): “a state is a human community that (successfully) claims the monopoly of the legitimate use of physical force within a given territory.”

beneath borders, beneath verdicts, beneath the school curriculum. Most of your life you do not see him, the way you do not see a house's foundation. But he is what holds it all up.

That man with a club at the very bottom is the first load-bearing node of the whole structure, the one every other part of it reduces to: **the state is the only authority permitted to use force on you and to call it lawful.** Not “the one that uses force”—a robber can use force. The one that is *permitted* to, and permitted alone.

The Definition No One Has Improved in a Hundred Years

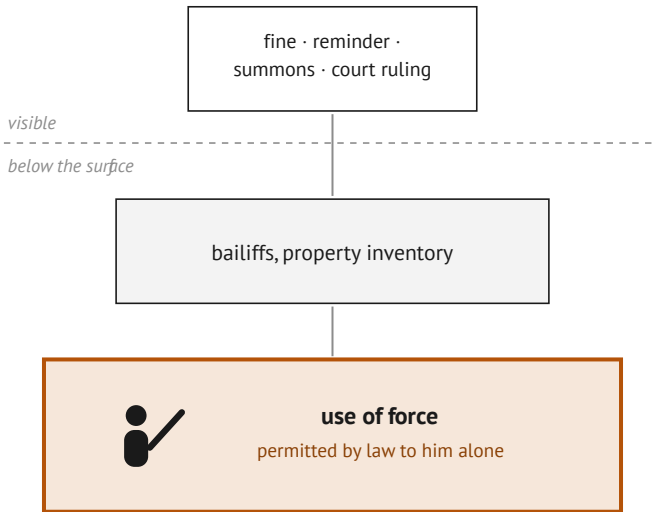
A hundred years ago Max Weber formulated this with an engineer's dryness—a sociologist whose definition of the state no one since has managed to refute or replace. The state, he wrote, is a human community that claims, and claims successfully, the monopoly of legitimate physical violence within a given territory.²⁹ The sentence seems dryish and academic. In fact the entire mechanics of power is hidden inside it, and it is worth taking it apart word by word.

“Community,” not a person. The state is not the president and not an official but a structure that outlives anyone sitting in it. The people in the chairs change; the structure stays. We saw this already in chapter three: change the face, keep the chair—you get the same result under a new name.

²⁹ Max Weber, “Politik als Beruf” (lecture, Munich, 1919; first published Munich and Leipzig: Duncker & Humblot, 1919). In the original, the definition carries Weber's own mid-sentence aside—that the “territory” is itself part of the criterion—which the epigraph omits. German original: “...das Monopol legitimer physischer Gewaltsamkeit für sich (mit Erfolg) beansprucht.” The epigraph follows the standard English translation by Gerth & Mills (*From Max Weber*, 1946): “a state is a human community that (successfully) claims the monopoly of the legitimate use of physical force within a given territory.”

FIGURE 4.1

What lies beneath the slip of paper



Only the tip shows—the bottom layer holds it all.

*Remove the bottom layer—and the upper papers
become just papers.*

FIGURE 4.2

Weber's definition, word by word

"A state is a human **community**¹,
which (successfully) claims the **monopoly**³
of the **legitimate**⁴
use of physical force⁵ within a given **territory**²."

Max Weber, 1919

- ① **community** — a structure, not a person
- ② **within a given territory** — inside borders
- ③ **monopoly** — it alone, no competitors
- ④ **legitimate** — a recognized right, not a line in a law
- ⑤ **force** — bottom layer (see 4.1)

Five words, all load-bearing; not one is decorative.

“Violence”—the bottommost layer. This does not mean the state beats you daily. Like the gold reserve behind paper money, force lies at the foundation and backs everything else, while remaining, in normal life, only a promise. You pay your tax not because a soldier has been posted at your side but because everyone understands how systematic refusal ends. Force almost always works without appearing—which is exactly why it is so easy not to notice.

And here Weber makes a move that most people miss. The state, he says, cannot be defined by its ends. Almost any conceivable task (from building roads to caring for souls) has at some point been taken up by some state order or other. And there is not a single task that has belonged to the state always and to it alone. It can be defined only through its specific *means*: physical violence.³⁰ The state is not “the thing that cares for people,” and not “the thing that collects taxes.” It is the thing that stands, in the last instance, behind all of that with the right to force.

“Monopoly”—it and it alone. The word is borrowed from economics. A monopoly is a sole supplier with no competitors. One territory cannot hold two armies and two tax services contesting you in earnest. Where there are two, a civil war is on. And it lasts exactly until one swallows the other. The state by definition strives to remain the sole holder of force and does not tolerate private bearers of it: not your neighbor’s militia, not your right to blood vengeance, not the duel.

“Legitimate”—the subtlest word in the definition. The difference between a robber and a tax inspector is not that

³⁰ Ibid. Weber stipulates specifically that the state cannot be defined by the content of its tasks: almost every task has at some time been taken on by some political association, and there is none that would be exclusively “state” business. The state can be defined only through its specific means—physical violence. From the same lecture, his second formula: the state is “a relation of men dominating men, a relation supported by means of legitimate... violence.”

one takes your money and the other does not: both take it. The difference is in the recognition of the right. Robbery is force without a mandate; a tax is force that a large enough number of people have agreed to count as lawful. Legitimacy is the invisible license without which the monopoly on violence would be simply the biggest gang in the neighborhood.³¹ And note: lawfulness here is not the same as what is written in the law. You can act strictly by the law and lose legitimacy; you can break the letter and keep it. It lives not in the legal code but in heads—in a quiet common consent to recognize this right.

“Within a territory”—inside borders. Inside the line there is one monopoly, and here it is master. Beyond the line is another, and to the first that one is foreign. What happens in the gap between them, where there is no common master at all, is a separate and far harsher conversation, and we will put it off until chapter six.

Why This Is Not Villainy but a Solution

Here it is easy to yield to temptation and read all of the above as an indictment: see, at the foundation of the state—a club. But we are engineers, not prosecutors, and we are obliged to see what problem this structure solves. And it solves a real and heavy one.

Imagine a territory where there is no monopoly. Force is used by everyone capable of it—and each by his own right. The neighbor is stronger—then the neighbor is right. You are wronged—you avenge yourself as best you can, and the offender’s relatives avenge themselves on you in return, and

³¹ The distinction between legitimacy and legality is essential here: legitimacy is a right’s being recognized (in people’s heads), not its being written into law. Per Weber, legitimate domination has three “pure” types—traditional (it has always been so), charismatic (behind the leader), and rational-legal (by established rules). See: Max Weber, *Wirtschaft und Gesellschaft* (*Economy and Society*).

so on with no bottom. This is not a fantasy: most of human history lived that way, and philosophers long ago gave it a name. Hobbes called this condition the war of all against all—a world in which the life of man is “solitary, poor, nasty, brutish, and short.”³² There is one way out of it: everyone puts their private right to violence into one common till and agrees that only it may be drawn from. You give up avenging yourself—in return you get a court. You hand over the right to your fist—you get a promise that your neighbor handed over his.

This is exactly the same centralization as in chapter three—only here it is justified. Some functions really are cheaper and safer to keep in one place than to smear across everyone. We do not want a thousand private armies, just as we do not want every man repairing his own traffic lights. The monopoly on violence, in this sense, is not a bug but a feature. A brilliant invention, at bottom: replace a million smoldering private wars with one common arbiter.

With one proviso, and the whole book hides in it. The monopoly is a feature exactly as long as it does what it is tolerated for.

The Catch That Has a Name

Now recall how chapter three ended. Every irreplaceable node has a built-in disease, and the more important the node, the more dangerous the disease.

The monopoly on violence is an irreplaceable node in the superlative degree. As extreme as they come. Which means everything we said about the single point of failure applies

³² Thomas Hobbes, *Leviathan* (1651): without a common power to keep them all in awe, men remain in a “war of all against all” (*bellum omnium contra omnes*), where the life of man is “solitary, poor, nasty, brutish, and short.” The state (the Leviathan) arises as an agreement to transfer the private right to violence to a common sovereign in exchange for safety.

to it at the maximum dose. Recall the two levers by which, per Hirschman, systems get repaired: “exit”—leave for a competitor—and “voice”—complain so that you are heard.³³ Now hold them up to the state’s monopoly on force. “Exit”? You cannot hire a competing police force for your street or plug into somebody else’s justice. The only exit available is called emigration. It is the most expensive and difficult exit in existence: abandon the country whole. “Voice”? Complaints about the monopoly have to be filed with the monopoly itself. The claim is reviewed by the very party it is brought against.

What emerges is a disturbing thing. The service that has the most power over you (the right to force itself) is built so that structurally it almost never has to answer to you. This is the same failure class as the border officer from chapter three: power concentrated, feedback absent. Only there it was one man for one day, and here it is the entire monopoly, for your entire life.

Take a case simpler than the border. A police officer overdoes it: detains the wrong man, hits him, shakes money out of him over nothing. Where does the complaint go? Most often into the same system: the actions of the police are investigated by the police. The competitor you would take your demand for law and order to does not exist—law and order on this street comes in one copy. And the medicine, by the way, is known and costs little: independent oversight that actually bites; body cameras; a complaints channel that does not lead to the desk of the accused’s colleagues. All of it was invented long ago and works somewhere. Where it is absent, the problem is not a shortage of engineers. Nobody obliged the monopoly to install it—that is

³³ Albert O. Hirschman, *Exit, Voice, and Loyalty* (1970)—introduced in Ch. 3. Systems are disciplined by “exit” (leaving for an alternative) and “voice” (voicing discontent with consequences); a monopoly deprives a person of both. Here is the limiting case: the monopoly on force itself shuts both levers almost completely.

all. Power is there; the incentive to fix is not.

And here is the key conclusion the whole chapter was worth building toward. When a system behaves badly, we look out of habit for a villain—a bad minister, a greedy chief, a heartless clerk. But more often the trouble is not villainy. Very often the repair is obvious and costs almost nothing: a second window, a real chance to appeal, an independent check. The trouble is that the monopoly has power but no incentive to repair. There is no competitor you would leave for. There is no feedback that comes back and hurts. Which means bad behavior holds not because monsters sit at the top, but because there is no force at all that would make them stop. Stop asking “why are they evil”—ask differently: “what, in this structure, could even stop them?” And too often the honest answer is “nothing.”

When the Soft Layer Comes Off

One consequence remains, and it locks this chapter to the first.

Legitimacy is the soft layer that makes the hard monopoly bearable. Look how much rests on consent alone, without a single soldier in the frame. Millions of people pay taxes without once seeing an armed man at their door: not because each was coerced one by one, but because the majority recognizes the state’s right to collect. Force is at the foundation here too (try not paying, seriously and in the open, and you will meet it), but in ordinary life it is not needed; consent does its work. That consent saves literally everything: no treasury would survive the cost of forcing the tax out of each person separately. As long as enough people recognize the power as their own, violence sleeps in the basement, remaining a promise; what comes out are the soft instruments—law, court, habit.

But legitimacy lives not in the legal code but in heads. It can be lost. And when people stop recognizing the power as their

own (when the soft layer comes off), the monopoly is left with only its foundation: bare force.

That is when the state fetches from the basement what it usually hides. Not because especially evil people suddenly ended up at the top, but because a power that has lost legitimacy simply has no other instruments left. This is exactly what you saw in the first chapter. The center, with power in the republic draining out of its hands, did not reach for negotiations, or a concession, or elections. It reached straight for the army, because the army was the only thing it had that still worked reliably. The less legitimacy a power has, the harder it must lean on pure violence. This is not the wicked temper of particular rulers. It is a property of the structure: when the soft layer wears through, the hard one is laid bare, and there is nothing else underneath.

Here too is the answer to why a monopoly manages to hold on so long at all, even a bad one. It did not fall from the sky ready-made. It was assembled over centuries by absorbing and knocking out all the private bearers of force: barons with their retinues, duelists, blood avengers, robber roads. Historians describe the process without romance. The state monopolized violence roughly the way the strongest racket in the neighborhood “cleans out” the rest and remains alone.³⁴ This matters not so as to brand it, but so as to remember: the monopoly on violence is not an eternal law of nature. It is a structure that people assembled, in a specific history, for a specific task. And if it was assembled, then in principle one may ask whether it could be assembled differently. That question belongs to the second half of the book; for now we are still reading the blueprint as it is.

³⁴ Charles Tilly, “War Making and State Making as Organized Crime” (in *Bringing the State Back In*, 1985) and *Coercion, Capital, and European States, AD 990–1990* (1990): state formation is described as a monopolization of violence structurally akin to a protection racket—eliminating the competing bearers of force and making oneself the only one. The monopoly on violence is a historically assembled structure, not a natural given.

The Second Monopoly, Quieter Than the First

Violence is the state's first monopoly and the most visible one. You can tell it by the uniform, the weapons, the dress coat; it is easy to think about because it is crude and graphic. But alongside it works a second monopoly, quieter and craftier. It reaches you every day without sending a single soldier—through the digits in your account and the price tag in the store. It is backed by the same force in the basement (try seriously refusing to pay your taxes in it, and you will meet the same club), but the monopoly itself is soft, made of paper, almost invisible.

Money is a monopoly too. And also a protocol we never chose. Time to read its source code.

Chapter 5. Money: The Protocol We Never Chose

“By a continuing process of inflation, governments can confiscate, secretly and unobserved, an important part of the wealth of their citizens.” — John Maynard Keynes³⁵

Take a bill out of your wallet and ask yourself: why is it worth anything at all?

The paper is nothing special, the picture is an acquired taste, and by itself it will neither feed you nor keep you warm. It is worth something for exactly one reason: everyone around you has agreed to accept it, and the state has promised that tomorrow will be the same. Nobody asked for your consent to this system. You were born inside it, the way people are born inside a language. At some point you simply discovered that your labor, your time, and the sleep you went without turn into these particular units, and that you have no other units.

In chapter two, a man fell asleep with his savings and woke up without half of them—in a single morning, because the rate was let go. Back then we walked along the wire from a distant office to his kitchen. Now let’s step back and look at the wire itself—at money. Because money is not just the thing wealth is

³⁵ John Maynard Keynes, *The Economic Consequences of the Peace* (1919), ch. VI, “Europe after the Treaty.” The original reads: “By a continuing process of inflation, governments can confiscate, secretly and unobserved, an important part of the wealth of their citizens... There is no subtler, no surer means of overturning the existing basis of society than to debauch the currency. The process engages all the hidden forces of economic law on the side of destruction, and does it in a manner which not one man in a million is able to diagnose.” The opening is preceded by a remark about Lenin: “the best way to destroy the Capitalist System was to debauch the currency.” The epigraph gives the first sentence.

measured in. It is a system, a protocol by which wealth moves. And that protocol you never chose and cannot switch off.

What Money Really Is

The word “protocol” is not here for decoration. A protocol is an agreed set of rules by which the parts of a system understand one another. Language is a protocol between people. There are protocols by which computers come to terms with each other. Money is a protocol for transferring value. It has three jobs, and they are worth naming separately, because we are used to lumping them together. Money is a measure (what to count in, what costs what), a medium of exchange (how to pass value along without hauling a sack of potatoes), and a store (how to set labor aside for later). One thing does all three jobs at once, which is why it seems like something simple and natural.

To feel that this is a protocol and not nature, imagine exchange without money. Then a deal is possible only when wants coincide: to get boots for your grain, you need to find a cobbler who needs exactly your grain, exactly now. Economists call this the double coincidence of wants—and it almost never happens.³⁶ Money is the workaround: a universal go-between that everyone agrees to accept, so that nobody has to hunt for the impossible match. Which means money was an agreement from the very start; a technology invented for a specific task. And if it is a technology, it has versions, owners, and bugs, like any other.

Now for what wrecks the illusion of simplicity. Almost all

³⁶ Money solves the problem of the “double coincidence of wants”: in direct exchange, a deal is possible only when two people simultaneously have exactly what the other needs. The concept goes back to W. S. Jevons, *Money and the Mechanism of Exchange* (1875). A caveat: anthropologists (e.g., D. Graeber, *Debt: The First 5,000 Years*, 2011) dispute that money historically grew out of barter; but as a description of the function money performs, the coincidence-of-wants argument stands.

the money you use is not bills. It is numbers in banks' databases. And here is the detail that surprises nearly everyone who hears it for the first time: those numbers are not created by a government printing press. Most of the money in a modern economy is created by ordinary commercial banks—by an entry in an account, at the moment they issue a loan. Cash, against that background, is small change: by British count, around three percent of all money, and the other ninety-seven exist only as lines in bank ledgers.³⁷

It sounds like a conspiracy theory. So let me cite the source itself. The Bank of England, a central bank hard to suspect of radicalism, spelled this out in so many words in its Quarterly Bulletin in 2014: banks do not lend out other people's savings, and they do not "multiply up" central bank money. Every new loan creates a new deposit of its own.³⁸ Three years later the Bundesbank wrote the same thing, almost word for word: a bank creates money at the stroke of a key, and this does not depend on whether anyone's deposits are already sitting with

³⁷ Bank of England, Quarterly Bulletin 2014 Q1: M. McLeay, A. Radia, R. Thomas, "Money creation in the modern economy." Most of the money in a modern economy is created by commercial banks at the moment they issue a loan (by an entry in an account), not by the central bank; banks do not lend out other people's savings and do not "multiply up" central bank money, and the widespread textbook "money multiplier" model describes the process incorrectly. According to the same source, cash is only a small share of the money supply (on the order of 3% in the United Kingdom); the rest exists as deposit entries.

³⁸ Bank of England, Quarterly Bulletin 2014 Q1: M. McLeay, A. Radia, R. Thomas, "Money creation in the modern economy." Most of the money in a modern economy is created by commercial banks at the moment they issue a loan (by an entry in an account), not by the central bank; banks do not lend out other people's savings and do not "multiply up" central bank money, and the widespread textbook "money multiplier" model describes the process incorrectly. According to the same source, cash is only a small share of the money supply (on the order of 3% in the United Kingdom); the rest exists as deposit entries.

it.³⁹

Let's take it apart on a mortgage, step by step. It is simpler than it looks. You come in for a loan on an apartment. The bank does not take other people's savings out of the vault, and it does not call its depositors for permission. It makes two entries at once. In your account, say, a hundred thousand appears—that is your new deposit, your money. And in the column “loan issued to you” the same hundred thousand appears—that is the bank's claim on you. A minute ago this money did not exist in the world. Now it does. Nothing was moved from one pocket to another—a new entry was created out of nothing. And when you pay the loan off, both entries collapse, and the money vanishes the same way. Money is not a thing in a vault but a line in a ledger that gets opened and closed. The schoolbook picture, where the bank carefully lends out what has been saved up, is a myth; the truth is arranged far more strangely.

We will need this design again: new units of the protocol appear as someone's debt, and they appear not where you are but with those who are closer to the tap.

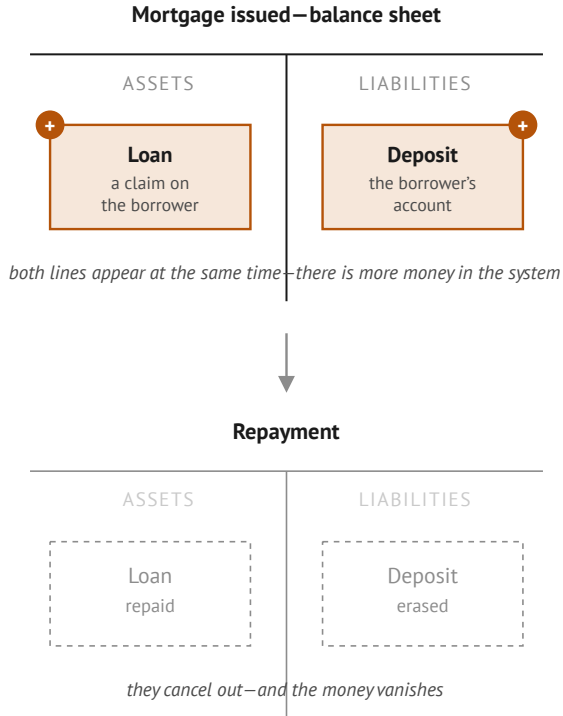
And the most curious part began literally just now. For hundreds of years the state held the right to issue “real” money in a death grip. But in 2025 the United States passed a law with the self-assured name GENIUS. For the first time it officially allowed private players—banks and approved companies—to issue their own stablecoins pegged to the dollar: digital money the state agrees to recognize even though it is not the one printing it.⁴⁰ The caveat matters: such a stablecoin must be backed

³⁹ Deutsche Bundesbank, Monthly Report, April 2017: “The role of banks, non-banks and the central bank in the money creation process.” A second major central bank confirms the same thing: a bank creates money by an accounting entry (at the stroke of a key), and its ability to issue a loan does not depend on whether it holds other people's deposits (“loans create deposits”). It directly refutes the textbook picture of the bank as an intermediary.

⁴⁰ The GENIUS Act (Guiding and Establishing National Innovation for

FIGURE 5.1

Creating money out of nothing



Issuing a loan creates money; repaying it destroys money.

one hundred percent by reserves—real dollars and short-term U.S. Treasuries—so this is not yet “money out of nothing” the way a bank loan is. But the gesture itself is telling: the exclusive right to dollar money, which for centuries belonged to the state alone, has for the first time been cracked open to the outside. The first hairline crack in that very second monopoly—we will come back to it in the second half of the book, when the talk turns to money without a single center.

The Quiet Tax Nobody Voted For

If there are more units, and no more goods and services, then every unit starts to be worth less. That is inflation, and it is not a force of nature but a redistribution. A quiet one, with no receipt. Value drains away from everyone holding the old units (from those who saved, who draw a salary, who put something aside for a rainy day) toward those who issue the new units and spend them first. And toward debtors: their debt, in real weight, shrinks.

This was named a century ago. Keynes (not, by the way, an opponent of the state, but a man who spent his whole life thinking about how to use it) wrote it straight out: by a continuing process of inflation, a government can confiscate, secretly and unobserved, an important part of the wealth of its citizens, and it does so in a manner that not one man in a million is able to di-

U.S. Stablecoins Act), signed into law in the United States on July 18, 2025. For the first time it created a federal regime for dollar-pegged payment stablecoins: banks (through subsidiaries) and approved non-bank issuers are permitted to issue them on condition of 100-percent backing by reserves of cash and short-term U.S. Treasuries. Paying interest to stablecoin holders is prohibited. The regime does not take effect at once: exchanges and custodians are allowed to trade stablecoins from “non-permitted” issuers until July 2028, so at the time of writing the monopoly is broken in law but not yet in fact. Sources: Congress.gov, S.1582 (119th Congress); Federal Register, “GENIUS Act Implementation” (2025).

agnose.⁴¹ Think about it: this is a tax. Only a tax that was never passed into law, never put to a vote, and never mailed to you in an envelope. The bill comes without a return address. Exactly like the devaluation in chapter two—the same mechanics, only sped up. Prices just “went up for some reason,” and who raised them cannot be seen in the passive voice.

If this seems abstract, ask your elders. In Russia, on January 2, 1992, prices were set free all at once. Over that year they rose roughly twenty-five-fold: inflation above 2,500 percent.⁴² In a matter of months, the savings families had put aside for decades—for an apartment, for a car, for a funeral—turned into nothing: by some estimates, around 99 percent of what sat in passbook accounts dissolved. Nobody walked into the apartments and carried the money out. There was no need to carry it out. It was enough to devalue the unit it was kept in. A whole generation across the post-Soviet space learned the hard way what Keynes had described as nearly a theorem: the money you entrusted your labor to stays yours exactly as long as whoever controls it agrees to consider it yours.

In our parts, this quiet tax has a loud relative—devaluation.

⁴¹ John Maynard Keynes, *The Economic Consequences of the Peace* (1919), ch. VI, “Europe after the Treaty.” The original reads: “By a continuing process of inflation, governments can confiscate, secretly and unobserved, an important part of the wealth of their citizens... There is no subtler, no surer means of overturning the existing basis of society than to debauch the currency. The process engages all the hidden forces of economic law on the side of destruction, and does it in a manner which not one man in a million is able to diagnose.” The opening is preceded by a remark about Lenin: “the best way to destroy the Capitalist System was to debauch the currency.” The epigraph gives the first sentence.

⁴² Russia, 1992: prices were set free on January 2; by year’s end consumer prices had risen roughly 25-fold (inflation $\approx$ 2,509%). Citizens’ savings in Sberbank, accumulated over decades, lost almost all their value within a few months (estimates run as high as $\sim$ 99%). Sources: “Economic history of the Russian Federation” (a compilation of data); TASS, “Key facts about the ’90s price liberalization in Russia”; IMF Working Paper, “Price Liberalization in Russia” (1992).

The manat in 2015, the hryvnia a year earlier: the unit you kept your savings in came to weigh half as much in a single morning, and imports got pricier first. The mechanism is one and the same (devalue the unit everything is counted in); it is just that in some places it creeps along unnoticed for years, and in others it snaps overnight.

And notice how neatly this lies on top of the last chapter. Violence is the state's first monopoly; money is the second. The state reserves the exclusive right to issue "real" money (try printing your own—you will meet that same club from chapter four). And inflation is a way of collecting a tax through this monopoly without passing a single law. There is power, there is no feedback, and there is nobody to ask.

A Handful of People at the Tap

Who turns this tap? The central bank—a small committee of appointed people that decides how much money exists and what it costs to get (through the rate: the price at which money is passed on down the line). Those same "people in the office where you have never been" from chapter two. They are not necessarily villains; there are smart and conscientious people among them. But in terms of design, this is the single point of failure of the entire monetary system. One node sets a parameter on which the price of everything you own depends. And with the same hole in accountability we have already taken apart. You cannot leave for a competing currency on your own street. There is, in essence, nobody to complain to either. The complaint goes to the same office.

And one more injustice is wired into the sequence itself. New money enters the economy not everywhere at once but at a specific point (through banks, through those who are closer to the tap), and it reaches them first, at prices that have not yet risen. By the time the new mass gets to your

paycheck, prices will have had time to climb, and it will reach you already cheapened. Whoever is at the tap drinks clean water; whoever is at the end of the pipe gets it already diluted. Richard Cantillon described this effect back in the eighteenth century, and since then the effect has only grown stronger: the one closest to the source of new money is not you.⁴³

The School That Says “The Problem Is the Tap Itself”

There is an entire tradition of thought that looks at all this and says: the problem is not bad managers. The problem is the design itself. This is the Austrian school—Mises, Hayek. Its argument runs roughly like this: money handed over to a state monopoly will always lose value, because the temptation to print more is irresistible; cheap, man-made credit inflates bubbles that are bound to burst; and the only honest money is “hard” money, which the authorities cannot water down: gold, or a strictly limited supply.⁴⁴ Its loudest voice today is the president of Argentina, who came to power with a chainsaw as his symbol and a promise to tear down the central bank and the peso.⁴⁵

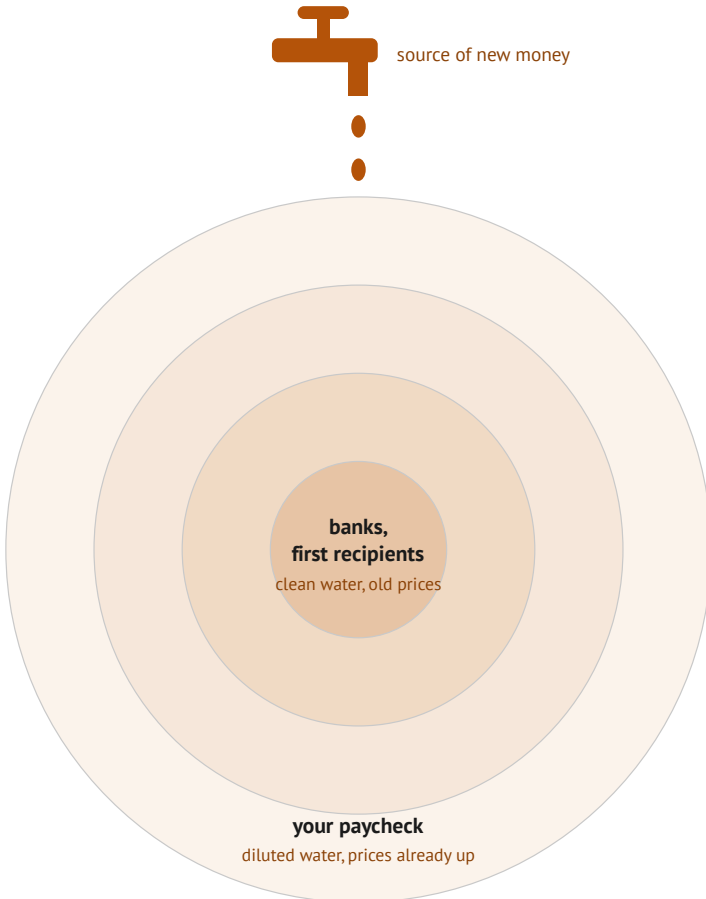
⁴³ The “Cantillon effect”: new money enters the economy at specific points and reaches the first recipients at prices that have not yet risen, while it arrives at those far from the source already devalued—issuance redistributes in favor of those closer to the source. Richard Cantillon, *Essai sur la nature du commerce en général* (written c. 1730, published 1755).

⁴⁴ The Austrian school of economics: Ludwig von Mises, *Human Action* (1949); Friedrich Hayek. Key for this chapter: the critique of fiat money and of the state monopoly on issuance; the theory of the business cycle (artificially cheap credit → malinvestment → inevitable crash); the ideal of “hard money” (gold or a strictly limited supply), which the authorities cannot debase.

⁴⁵ Javier Milei—president of Argentina (since December 2023), who calls himself an “anarcho-capitalist”; he campaigned with a chainsaw as the symbol of cutting the state down, promising to abolish the central bank

FIGURE 5.2

Cantillon's tap



*New money reaches you last,
new prices first.*

The observation here is correct: the incentive to print really is built into the structure, and those who save really are being quietly robbed—as we saw, even Keynes, the Austrians’ opponent, admitted as much.

But the dogma is not. “Hard money” has failures of its own, and heavy ones. A rigidly fixed supply cannot absorb shocks: when everyone rushes into cash at once, money that will not bend turns a downturn into a death spiral, because there is physically not enough of it to go around. The gold standard did not prevent the Great Depression. The economists who studied it showed the opposite: it spread the Depression and deepened it, and the countries that unhooked themselves from gold before the others were the ones that climbed out of it faster.⁴⁶ “Abolish the central bank” is no free lunch; it is a trade of one set of problems for another.

The engineer’s view cuts through the ideology. The trouble was never that “the central bank is evil.” The trouble is the same as everywhere else in this book: one unaccountable node sets a parameter on which everyone’s life depends. Fiat with a central bank is one answer to that, naive gold is another, and both are, in essence, a single point of failure, just with different ailments. Curiously, the most honest conclusion from the whole dispute was drawn by Hayek himself, toward the end of his life: maybe money should not be anyone’s monopoly at all—maybe currencies ought to compete, the way everything else competes.⁴⁷ To-

and dollarize the economy. Cited as a present-day popularizer of Austrian ideas, not as a partisan figure: what interests us is the monetary optics, not the politician.

⁴⁶ Barry Eichengreen, *Golden Fetters: The Gold Standard and the Great Depression, 1919–1939* (1992); see also Ben Bernanke’s work on the role of the gold standard. The finding of this research: the gold standard transmitted and aggravated the Great Depression between countries, and the states that abandoned the gold peg earlier recovered faster. An illustration of the fact that “hard money” has heavy failures of its own.

⁴⁷ Friedrich A. Hayek, *Denationalisation of Money* (1976): a proposal to

day that sounds wild. But it is the first point in our teardown where the disease itself and the future cure point in the same direction.

Beyond the Border There Is No Tap at All

Money is power within borders. And, like every power of the state, at the very bottom it rests on that same monopoly on violence: where taxes are paid in the official money, you will not be allowed to refuse to accept it.

But step across the border, and everything we have described dissolves. There is no world central bank there, no shared sheriff, no monopoly on violence of any kind that would keep order. There, between states, there is no architecture at all—naked anarchy. And it lives by laws that one historian described better than anyone two and a half thousand years ago, on the example of a small island that was offered a choice with no choice in it.

strip the state of its monopoly on money and allow free competition among private currencies. The late, radical conclusion of one of the century's greatest economists; it echoes the theme of "trust without a center" in the second half of the book.

Chapter 6. States in Anarchy

“The strong do what they can and the weak suffer what they must.” — Thucydides, the Melian Dialogue⁴⁸

Summer, 416 BC. An Athenian fleet approaches the small island of Melos. Melos had attacked no one; it simply wanted to stay out of someone else’s big war. The Athenians send negotiators, and the negotiators speak bluntly. We will argue about justice some other time. Right now the choice is simple: submit and pay tribute, or we erase you. The Melians try every move that seems reasonable to them: but this is unjust; the gods are on the side of the righteous; our Spartan kinsmen will stand up for us. The Athenians answer calmly and terribly. Justice in this world is discussed between equals in power; between the strong and the weak there is none—the strong do what they can and the weak suffer what they must. The gods? As far as we know, they too rule wherever they can, by the same law. The Spartans? They will not come.

Melos refused. The Athenians starved the island out, killed all the grown men, and sold the women and children into slavery.⁴⁹

⁴⁸ Thucydides, *History of the Peloponnesian War*, Book V, the Melian Dialogue (chs. 84–116); the famous formula is V.89 (416 BC). The epigraph gives it in R. Crawley’s translation: “the strong do what they can and the weak suffer what they must.” Athens offered neutral Melos a choice between submission and destruction; after the refusal, the grown men were executed and the women and children sold into slavery. Like Pericles’s speech (Ch. 2), the dialogue is a reconstruction by Thucydides, not a transcript.

⁴⁹ Thucydides, *History of the Peloponnesian War*, Book V, the Melian Dialogue (chs. 84–116); the famous formula is V.89 (416 BC). The epigraph gives it in R. Crawley’s translation: “the strong do what they can and

This scene is two and a half thousand years old, and it has not aged a day. Because it describes not wicked Athenians but a place without a master. The space between states, in which we live to this day.

The Void Above the Players

The whole road so far, we have been taking apart power inside borders. There, as we saw in the fourth chapter, at the very bottom lies the monopoly on violence: the single authority permitted to coerce, and for that reason holding the rules up, more or less. Inside a country you do not avenge yourself on your neighbor: the state takes that over for you. You do not go to war against the partner who cheated you—you go to court, and behind the court stands force. Leviathan, as Hobbes named this monster, ended the war of all against all by standing above all.

Now step past the border—and Leviathan ends. Between states there is nothing above them. No world government, no world police, no court that could come and compel a great power the way a bailiff compels a debtor. There are bodies that resemble them from the outside (the UN, tribunals, international law), but not one of them has the thing that makes power power: its own truncheon. They can condemn, ask, vote. Compel—no.

This condition has a precise name, and the name is not “chaos.” It is anarchy—literally “no rule,” the absence of a ruler above. That is how international politics is built, and those who look at it soberly take this position as the baseline. Above states there is no supreme authority. Each, in the last resort,

the weak suffer what they must.” Athens offered neutral Melos a choice between submission and destruction; after the refusal, the grown men were executed and the women and children sold into slavery. Like Pericles’s speech (Ch. 2), the dialogue is a reconstruction by Thucydides, not a transcript.

relies on itself.⁵⁰ Hobbes, who invented Leviathan for the inside, saw perfectly well that outside there is none: sovereigns, he wrote, always stand toward one another “in the state and posture of gladiators”—weapons at the ready, eyes riveted on the other’s hands.⁵¹ Inside borders, the war of all against all was extinguished. Between borders it simply never stopped—it quieted, hid under treaties and the smiles of ambassadors, but the foundation under it is the same one, the Melian one.

And if that is so, everything we said about weak nodes runs here at maximum power. Inside a country, a poorly protected person is at least somewhat covered by the law. Outside, only one thing protects: your own force, or the force of someone who agrees to stand up for you. Everything else is words. And what words are worth in such a world is best seen in one piece of paper that was signed within my own memory.

Paper Against Force

The year is 1994. Young Ukraine found itself holding the planet’s third-largest nuclear arsenal—almost two thousand strategic warheads that had fallen to it in the collapse of the USSR.⁵² In a world where there is no master above the players,

⁵⁰ “Anarchy” here is a term of international relations theory: the absence of a supreme authority above states (as opposed to “hierarchy” inside a state), not “chaos.” The classic formulation is Kenneth N. Waltz, *Theory of International Politics* (1979); see also John J. Mearsheimer, *The Tragedy of Great Power Politics* (2001).

⁵¹ Thomas Hobbes, *Leviathan* (1651), ch. XIII: even when the war “of all against all” inside states has been ended by the sovereign, the sovereigns themselves remain toward one another “in the state and posture of gladiators”—weapons at the ready. A direct continuation of the Hobbes conversation from Ch. 4.

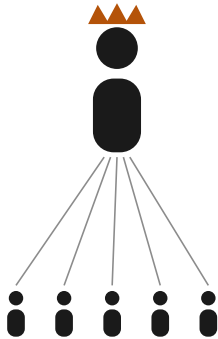
⁵² The Budapest Memorandum on Security Assurances was signed on December 5, 1994 (Ukraine, Russia, the US, the UK; separate identical memorandums also for Belarus and Kazakhstan). Ukraine gave up the world’s third-largest nuclear arsenal ($\approx 1,900$ strategic warheads plus

FIGURE 6.1

Inside borders and between them

Inside borders

above—Leviathan, the monopoly on violence



holds the rules and damps
"war of all against all"

Between states

above—no one



each, weapons at the ready,
"posture of gladiators"

The same scene—with a master and without.

Above citizens there is a Leviathan; above states, none.

that is the one argument everyone understands without translation. With someone able to answer with a nuclear strike, you do not talk the language of Athens. It comes out too expensive.

And Ukraine gave it up. Under pressure and for a promise. In December 1994, in Budapest, it agreed to ship everything nuclear to Russia for dismantlement. In exchange, Russia, the US, and Britain signed a memorandum: to respect its borders, not to threaten it with force, not to apply pressure.⁵³ Let me add a caveat, so as not to embellish. Kyiv did not hold the “button” in the pure sense: the command structure and the codes were inherited Soviet-Russian, and turning possession into a launch-ready arsenal would have cost years and money.⁵⁴ But the lever was colossal, and it was handed over. In exchange for what? Here is the most important detail of the whole story, and it is hidden in a single word.

Ukraine asked for guarantees. What it received were assurances. Two different words—*guarantee* versus *assurance*—and a chasm between them. A guarantee would mean that if trouble came, they would come and fight for you. An assurance means nothing of the kind—it is a polite promise of respect with

tactical ones), transferring it to Russia for dismantlement and joining the NPT as a non-nuclear state. Source: Arms Control Association, “Ukraine, Nuclear Weapons, and Security Assurances at a Glance.”

⁵³ The Budapest Memorandum on Security Assurances was signed on December 5, 1994 (Ukraine, Russia, the US, the UK; separate identical memorandums also for Belarus and Kazakhstan). Ukraine gave up the world’s third-largest nuclear arsenal ($\approx 1,900$ strategic warheads plus tactical ones), transferring it to Russia for dismantlement and joining the NPT as a non-nuclear state. Source: Arms Control Association, “Ukraine, Nuclear Weapons, and Security Assurances at a Glance.”

⁵⁴ An honest caveat, so as not to inflate “they gave away launch-ready missiles”: physical possession of the arsenal did not equal full operational control—command and codes were Soviet-Russian, and bringing the weapons to independent combat readiness would have taken time and money. [Stanford CISAC, “Budapest Memorandum Myths.”] This does not change the structural conclusion: a colossal lever was handed over for a political promise.

no enforcement mechanism underneath. The US and Britain knew what they were doing and deliberately did not put their names to the word “guarantee”: it would have obligated them to fight.⁵⁵ Ukraine was handed a paper that looked like a shield and was a sheet.

But here is the detail that usually gets left out, and it turns the whole story over. The memorandum was drawn up in three languages (English, Russian, and Ukrainian), and all three texts were declared equally authentic: no one of them outranks the others. Now: the English text says “assurances”—while the Ukrainian and Russian texts of the same document say “гарантії,” “гарантии,” a word that means guarantees and nothing but.⁵⁶ No one in his right mind was trading a nuclear arsenal for empty assurances. In the wording of the treaty that Ukraine held in its hands—by the letter, equal in force to the English—it was promised precisely guarantees. And when it came to the point, the strong side produced the version of the rules that suited it best. So in anarchy not only the enforcement but the very text of the rules is not stone but plasticine, and the one with more force does the molding.

How it ended, you know. In 2014 Russia took Crimea. In

⁵⁵ The key distinction: Ukraine sought guarantees and received assurances. The US and the UK deliberately avoided the word “guarantee,” since it would have implied an obligation to use military force in Ukraine’s defense. Sources: Harvard Kennedy School, “The Budapest Memorandum at 25: Between Past and Future”; Arms Control Association.

⁵⁶ The memorandum was drawn up in three equally authentic languages—English, Russian, and Ukrainian. The English text says “security assurances,” while the Ukrainian and Russian texts of the same document say “гарантії безпеки” / “гарантии безопасности”—a word that means precisely guarantees. The English version has no precedence over the others (equal legal force). The American side entered into the record a proviso that “guarantee” in the Slavic texts should be understood as “assurance”—but that is an interpretation, not an amendment of equally authentic texts. Sources: Lawfare, “Constructive Ambiguity of the Budapest Memorandum at 28”; mezha.net.

2022 it went for the whole country. One of the three who had signed “no threats of force” was the one who used force, and the other two did not come to fight for someone else’s border, as a guarantor would have come, because they had never promised to. Weapons they sent. But in crumbs, squeezing each system out of themselves over months and years, and every time with a glance over the shoulder—“don’t provoke him.” HIMARS rocket launchers were asked for in April 2022, given in June; long-range ATACMS missiles were asked for in the fall of 2022, given a year later; fighter jets were asked for from the spring of 2022, and the first came only in the summer of 2024. Each time at the moment the window was already closing.⁵⁷ Aid measured out so that the ward neither loses nor wins is not what a guarantor does. It is what a sympathetic onlooker does—one who swore no oath and therefore risks nothing but money. The memorandum held exactly as long as holding it was convenient for the strong side, and crumbled the second it became inconvenient. The conclusion is cold and offers no consolation: in anarchy a promise is worth exactly the force that stands behind it. A promise with no force behind it is worth nothing. Ukraine traded its only real deterrent for words, and the words evaporated.

Judge and Defendant in One Chair

Here you will surely object: but there is the UN, there is the Security Council, there is a whole machine built precisely

⁵⁷ The timeline of key systems (request → delivery), illustrating “aid by the drop, arriving late”: HIMARS—requested April 13, 2022, delivered June 23, 2022; ATACMS (long-range)—requested September 12, 2022, delivered October 17, 2023; F-16 fighters—requested from March 2022, approved in August 2023, first deliveries in the summer of 2024. Each delay was explained by fear of “escalation.” Sources: VoxUkraine, “The Cost of Hesitation”; Foreign Policy, “Biden’s Ukraine Support Record, From F-16s to ATACMS” (2024).

so that this would not happen. There is. Now look at how it is put together—because the design explains everything.

The Security Council is the only body that can authorize force against an aggressor. And in it, the five permanent members hold the right of veto: by one raised hand, any of them stops any decision. So when Russia invaded in 2022, the Council met, and eleven countries out of fifteen voted for a resolution against the invasion. And Russia, the very party being judged, vetoed the resolution.⁵⁸ The defendant sat in the judge's chair and acquitted himself. And note: knowing the outcome, the drafters had removed every genuinely coercive formulation from the text in advance—and the veto came anyway.

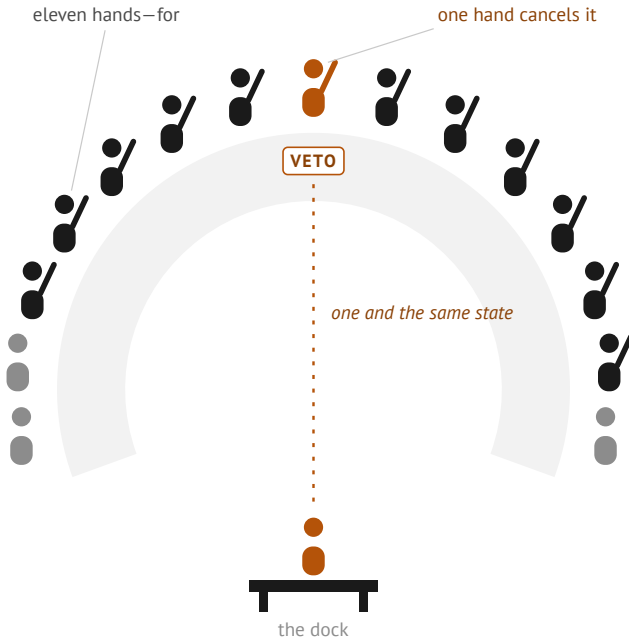
And this is the foundation of the system. The veto was written into the UN Charter in 1945 not through oversight: the great powers agreed to join only an organization that would never be able to compel them. Otherwise they simply would not have joined. In other words, the monopoly on violence that was more or less assembled over citizens inside countries was, at the international level, deliberately not built over the strongest. The UN is not a Leviathan above states; it is a negotiating room in which the five strongest hold a stop button. A useful room, one that has saved lives more than once. But if the strong one has decided to use force, it is not the authority that will stop him—it is the rostrum from which he will explain why he was right.

⁵⁸ On February 25, 2022, the UN Security Council voted on a draft resolution condemning Russia's invasion of Ukraine: 11 of 15 members in favor; China, India, and the UAE abstained; Russia—a permanent member and a party to the conflict—vetoed it. The reference to Chapter VII of the Charter (the coercive one) had been removed from the draft in advance and the wording softened. The veto right of the five permanent members (the US, Russia, the UK, France, China) was written into the UN Charter in 1945. Sources: UN Press SC/14808 (February 25, 2022); NPR, February 25, 2022.

FIGURE 6.2

Judge and defendant—one chair

UN Security Council



*A monopoly on violence was deliberately not built
above the strongest (UN Charter, 1945).*

My Side at the Lever

So that you do not take me for a man who divides the world into noble victims and vile aggressors, let me tell you about a second anarchy—one where I myself ended up on the strong side.

I am from Baku. For nearly my whole life a conflict smoldered over Nagorno-Karabakh—the one that textbooks of international relations cite as the model “frozen” conflict. The territory is Azerbaijani under international law; its population was mostly Armenian and had proclaimed an unrecognized republic. In the first war, at the turn of the 1980s and 1990s, the Armenian side won. And that war was not clean. In February 1992, in the Azerbaijani town of Khojaly, hundreds of civilians were killed in one night. Human Rights Watch called it the largest massacre of the conflict to that point and laid direct responsibility on the Karabakh Armenian forces.⁵⁹ Karabakh itself and seven adjacent Azerbaijani districts passed under Armenian control, and six hundred, maybe seven hundred thousand Azerbaijanis were driven out of them—driven out, exactly that, under threat of the same reprisal.⁶⁰

Then for thirty years “negotiations were under way.” It

⁵⁹ The Khojaly massacre, February 25–26, 1992: hundreds of civilians were killed in the Azerbaijani town of Khojaly. Human Rights Watch characterized it as “the largest massacre to date” of the Karabakh war and laid direct responsibility on the Karabakh Armenian forces; HRW’s estimate—at least 200 dead (possibly 500–1,000); the official Azerbaijani figure is 613 civilians. In Azerbaijan the events are called a genocide. Sources: Human Rights Watch; “Khojaly massacre” (compiled data).

⁶⁰ The First Karabakh War (late 1980s–1994): Nagorno-Karabakh and seven adjacent districts of Azerbaijan passed under the control of Armenian forces; hundreds of thousands of Azerbaijanis (estimates ~600–700 thousand) were forced to leave their lands. The 1994 ceasefire froze the conflict without a political settlement. Nagorno-Karabakh is internationally recognized as part of Azerbaijan; its Armenian population proclaimed the unrecognized “Republic of Artsakh.”

is worth a close look at who conducted them. The mediator was the OSCE Minsk Group, created specially for the purpose, which had not one lever of coercion—only persuasion. And among its co-chairs was Russia, a mediator in name only. Armenia's ally in a military bloc, with a base in the Armenian city of Gyumri, it was at the same time selling weapons to both sides. And the unhealed conflict itself it held as a lever over both capitals at once: frozen, it was more useful to Russia than settled.⁶¹ Resolutions were adopted, rounds were held, nothing moved. Not because the world did not care. Simply, above the two sides stood no one who both could and wanted to compel an ending. The “mediator” here was not a Leviathan above the fray but its most interested player.

And then the balance of force shifted. Azerbaijan invested in its army and bided its time. And took back its own: land that international law and any map of the world had all along counted as Azerbaijani. Forty-four days of war in the fall of 2020; one

⁶¹ The OSCE Minsk Group was created in 1992 to settle the Karabakh conflict; from 1997 its co-chairs were Russia, the US, and France. In nearly thirty years of work the group achieved no settlement: its mandate came down to mediation, without any mechanism of coercion. Russia was meanwhile a key player itself: Armenia's military ally in the CSTO, with the 102nd Russian military base in the Armenian city of Gyumri, it simultaneously supplied arms to both Armenia and Azerbaijan. After the 2020 war, Russia unilaterally introduced its own peacekeeping contingent into Nagorno-Karabakh ($\approx 2,000$ troops, 2020–2024) and controlled the implementation of the ceasefire; analysts note that the frozen status quo served Moscow as an instrument of influence over both capitals at once. The Minsk Group was formally dissolved on September 1, 2025, by a unanimous decision of the OSCE Ministerial Council—following a joint appeal by Armenia and Azerbaijan, signed by Pashinyan and Aliyev in Washington on August 8, 2025. Sources: RFE/RL, “Why The OSCE Minsk Group Is Ending”; Eurasianet, “The OSCE's Minsk Group: A unipolar artifact in a multipolar world”; Johns Hopkins, “Failed Mediation: Why the OSCE Minsk Group Cannot Mediate....”

day of military operation in September 2023.⁶² And here is a difference I am obliged to name so as not to swap one thing for another. Unlike in the nineties, no one drove the Armenians of Karabakh from their homes by force. After the capitulation, Baku officially announced that they could stay and take Azerbaijani citizenship. There were no eviction columns, no mass executions, no order to leave. And still almost the entire population, more than a hundred thousand people, packed up within days and left for Armenia—on their own, without stopping to test whether yesterday’s enemy’s promises could be believed. Part of the world called it ethnic cleansing; that is the exact word in the European Parliament’s resolution and in the Freedom House report.⁶³ The label, to my eye, is disputable: cleansing usually means expulsion by force, and here staying was offered, and people left on their own. But I will not paint the exodus rosy either: these people had no trust in Baku (after thirty years of enmity, a lost war, and a grinding blockade, it is hard to take yesterday’s enemy at his word), and fear did what no order did. Coercion in the sense of a gunman in the doorway did not happen; what happened was an atmosphere in which

⁶² The Second Karabakh War began on September 27, 2020, and lasted 44 days (an Azerbaijani victory). From December 2022, Azerbaijan blockaded the Lachin corridor (~10 months), causing shortages of food and medicine; on September 19, 2023, it conducted a one-day military operation, and on September 20 the Karabakh authorities capitulated. Sources: “2023 Azerbaijani offensive in Nagorno-Karabakh” (compiled data); International Crisis Group.

⁶³ After the capitulation, Azerbaijan’s authorities stated that the Armenians could stay and take citizenship; no organized deportations or mass killings of civilians were recorded in the days of the exodus. Even so, within a week ~100,400 people (~99% of the remaining population) left Karabakh. The European Parliament (resolution of October 5, 2023) and Freedom House’s international mission qualified this as ethnic cleansing—expulsion through the creation of unbearable conditions (the blockade and the military operation); Azerbaijan rejects the qualification. Sources: European Parliament; Freedom House; “Expulsion of Nagorno-Karabakh Armenians” (compiled data).

“stay” sounds like “risk it.”

And here I will not soften anything because these are “my own”—but neither will I equate the two, because that would be dishonest. The methods differed: in the nineties, Azerbaijanis were driven out by massacre and at gunpoint; in twenty twenty-three, the Armenians packed up and left on their own, though out from under a blockade and after a lost war. These are not the same thing, and whoever piles them into one heap is cheating. But in one respect they are alike, and for that one respect I have set them side by side: both times the matter was decided not by right but by force. And both times, people left the places where they had lived. My side, this time, was the strong one. And it took back its own. And here it is important not to lose the thread, because the easy word “injustice” suggests itself. And it is not here. By right the land was indeed Azerbaijani; force and law coincided for once, and there is no villainy in Baku taking what was recognized as its own. The diagnosis lies elsewhere. The matter was not decided by the law that stood behind Baku. The matter was decided by the army. For thirty years, being in the right lay there as dead weight (resolutions, maps, international law—everything was “for”) and weighed exactly nothing until force stood behind it. Justice did not triumph—it merely waited until enough guns were wheeled up beneath it. In a world with no master above the players, even what is lawfully yours is either taken by force or not taken at all. The same mechanism that betrayed Ukraine played for Baku in Karabakh—it is one and the same, and what it measures at the decisive hour is force.

Where I See This From

Now it is clear why I am conducting this conversation in the first person. I stand on both sides at once.

I was born in Baku—on the strong side of one anarchy. I live

in Kyiv—inside the betrayed side of another. And this doubleness is a rare optic. A man who spends his whole life on one side can easily tell himself the cozy tale: we are the just, they are the villains, and all of history is the story of good suffering at the hands of evil. I am not allowed to tell myself that tale, because I have been both. And when the tale falls away, what is laid bare underneath is the machine: one and the same empty space between states, rewarding whoever has more force at the needed moment—regardless of which side right is on. Right is not repealed in this space. It is simply not load-bearing. What bears the load is force.

This is not a reason to give up, and not a call to love the strong. It is a diagnosis, and out of a diagnosis, as always in this book, grows a question. If the trouble is that above the players there is no authority that both compels and answers for itself—can such an authority be built without giving birth to a new monster, a new worldwide Athens? The question is heavy, and it waits in the second half of the book. For now we are still reading the blueprint as it is.

Then Why All the Words

One strangeness remains, and it is the right place to end. If force decides everything between states, then where does this whole ocean of words come from? Why did Athens come to talk with Melos at all instead of simply landing troops? Why the memorandums, the speeches, the endless arguments over who attacked whom first and who the real aggressor is?

Because there is a second front, and it is fought not with tanks but with the version of what happened. Even naked force wants to be called right; even Athens spends an evening on persuasion before killing. The strong almost never says “I am taking this because I can.” He says he is defending himself, that he is restoring justice, that he was forced. The production of this

“who is the aggressor” is a separate and enormous machine, and it reaches your head far more often than the truncheon reaches your back.

Chapter 7. Information: How an “Aggressor” Is Made

“Falsehood flies, and truth comes limping after it, so that when men come to be undeceived, it is too late; the jest is over, and the tale hath had its effect.” — Jonathan Swift⁶⁴

July 2014, prime time on Channel One. A woman introduced as a refugee from Sloviansk is asked what she saw. And she tells it—calmly, with details. Ukrainian soldiers herded the town onto the square, nailed a three-year-old boy to a board, as if to a cross, and held him there until he died. Then they tied his mother to a tank and dragged her around the square. The segment goes out on air to millions of homes.

Now the cold facts. The square she named does not exist in Sloviansk. There are no witnesses. There is no body. There is no mother. Within a day, journalists had picked the story apart bone by bone: the heroine turned out to be the wife of a fighter who had gone over to the separatists, and the scene itself an invention; years later she would admit that she “regrets” it.⁶⁵

⁶⁴ Jonathan Swift, *The Examiner*, No. 14 (November 9, 1710; in some collections numbered No. 15), from the essay on “the art of political lying.” The original, quoted in the epigraph: “Falsehood flies, and truth comes limping after it, so that when men come to be undeceived, it is too late; the jest is over, and the tale hath had its effect.” The widely known phrase about a lie traveling halfway around the world while the truth is putting on its shoes is attributed to Mark Twain and others—a later reworking, not Swift’s words.

⁶⁵ The “crucified boy”—a Channel One segment of July 12, 2014: a woman (Galina Pyshnyak) told of the public “crucifixion” of a three-year-old child by Ukrainian soldiers on “Lenin Square” in Sloviansk. Refuted within a day (by journalists of *Novaya Gazeta* and the TV channel *Dozhd*): there is no Lenin Square in Sloviansk (there is an October Rev-

But none of that matters anymore. By the time the lie was refuted, it had done its work: the horror had been sown, and the refutation caught up with a tenth, at best, of those the horror had caught—and convinced fewer still. The falsehood flew; the truth came limping after. And this is not a broadcast glitch, not an editor’s slip. It is a method, and the method has a purpose.

The sixth chapter ended with a riddle: if force decides everything between states, then where does this whole ocean of words come from?

Why the Strong Need Words

Remember Melos. The Athenians, who had the fleet and had already decided everything for themselves, spent an evening, for some reason, sending negotiators to the island. Why spend words at all on those already doomed? Because force wants more than victory. It wants one thing more—to be called right. The strong almost never says “I am taking this because I can.” He says he is defending himself, that he is restoring justice, that he was forced. Legitimacy is the second prize, and often it is dearer than the first: holding what everyone recognizes as lawful is cheaper than holding what the world keeps trying to take back. That is why alongside the war of tanks there always runs the war of versions. And its main product has a precise shape.

The Byzantine Generals

Computer science has an old problem. It is called the Byzantine generals problem. Several divisions have surrounded a city,

olution Square); no eyewitnesses or body were found. The heroine was the wife of a fighter who had gone over to the separatists; in 2021 she admitted that she “regrets” what she said. Sources: “Crucified boy” (compiled data); The Moscow Times, July 14, 2014; StopFake; EUvsDisinfo.

each commanded by a general, and they can win only together: either all storm at once or all retreat at once. Half a storm is a slaughter. The generals communicate only through messengers, and a messenger travels through enemy land. Now the main thing: some of the generals are traitors. A traitor sends one neighbor “attack” and another “retreat”—deliberately, so that agreement does not come together. The question: can the honest ones still agree?

The answer, proved back in 1982, is bleak and precise: agreement is possible only if the traitors are fewer than a third. Cross that line. And no protocol helps: an honest general can no longer tell the common plan from the common noise.⁶⁶

Read this problem as a metaphor. The generals are all of us, trying to work out together what happened. The messengers are the media. And the propaganda machine is the traitor general, with one amendment: its goal is not even to make you storm when you should retreat. Its goal is to send so many contradictory messages that the common picture never comes together at all. It wins not by convincing you of its version but by pushing the share of noise past that same one-third—past the line beyond which the truth no longer reassembles.

The Firehose

This is why the most effective modern propaganda looks, from the outside, like hackwork. It contradicts itself. It does not

⁶⁶ The Byzantine generals problem is a classic problem of distributed systems: Leslie Lamport, Robert Shostak, Marshall Pease, “The Byzantine Generals Problem,” *ACM Transactions on Programming Languages and Systems*, vol. 4, no. 3 (1982). Several commanders must agree on a common action by exchanging messages through messengers, while some of the commanders are traitors sending contradictory orders. For “oral” (unsigned) messages, reliable agreement is achievable only if the traitors are fewer than a third (at least $3m+1$ participants are required to withstand m traitors). From the same distributed-systems canon as Tanenbaum and Fielding in Ch. 3.

The Byzantine generals

The diagram illustrates a game of trust between a city and its defenders. In the center is a grey rectangle labeled "the besieged city". Surrounding it are six black figures representing defenders. Two of these figures are labeled "traitor" and are shown with a small orange square on their chest. The other four figures are plain black. Arrows indicate the flow of the game:

- From the top defender to the top traitor: an orange arrow labeled "retreat" and a grey arrow labeled "attack".
- From the top traitor to the top defender: an orange arrow labeled "attack" and a grey arrow labeled "retreat".
- From the top defender to the top traitor: an orange arrow labeled "retreat" and a grey arrow labeled "attack".
- From the top traitor to the top defender: an orange arrow labeled "attack" and a grey arrow labeled "retreat".
- From the top defender to the top traitor: an orange arrow labeled "retreat" and a grey arrow labeled "attack".
- From the top traitor to the top defender: an orange arrow labeled "attack" and a grey arrow labeled "retreat".

 To the right of the diagram is a vertical bar representing the percentage of lies. The bar is divided into two sections: a top orange section labeled "plan falls apart" and a bottom grey section labeled "they agree". A horizontal line with the fraction $\frac{1}{3}$ separates the two sections, indicating that the plan falls apart 1/3 of the time and they agree 2/3 of the time.

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bother to tie up loose ends. To anyone raised on the idea that a liar at least tries to be consistent, this looks like clumsiness. It is not clumsiness. Analysts at the RAND Corporation gave the technique a name (“the firehose of falsehood”) and listed its traits: enormous volume across many channels; speed and repetition around the clock; complete indifference to whether what is said is true; and complete indifference to whether today contradicts yesterday.⁶⁷

Take MH17. July 2014: a passenger jet falls out of the sky over the Donbas, 298 dead. Within days, Moscow offers several mutually exclusive explanations at once: a Ukrainian attack jet shot it down; no, a Ukrainian Buk; no, the whole thing was staged, the bodies planted in advance; no, the target was Putin’s plane. These cannot all be true at the same time; for a courtroom, that is a failure. For the firehose it does not matter, because the task was never to win the argument about what happened. The task was for the ordinary person, watching from the couch, to conclude: “everyone lies, the truth can’t be known, and to hell with it.” That sigh is the product. Years later, investigators would trace the missile to a specific Russian brigade.⁶⁸

⁶⁷ “The firehose of falsehood” is the RAND Corporation’s model of Russian propaganda: Christopher Paul, Miriam Matthews, “The Russian ‘Firehose of Falsehood’ Propaganda Model: Why It Might Work and Options to Counter It,” RAND, PE-198 (2016). Four traits: high volume and many channels; rapid, continuous, and repetitive; indifferent to objective truth; indifferent to its own consistency. Its effectiveness rests on volume and repetition (the familiar seems plausible) and on the fact that the contradictions do not persuade you of one version—they make you abandon the attempt to understand.

⁶⁸ Flight MH17 was shot down over the Donbas on July 17, 2014; 298 people died. Russian state media put forward a series of mutually exclusive versions (a Ukrainian Su-25; a Ukrainian Buk; a staging with bodies planted in advance; an attempt on Putin’s plane). The Joint Investigation Team (JIT) established: the missile, of the 9M38 series, was fired from a Buk TELAR belonging to the 53rd Anti-Aircraft Missile Brigade of the Russian armed forces (Kursk). The contradictory versions are a technique, not a blunder. Sources: JIT; Bellingcat; EUvsDisinfo, “The

But by then the sigh had set, like concrete.

And notice what that sigh does. It does not make you believe Moscow. It makes you believe no one—and a public that believes no one is paralyzed exactly like a public that believed the lie. Both stay home. Beneath this lies a doctrine older and subtler. Soviet theorists called it reflexive control: do not impose the conclusion; arrange the inputs so that the person arrives “on his own” at the one you need.⁶⁹ The firehose does not push you onto anyone’s side. It walks you to the exit and leaves you certain that leaving was your own decision.

The Aggressor Inversion

While the noise machine runs, a second machine assembles the actual product—the inversion. On the morning of February 24, 2022, the country with the bigger army crossed its neighbor’s border, and the man who gave the order went on screen to explain that he was the one under attack. The operation, he said, was needed to “denazify” and “demilitarize” Ukraine; it was self-defense; its purpose was to stop the “genocide” that the Kyiv authorities had been committing against Russian speakers for eight years.⁷⁰ Every load-bearing word is flipped. The

Kremlin’s Shifting, Self-Contradicting Narratives on MH17.”

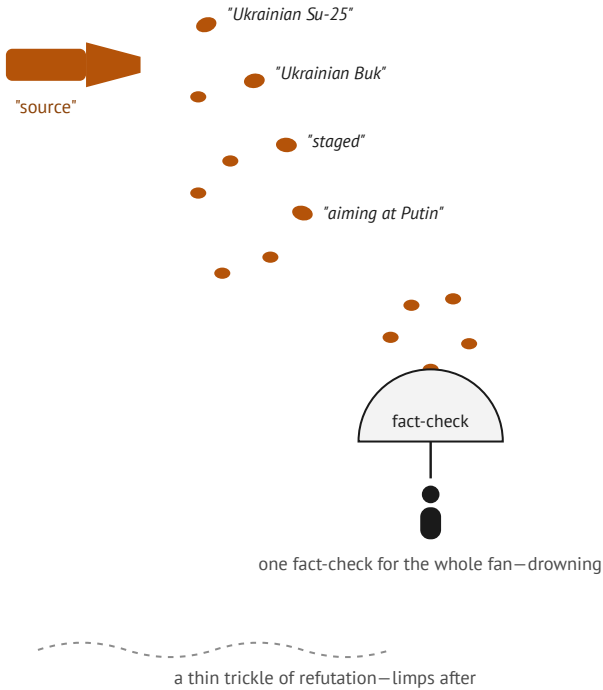
⁶⁹ Reflexive control is a concept of Soviet military theory (from the 1960s; the key figure is the mathematician and psychologist Vladimir Lefebvre): the adversary is fed specially prepared information so that he “voluntarily” makes the decision the other side needs in advance (a substitution of the grounds of his choice). It entered the Russian doctrine of information confrontation. Sources: “Reflexive control” (compiled data); U.S. Army War College, *Parameters*.

⁷⁰ Vladimir Putin’s address of February 24, 2022 (transcript: kremlin.ru): a “special military operation” was announced with the goals of the “demilitarization and denazification” of Ukraine, as self-defense (with a reference to Art. 51 of the UN Charter) and as protection of the Russian speakers of the Donbas from “genocide... for eight years.” The check: in the year before the invasion, ~25 civilians died in the Donbas (more

FIGURE 7.2

The firehose of falsehood

one event—MH17—and a fan of mutually exclusive versions



*The goal is not that you believe one version,
but that, swamped by contradictions, you give up.*

attacker is the defender. The attacked is a Nazi. Aggression is salvation.

Hold these words up against what can be checked. “Genocide”: in the year before the invasion, the conflict in the Donbas took the lives of roughly twenty-five civilians, more than half of them to mines and unexploded shells. The number is real and bitter. But no one who uses the word honestly would call it genocide. “A Nazi state”: headed by a Jewish president whose relatives died in the Holocaust; the leading historians of Nazism signed a statement that the accusation is untenable.⁷¹ In the light, the inversion is transparent.

But—and here is what matters—it does not need to survive the light. It needs to do only two things. At home, give its own population a story in which it is the rescuer, not the attacker, so that hard questions are not asked. Abroad, sow exactly enough doubt (“well, it’s complicated over there, both sides have their faults, who can even tell who started it back in fourteen”) for the outside world to hesitate, argue, and be late. Belief is not even required; a stall is enough. The week the world spends on

than half to mines and unexploded ordnance)—not genocide in any honest sense of the word; the “Nazi state” claim was rejected by leading historians of Nazism and the Holocaust (in a collective statement), and Ukraine’s president is a Jew who lost relatives in the Holocaust. Sources: kremlin.ru (transcript, February 24, 2022); PBS NewsHour; U.S. Department of State, “Disinformation Roulette.”

⁷¹ Vladimir Putin’s address of February 24, 2022 (transcript: kremlin.ru): a “special military operation” was announced with the goals of the “demilitarization and denazification” of Ukraine, as self-defense (with a reference to Art. 51 of the UN Charter) and as protection of the Russian speakers of the Donbas from “genocide... for eight years.” The check: in the year before the invasion, ~25 civilians died in the Donbas (more than half to mines and unexploded ordnance)—not genocide in any honest sense of the word; the “Nazi state” claim was rejected by leading historians of Nazism and the Holocaust (in a collective statement), and Ukraine’s president is a Jew who lost relatives in the Holocaust. Sources: kremlin.ru (transcript, February 24, 2022); PBS NewsHour; U.S. Department of State, “Disinformation Roulette.”

the question “who is the aggressor here” is a week of free hands. The inversion buys time, and in war, time is territory.

Here is the machine the chapter is named for: the production of the aggressor. Its raw material is real grievance and real history (there is always enough of both); its product is a relabeling, and the label always points one way: at the other.

There Are No Free Sources

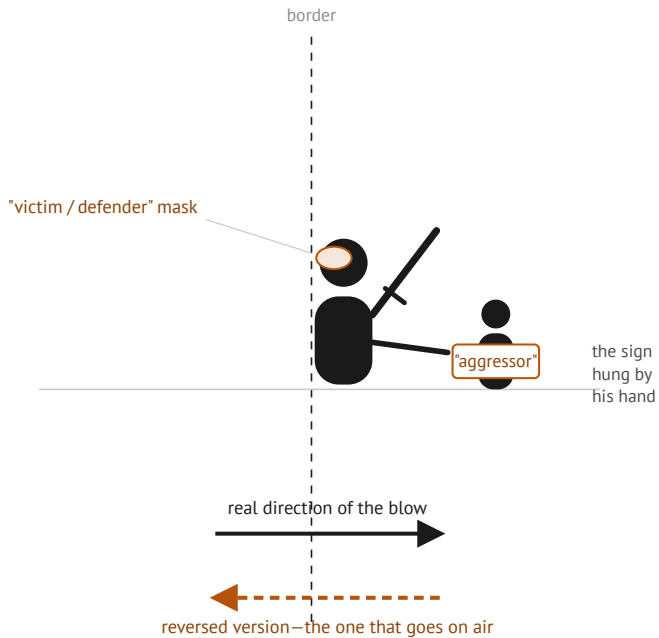
Here it is easy to fall into a trap that propaganda itself sets: to start looking for the “independent,” “free” source you can finally trust without looking over your shoulder. There is no such source. Every channel has someone who feeds it (a state, an owner, an advertiser, a grant-maker, a party, a diaspora), and every feeder has its own interest. An “independent” outlet is independent of exactly one set of masters and dependent on another; an impartial point from which pure truth is broadcast does not occur in nature.

But what does not follow from this is the conclusion they are waiting for you to draw—“if everyone is biased, then everyone lies equally, and there is no point sorting it out.” That is the very sigh, the very exit you are being walked to. There is a difference between sources; it just does not run along the line of “honest versus bought.” It runs along two others.

The first: is the interest visible. A source whose master and whose profit you can name is a working instrument: you correct for its angle, as a navigator corrects for drift, and you use it. The truly dangerous one is not the source with an interest but the source whose interest is hidden. And propaganda’s strongest weapon is not its own loudspeaker with a flag on the title card: everyone already divides that one by two. The strongest is the voice that looks independent—the “ordinary blogger,” the “neutral expert,” the cozy website with no visible home address—while in fact it is plumbed into the same pipe. The machine

FIGURE 7.3

The aggressor inversion



*The one who used force relabels himself the victim,
and relabels the attacked the attacker.*

does not spend money on manufacturing counterfeit “locals” and “neutrals” for nothing: precisely because you instinctively look for someone who does not resemble propaganda, it tailors the costume to that measurement.

The second line, cruder: are there still different voices at all. While the sources are many and they argue, their interests at least damp one another, and something shows through the discord. The most dangerous arrangement is the one where force has left a single voice: where the dissenters have been shut down, and over the country sounds a single version, smooth and free of contradictions. The smoothness here is not a sign of truth but the trace of the other microphones being switched off. Remember the Byzantine generals. The trouble is not that there are liars among them: there are always liars. The trouble comes when they outnumber the honest, and agreement can no longer be assembled. A power that gags its own dissenting voices is not cleansing the airwaves of “slander.” It is pushing the share of noise past that same one-third and taking away from its own citizens the very possibility of checking anything.

How You Can Tell

So how do you stand up to the firehose and not buckle under the pressure? Not with logic first, it turns out—because the firehose does not aim at logic. It aims at your attention and your stamina. It works by volume and fatigue. And so the first defense is simply knowing that the fatigue is the goal. In the minute when “ah, they all lie, to hell with them” washes over you, that feeling is not your conclusion but their product, delivered to you disguised as yours.

After that, a few habits do almost all the work. And not one of them requires that you already know the truth. Ask whether the story is built so that it can be checked, or so that it can only be felt. A real report gives names, dates, places you can

travel to and look at. A fake shoves an image at you and hurries you along: the crucified boy, the square... which square? Ask whether the source survives a second question—or falls apart the moment you ask it. Ask whether it tells the same story over time—or buries everything under ever-new versions, counting on you not to collate them.

But there is a reason these habits are rare and the firehose effective, and the reason is not stupidity. It is economics. Checking is expensive: it costs time, attention, and the weight of uncertainty while the answer is not yet in. Believing is cheap, instant, and feels like relief. The firehose does not defeat your reason. It devalues it: lays costly doubt and free certainty side by side, and waits. Most people on most days take the free one. Why the mind is built to grab cheap certainty—why faith comes by default while doubt remains a luxury—is the next part of the machine we will have to open up. We have been calling all of this information. Its fuel is faith.

Chapter 8. Faith as a Crutch

“Doubt is not a pleasant condition, but certainty is absurd.” — Voltaire⁷²

Take any belief you hold and ask how you know it is so. The Earth is round. Atoms exist. There is a country called Australia. The pack you opened this morning held coffee, not poison. You know all of this—and you have verified almost none of it yourself. You have not flown around the Earth, you have never seen an atom, you may never have been to Australia, you did not have the coffee tested for poison. You took it on faith: from a textbook, from a map, from habit, from the fact that everyone says so. And you were right to—there is no other way. Ten lifetimes would not be enough to personally verify even a hundredth of what a person leans on every day. Faith is not the vice of a lazy mind, and it is not weakness; it is the only way a finite mind copes with an infinite world at all. Without it you could not take one step past your own threshold.

So this conversation will not be about how to stop believing—that is impossible and unnecessary. It is about the fact that this necessary support has a design and has a cost. Both are worth examining. The previous chapter showed someone else’s machine slipping its hand exactly here.

The Cache

There is a precise engineering name for the way the mind handles faith. A belief is a cache. In computing, a cache is a

⁷² Voltaire, from a letter to Frederick William, Prince of Prussia, November 28, 1770. Fr.: “Le doute n’est pas une condition agréable, mais la certitude est absurde”; the epigraph gives the standard English rendering, and the wording varies slightly from edition to edition.

saved answer: something was computed once at great cost, the result was set aside, and from then on it is taken ready-made, without computing it again. Without caches, any system would choke, recalculating the same things at every step. The mind is built the same way: a conclusion once drawn (“fire burns,” “this person can be trusted,” “the world is just” or “the world is cruel”) is filed away in memory and from then on comes out ready-made—instantly, at no cost.

Psychologists describe this as two gears of thinking. The first is fast, automatic, cheap: it reads the cache and returns an answer before you have even noticed the question. The second is slow, effortful, expensive: it computes from scratch. And the mind, a miser by nature, economizes wherever it can and gets by on the first.⁷³ This is not a defect of the design but its genius: a creature that derived every truth anew would never have out-run its first predator.

Most of the time the answer is not even computed in-house. It is taken ready-made from someone trusted: parents, a teacher, an expert, a priest, a leader. Faith, in this sense, is delegated computation: you do not do the math yourself, you rely on someone who, it seems to you, has done it. And like any delegation, it runs into two questions: can you trust the one the computation was handed to—and will you notice if he errs or lies. For most of life there is no time for these questions, and the result is accepted sight unseen.

The trouble is that the cache has a built-in weakness, long known to engineers. There is even a joke that there are only

⁷³ The two-system model of thinking: Daniel Kahneman, *Thinking, Fast and Slow* (2011). System 1 is fast, automatic, effortless; System 2 is slow, analytical, energy-hungry. The mind as a “cognitive miser” (S. Fiske and S. Taylor’s term) economizes on effort and leans on System 1 wherever it can. Tied to this is the illusory truth effect: a statement repeated many times seems more plausible, because processing the familiar runs easier, and the mind takes that ease for a mark of truth (the direct link to the “firehose” of Ch. 7).

two truly hard problems in computer science: naming things and invalidating a stale cache in time.⁷⁴ To invalidate a cache is to recognize that the saved answer is no longer true and to force yourself to compute it again. Machines find this hard. A person whose cache is his picture of the world, his faith, his “it’s all obvious anyway” finds it many times harder.

Why the Crutch Is Real

Before talking about the cost, honesty requires saying what people are paying for. They are not paying out of stupidity. Faith covers needs that no mockery can cancel.

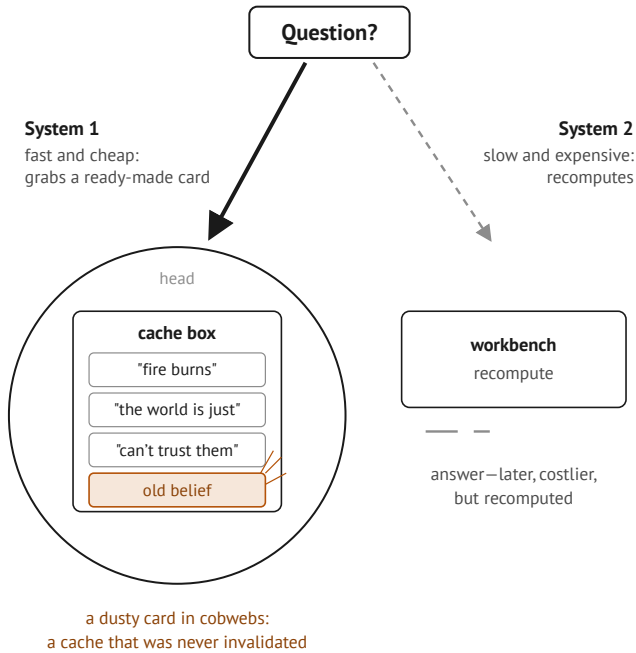
The first and deepest is the fear of death. Man is the only animal that knows for certain it will die and has to live with that knowledge every day. Psychologists who spent decades testing this described a regularity. Remind a person of his own mortality, and he clings harder to his worldview: to a picture of the world that has meaning, order, and something that will outlive him.⁷⁵ Religion is the oldest and most polished answer to this terror: it gives death back its meaning, promises continuation, sets a father above the chaos. To call it a crutch is not an insult. A crutch is given to someone who truly cannot walk on his own,

⁷⁴ A cache, in computing, is a store of results already obtained, which spares the system from computing them anew. “Cache invalidation”—flushing entries that have gone stale—long ago became the emblem of a hard problem: a widely circulated joke holds that “there are only two hard things in Computer Science: cache invalidation and naming things” (usually attributed to Phil Karlton). The cache comes from the same world of distributed systems as Ch. 3.

⁷⁵ Terror management theory—J. Greenberg, S. Solomon, T. Pyszczynski (from 1986), building on Ernest Becker’s *The Denial of Death* (1973). The thesis: a cultural worldview (religion included) and self-esteem serve as a buffer against the terror of conscious mortality. In mortality-salience experiments—reminders of death—subjects defend their worldview harder, warm toward their own, and grow more hostile toward carriers of other views.

FIGURE 8.1

Belief as a cache



Faith = a saved answer taken without recomputing.

and to laugh at the crutch is to laugh at the wound beneath it.

The second need is chaos. The mind tolerates “no reason at all” unbearably badly: it needs things to have a cause. “This happened because...”—almost any ending to that sentence is easier than the void. Faith builds in a cause where none is visible, and the world turns from senseless to readable.

The third is loneliness. A shared faith works like a password by which one’s own recognize their own. To believe what your people believe is to be accepted rather than left alone. And often it is this, not the content of the faith, that holds a person hardest.

The Cost

Now the cost—and it grows the longer the crutch is leaned on without noticing that it has grown into the flesh.

First, the cache goes stale. An answer once true keeps being served ready-made decades later, when the world that produced it is long gone. A man walks by the map of a country that no longer exists and cannot understand why the roads fail to line up. A belief never once recomputed since childhood is not wisdom; it is just a very old cache.

Second—and here the previous chapter closes in: the cache can be written to from outside. Whoever gains access to your ready-made answers does not argue with your reason. He bypasses it. Recall the firehose: repetition does not persuade by argument, it works more quietly—what is heard many times becomes familiar, and the familiar the mind accepts as true at a discount.⁷⁶ Cheap faith is an unlocked door, and the

⁷⁶ The two-system model of thinking: Daniel Kahneman, *Thinking, Fast and Slow* (2011). System 1 is fast, automatic, effortless; System 2 is slow, analytical, energy-hungry. The mind as a “cognitive miser” (S. Fiske and S. Taylor’s term) economizes on effort and leans on System 1 wherever it can. Tied to this is the illusory truth effect: a statement repeated many times seems more plausible, because processing the familiar runs easier,

propaganda of the previous chapter walks in through exactly that door.

Third, the crutch has a sharp edge. The very buffer that soothes the fear of death turns, under pressure, into hostility. Experiments show that a reminder of death not only strengthens love for one's own but also raises animosity toward outsiders, toward those who believe differently.⁷⁷ That is why it is so easy to raise people under the banner of faith and so hard under the banner of doubt: fear needs something to grab hold of, and certainty hands it the neighbor. A crutch does not just hold you up—it can be yanked, and the person will march in step.

Fourth, and quietest of all: a crutch stood on too long weakens the leg. The longer a mind gets by on ready-made answers, the worse it does at “I don't know.” The capacity to hold a question open, to endure the discomfort of not knowing, to recompute—that is a muscle, and without load it withers. In the limit, a person no longer chooses faith over verification. He has simply forgotten how to verify.

The Test

What to do about all this is not a rhetorical question, and it has a working answer. But first the false one has to be turned away. The false answer is “believe nothing, doubt everything.” That is not salvation but the same pit from the other side. Total

and the mind takes that ease for a mark of truth (the direct link to the “firehose” of Ch. 7).

⁷⁷ Terror management theory—J. Greenberg, S. Solomon, T. Pyszczynski (from 1986), building on Ernest Becker's *The Denial of Death* (1973). The thesis: a cultural worldview (religion included) and self-esteem serve as a buffer against the terror of conscious mortality. In mortality-salience experiments—reminders of death—subjects defend their worldview harder, warm toward their own, and grow more hostile toward carriers of other views.

doubt paralyzes no worse than total faith. And, as the previous chapter showed, that is exactly where the firehose pushes you: “everyone lies, nothing can be checked.” Doubt is an expensive instrument, and it must be deployed selectively.

Selectively means on the load-bearing beliefs. The ones holding up your life: how you vote, whom you trust with your money and your children, what you are prepared to fight for, what you teach those coming after you. Most of the cache can be left alone—it does not matter whether you have personally verified that Australia exists. But a belief with something heavy standing on it is worth taking off the shelf and inspecting before it carries you any further.

The inspection is a handful of questions, and behind each stands a proven instrument, sometimes centuries old. They are worth memorizing as a kit; it will come in handy more than once further on.

- **Where did it come from?** Did you verify it—or absorb it and forget that you never did? Most of the cache is borrowed, and that is normal; what is not normal is not knowing what is borrowed.
- **What could refute it?** If there is no answer (if the belief cannot in principle be refuted by anything), it is not knowledge but a fortress. Knowledge exposes itself to blows; a fortress only defends.⁷⁸
- **Who finds it convenient that you believe it?** Every entry in the cache may have an author with an interest

⁷⁸ The techniques of critical testing go back to Carl Sagan’s “Baloney Detection Kit” from *The Demon-Haunted World: Science as a Candle in the Dark* (1995): independent confirmation of facts; entertaining several hypotheses rather than seizing the first; Occam’s razor (among equally fitting explanations, choose the simpler); the demand for falsifiability (a test must be conceivable that could refute the claim). The principle that extraordinary claims require extraordinary evidence was popularized by Sagan (*Cosmos*, 1980); M. Truzzi had formulated it earlier (1978), and it goes back to P.-S. Laplace (1812).

of his own—the question from the previous chapter, now turned inward.

- **Do you want it to be true a little too much?** The belief that flatters, consoles, or excuses is the one checked least of all—and it is exactly the one to check, and more strictly than the rest.
- **Is the evidence proportional to the claim?** For the ordinary, the ordinary will do; the extraordinary demands extraordinarily solid grounds. “The neighbor moved away” and “the neighbor was taken by aliens” are two very different bills to pay.⁷⁹
- **Is there a simpler version?** If two explanations fit the facts equally well, the one with fewer assumptions and fewer gears is usually closer to the mark.⁸⁰
- **Will you notice that you were wrong?** A belief that cannot be tested and that confirms itself has no brakes: having erred, you will not find out, and you will drive on.

Run any large “it’s all obvious anyway” through these ques-

⁷⁹ The techniques of critical testing go back to Carl Sagan’s “Baloney Detection Kit” from *The Demon-Haunted World: Science as a Candle in the Dark* (1995): independent confirmation of facts; entertaining several hypotheses rather than seizing the first; Occam’s razor (among equally fitting explanations, choose the simpler); the demand for falsifiability (a test must be conceivable that could refute the claim). The principle that extraordinary claims require extraordinary evidence was popularized by Sagan (*Cosmos*, 1980); M. Truzzi had formulated it earlier (1978), and it goes back to P.-S. Laplace (1812).

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tions, and much of it will crumble on its own. Take a popular one: the world is secretly run by a handful of people pulling the strings. What could refute it? Nothing—any fact against it is filed under “they staged that too”; a fortress, not knowledge. Who finds it convenient that you believe it? The one selling a simple answer to a complicated world—and, for that matter, you yourself: if a clique runs everything, then nothing is asked of you. Is the evidence proportional? The claim is enormous, and the grounds are hints and coincidences. Is there a simpler version? There is, almost always: not a single design but thousands of people pulling the world each in his own direction, out of stupidity and self-interest, with no headquarters at all. This is called Hanlon’s razor: never attribute to malice what is adequately explained by stupidity.⁸¹ A world ruled by a secret genius is, in its way, cozier than a world ruled by no one—but coziness is not an argument.

And one rule above all the rest: what entered the head without evidence can be shown out without evidence. You owe no belief its keep merely for the fact that it has lived there a long time.⁸²

The Most Certain

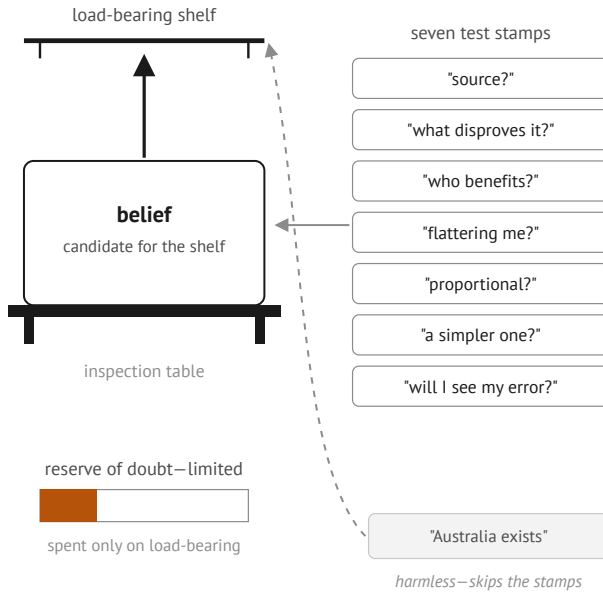
All of this is work, and thankless work. The test takes time, spoils cozy stories, and leaves you with an honest “I don’t know

⁸¹ “Hanlon’s razor”: “Never attribute to malice that which is adequately explained by stupidity.” Usually traced to Robert Hanlon (the *Murphy’s Law* compilations, 1980); R. Heinlein voiced a similar thought. Not an absolute law but a heuristic: choosing between conspiracy and incompetence, the latter is more frequent and simpler. It leads straight into the next chapter.

⁸² “Hitchens’s razor”: “What can be asserted without evidence can also be dismissed without evidence” (Christopher Hitchens, *God Is Not Great*, 2007). It goes back to the Latin “Quod gratis asseritur, gratis negatur”—what is asserted without grounds is denied without grounds. The point: the burden of proof lies on the one asserting, not on the one doubting.

FIGURE 8.2

The test as cache invalidation



*You can't recompute everything—
you inspect what heavy things stand on.*

yet” where your neighbor long ago “figured it all out.” And here lies a vicious regularity, with which the next chapter will begin. The test is needed most by exactly those who are most certain it is not needed. A cache never recomputed, never once inspected, breeds not a quiet delusion but a very loud, very self-satisfied rightness. And when such rightness claws its way to a lever, what begins is the thing usually chalked up to malice, though its name is different and far more common. Stupidity. And how it ends up in power is a conversation of its own.

Chapter 9. The Power of the Stupid

“The fundamental cause of the trouble is that in the modern world the stupid are cocksure while the intelligent are full of doubt.” — Bertrand Russell⁸³

When something big goes off the rails—an economy collapses, a war fails, a whole industry rots for decades—the mind’s first move is to look for a culprit. Not a cause—a culprit. Someone’s evil will, design, hand. It is calmer that way: malice has a face, a motive and, above all, an off switch—there is someone to remove so that the trouble ends. A picture of the world in which every catastrophe has someone’s cold calculation behind it is cozy precisely because it promises a remedy.

Except that most of the damage is done not by those who wished evil. It is done by those who meant well (or meant nothing at all) and were, all the while, perfectly certain they were right. This has a name, inherited from the previous chapter: stupidity. The word is crude and misleading. In everyday speech it means a weak mind. Here it means something else entirely. We will have to start with the definition, or the whole conversation will slide off course.

⁸³ Bertrand Russell, “The Triumph of Stupidity” (1933)—a syndicated newspaper column (US; e.g., *New York American*, May 10, 1933), later collected in *Mortals and Others: American Essays 1931–1935*. Written in response to the rise of Nazism in Germany. Verbatim: “The fundamental cause of the trouble is that in the modern world the stupid are cocksure while the intelligent are full of doubt.” NOT to be confused with the popular apocryphal version “The whole problem with the world is that fools and fanatics are always so certain of themselves, and wiser people so full of doubts”—it circulates widely online but is absent from Russell’s texts (the same story as with Swift and Twain in Ch. 7). Russell’s observation anticipated the “Dunning–Kruger effect” by 66 years.

Not About Intelligence

The most useful definition of stupidity came not from a psychologist but from an economic historian, and as a joke at that—one that turned out more serious than many treatises. A stupid person is one who causes losses to another (and often to himself as well) while deriving no gain whatsoever.⁸⁴ The definition rests on the shape of the act, and IQ plays no part in it. Cross two questions (whom the action benefits and whom it harms) and you get four cells. The intelligent person benefits both himself and others. The bandit wins at others' expense: he does harm, but there is a cold logic in his actions, a motive that can be understood, foreseen, bought off. The helpless person sacrifices himself for someone else's gain. And in the last cell sits the stupid one: the person who harms others and himself along with them, acquiring nothing.

Hence an unexpected conclusion: the most dangerous of all is not the villain but precisely the stupid person. A bandit can be dealt with—he has an interest, and as long as the interest is clear, you know what to expect. The stupid person is unpredictable: there is no gain behind his actions from which they could be computed. He wrecks without plan or reason. Which means you can neither defend against him nor come to terms with him. And note: in this definition, intelligence is no defense. A very smart, very educated person is capable of being stupid in

⁸⁴ Carlo M. Cipolla, *The Basic Laws of Human Stupidity* (essay, 1976; first collected in *Allegro ma non troppo*, 1988; published as a standalone English edition in 2011). An economic historian, writing half in jest. The third of the five laws gives the definition: a stupid person is one who causes losses to another person (and often to himself) while deriving no gain. The 2×2 matrix (gain/loss to self × gain/loss to others): the intelligent (++) , the bandit (+ to self, – to others), the helpless/naive (– to self, + to others), the stupid (––). Cipolla's conclusion: the most dangerous is not the bandit (he has a motive, is predictable, and can be defended against) but the stupid person, whose behavior cannot be computed, since there is no gain behind it.

this precise sense—of acting against the facts and against the common good while certain of the opposite. A diploma is no vaccine here. And there is a corollary, doubly unpleasant: both the number of such people and the cost of their actions are consistently underestimated. Stupidity is expected to arrive with a stupid face. It arrives in robes and with an academic degree, and it destroys all the more freely because the danger in it was not recognized in time.

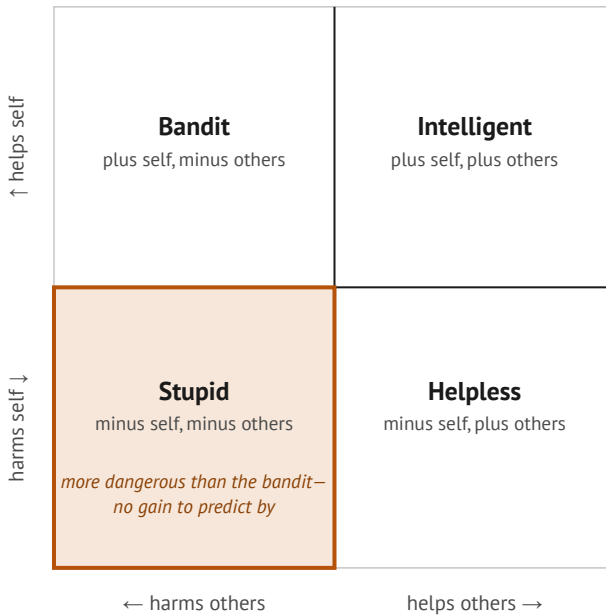
Under a Spell

So where does stupidity come from in people no one would call dim? The soberest answer came from a man the Nazis would soon arrest and execute. The theologian Dietrich Bonhoeffer, watching the best-educated nation in Europe (the nation of Kant and Bach) fall into step behind what it fell in behind, tried to understand how it had come about. His conclusion: stupidity is not a property of the mind but a state into which people are driven by an external force. And that force is power. Under the pressure of rising power, a person loses his inner independence and, more or less consciously, gives up his own judgment.⁸⁵

Bonhoeffer describes it almost clinically. Talk with such a person, and you get the feeling that it is not he who answers

⁸⁵ Dietrich Bonhoeffer, “On Stupidity” (Von der Dummheit)—part of the essay “After Ten Years” (Nach zehn Jahren), written at Christmas 1942 for his comrades in the anti-Nazi resistance (that is, before his arrest on April 5, 1943); included in the posthumous collection *Letters and Papers from Prison* (Widerstand und Ergebung, 1951). Bonhoeffer was executed in the Flossenbürg concentration camp on April 9, 1945. Key theses: “stupidity is a more dangerous enemy of the good than malice”; against evil there are remedies, against stupidity there is no defense (arguments bounce off; contradicting facts are not accepted); stupidity is the product of an external force: under the pressure of rising power a person gives up his own judgment and ends up “under a spell” of slogans.

FIGURE 9.1
Cipolla's four cells



*Stupidity is defined not by IQ but by the act's shape—
harm without gain.*

but the slogans that have taken possession of him; he is as if under a spell. And from this comes the practical consequence for whose sake all of it was said: against stupidity there is no defense. Against evil there are remedies: it can be exposed, it can be stopped by force. Not so with stupidity. Arguments bounce off it; facts that contradict the belief are simply not accepted, and if they are irrefutable, they are brushed aside as meaningless. Stupidity is not cured by explanation. Bonhoeffer goes further: from this state only liberation liberates—as long as the external force holds, the person cannot be argued out of it from within. And what disarms most of all: such a person is not necessarily wicked—in private life he can be kind and decent. Stupidity here is a surrendered position of the mind, and moral reproach cannot reach it.

And if its root is in power, then the question becomes structural: what exactly in power produces this state so reliably?

Severed Feedback

The answer comes into view if you look at power as a control system. Every such system stands on feedback: it takes a step, measures the result, compares it with the goal, and corrects the error. A thermostat fires the boiler, reads the temperature, and shuts it off at the target. A helmsman sees the bow drifting right and puts the wheel over to the left. This is error correction—the thing that distinguishes a working mechanism from one gone berserk.⁸⁶ Sever the cable from the sensor, and the system will not learn that it has strayed. It will drive the error to the stops in

⁸⁶ Negative feedback is the basis of error-correcting control: the system measures the discrepancy between goal and result and acts to reduce it (the thermostat, the autopilot helm). The concept was formalized by cybernetics—Norbert Wiener, *Cybernetics: Or Control and Communication in the Animal and the Machine* (1948); the same lineage of distributed and control systems as in Ch. 3. Without feedback, the loop loses the ability to learn of its own deviation.

full certainty of being right: the boiler will roast the house not out of malice—it has simply gone blind. The same thing holds up everything that has not slid into chaos over the centuries: the market corrects error with losses, science with refutation, evolution with extinction. Their secret is one and the same: being wrong brings a bill. And it comes to whoever committed the error.

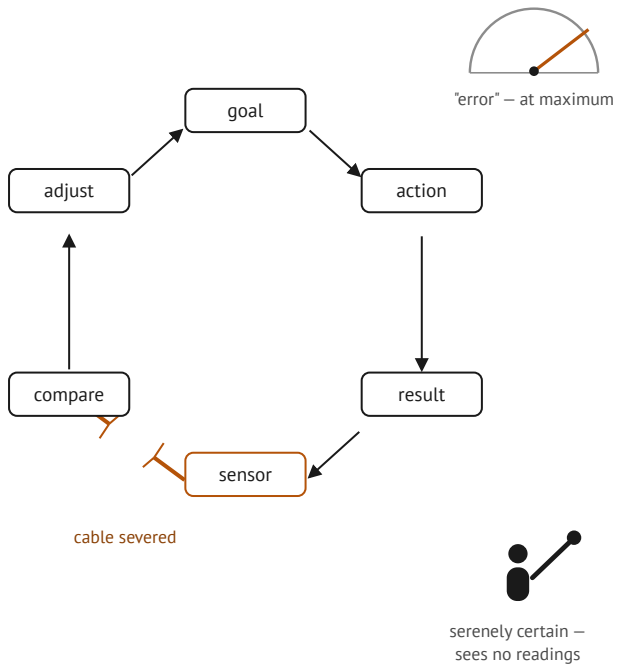
Back in the fourth chapter there was a glimpse of this: a monopoly has power and no feedback. Then it looked like the private defect of one service; now it is visible as a law. And the previous chapter added its share: a belief that has never been recomputed is a cache with its sensor unplugged. One person with such a cache is a private misfortune: sooner or later reality will rub his nose in it, burn him, correct him—and correct him cheaply. But seat him at a lever that moves thousands, and sever the wires along which “wrong” would come back to him, and the private misfortune becomes history. What is deadly here is not the stupidity itself but precisely the severed feedback. Stupidity without power gets corrected by reality quickly and at the fool’s own expense. Stupidity in power is fenced off from the consequences. Others pay, the signal does not come back, and the course is not corrected. Because, in all sincerity, no drift can be seen. Power, by its very design, is the thing that severs the wire between “erred” and “found out.”

The Machine Promotes Incompetence

As if muffling feedback were not enough, power also selects upward the very people who need that feedback most. The mechanism was described half a century ago and sounds like a joke, but it stands on iron logic. In a hierarchy, a person is promoted for doing his current job well. And he keeps being promoted as long as he copes—that is, exactly up to the rung where he stops coping. There the promotions stop, and

FIGURE 9.2

The loop with the severed cable



*A blinded system drives its error to the stops –
not from malice: the "wrong" signal never arrives.*

there he stays. The result: every post tends, in time, to be occupied by someone who has risen precisely to his level of incompetence.⁸⁷ The skill that earned the reward and the skill the new post demands may not coincide at all.

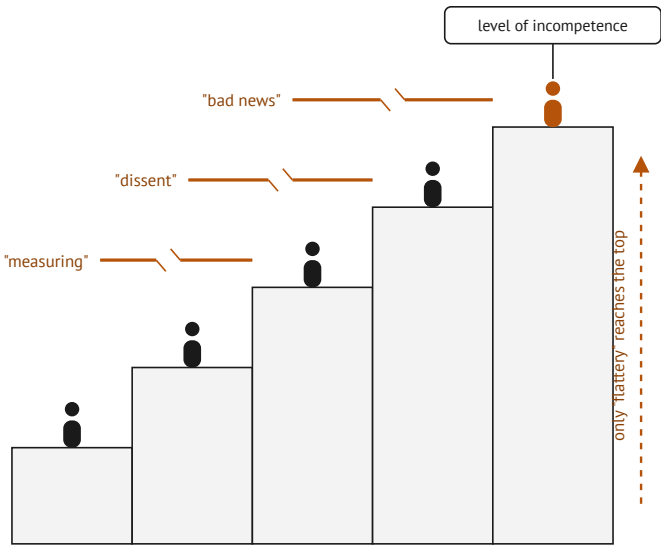
Add the severed feedback, and the ring closes. The higher the rung, the thicker the filter between its occupant and the truth: subordinates carry up the good news and hide the bad, disagreement gets expensive, flattery crowds out measurement. The structure does two things at once: it raises a man above his competence. And it severs exactly the wires through which he might have noticed. And no villain is needed for this on any floor. Everyone does what is understandable and approved: promotes the best worker, spares the boss the bad news. And at the output, the machine delivers confident incompetence to the lever with high reliability. And blinds it.

The Mountain of Confidence

This certainty has an internal spring as well. To notice your own incompetence, you need the very competence you lack: the missing skill is exactly the skill by which its shortage is measured. The illiterate man does not see his mistakes for a simple reason: detecting them takes literacy. The result is a locked loop: the thinner the knowledge, the smoother and more pleasant the feeling that it is enough. Psychologists christened this a special effect you have surely heard of. True, the famous “mountain of confidence” has taken a real beating in recent years. A fair share of that beautiful chart turned out to be a statistical mi-

⁸⁷ Laurence J. Peter and Raymond Hull, *The Peter Principle* (1969): “In a hierarchy every employee tends to rise to his level of incompetence.” The logic: people are promoted for success in the current post—up to the rung where they stop coping, and there they stay. The skill that earned the reward need not coincide with the skill of the new post. Empirical confirmation: Benson, Li & Shue (2019)—firms tend to promote their best salespeople into managers, where they perform worse.

FIGURE 9.3
The Peter pyramid



*The machine raises people past their competence and
cuts the wires that would have shown it.*

rage: feed the same procedure pure noise with no psychology in it at all, and the mountain obediently draws itself again.⁸⁸ So the thing to lean on is not the picture. Beneath it lies an old observation that needs no charts: the stupid are cocksure, the intelligent full of doubt. The mechanism is simple. To doubt in the right place, you have to know enough to see the limits of your own knowledge.

And here is a trap that spares no one, including the man writing these lines. On the summit of this mountain you do not feel that you are standing on a summit. It is visible only from above, from the altitude of real knowledge, which the summit itself does not yet have. I have stood on it more than once and was certain, every time, that I had not; I always found out afterward, and late. If, having read this far, you have felt a pleasant certainty that this chapter surely does not apply to you—that is the very symptom it describes.

Two Lessons from History

What this looks like at full scale is shown by two cases, both from long ago—so as not to confuse the mechanism with today's scores.

The first is the agronomist Trofim Lysenko. He rejected genetics, going as far as denying genes themselves, and promised a hungry country unheard-of harvests; the regime believed

⁸⁸ The Dunning–Kruger effect—Justin Kruger, David Dunning, “Unskilled and Unaware of It...,” *Journal of Personality and Social Psychology* (1999): the least competent overestimate themselves the most, because the same lack of skill keeps them from noticing the lack. An honest caveat: a significant part of the famous “curve” is a statistical artifact (autocorrelation, regression to the mean, the better-than-average effect): the same picture reproduces on random data with no psychology at all. Critiques: Nuhfer et al. (2016, 2017); Gignac & Zajenkowski (2020). Hence the thing to lean on is the robust mechanism and Russell’s old observation (1933).

him and gave him the lever. What follows is exactly what this whole chapter is about: the lever severed the feedback. Genetics was declared a “bourgeois pseudoscience”; those who could have proved Lysenko wrong were scattered, imprisoned, some of them shot. Nikolai Vavilov (a great geneticist who had assembled one of the world’s largest seed collections as insurance against famine) was arrested in 1940 and died of starvation in a Saratov prison in 1943.⁸⁹ Once the critics fell silent, the “wrong” signal stopped coming back. Soviet biology was thrown back by decades, the promised harvests never appeared, and the same methods, later carried abroad, had a hand in the deaths of millions. Lysenko was not a villain in the simple sense—he, by all appearances, believed himself. That is the horror of it: the system handed certainty a lever and, with its own hands, tore out every sensor capable of whispering that it was wrong.

The second case is shorter and cut from different cloth. In 1854, at Balaclava, a garbled order passed down a chain of officers, and not one of them asked his superior to confirm it. Six-hundred-odd horsemen of the Light Brigade were sent in a frontal charge at the wrong battery, into a valley swept by fire from three sides. More than a hundred died within minutes.⁹⁰

⁸⁹ Trofim Lysenko (1898–1976)—a Soviet agronomist who rejected Mendelian genetics to the point of denying genes and promised a sharp rise in harvests; he enjoyed the state’s backing. At the 1948 session of VASKhNIL (the All-Union Academy of Agricultural Sciences), genetics was officially branded a “bourgeois pseudoscience”; some 3,000 biologists were fired or arrested, a number of them shot. Nikolai Vavilov—an outstanding geneticist, creator of one of the world’s largest seed collections—was arrested in 1940 and died of exhaustion in a Saratov prison in January 1943. Lysenkoism set Soviet biology back by decades; similar methods, later adopted in Maoist China, contributed to the mass famine of the Great Leap Forward.

⁹⁰ The Charge of the Light Brigade—the Battle of Balaclava in the Crimean War, October 25, 1854. Because of a garbled order that passed down the chain of command (Raglan—Airey—Nolan—Lucan—Cardigan) with-

A poet made glory out of it; by its design it was a feedback failure with sabers drawn—a chain along which the question “is that really the one?” never traveled back up.

It's Not the Villain

So the reading of the state's legacy code comes to its end. Every chapter of this movement has run into the same thing: no villain is needed for disaster. A monopoly on violence with no one to check it; money you never chose; the absence of a Leviathan above the powers; a cache that someone else's hand writes to; and a machine that reliably delivers confident incompetence to the lever and severs its feedback. The villain version is so long-lived precisely because it consoles: a villain can be removed—and then it will all be over. The structural version is heavier and truer: remove the man, and the machine will raise another just like him into his place, because it was never about the man.

And if it is about the design, then the question is different too: not “how to find a righteous man for the throne” but “can it be built otherwise.” That question occupies the entire remainder of the book.

out a query back up, about 670 British cavalymen were thrown into a frontal attack on the wrong artillery position, along the floor of a valley swept by fire from three sides; over a hundred died within minutes (total casualties on the order of 270). Alfred Tennyson celebrated the episode in his poem “The Charge of the Light Brigade” (1854).

Chapter 10. The Same Rake

“But what experience and history teach is this, that peoples and governments never have learned anything from history, or acted on principles deduced from it.” — Georg Wilhelm Friedrich Hegel⁹¹

The previous movement ended with a heavy accusation. The trouble is not the villain but the design: remove the man, and the machine will lift another one just like him into his place. A handsome accusation, but so far an unproven one, and there is an obvious objection to it. What if it was simply bad luck with people? What if the whole thing is a run of bad rulers, and once a worthy man is finally seated on the throne, it will go differently? The objection is serious. It cannot be waved away. It has to be tested.

An engineer has a technique for such a test. To tell whether the design is at fault or chance is, you reproduce the failure. A fault that happened once on one machine may turn out to be that machine’s whim. But if the same fault repeats on different machines, under different teams, in different years, in incompatible circumstances—the machine and the team have nothing to do with it. The shared design is at fault. Reproducibility is what separates a design flaw from bad luck.

This chapter is about the fact that the failure reproduces. Not once or twice. With a persistence that becomes unsettling. One and the same breakdown—in Rome and in China, in the

⁹¹ Georg Wilhelm Friedrich Hegel, *Lectures on the Philosophy of History* (Vorlesungen über die Philosophie der Geschichte; delivered 1822–1831, published posthumously in 1837), Introduction; the epigraph gives the verified English wording. NOT to be confused with the popular paraphrase—“we learn from history that we learn nothing from history”: Hegel has no such words; it is a later compression.

Bronze Age and in the twentieth century, under emperors, general secretaries, and pharaohs, under men brilliant and talentless, merciful and monstrous. Different scenery, different names, different gods—one and the same shape of collapse. And if the shape holds while everything else varies that widely, then the names really are not the point.

And this is no abstract fine point, and the argument is not about words. If the design is at fault, then neither choosing an honest ruler nor executing a dishonest one fixes anything: onto the cleared spot steps the same scheme, and it produces the same result. And then the era's main defense (its faith that it, at least, is not like the ones before) turns out to be the very door the disaster walks in through. Which is why the failure is worth examining in detail: not to point a finger at the dead, but to recognize it when it comes near under a new name.

How to Read the Log

To see this, history has to be read differently from the way we were taught. We were taught to read it as a procession of heroes and villains: this one conquered, that one slept through it, here a feat, there a betrayal. Read that way, every catastrophe stands apart, with its own culprit, and the lesson it teaches is always the same: keep such people away from the wheel. The lesson is empty. The wheel produces such people on its own—that was the previous chapter. And this way of reading rests on the very thing that makes it useless: consolation. A villain can be named, cursed, overthrown—and it seems the disaster will end with him. That is why history-as-a-parade-of-villains is so cozy and so barren: it promises that next time, with a good king, things will turn out fine—and thereby makes it all the more certain that they will not.

An engineer reads failures differently. When a system goes down, a mature team looks not for someone to punish but for

whatever in the design allowed the fall. This is called a blameless postmortem. The on-call engineer's name is left out of the report deliberately. After all, if one person could cause the catastrophe by pressing the wrong button, then the problem is neither the button nor the person: the fault lies with a system in which one button brings everything down.⁹² Punishing the on-call engineer is satisfying and useless: someone else will take his seat, and the button will remain. And when one and the same incident keeps arriving again and again from different places, the reports are gathered into a stack and searched for the common line—the root that repeats beneath dissimilar symptoms.

Stack up the crash reports of empires the same way, and the common line shows through quickly. It is the one from the previous chapter: power gathered at a single point, and no feedback that would return it a “wrong.” A single point of failure and a severed line—a root that does not depend on the era. The most graphic symptom, graphic to the point of literalness, is the reprisal against the bearer of bad news. On the eve of his march on Greece, the Persian king Xerxes asked Demaratus, a deposed Spartan king living at his court: would the Greeks fight against such a force? Demaratus told him the truth. They would, and the Spartans first among them: even a handful would come out to meet him. Over them stands a master more fearsome than any king—the law, and it commands them not to flee but to stand to the death. Xerxes laughed: the lord of millions could not fit it into his head that free men, with no master over their

⁹² The blameless postmortem is a practice of the reliability-engineering culture: after a failure, what gets dissected is the design that allowed the failure, on the premise that a human will always err and the system's job is to survive the error, not to find someone to blame. The canonical treatment is Google's *Site Reliability Engineering* (Beyer, Jones, Petoff, Murphy, 2016). The same distributed-systems lineage as in Ch. 3 and Ch. 9.

souls, would prove harder than his subjects.⁹³ The messenger did not need to be executed. Laughter was enough to push the inconvenient truth aside. Within months that truth met him in the pass at Thermopylae, and at Salamis it broke the whole campaign. From the ancient king ordering the herald of defeat beheaded to the boss who is brought only smooth reports, the gesture is one and the same: gag the wire that carries the “wrong” back. And every time it looks like strength: putting a panicker in his place, reining in a doubter. In fact it is the system putting out its one eye—the only one with which it could still have noticed that it was going the wrong way.

Anatomy of the Failure

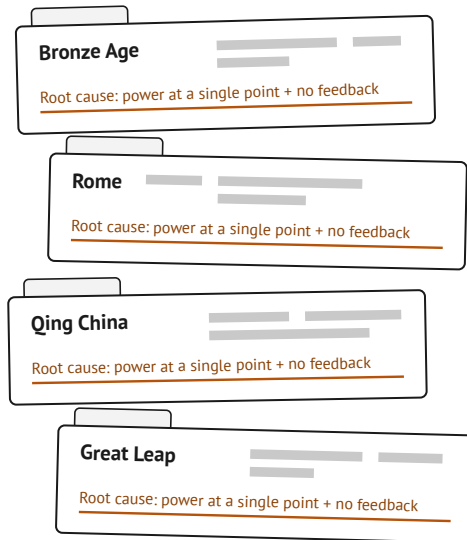
This breakdown has a repeating course, and it is worth memorizing step by step. From here on, it will be recognizable at half a glance. First, power is gathered into a single point, and at first this works: centralization delivers order, speed, a single answer to a threat—that is what it is loved for. Then the center’s hearing dulls: the stronger it is, the more it costs to bring it bad news, and the reports flowing from bottom to top grow smoother and smoother. The mistakes do not go anywhere. They pile up uncorrected, because the signal about

⁹³ Herodotus, *Histories*, Book VII, ch. 101–104 (Xerxes’ march on Greece, 480 BC; the conversation takes place at a review of the troops in Thrace). Xerxes asks Demaratus—a deposed Spartan king of the Eurypontid line who had fled to the Persians—whether the Greeks will resist. Demaratus answers: the Lacedaemonians will accept battle at any odds, for over them stands a master—the law (δεσπότης νόμος)—whom they fear more than Xerxes’ subjects fear the king; it commands them not to flee but to stand, and conquer or die. Xerxes laughs and does not believe him (VII.103). In that same year, 480, a small Greek holding force delayed the Persians at Thermopylae, and the rout of the fleet at Salamis broke the campaign. The speeches in Herodotus are the historian’s literary reconstruction, not a transcript; but the episode is canonical, and on it rests the image of the ruler who waved the truth away.

FIGURE 10.1

A stack of crash reports

different eras – the same field



— symptoms: each era has its own

*Different collapses, one root –
visible only with the reports stacked together.*

them never reaches the top; the system strides confidently the wrong way, certain it is going right. For a while, everything holds. An unnoticed mistake is not yet a catastrophe. From the outside, the center looks stronger than ever—precisely before it crumbles. And then comes the shock—a failed harvest, an invasion, a plague, someone else’s army. And it turns out the margin of safety was eaten through long ago, there is nothing left to patch with, there are no bulkheads. The monolith comes apart within a generation, sometimes within a morning. The symptom on the cover of the report is new every time—it gets named the trigger, and it takes the blame. But the root is the same every time: a structure gone deaf that arrived at the shock blind.

Neither Ancient Nor Distant

Hence a conclusion uncomfortable for any era, including the present one. The breakdown we are accustomed to viewing as someone else’s misfortune (the savagery of the ancients, the barbarism of the distant) is neither ancient nor distant. It is structural. Tools change, languages, gods, and banners change; what does not change is the arrangement in which one man holds the lever, and there is no one and nothing to tell him the lever is pointed wrong. As long as that arrangement stands, failure is a matter of time, not of ill will. The rake has lain in the same spot for thousands of years, and every new generation steps on it with genuine astonishment, certain that its own foot, at least, is landing on a clean floor.

And here reading history begins to pay—with a working set of questions. Instead of “is the man at the top any good,” three questions about the structure itself. And all three about one thing: is it capable of learning that it has erred, and of paying for the error before it is too late. Does it have a rival people can leave for when it goes bad—or is there nowhere to go? Does dis-

agreement reach the top undistorted—or is the messenger with bad news beaten? And does the bill for a mistake come back to whoever made it—or does someone else always pay? Wherever the answer to all three is “no,” the diagnosis is ready in advance, whoever sits on the throne: such a system will not notice its own mistake and therefore will one day make it. The questions are duller than hunting villains—but they have answers, and the answers come true.

The Temptation of the Timetable

This astonishment is so stubborn that it tempts you to look for a law in the repetitions—a timetable by which the disaster returns. The best-known attempt is the theory of the generational cycle. History, it says, moves in circles of roughly eighty to ninety years, and each circle passes through the same four seasons: rise, fracture, unraveling, crisis—and rise again.⁹⁴ It has the charm of a horoscope: learn the signs of your “season,” and the future seems already mapped out—all that is left is to check the table.

It is exactly this charm one should be careful with. Most historians reject the theory—for its vagueness, for the impossibility of refuting it (with a little effort, anything can be fitted into four seasons), for a kinship closer to astrology than to science. To take it as law is to trade one superstition (history is driven by heroes) for another (history is driven by a clock).

⁹⁴ The theory of generational cycles—William Strauss and Neil Howe, *Generations* (1991) and *The Fourth Turning* (1997): the “saeculum” (a span borrowed from Roman reckoning, the length of a human life, ~80–90 years) divides into four “turnings”—High, Awakening, Unraveling, Crisis—with recurring generational archetypes. Most historians and sociologists class the theory as pseudoscience—“vague and bordering on pseudoscience,” “unfalsifiable” (Michael Lind). Its ideological career came through Steve Bannon, who popularized it energetically. It is taken here as a symptom of the craving for a timetable, not as a law.

There is a pattern in the repetitions, no argument there; but it rests on no mystical timetable. For disaster to “rhyme,” no scheduled turnover of generations is required—the same broken structure, rebuilt anew, is enough.⁹⁵ This explanation is duller, and more honest for it. It does not undertake to name the year of the collapse. It says only that everything built to this scheme will collapse, and points to what in the scheme needs fixing. The timetable guesses at dates and almost always misses; the blueprint names no dates, but it names the cause—and is the more useful for it. History does not tick like a clock. It keeps stepping on the same rake, because no one has ever put the rake away.

Why the Lesson Doesn’t Take

So why does no one put it away? Why is the lesson, paid for with so many collapses, not passed down? Here the mechanism from Chapter 8 returns—the cache that never gets recomputed. Every generation holds a ready-made answer it has never once checked. The people before—the ones who stepped on this rake earlier—were naive, savage, backward. The people now are another matter: the people now have reached the end of the road. Each time, this conviction dresses itself in new arguments, and the arguments seem weighty. Sometimes in tools: the people before lacked what exists now—and since the tools are unprecedented, the fate will be unprecedented too. Sometimes in morals: the people before were harsher, darker, more bloodthirsty, while the people now are more enlightened and

⁹⁵ The folk version of the same intuition—“history does not repeat itself, but it rhymes”—is usually attributed to Mark Twain; the attribution is apocryphal (no trace of it before his death in 1910; the phrase began to be credited to Twain only around 1970). A genuinely close thought does appear in Twain, in the novel *The Gilded Age* (1874), but in different wording. The “rhyme” metaphor is convenient, but behind it stands the same structure nobody has cleared away.

gentler—as though gentleness of temper fixed a flaw in the design. Sometimes in history itself: the people before stood in the middle of the road and erred for that reason, while whoever stands at its end is insured. The arguments change, the conclusion is always the same (“it will not happen here and now”), and that is exactly the part that never gets recomputed. It surfaces with particular force at the peaks of calm. The freshest example is the turn of the 1990s, when “the end of history” was proclaimed in earnest and with scholarly weight: the great confrontations were behind us, the best of systems had been found, and what remained was to furnish what had been achieved.⁹⁶ The wheel, of course, turned over again. Not because that hope was stupid. It is simply that “we have reached the end” is the very cached answer every era pulls out without looking—and errs with in exactly the same way each time. Hegel said it dryly a century and a half before it became fashionable: exactly one thing is ever learned from history—that no one learns from it.

And still the reports are worth reading—not for a timetable of the future. For the sake of remembering the shape of the failure the way you remember a face: wherever it turns up, whatever banners it dresses in, you know it for the same one. The place to start is with the oldest and most enormous single points of failure civilization has known—empires. They seemed eternal right up to the morning they crumbled.

⁹⁶ Francis Fukuyama, the essay “The End of History?” (*The National Interest*, Summer 1989) and the book *The End of History and the Last Man* (1992): the thesis that liberal democracy may prove to be the end point of humanity’s ideological evolution. Subtler than the popular slogan (Fukuyama spoke of a direction, not a literal “end of events”), but in the mass reading it became the vivid specimen of the recurring conviction that the final form has already been reached—exactly what Ch. 8 called the unrecomputed cache.

Chapter 11. Empires and the Single Point of Failure

*“My name is Ozymandias, King of Kings; / Look on my Works, ye Mighty, and despair!” — Percy Bysshe Shelley, “Ozymandias” (1818)*⁹⁷

On the pedestal, a boast: king of kings, look and despair. Around the pedestal, sand to the horizon. Two stone legs without a trunk, a shattered face in the sand, and nothing else left. Shelley packed into fourteen lines everything worth knowing about empire: the inscription promises eternity, and the one reading it is a lone traveler in the middle of the desert that this eternity has become.

An empire at its peak really does look eternal. The roads are laid out, the border is locked, the coin rings the same from one edge to the other, an official in a distant province writes in the same hand and on the same form as in the capital. To a subject it seems it has always been this way and always will be. Those who live through the peak are usually unable to imagine its end—which is why they prepare no fallback routes. This feeling of indestructibility is not a refutation of the coming collapse but a symptom of it. In the last chapter, the failure had a repeat-

⁹⁷ Percy Bysshe Shelley, the sonnet “Ozymandias”—written around Christmas 1817, published on January 11, 1818, in the London *Examiner* under the pseudonym “Glirastes.” The key lines verbatim: “My name is Ozymandias, King of Kings; / Look on my Works, ye Mighty, and despair! / Nothing beside remains.” The epigraph gives the original lines, “despair” intact. The canonical Russian translation by K. Balmont drops that word (his lines run, roughly, “Look upon my great deeds, / Ye lords of all the ages...”), and the whole irony lives in it: the “Works” have long since been ruins. “Ozymandias” is the Hellenized throne name of Pharaoh Ramesses II.

ing course. A system heading for the cliff looks, right before the cliff, stronger than ever. An unnoticed mistake is not yet a catastrophe. The monolith looks like a monolith until the morning it crumbles. An empire is that course at the largest scale history has known. The ruins of the Roman Forum that tourists are led through are the same pedestal in the sand, only the inscriptions have worn away.

To understand why it is precisely what looked eternal that crumbles, you have to look at an empire not as a succession of kings but as a structure. Then, beneath the Roman, Bronze Age, and Chinese scenery, one blueprint shows through: power, supply, accounting, and defense gathered into a single point. And no wire along which word could travel back up that the point is leading the wrong way. A single point of failure the size of a civilization.⁹⁸

Strictly speaking, there are two kinds of breakage here, and they are worth telling apart from the start. A single point of failure is when there is a node without which nothing stands. Tight coupling is when there is no single node at all, but the parts are coupled so tightly that none of them fails alone. In this chapter, Rome and the Chinese dynasties will show the first, the Bronze Age the second, and one thing makes them kin: both turn a local calamity into a shared one.

Rome: The Tighter It Is Bound, the Wider the Crack

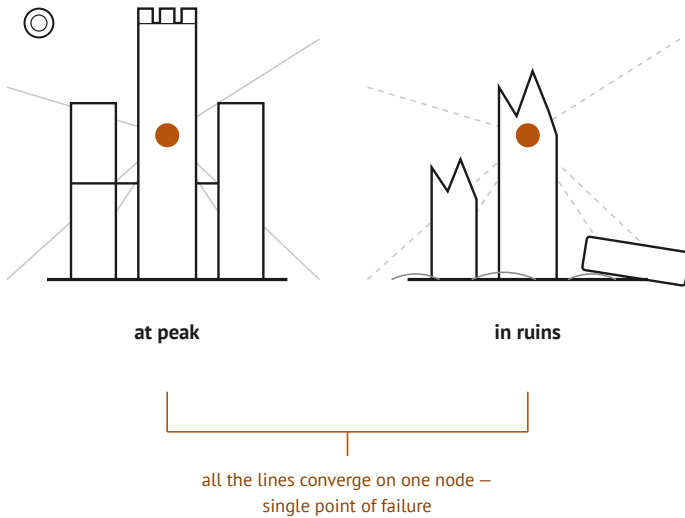
Rome carried the gathering of everything into one point to a model that everyone afterward measured themselves against.

⁹⁸ A single point of failure is a node whose failure brings down the whole system; tight coupling is a linkage in which the failure of one component is passed quickly to the rest. The classic analysis of how tight coupling turns a local fault into a catastrophe is Charles Perrow, *Normal Accidents* (1984). Bulkheads are a technique for isolating failure. The lineage is from the design of reliable systems (Ch. 3).

FIGURE 11.1

The peak as a ruin

the same city – the same blueprint



*What holds everything up is also
what takes it all down.*

The roads converged on the capital, and along them moved the legions and the grain. The coin was struck to a single standard. It paid wages on three continents. Administration, tax, law, the army's oath—everything ran up to the center. This centralization was Rome's strength: it bought order, speed, a single answer to a threat, a common market the size of the Mediterranean. Two centuries of the Pax Romana seemed the natural order of things, not a rare and fragile stroke of luck.

The same centralization carries a price on its reverse side, and that price is sewn into the structure itself. When everything rests on the center, the periphery has no footing of its own. While the center is healthy, this goes unnoticed and is even convenient. But the moment it splits (a coup, a civil war, a run of emperors raised up and cut down by their own armies), the provinces are left without what they stood on: without the coin they trusted, without the legions that came to the rescue, without the court they appealed to. A fault that in a loose, scattered system would have stayed local runs, in a tightly bound one, up and down every line at once.

Twice this price is visible to the naked eye. Money. The silver denarius, the single standard on which trade from Britain to Syria rested, was hollowed out from within over centuries. Under Augustus the coin was about 98 percent silver, under Caracalla half, and by the height of the third-century crisis a few percent.⁹⁹ For a center with nothing to pay its armies, the easiest thing was to debase the coin. And the coin the whole world trusted turned, before everyone's eyes, into a token. And

⁹⁹ The silver denarius: ~98% silver under Augustus → ~75% by AD 117 → ~50% under Caracalla (211–217) → a few percent by the third quarter of the third century (under 1% by the end of the crisis). The “Crisis of the Third Century” (235–284): in some 50 years, more than twenty emperors succeeded one another on the throne, almost all of whom died violently. Debasement of the coin → inflation and loss of trust in the single standard. Compiled data on the Roman denarius and the Crisis of the Third Century.

along with trust in it, the trade that held the empire together crumbled too. Power. In the half century after 235, more than twenty emperors succeeded one another on the throne, and almost every one was killed—by his own soldiers or by rivals. The single point where all command converged became a revolving door with a knife on the threshold. Neither came from outside. The center itself failed, exactly where everything leaned on it.

Why Rome fell, historians argue to this day, and there is no single answer: the proposed causes run into the hundreds.¹⁰⁰ No verdict is passed here on any one of them. The claim is more modest and, for that reason, firmer: centralization does not necessarily bring the system down by itself. It changes the physics of failure, turning a local calamity into a shared one. The tighter everything is bound into one point, the wider the crack spreads when the point gives way.

The Bronze Age: The Coupled Sink Together

More than a thousand years before Rome, the Eastern Mediterranean was already stitched into a single system. Egyptians, Hittites, Mycenaeans, Minoans, Cypriots, Assyrians, Babylonians, Canaanites—ten or so civilizations bound together by trade, embassies, marriages between royal houses, and the flow of copper and tin, hauled in from a handful of deposits thousands of kilometers away. Without them, no bronze can be cast, and bronze in those days was the plow, the sword, and the very possibility of arming an army. Coupling

¹⁰⁰ The causes of the fall of the Western Roman Empire remain a matter of dispute without consensus; Alexander Demandt (1984) counted 210 proposed explanations. Modern historiography avoids a single cause, listing the army, the economy, demography, the competence of rulers, internal strife, religious shift, and administrative efficiency, and divides the schools into “external” (invasions) and “internal” (institutional decay) factors. Centralization is taken here not as the cause of the collapse but as a property that changes the physics of failure.

was wealth: every palace received what it lacked and sold off what it had in surplus.

Around 1177 BC this system collapsed—almost all at once, within a single human lifetime.¹⁰¹ The palace economies fell, the scribes vanished along with writing, the cities emptied, trade broke off, and centuries followed from which almost no records remain. The historian Eric Cline describes what happened not as a single invasion but as a “systems collapse”: drought, famine, earthquakes, severed trade routes, raids by the “Sea Peoples”—a linkage in which each failure dragged the next one after it. The specific causes are argued over to this day; but the mechanism is plainly visible.

The mechanism lies in the coupling itself, and it is a different one from Rome’s. There was no capital here whose fall would have brought down the rest: not one of the ten palaces held the system up alone. The network between them held it. A tightly coupled system is efficient while everything works and merciless when any one thing breaks: a link snaps, the load shifts to its neighbors, and they snap too. There are no bulkheads of the kind that, on a ship, keep the water from a breached compartment from flooding the whole hold. What in a good year served as a channel of plenty became, in a bad one, the channel along which one palace’s calamity reached all of them within a few decades. The coupled sink together.

From one of those palaces, a last letter survives. The king of Ugarit (a port city on the Syrian coast) managed to report that enemy ships were already burning his cities and doing evil in his land. The clay tablet bearing those words was baked to stone by

¹⁰¹ Eric H. Cline, *1177 B.C.: The Year Civilization Collapsed* (Princeton University Press, 2014). The term “systems collapse” goes back to Colin Renfrew. The markers: collapse of central administration, disappearance of elites and of writing, breakdown of the centralized economy, population decline. The specific causes (drought, earthquakes, the “Sea Peoples,” the rupture of trade) are disputed; Cline insists on the linkage of causes and on the fact that interdependence itself accelerated the collapse.

the very fire that destroyed the city.¹⁰² Ugarit was never rebuilt. “Writing stops, everything stops, and no one comes back,” Cline observes. A city that managed to record its own death is more graphic than any diagram: the connection that had fed it for years saved no one in the hour when everything was snapping at once.

The Mandate of Heaven: A Signal That Arrives Late

China gave the periodic collapse of power gathered into a point a direct name—and built it into its picture of the world. The Mandate of Heaven: heaven grants the right to rule to the worthy and takes it from the unworthy.¹⁰³ The sign of a revoked mandate was disaster—famine, flood, plague, rebellion. If misfortunes are raining down on the country, the ruler has lost heaven’s sanction. And overthrowing him is permitted: it is the fulfillment of heaven’s will. The next dynasty, risen on the wreckage of the one before, justified itself by the same mandate.

This script repeated so many times that historians gave it a name—the “dynastic cycle.” Han, Tang, Song, Ming, Qing—different houses, different centuries, one and the same arc from the warrior-founder to the last weak heir, and often one and the same trigger: a flood on the Yellow River, a failed harvest, a

¹⁰² Ugarit (Ras Shamra, on the Syrian coast) perished ca. 1185–1178 BC. The last letter of King Ammurapi: “My father, behold, the enemy’s ships came; my cities were burned, and they did evil things in my country.” The tablets were found baked in the fire that destroyed the city (the earlier version—baked “in a kiln before dispatch to Cyprus”—is now disputed). Cline’s remark is from his lectures and the book *1177 B.C.* (2014).

¹⁰³ The Mandate of Heaven is a concept formalized under the Zhou dynasty (from the eleventh century BC) to legitimize the overthrow of the Shang. The “dynastic cycle” (rise → flourishing → decline → loss of the mandate → change of dynasty) is a traditional model and a real pattern, but also a simplification: historians dispute its accuracy. It is taken here as a pattern plus a structural reading (belated feedback), not as a law.

hunger riot.

Inside the mystical shell hides a sound engineering meaning—and a built-in flaw. The “mandate” works as a feedback signal: something in the government has broken. But the signal is late by its very design. It lights up not when power began to err but when the error has already become famine and revolt—that is, when there is almost nothing left to fix. And, more important, each time the cycle restarts the same structure: the new dynasty does not touch the arrangement under which everything is once again gathered into one point, and there is still no one to tell it “wrong” before the catastrophe. They change the tenant, not the house. That is why the wheel keeps turning—rise, ossification, blindness, collapse, restart—the same rake from the last chapter, laid out dynasty by dynasty. The “dynastic cycle” itself is only a model and, like any model, simplifies; but the pattern is real, and so is its cause—a control loop in which the signal about the error arrives last.

What this looks like up close can be seen in the last decades of the Ming dynasty. Its last emperor, Chongzhen, was neither lazy nor stupid—he was blinded. From below, smoothed-over reports flowed up to the throne, in which the harvest failure was milder, the tax arrears smaller, and the rebellion farther away than in fact. Around the throne, courtiers and eunuchs intrigued, each with his own version of the truth. The emperor could not pick the signal out of that noise—so he struck at the noise. In seventeen years he replaced his minister of war fourteen times, executed seven governors and eleven commanders, and went through some fifty grand secretaries. The culmination was the execution of Yuan Chonghuan—his best general, who had held the northern frontier against the Manchus. He was falsely accused of treason; by a number of accounts, on the strength of a rumor the Manchus had planted on purpose. The throne, with its own hand, removed the one man who was

actually defending it.¹⁰⁴ When the rebels reached Beijing in 1644, the gates were opened from inside, and there was no one left to defend the capital with. Chongzhen hanged himself in the palace garden. The “mandate” was revoked—but only when there was nothing left to repair; on the wreckage rose a new dynasty with the same arrangement.

The Sparrows: A Decree Without a Return Wire

The fastest and most graphic case is not from antiquity. In 1958, China declared war on the “four pests”: rats, flies, mosquitoes, and sparrows.¹⁰⁵ The sparrows were accused

¹⁰⁴ Chongzhen (Zhu Youjian)—the 17th and last emperor of the Ming, reigned 1627–1644; hanged himself in the palace garden (Jingshan) when Li Zicheng’s rebels took Beijing on April 25, 1644 (the gates were opened from inside). In 17 years he executed seven governors and eleven commanders, changed his minister of war fourteen times, and appointed ~50 grand secretaries. The execution of General Yuan Chonghuan (1630), who had defended the northern frontier against the Manchus, on a charge of “treason” is considered by many the decisive blow to the Ming’s capacity to defend itself; by some versions, the suspicion was inflamed by a rumor deliberately planted by the Manchus (cf. reflexive control, Ch. 7). The famines of the 1620s–30s, the Li Zicheng rebellion (from 1631, Shaanxi), the dominance of the eunuchs (Wei Zhongxian under the preceding reigns)—the crisis had many causes; Chongzhen here is a graphic illustration of the mechanism, not the sole cause.

¹⁰⁵ The “Four Pests” campaign (1958), part of the Great Leap Forward: rats, flies, mosquitoes, sparrows. By various estimates, hundreds of millions of sparrows were exterminated (by some estimates, up to ~2 billion). Studies showed that the sparrow’s diet is predominantly insects, and their disappearance caused an outbreak of pests, above all locusts; grain yields fell. The ornithologist Zheng Zuoxin (Cheng Tso-hsin, Institute of Zoology, Chinese Academy of Sciences) had warned in advance of the sparrows’ usefulness (dissection of hundreds of birds: in spring they feed on insects) but was ignored; his arguments were revisited only by April 1960—at which point sparrows were removed from the list (replaced by bedbugs). Sources: Four Pests campaign (compiled data); VoxDev (2023); Global Landscapes Forum; CGTN.

of pecking grain. The country went out hunting: birds were driven with noise and never allowed to land, people banged on basins and pots, nests were torn apart. In places the din went on for days on end—exhausted birds, finding nowhere to land, dropped out of the sky straight onto the streets. Hundreds of millions were exterminated.

The calculation was obvious and wrong. In the sparrows' stomachs there turned out to be less grain than insects: the bird appointed a pest had been keeping the real pests in check—above all the locusts, whose natural enemy the sparrow was. The enemy vanished—and the insects multiplied without restraint. The harvest the campaign promised to save was the harvest it undercut: where the sparrows had been wiped out more thoroughly, the yields fell harder. The sparrow hunt became one of the threads braided into the Great Chinese Famine of 1959–1961—alongside forced grain requisitions, padded reports, the melting of household utensils into useless iron, and dense sowing by Lysenkoist recipes. How many people died is disputed: estimates range from fifteen million to more than fifty.¹⁰⁶

In engineering terms, this is the same failure that killed Soviet genetics in Chapter 9, only scaled up to the population of an entire country. There was a center capable of issuing a command to the whole country at once. And there was no line along which a simple message could reach the top from below: the sparrow eats locusts, leave the sparrow alone. A voice that could have said this sounds, in a system resting on the infallibility of the leader, like doubt about the leader. And such a voice is the

¹⁰⁶ The Great Chinese Famine (1959–1961) was a catastrophe with many causes: forced grain requisitions, padded reports, “backyard furnaces,” dense sowing (Lysenkoism), weather, the ecological backlash of the sparrow campaign. Estimates of the death toll diverge widely—~15–55 million (the figures most often cited are ~30–45 million: Yang Jisheng ~36 million, Frank Dikötter ≥45 million). Given as a range because of the dispute.

first to be silenced. But the voice was there. The ornithologist Zheng Zuoxin and his group dissected hundreds of sparrows and showed it in numbers: in spring the bird feeds its chicks insects, grain is only part of the diet, and destroying the sparrow regardless of season and place is wrong.¹⁰⁷ The arguments were set aside. The signal did reach the top in the end (by 1960 sparrows had been quietly removed from the list of pests), but it reached it only when the locusts and the famine had made the ornithologist's rightness obvious without any statistics at all. The bill had already been paid.

An Old Failure Under Load

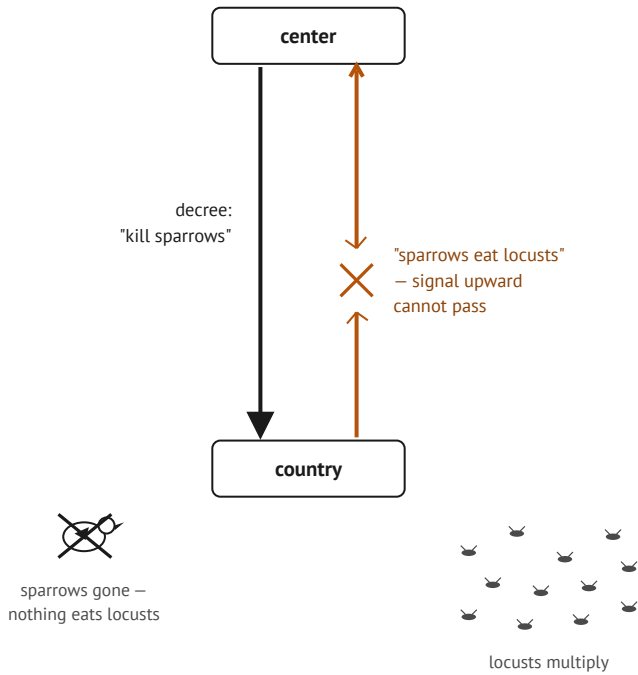
Rome, the Bronze Age, the Chinese dynasties, a Maoist decree—four dissimilar worlds, four technologies, four pantheons, and one shared property: the failure had nowhere to stop. Where everything is gathered into a point, the fall of the point brings it down; where everything is coupled tight, the snapping of any link does. The blueprints differ, the calamity is one: a local breakage spreads to everyone, and there is no one to say “wrong” in time. Only the scale changes, and the speed at which the bill comes back.

This failure has an opposite, and it is not an engineers' invention. A system assembled from many independent parts loses a

¹⁰⁷ The “Four Pests” campaign (1958), part of the Great Leap Forward: rats, flies, mosquitoes, sparrows. By various estimates, hundreds of millions of sparrows were exterminated (by some estimates, up to ~2 billion). Studies showed that the sparrow's diet is predominantly insects, and their disappearance caused an outbreak of pests, above all locusts; grain yields fell. The ornithologist Zheng Zuoxin (Cheng Tso-hsin, Institute of Zoology, Chinese Academy of Sciences) had warned in advance of the sparrows' usefulness (dissection of hundreds of birds: in spring they feed on insects) but was ignored; his arguments were revisited only by April 1960—at which point sparrows were removed from the list (replaced by bedbugs). Sources: Four Pests campaign (compiled data); VoxDev (2023); Global Landscapes Forum; CGTN.

FIGURE 11.2

The severed wire



*The command passes down;
the error signal never comes up.*

part, not itself: one drops away, and its neighbors hold, because they never rested on it entirely. That is how the networks are built that survive the death of any node; that, in embryo, is how any federation is built. Neither the single point of failure nor tight coupling is fate: both are design choices, and the choice can be made differently.

The twentieth century, knowing the price of imperial collapses, did not disperse power. It gathered it tighter than ever—and thereby put the ancient failure on an industrial footing. The planned economy undertook to count, from a single center, what no empire had ever attempted: every ton, every nail, every pair of shoes. Propaganda undertook to fix feedback itself—to erase the error signal at its source, so that not even the belated “mandate” that toppled dynasties would reach the top. The old breakage acquired electricity, statistics, radio, and barbed wire. What came of it, history showed quickly—and twice.

Chapter 12. The Twentieth Century: Totalitarianism and Its PR

*“Who controls the past controls the future: who controls the present controls the past.” — George Orwell, 1984 (1949)*¹⁰⁸

The last chapter ended with the twentieth century putting imperial failure on an industrial footing. It is worth seeing exactly how. In the twentieth century, the old breakage (power gathered into a single point, the feedback wire severed) acquired two new engines: centralized planning and mass broadcasting. The first undertook to count, from a single center, the country’s entire economic life, down to the last nail. The second undertook to manage what the country counts as true. In both places one and the same line was cut (the one over which a system learns it was wrong)—only now it was cut skillfully: with people’s commissariats, budgets, and a theory explaining why this was how it should be.¹⁰⁹

What follows is about the century’s totalitarian regimes, the Soviet and the Nazi. Measuring their crimes with a single yard-

¹⁰⁸ George Orwell, *Nineteen Eighty-Four* (1949), pt. I, ch. 3—the Party slogan: “Who controls the past, ran the Party slogan, controls the future: who controls the present controls the past.” In the USSR the novel was banned until 1988 (the first published Russian translation—V. Nedoroshev, 1988; V. Golyshev’s, 1989).

¹⁰⁹ “Totalitarianism” here is a structural category (Arendt; the Friedrich–Brzezinski model, 1956: a single ideology, one party, terror, a monopoly on information and weapons, a planned economy): centralized power + suppressed feedback + total propaganda. Placing the Soviet and Nazi regimes in one class is a matter of STRUCTURE—not an equation of their specific crimes, and not a denial of the differences in ideology and scale; disputes such as the “double genocide” debate are a separate subject, not taken up in this book.

stick is neither necessary nor the point here. What matters is something else: two dissimilar ideologies that hated each other turned out to share one and the same blueprint of failure. It is recognized by the same mark as the imperial collapses of the last chapter: severed feedback. Only now it is severed in two places at once—in the economy and in truth. In the last chapter the error signal merely ran late—the Mandate of Heaven was revoked when the dynasty was already burning. Here it is cut ahead of time and on purpose: so that no bad news reaches the top, the very instrument by which bad news is obtained is abolished. That is the transition from breakage to its industrial production.

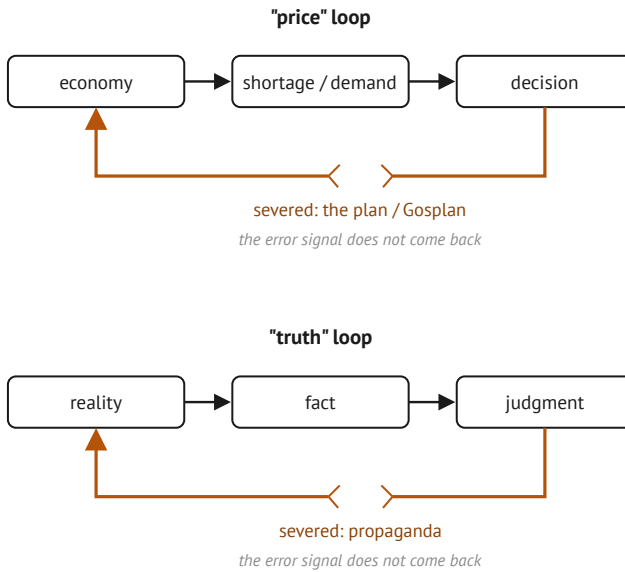
An Economy Without a Signal

The first break is economic, and it rests on a simple misunderstanding about price. A price looks like greed talking: the seller wants to gouge a bit more. In fact a price is a signal, and a dense one. Folded into it is knowledge dispersed across millions of people, knowledge no one holds in full: how scarce the thing is, how badly it is needed, how much labor and raw material went into it, whether a substitute exists. When copper gets expensive, an engineer who has never seen a mine in his life switches to aluminum—not because he has sorted out world copper mining, but because the price delivered the conclusion to him without showing the calculation. The economist Friedrich Hayek called this the market's chief marvel: a price conveys exactly as much knowledge as the decision needs, and does not require gathering all knowledge in one head.¹¹⁰

¹¹⁰ The economic calculation debate. Ludwig von Mises, "Economic Calculation in the Socialist Commonwealth" (*Die Wirtschaftsrechnung im sozialistischen Gemeinwesen*, 1920): without a market for the means of production there are no prices for them, and without prices the planner cannot calculate efficient allocation. Friedrich Hayek, "The Use of Knowledge in Society" (1945): the needed knowledge is dispersed,

FIGURE 12.1

Two severed wires



The same breakage, two places.

The planned economy undertook to gather it. The intent was not evil, and in its own way it was coherent: if the market is a chaos of private interests, replace it with a single rational plan, count the country's needs in advance, and hand out to each according to the computation. But in abolishing the market for the means of production, they abolished the prices of those means—and with the prices went the signal. Ludwig von Mises showed this as early as 1920: without prices the planner is blind; he has nothing with which to tell a sensible use of a resource from a wasteful one; he does not calculate. He guesses.¹¹¹

What happens when a signal is replaced by an order shows in a textbook example. A factory receives its nail plan in tons. And the most profitable move is to cast one enormous useless nail: the tons are made, the report is green. The plan is switched to units. The factory churns out millions of tiny useless nails. This is a caricature, from the magazine *Krokodil*; but behind the caricature stand documented distortions: under tonnage plans, Soviet sheet metal came out thicker, glass heavier, paper

tacit, and changeable, and price aggregates it without requiring it to be collected in one center—the problem is not computational but epistemic. Mises's strong thesis ("socialism is impossible") was contested (the Lange–Lerner market socialism); what is taken here is the durable core—price as a feedback loop—not the political program (cf. ch. 5, on the Austrians critically).

¹¹¹ The economic calculation debate. Ludwig von Mises, "Economic Calculation in the Socialist Commonwealth" (*Die Wirtschaftsrechnung im sozialistischen Gemeinwesen*, 1920): without a market for the means of production there are no prices for them, and without prices the planner cannot calculate efficient allocation. Friedrich Hayek, "The Use of Knowledge in Society" (1945): the needed knowledge is dispersed, tacit, and changeable, and price aggregates it without requiring it to be collected in one center—the problem is not computational but epistemic. Mises's strong thesis ("socialism is impossible") was contested (the Lange–Lerner market socialism); what is taken here is the durable core—price as a feedback loop—not the political program (cf. ch. 5, on the Austrians critically).

thicker than needed.¹¹² Reliability engineers know this as Goodhart's law: when a measure becomes a target, it ceases to be a good measure. The economy optimizes the metric, because it answers to the metric and not to the man who needs a nail. The signal "this is no good to anyone" would have come back as an empty till; an order has nothing to carry it back with. Which is why the planned economy lived for decades inside one and the same paradox: warehouses stuffed with the unusable, and a line for the simplest things.

This blind economy had its own daily routine, too. A factory that cannot go bankrupt is also denied the market's main signal—the news of its own uselessness. The Hungarian economist János Kornai called this the soft budget constraint. Losses are covered from above; failure is plugged with a subsidy. The enterprise has no reason to count in earnest: the center will count for it and bail it out.¹¹³ Hence the month split in two. For the first weeks the shop floor stood idle, waiting for components the supplier plant's own plan had failed to deliver to it. And at the close came storming—a feverish race just to get the plan figure out by the deadline. At any cost and of any quality. And when the figure still did not come out, it was written in. Padded returns—invented summaries of harvests, tons, and percentages—went up the line exactly the way victory dispatches about battles that never happened had gone to

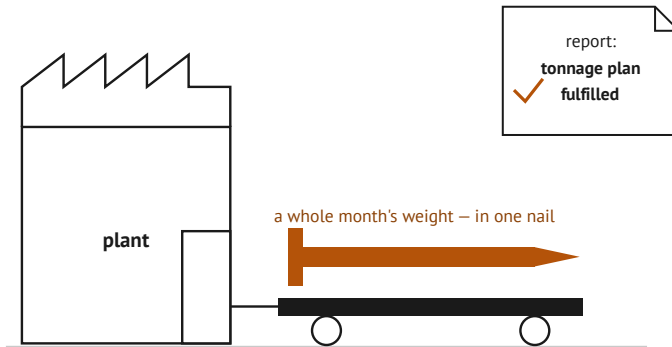
¹¹² "One big nail" is a caricature from the magazine *Krokodil* (1957), a parable-anecdote, not a documented case. Distortions of the same kind are documented: under tonnage plans, Soviet sheet metal came out thicker, glass heavier, paper thicker than needed (Alec Nove, *The Soviet Economic System*). Goodhart's law: "when a measure becomes a target, it ceases to be a good measure" (C. Goodhart, 1975).

¹¹³ János Kornai (1928–2021), Hungarian economist. The concepts of the soft budget constraint (1979) and the economics of shortage (*Economics of Shortage*, 1980): a socialist enterprise insured in advance against bankruptcy loses the incentive to economize—hence chronic shortage and waste at the same time. Kornai described the system from inside (Hungary), empirically, not from Austrian positions.

FIGURE 12.2

One big nail

the plan is set in tons – the plant makes tons



a line for ordinary nails –
none exist

When a measure becomes a target (Goodhart's law).

court a century earlier (chapter eleven). The center governed the country by reports—and the reports had learned to tell the center what it wanted to hear. The loop closed on itself: an order from above, a report of fulfillment from below—and nowhere around the circle a gram of reality.

A caveat is needed here, so as not to swap one slogan for another. Nor was the debate one-sided: the socialists answered Mises's challenge. Oskar Lange and Abba Lerner showed on paper how a planning board could feel its way to prices by trial and correction, the way a market does, and that argument drags on to this day. But from the fact that the plan tears the price feedback loop it does not follow, in any case, that the market is holy and all intervention ruinous: that is a different faith, and it gets a conversation of its own. The conclusion is more modest and firmer—the market is first of all a feedback loop, and an economy that cuts that loop goes blind in proportion to how conscientiously the cutting was done.

Truth Without a Signal

The second break is subtler than the first, and more frightening. A totalitarian regime does not merely lie. All governments lie. An ordinary lie hides a truth that still exists somewhere: the liar fears exposure, because there is something to expose him with. Totalitarian propaganda aims deeper—at the very capacity to tell truth from fiction. When yesterday's hero is declared an enemy today and struck from the textbooks and the photographs; when harvest figures are drawn rather than counted; when today's ally has retroactively always been the enemy—what is taken from a person is not a fact but the footing on which facts are checked at all. Orwell called this controlling the past: whoever rewrites yesterday disposes of tomorrow.

This remaking of the past had an entirely literal craft to it. In a 1937 photograph, People's Commissar Nikolai Yezhov,

head of the secret police, stands beside Stalin on the bank of the Moscow–Volga Canal. Yezhov was shot, and a retoucher removed him from the photograph. Where the man had been, water remained. Trotsky was scrubbed from frames beside Lenin, comrades-in-arms from group portraits. Whole faces were dissolved with scalpel and airbrush until yesterday’s leader turned into a blank between the two men left standing.¹¹⁴ This was the technology of controlling the past: the record of what had been was rewritten physically, frame by frame, so that tomorrow would have no yesterday left to check itself against.

Hannah Arendt described the end state more precisely than anyone. The ideal subject of such a regime, she wrote, is not the convinced Nazi or the convinced Communist, but the person for whom the distinction between fact and fiction, between true and false, no longer exists.¹¹⁵ That is the severed feedback of truth, taken to the limit. A society deprived of the distinction between true and false cannot notice that it is going the wrong way—it has nothing to notice with. The signal from reality is cut at the very root. What in chapter eight was a personal convenience (not recomputing a conviction, keeping a ready answer in cache) becomes a state program here: the cache is rewritten from above, and the instrument of verification is confiscated

¹¹⁴ The falsification of photographs in Stalin’s USSR is documented: David King, *The Commissar Vanishes* (1997). Nikolai Yezhov, People’s Commissar of Internal Affairs, was photographed beside Stalin on the bank of the Moscow–Volga Canal (1937); after Yezhov’s execution (1940) he was retouched away—smooth water remained on the print. Leon Trotsky and others were scrubbed out of photographs from Lenin’s time.

¹¹⁵ Hannah Arendt, *The Origins of Totalitarianism* (1951): “The ideal subject of totalitarian rule is not the convinced Nazi or the convinced Communist, but people for whom the distinction between fact and fiction (i.e., the reality of experience) and the distinction between true and false (i.e., the standards of thought) no longer exist.” In “Truth and Politics” (1967) she adds: the consistent substitution of lies for truth destroys the very sense by which we take our bearings in the real world.

altogether. The society goes blind not in one eye but entirely—and, worse, loses the ability to notice the blindness itself. A system unable to learn that it was wrong is doomed to accumulate the error—exactly as the fallen empires of the last chapter accumulated it, only faster now, and more totally.

Stupidity at the Scale of a Nation

One question remains, without which the picture does not add up: how did whole peoples—literate, cultured, peoples who had given the world music and science—do the monstrous and see nothing monstrous in it? The answer came from a man who watched it from inside. Dietrich Bonhoeffer, a Lutheran pastor in the anti-Nazi resistance, wrote that stupidity is a condition produced by the pressure of power.¹¹⁶ Under the press of slogan and crowd, a person surrenders his own judgment and stops asking questions. And then even the far-from-stupid becomes an instrument against which, Bonhoeffer observed, arguments are powerless. They bounce off. There is nothing left to appeal to.

This is not a verdict of “they were villains,” nor a verdict of “they were idiots.” Both are comforting and wrong, like every villain hunt from chapter ten. The mechanism is impersonal, and dangerous for exactly that reason. Give power enough force and a loud enough megaphone, take from people the habit and the means of checking against reality—and no villain will be needed. Ordinary people who have surrendered their judgment are enough. It is the same stupidity that in chapter nine, through Lysenko’s hands, cost the country its harvests and its scientists—only poured out across an entire

¹¹⁶ Dietrich Bonhoeffer, “On Stupidity” (part of “After Ten Years,” Christmas 1942; published in *Widerstand und Ergebung*, 1951): stupidity is a moral and social condition under the pressure of power; arguments are powerless against it, and only liberation cures it. Bonhoeffer was arrested in April 1943 and executed on April 9, 1945. More in ch. 9.

nation. Literacy was no protection: an educated man who had surrendered his judgment simply executed the madness more neatly and more inventively than an ignorant one. The more complex the machine, the more it needs this voluntary refusal by millions to think for themselves—without it, no total system runs for even a day.

One and the Same Pretext

This design has an outward habit as well (a way of starting wars), and it, too, repeats down to the letter. The model was set in 1938. Germany demanded the Sudetenland, a border region of Czechoslovakia, on the grounds that ethnic Germans lived there, that they were being oppressed, and that justice commanded they be “brought home.” The subtlety is that the oppression was being constructed. Konrad Henlein’s Sudeten German Party took its instructions from Berlin. At a meeting with Hitler on March 28, 1938, Henlein received a direct instruction, and by the surviving accounts he expressed its meaning himself: to demand so much that the demands could not be satisfied. A month later the party announced the Karlsbad Program—eight points drawn up so that any concession from Prague only dragged a new demand behind it. The grievance was not found. It was mass-produced, so that a pretext would always be at hand.¹¹⁷ In September 1938 the great powers, saving

¹¹⁷ The Sudeten crisis, 1938. Germany grounded its claim to Czechoslovakia’s border region in the “Germanness” of its population. Konrad Henlein’s Sudeten German Party acted on instructions from Berlin; at a meeting with Hitler on March 28, 1938, Henlein was instructed to put deliberately unacceptable demands to Prague (so that the pretext would never run dry)—a point he himself, by the surviving accounts, condensed into a formula: to demand so much that the demands could not be satisfied. On April 24, 1938, the party announced the eight-point Karlsbad Program (Karlsbader Programm). The Munich Agreement (September 29–30, 1938; Germany, Italy, Britain, France—without Czechoslovakia’s participation) handed the Sudetenland to the Reich; in March

the peace, handed over the Sudetenland at the Munich Conference, to which Czechoslovakia itself was not invited. Six months later Germany took the rest of the country. There was no one left there to protect.

The template is simpler than it seems, and the more tenacious for it: inflate or invent an “oppressed minority of our own” abroad → demand its protection → send in the troops. Its strength is that it sounds like compassion: not a seizure but a duty to stand up for perishing kin. Under that banner they have marched in more than once. The Anschluss of Austria in that same 1938 was justified as the “reunification of Germans”; in 2014 the occupation and annexation of Crimea was grounded in the protection of Russian speakers and the threat hanging over them.¹¹⁸ The scenery, the languages, and the measure of their own rightness are different every time—the construction of the pretext is one. It is worth learning to recognize for a single reason: a recognized pretext loses its force.

Trains on Time

And yet these regimes did not stand on fear alone. People sincerely counted them competent. Trains on time, blast furnaces and dams, a rocket in the sky, the firm hand that “brought order” where garrulous democracies only bickered. If the failure is so obvious from inside the design, where did this PR come from, and why does it live on—a reputation for strength and competence that has outlived the regimes themselves?

1939 Germany occupied the rest of the country. The Anschluss of Austria—March 1938.

¹¹⁸ Russia’s occupation and subsequent annexation of Crimea (March 2014) were justified by the protection of the Russian-speaking population and the threat to it. Cited as a modern instance of the recurring “protecting our kin” template—not as the only one, and not as identical to the Sudetenland in its circumstances. The “denazification” rhetoric of 2022 is taken apart separately (ch. 7) and not duplicated here.

Chapter 13. The Myth of “Efficient” Autocracy

*“How can we so organize political institutions that bad or incompetent rulers can be prevented from doing too much damage?” — Karl Popper, The Open Society and Its Enemies (1945)*¹¹⁹

The Lure of the Strong Hand

First, the lure itself: it is real. Democracy looks like a mess—endless argument, slow decisions, a compromise that leaves everyone unhappy. Against that backdrop the strong hand promises something simple: enough talk, the work needs doing. Reaching for that promise in an hour of chaos is an understandable pull toward having someone bring order. There is neither stupidity nor vice in it. In the weariness with squabbles and talking shops, the strong hand looks like relief: at last the arguing will stop and the doing will start. The demand for decisiveness gets louder as the crisis gets louder, and there is nothing shameful in it. The question is not whether the motive is noble but whether the design keeps its promise.

A convenient way to test it is the most famous piece of material evidence. “At least Mussolini made the trains run on time”—the phrase outlived fascism and Mussolini himself and became

¹¹⁹ Karl Popper, *The Open Society and Its Enemies* (1945), vol. 1, ch. 7, “The Principle of Leadership”: in place of Plato’s “Who should rule?” Popper proposes the question—“How can we so organize political institutions that bad or incompetent rulers can be prevented from doing too much damage?” His criterion of democracy (ch. 19) is the ability to remove rulers “without bloodshed.”

the folk formula of autocratic competence. The trouble is that he did not make the trains run on time. The untangling of Italy's railways was under way before he came to power in 1922. On the trunk lines traveled by tourists and dignitaries, the regime built showcase stations and brought the great expresses in on schedule. On the minor lines the delays stayed as they were. A journalist of the day who took this apart at close range noted: the show trains ran on time, the provincial ones as luck would have it.¹²⁰ The myth survived not because it was true but because it was repeated. Strong hands often work exactly this way: they arrive on momentum someone else has already built, stamp their brand on it, and sell the acceleration as their own achievement. And there, in embryo, is the whole device of this chapter: what stands in view is the station's dressed-up facade, not the timetable.

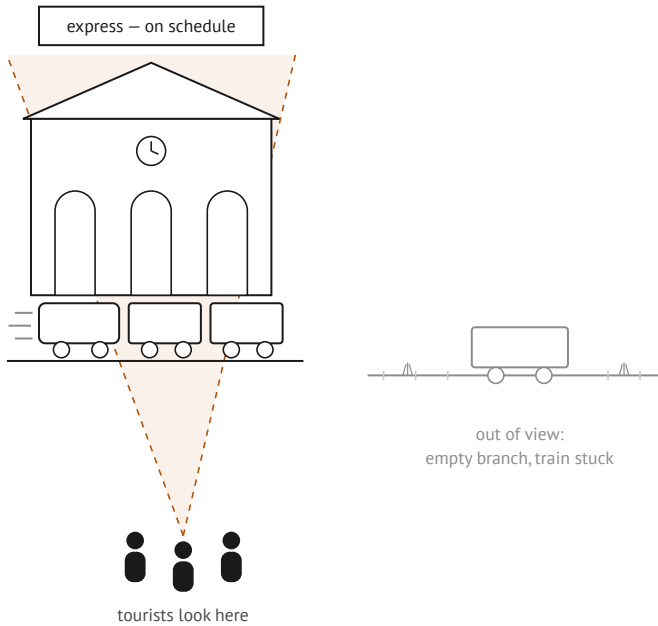
Friction Was Feedback

To understand the deception, look closely at what exactly the strong hand removes when it “brings order.” It removes friction: argument, disagreement, the stubborn deputy, the opposition newspaper, the court that says “no.” All of this genuinely slows things down—it looks like interference, lost time, inefficiency. But the friction carried a signal. Argument is the system that stress-tests a decision before it becomes an order; a dissenter is a sensor reporting that there is an error somewhere. Silencing the friction, power blinded itself: quiet at the top means not that everything is right but that the feedback wire has been

¹²⁰ “Mussolini made the trains run on time” is an enduring myth. Improvements on the Italian railways began before the Fascists came to power (1922); the punctuality of the show expresses on the trunk lines coexisted with the old delays on the secondary lines; the regime put up show-piece stations on the routes used by tourists and dignitaries. The contemporary witness is the journalist George Seldes. Debunkings: Snopes (“loco-motive”); Professor Buzzkill (2022); HowStuffWorks.

FIGURE 13.1

The facade and the branch line



"Efficiency" is shown on the facade.

cut (the invariant of chapter nine). Silence is not soundness. It is a sensor that has been cut out.

Then the second stage engages. A subordinate who has learned that disagreement is punishable stops objecting even where he plainly sees the mistake—and reports upward not what is, but what they want to hear. A mistake left with no one to contest it does not go away: it piles up silently until it breaks through all at once, and big. All that while, the system looks remarkably smooth. And that smoothness itself should be read as an alarm signal, not a success. Where there is no argument, no objection, no misfire, what you have is not perfect order—it is an alarm system switched off.

Why, then, do autocracies so often look successful? A trap is at work here that engineers know as survivorship bias. In the Second World War the statistician Abraham Wald was working out where to armor bombers. The machines came back with holes sown thick across the wings and fuselage—and the obvious move was to reinforce exactly those places. Wald showed the opposite: the armor must go where the holes are not—on the engines. Planes hit in the engine simply did not come back; the command never saw their holes, because it counted only the survivors.¹²¹ So it is with autocracies. In view are the few that “returned”: the regimes and megaprojects that worked out. Those that crashed into catastrophe never enter the statistics of popular memory. They “did not return.” Hence the impression that the strong hand works: the Singapore miracle and the shock construction projects are on everyone’s lips; the dozens of regimes that took the same swing and drove their countries into poverty, famine, or war are not. And force can seize terri-

¹²¹ Survivorship bias. Abraham Wald (Statistical Research Group, USA, World War II): armor on bombers should go not where the returning machines had holes (wings/fuselage) but where they had none (engines)—planes hit in the engine did not come back, and their damage never entered the sample. Popularized in Jordan Ellenberg, *How Not to Be Wrong* (2014).

tory, but it cannot replace the function it has destroyed. That is what the old observation is about: you can lean on bayonets, but you cannot sit on them.¹²²

The Blindest Node

The strong hand also has a blindness of its own, built in, and it runs deeper the firmer the hand. An autocrat is the stalest cache in the system (chapter eight): a conviction no one has dared to recompute in years. A wall of fear grows around him, and only pleasant news passes upward through it. The result is a paradox: the more power one man holds, the worse he sees. The political scientist Ronald Wintrobe called this the dictator's dilemma—repression muffles exactly the signal the ruler needs most: the truth about what people resent and where the fire is. Having cowed everyone who might have objected, the ruler is left alone with his own echo.¹²³ And the longer he rules, the thicker the wall and the sweeter the reports: the apparatus tunes itself to please the one viewer on whom everything depends.

The year 1937 showed what this looks like in action. Stalin, preparing for a great war, gutted his own army. On a fabricated “conspiracy,” Marshal Tukhachevsky and the top of the command were shot. In two years about thirty-five thousand com-

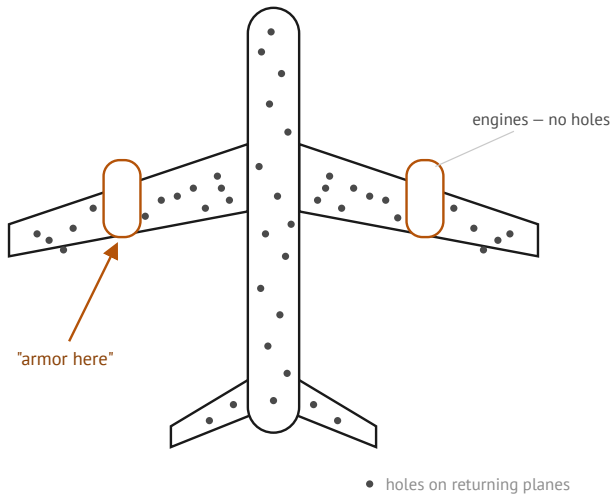
¹²² The aphorism “you can do anything with bayonets except sit on them” is traditionally attributed to Talleyrand, but the attribution is disputed (it appears in W. R. Inge, 1923, as a “throne of bayonets”; an 1851 newspaper credits Schwarzenberg). Cited as an image, not as a documented quotation.

¹²³ The “dictator's dilemma”—Ronald Wintrobe, *The Political Economy of Dictatorship* (1998): repression reduces the inflow of truthful information about discontent, and the ruler becomes worse at telling a real threat from an imagined one. The thesis is contested (S. Gehlbach et al., *AJPS*, 2026). On the modern variety—control through distortion of information and imitation of democracy instead of terror—see Sergei Guriev & Daniel Treisman, *Spin Dictators* (2022).

FIGURE 13.2

Survivorship bias

bullet-hole map of the bombers that returned



*Only what came back is visible; the missing holes —
on the missing planes.*

manders were purged—by arrest, execution, dismissal—among them three of the five marshals and thirteen of the fifteen army commanders.¹²⁴ The system was stripped of precisely those who knew how to fight. And then came the bill for the second severed line. In the spring of 1941, intelligence, allies, and defectors sent warning after warning of the coming German invasion. The signals ran to nearly ninety. Stalin brushed them all aside, trusting his own judgment, and on June 22 was caught by the war unprepared, paying for it with the catastrophe of the first months.¹²⁵ The point is not that the autocracy “lost the war”—the Soviet Union won the war, at monstrous cost and on the strength of scale. The point is the mechanism: the strong hand had itself executed the messenger (chapter eleven) and itself held the stale cache, and there was no one left to correct it. The best-protected node turned out to be the blindest.

And sometimes the severed feedback comes back to the top all at once, on live television. In December 1989 Nicolae Ceaușescu, who had ruled Romania for a quarter century inside a tight ring of adulation, stepped out onto a balcony before a crowd rounded up for the occasion. And for the first time the

¹²⁴ The purge of the Red Army, 1937–38. In the fabricated case of a “military-Trotskyist conspiracy,” M. Tukhachevsky and others were shot (sentenced June 11, 1937; the confessions beaten out of them). Repression (arrest, execution, dismissal) touched ~35,000 commanders, including 3 of 5 marshals, 13 of 15 army commanders, 8 of 9 fleet flag officers, 50 of 57 corps commanders, 154 of 186 division commanders, and all 16 army commissars. Sources: Great Purge (overview); globalsecurity.org, “Military Purges 1937–1941.”

¹²⁵ Before the German attack (June 22, 1941), Stalin received on the order of 87 warnings from different sources (intelligence, including R. Sorge; Churchill and Roosevelt; a German defector the day before) and rejected them, relying on his own judgment; the USSR met the invasion unprepared. The chapter’s thesis is about the MECHANISM (severed feedback at the summit), not about “defeat”: the USSR won the war, at the cost of enormous losses. Sources: Operation Barbarossa (overview); CIA CSI, “What Stalin Knew.”

crowd answered not with applause but with boos and whistles. On the footage you can see the leader's face freeze: a man who for years had received not a single honest signal from below receives all of it in one second. And he does not understand what is happening. The broadcast was cut; four days later Ceaușescu was overthrown and shot.¹²⁶ The strong hand does not feel the ground going, precisely because it has trained the ground not to speak—and it learns everything last, when there is nothing left to fix.

Nor is this a museum piece from a departed century. The same blind node fires before the eyes of the present generation. By 2022 the circle in which the invasion of Ukraine was decided had narrowed to a handful of trusted men from the security services, whose job was to agree. By later Western intelligence assessments, the ruler's own apparatus reported upward what was wanted.¹²⁷ The calculation was built on a quick victory—

¹²⁶ Nicolae Ceaușescu ruled Romania from 1965. On December 21, 1989, his speech from the Central Committee balcony in Bucharest drowned for the first time in the whistling and rumble of the crowd; the live broadcast was cut off. On December 22 he fled; on the 25th he was captured, condemned by a hastily convened tribunal, and shot together with his wife, Elena.

¹²⁷ Russia's invasion of Ukraine, launched on February 24, 2022, is cited here only as an example of the MECHANISM—a decision made by a node cut off from feedback (the propaganda around the war is taken apart separately in ch. 7; the mechanics of power change in the post-Soviet branches, in ch. 14). By the start of the invasion, the decision-making circle had narrowed to a few loyalists from the security services; in the assessment of American intelligence, Putin was “being misinformed by his advisers,” who were unwilling to tell him the full consequences of the military step. The calculation was built on a quick victory—the rapid capture of Kyiv and a change of government; the assumption proved a gross miscalculation (the tenacity of Ukrainian resistance and the West's readiness to respond were underestimated). The thesis is about the DESIGN (an isolated ruler + severed feedback = an uncorrectable error), not about the leader's psychology and not about “defeat” as the outcome of the war. Sources: The Washington Post, “Hubris and isolation led Vladimir Putin to misjudge Ukraine” (April 11, 2022);

on the capital falling within days and the resistance crumbling on its own. There was no one at the top to challenge the assumption: the wire that carries unpleasant truth to the summit had long since been cut as “disloyalty.” The quick operation did not happen. What happened was a drawn-out catastrophe—the very failure to which the best-protected, and therefore blindest, node is doomed. Between this case and Stalin’s lie eighty years; the mechanism is one.

Design, Not Character

From here comes the turn that carries the whole constructive part of the book. If the trouble is not in the villain but in the design (chapter nine), then the strength is there too. Efficiency is a property of design, not of character. An engineering rule puts it bluntly: there are no bad systems—there is bad design, and the wrong people in key positions. A well-designed distributed system beats a brilliant autocrat with no superiority in personnel at all: it can correct a mistake, and he has no rollback.

Back in the middle of the last century, Karl Popper observed that political thought had spent centuries asking the wrong question. The question was: who should rule—the wisest, the strongest, the best? But any ruler will sooner or later be succeeded by a bad or incompetent one, and the question worth asking runs differently: how do we arrange institutions so that a bad ruler cannot do too much damage, and so that he can be removed without bloodshed?¹²⁸ This is exactly the engineering

Foreign Affairs, “The Bully in the Bubble” (2022); RFE/RL (on the miscalculation and the role of intelligence); Atlantic Council, 2022 year in review.

¹²⁸ Karl Popper, *The Open Society and Its Enemies* (1945), vol. 1, ch. 7, “The Principle of Leadership”: in place of Plato’s “Who should rule?” Popper proposes the question—“How can we so organize political institutions that bad or incompetent rulers can be prevented from doing too much

view: a system is designed not for the ideal operator but for component failure.

And exactly here the myth of efficiency—the hardest argument for the strong hand—falls apart. The numbers do not support it. A study of one hundred and eighty-four countries over half a century found that a transition to democracy raises income per person by about a fifth in the long run—through investment in education, health, and capital, not in spite of them.¹²⁹ The “authoritarian growth miracle” turns out to be survivorship bias in the rigorous data as well. Yes, nine of the ten fastest-growing developing economies were led by autocrats. But over the half century, only about a tenth of all developing autocracies delivered high growth. The spread of outcomes under autocracy is enormous: one and the same design produces both the economic miracle and total ruin, and there is no predicting in advance which one you will draw—just as there is no removing, afterward, the one you got. The same work adds a bitter detail: autocracy works best where the individual ruler matters least.¹³⁰ Put differently, an autocracy

damage?” His criterion of democracy (ch. 19) is the ability to remove rulers “without bloodshed.”

¹²⁹ The empirics of the “efficiency myth.” Acemoglu, Naidu, Restrepo, Robinson, “Democracy Does Cause Growth” (*Journal of Political Economy* 127(1), 2019, pp. 47–100): democratization raises GDP per capita by about 20% in the long run (184 countries, 1960–2010), through investment, education, and health care. William Easterly, “Benevolent Autocrats” (NBER/NYU): 9 of the 10 fastest-growing developing economies were headed by autocrats, but only ~10% of developing autocracies delivered high growth; the variance of growth WITHIN a ruler’s tenure exceeds the variance between rulers (more strongly under autocracy) → the “benevolent autocrat” is statistically indistinguishable from luck. Timothy Besley & Masayuki Kudamatsu, “Making Autocracy Work”: autocracy succeeds where the “selectorate” is able to remove a failed leader—that is, where the mechanism of replacement works.

¹³⁰ The empirics of the “efficiency myth.” Acemoglu, Naidu, Restrepo, Robinson, “Democracy Does Cause Growth” (*Journal of Political Economy* 127(1), 2019, pp. 47–100): democratization raises GDP per capita

is competent exactly insofar as it smuggles back in the feedback it promised to abolish.

All of this has a simple engineering name—the absence of rollback. Democracy does not promise a wise ruler; it guarantees that an unwise one can be removed without breaking the country: lose the election—leave; the system rolls on. Autocracy removes precisely that safeguard. It stakes everything on a good man ending up at the top and holding on there—a bet you cannot exit and cannot replay. Draw a tyrant, or simply a mediocrity, and there is nothing to take the move back with: the lever of replacement is gone; it was removed first. Those nine miracles out of ten are Wald’s returning bombers. The survivors are admired and held up as examples. And the countries that bet on the strong hand and went over the edge into ruin, famine, or slaughter never make it into the cheerful statistics: no one is left there to tally the result.

Corruption as a Virus

The same logic explains the thing most often chalked up to autocracy’s credit—“order.” Corruption cannot be eradicated once and for all; like a virus, it can only be held in check by an immune system. The immune system here is accountability: a free press, an independent court, an opposition, able to ask the

by about 20% in the long run (184 countries, 1960–2010), through investment, education, and health care. William Easterly, “Benevolent Autocrats” (NBER/NYU): 9 of the 10 fastest-growing developing economies were headed by autocrats, but only ~10% of developing autocracies delivered high growth; the variance of growth WITHIN a ruler’s tenure exceeds the variance between rulers (more strongly under autocracy) → the “benevolent autocrat” is statistically indistinguishable from luck. Timothy Besley & Masayuki Kudamatsu, “Making Autocracy Work”: autocracy succeeds where the “selectorate” is able to remove a failed leader—that is, where the mechanism of replacement works.

uncomfortable question and remove the guilty.¹³¹ All of it is the same feedback, only trained on theft. The difference shows on a single official. Where the immune system is alive, a minister caught stealing means a newspaper investigation, a parliamentary inquiry, a resignation, a trial. The reaction is noisy and unpleasant, and an observer used to reading scandal as a symptom of disease takes fright. Where the immune system has been stripped out, the same minister steals quietly and for a long time (so long as he pays where payment is due and does not touch what is not his), and nothing seeps out. From the outside, the second looks healthier than the first. In fact, the organism that is silent is not the healthy one but the one whose defenses have failed: there is no one to sound the alarm—until the day everything fails at once. Autocracy, in muffling friction, strips out the immune system along with it. And corruption begins to metastasize unhindered. From the outside this often looks like order itself: no scandals, no exposures, no resignations—a smooth vertical of power. But that quiet is the quiet of a tumor there is no one left to mark. A scandal in a system with live feedback is not a symptom of disease but a sign of a working immune system: it means there is someone to notice and to name.

One Codebase, Three Forks

Until now we have been picking the pattern out across epochs—Rome, the Bronze Age, the Mandate of Heaven, the twentieth century. But it also has a fast test, the length of a single human life. In 1991 one shared “codebase”—the Soviet

¹³¹ Corruption and “immunity.” Perceived corruption (indexes like Transparency International’s CPI) is consistently worse where a free press and independent courts are suppressed: institutions of accountability work as feedback that detects and punishes abuse. Cf. Besley & Kudamatsu (the removability of the leader as the condition of a “working” autocracy). The metaphor of corruption as a virus held in check by an immune system is the author’s frame.

one—came apart. From nearly the same starting point, different branches split off: Azerbaijan, Russia, and Ukraine began with a common inheritance of institutions, habits, and fears. From there the forks diverged. What each did with the same starting code—and what came of it—can be seen up close, without archaeology. One starting code, three branches—and three different answers to what is, at bottom, a single question: keep the feedback line in the system, or cut it for the appearance of order.

Chapter 14. The Post-Soviet Laboratory

*“The past is never dead. It’s not even past.” — William Faulkner, Requiem for a Nun (1951)*¹³²

A Fork of My Own

This chapter is not written by an outside observer, and it is more honest to say so at once. I was born in Baku, lived in Moscow, and in February 2022 I was in Kyiv. One and the same Soviet code came down to me in several branches, and each one I came to know not from a textbook but firsthand, the hard way. That strips me of any right to a pose of impartiality. And it obliges me to the opposite: to hold my own side to the same yardstick as anyone else’s. The branch I came out of will pass under that yardstick further on, and not everything it shows will be comfortable for me.

Let me also flag the opposite temptation. Having lived through several branches, it is easy to imagine that personal experience grants a privilege of judgment: I was there—I know better. It does not. Experience is a set of observations, and it does not become proof. It is worth exactly as much as it can withstand of the same cold dissection that every historical case in the previous chapters went through. So from here on I am not a witness demanding to be taken at his word. I am one more source of data, held under the same magnifying glass.

¹³² William Faulkner, *Requiem for a Nun* (1951), Act I, Scene III: “The past is never dead. It’s not even past.” The line is spoken by a character (the lawyer Gavin Stevens), not by the author directly—as with the speeches in Thucydides (ch. 2, 6); it is cited as an exact thought, given its form by Faulkner.

The previous chapters took the breakage apart at a distance—Rome, the Bronze Age, the twentieth century. Here there is no distance: the same flaw can be checked against a single human life. In 1991 it was not just the Union that came apart—one shared code scattered into branches, and three of its forks ran through my biography. What they inherited, where they diverged, and why they diverged the way they did—that is what this chapter is about. There is no one to present a bill to. The task is different: to read, in what is near and alive, the same blueprint as in what is distant and ancient.

One Codebase

On December 8, 1991, in the Belovezha Forest, three men signed a paper stating that the USSR “as a subject of international law and a geopolitical reality ceases to exist.” On December 26 the Union was officially dissolved.¹³³ Fifteen republics became fifteen states. But independence is a change of signboard, not a rewrite of the source. Every branch inherited one and the same legacy code: power gathered into a single point; severed feedback; the “state” (the courts, the police, the press, the treasury) captured by whoever happened to be closest to the controls at the moment of the breakup (chapters four and nine).

And every item on that list is an institution with its purpose turned inside out. The court serves not the law but whoever is

¹³³ The dissolution of the USSR. The Belovezha Accords were signed on December 8, 1991 (B. Yeltsin—RSFSR, L. Kravchuk—Ukraine, S. Shushkevich—Belarus): the preamble—“the USSR as a subject of international law and a geopolitical reality ceases to exist”; the CIS was established. The Alma-Ata Declaration of December 21, 1991—Azerbaijan and seven more republics joined the CIS. Formal dissolution—December 26, 1991 (Declaration No. 142-N of the Soviet of the Republics of the USSR Supreme Soviet). Ukraine confirmed its independence by referendum on December 1, 1991 (~92% in favor); Azerbaijan proclaimed its independence in 1991.

on top. The police guard power from the citizens—the citizens’ own troubles are none of their concern. The press answers to the office, not to the reader. The treasury is treated as a personal wallet. And over all of it, the reflex of ownership: the state is a trophy, and it belongs to whoever took it. This is not a list of abuses. It is a specification—how a captured “state” behaves by default until feedback is wired into it.

From there a simple engineering rule takes over. The same code, run under different conditions (a different geography, different resources, someone different seizing the repository first), produces different behavior but the same class of failures. A fork does not rewrite the architecture; it inherits it. What changes is the configuration, not the blueprint. That is why the post-Soviet states are so alike in the main and so different in the particulars: a shared bug, different inputs. The laboratory is nearly clean (one source, fifteen runs), and its symptoms should be read exactly that way.

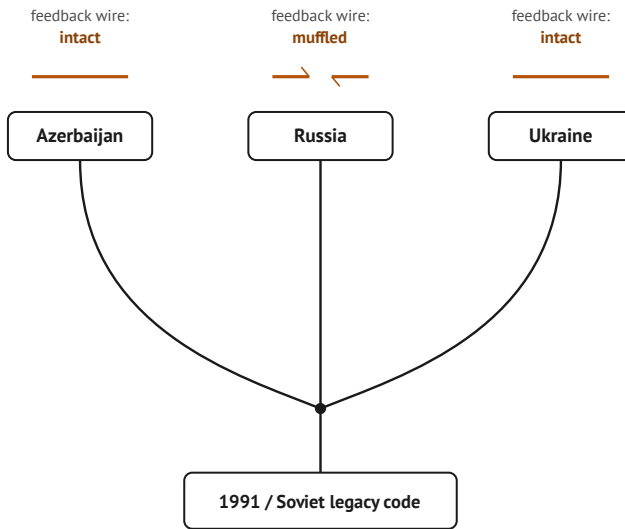
What Was in the Source

What temper this code had, the legacy showed even before the breakup—on the periphery, where people tried to raise the error signal before anyone else. In 1956 Hungary tried to fix the system from inside: Imre Nagy’s government disbanded the secret police, announced its withdrawal from the Warsaw Pact, and promised free elections. Reform is feedback itself—an attempt to tell the center that the course is wrong. The answer came in tanks: Soviet units crushed the uprising, no fewer than two and a half thousand Hungarians died, and two years later Nagy was executed.¹³⁴ In 1968 Prague came at it from

¹³⁴ The Hungarian uprising of 1956 (October 23–November 4). Imre Nagy’s government disbanded the secret police (the ÁVH), on November 1 announced withdrawal from the Warsaw Pact, and promised free elections. The Soviet suppression: no fewer than ~2,500 Hungarians killed (in-

FIGURE 14.1

One root, three branches



runtime conditions vary per fork:
geography, resources, who seized the repository

One source, different runs, one failure class.

the other side—“socialism with a human face,” freedom of the press and of assembly; the same signal, a different register. The troops of five Warsaw Pact countries entered Czechoslovakia in a single night—a quarter of a million soldiers and thousands of tanks—against unarmed people who came out to argue with the tanks by word, not by weapon.¹³⁵ And on its heels Brezhnev formulated a doctrine that flatly forbade the periphery to deviate: Moscow reserved the right to intervene if a socialist country strayed from the line. This is severed feedback raised to a principle: no signal from below.

Every branch of 1991 started with this memory in its source. The periphery already knew how an attempt to send a signal upward ends—and that memory lay at the foundation of what the branches went on to do with their sudden freedom.

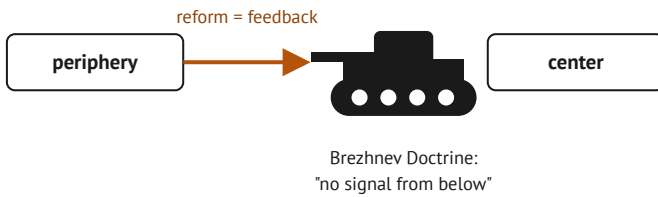
That memory, though, is ambiguous. Some it taught that a signal is mortally dangerous and silence is safer—and they, once they got their hands on controls of their own, cut the wire themselves first thing. Others, that the signal is costly but possible, and sometimes works. One and the same lesson, read in opposite directions; the fork in the road begins right here—in what conclusion a branch drew from 1956 and 1968.

cluding ~1,569 civilians in Budapest), ~20,000 wounded; Soviet losses ~699 killed. Nagy was arrested, taken to Romania, and executed on June 16, 1958. Sources: Hungarian Revolution of 1956 (overview); Imre Nagy (overview); Britannica.

¹³⁵ The Prague Spring of 1968. A. Dubček—First Secretary of the Central Committee of the Communist Party of Czechoslovakia from January 5, 1968; the April program of “socialism with a human face” (freedom of the press, assembly, speech, and movement). The Warsaw Pact invasion (USSR, Poland, Hungary, Bulgaria; the GDR took part symbolically—its units stayed at the border) on August 20–21, 1968: ~250,000 troops (later up to ~500,000), thousands of tanks; ~137 civilians killed. The result—the “Brezhnev Doctrine” (the limited sovereignty of socialist countries). Sources: Prague Spring (overview); Warsaw Pact invasion of Czechoslovakia; history.state.gov.

FIGURE 14.2

The signal and the tank



*The legacy's root behavior,
inherited by every fork.*

Different Forks, One Bug

The branches diverged, above all, in two details of the blueprint. The first is the feedback wire: does the signal from below get through, and does it change anything in reality. The second is the rollback lever: can society remove an unfit ruler and correct the course. The details are related but distinct: the wire fixes errors without touching the operator; the lever changes the operator when errors are no longer being fixed. A branch can be broken on one of them, on both—or not broken at all.

In the Ukrainian branch the lever survived and worked twice. In 2004 a falsified second round of the presidential election brought people out onto the square; the Supreme Court annulled the result, and the rerun it ordered produced a different winner.¹³⁶ Ten years later, in 2013–2014, the same branch strained again: a president who had swung the country away from its promised course in mid-stride fled under pressure from the street, and parliament removed him.¹³⁷ The Maidans were hard, bloody, and contested inside Ukraine itself—but architecturally one thing matters: a channel for changing power existed and worked. This is the branch that kept its rollback. The wire here is noisy and costly (the signal from below often gets through only by way of the square),

¹³⁶ The “Orange Revolution” (Ukraine, November 2004–January 2005): the second round of the presidential election was found to have been falsified; after mass protests the Supreme Court annulled the result and ordered a rerun (December 26, 2004), won by V. Yushchenko (~52% to ~44%). Source: Orange Revolution (overview).

¹³⁷ Euromaidan / the “Revolution of Dignity” (November 2013–February 2014): protests after President V. Yanukovich backed out of the association agreement with the EU; in February 2014 Yanukovich left the country, and parliament voted to remove him and to hold new elections. Source: Revolution of Dignity (overview). The geopolitics and propaganda around 2014/2022 are taken apart in ch. 7; here—only the mechanism of the change of power.

but alive. All the rest of the inheritance (captured courts, the oligarchy, corruption) went nowhere meanwhile. The Ukrainian branch is no model of purity, and the difference from its neighbors rests on exactly one surviving lever. Virtue has nothing to do with it.

In the Russian branch the same lever was jammed. Power gathered itself back into a single point, and no working way to replace it at the top remained—that same “absence of rollback” from the previous chapter, served up as stability and order.¹³⁸ And in 2020 that choice was written into the basic law itself. The amendment “zeroed out” the count of presidential terms: formally, it erased the lever of rotation and opened the way for one man to stay at the controls potentially until 2036.¹³⁹ The mechanism for changing power here was not merely jammed—it was struck out of the blueprint itself. The wire is muffled too: a signal from below (a protest, an investigation, an inconvenient news story) is read not as data about an error but as an attack on the system, and the very act of signaling became pun-

¹³⁸ The Russian branch: the re-centralization of power and the absence of a working mechanism for replacing it at the top (see “the absence of rollback,” ch. 13; the “spin dictatorship” model—Guriev & Treisman, *Spin Dictators*, 2022). Presented structurally, above the fray: not as a property of the people but as a design choice at the post-Soviet fork in the road.

¹³⁹ The 2020 constitutional amendments in Russia. A last-minute amendment by Deputy Valentina Tereshkova (the new Part 3-1 of Article 81) prescribed that presidential terms served before its entry into force not be counted—“zeroed them out,” lifting the limit on the number of terms for the sitting president and opening the way for V. Putin to run again and remain in power potentially until 2036. The package was approved by a nationwide vote (June 25–July 1, 2020; ~79% in favor by official figures). In the book’s logic this is the formal removal of “rollback”—the very mechanism of the rotation of power (ch. 13): a change to the design, not a judgment of a personality. Sources: NPR and PBS NewsHour (July 1, 2020); European Parliament Research Service (EPRS), “Constitutional change in Russia” (2020); en.wikipedia, “2020 amendments to the Constitution of Russia.”

ishable. This is not a verdict on a people and not a reckoning by blood: it is a structural outcome, a branch that, at the fork in the road, chose to centralize tighter still. What such a choice looks like from inside, from the engine room of propaganda, was the subject of chapter seven; what matters here is the design itself, not its voice.

The Azerbaijani branch is my entry point, and I will speak of it without cutting myself any slack, but without borrowing someone else's measure either. The rollback lever here has never once worked: power stayed gathered into a single point and passed down by inheritance.¹⁴⁰ But the feedback wire—the second detail of the blueprint—is alive in this branch. I tested this with my own correspondence. In the 2010s I spent years writing to the traffic police about incorrect road markings—and the markings were repainted. I reported improper behavior by drivers and by the police themselves—and the signal came back as action. New-generation service agencies take in requests, answer them, and change something in reality. Not everything, and not perfectly, but the loop is closed: the signal from below gets through, is processed, and changes the system's behavior—rather than being punished as an attack on it. So there is no equals sign between the Azerbaijani branch and the Russian one: of the two details of the blueprint, the one alive

¹⁴⁰ The Azerbaijani branch—the author's personal entry point; the yardstick is the same as for the rest. The fact on the lever: centralized power retained, succession hereditary (Heydar Aliyev, from 1993; İlham Aliyev, from 2003). The assessment “the feedback wire is alive” concerns the operational loop: the 2010s reform of public services (new-generation service centers, e.g., the ASAN xidmət network, from 2012) and the author's personal experience—years of appeals to the traffic police (YPX) about correcting road markings and about the behavior of drivers and of the police themselves, ending in real corrections. This is an assessment of the operational loop, not a verdict on the rotation of power: the rollback lever is a separate detail of the blueprint (see the chapter text). Karabakh and the issues connected with it are taken apart in ch. 6 and are not duplicated here.

here is exactly the one the Russian branch muffled first. One living detail is no absolution for the other: the inherited bug went nowhere. But the same bug, run in different branches, produced different configurations—and to equate them would be to measure by habit instead of by the yardstick.

The personal here does not contradict the architectural. It confirms it. In Moscow I ran into the custom of treating my homeland's history as the junior, incorrect version of the real one—an everyday imperial reflex—condescension instead of argument. Later, driving a car across Russia, I saw the same machine of power up close, at the level of the post, the barrier gate, and someone else's discretion, which answers to no rule. And in 2022, in Kyiv, I saw what the logic of a center that tolerates no signal from outside turns into. Three different experiences—and one and the same blueprint, recognizable every time.

And every time the recognition was uncomfortable—because it left no one to hate. The post on the highway behaved that way not because especially bad people were standing there (though in this case, perhaps, because of them too), but because in that spot power had no reason to behave otherwise: a complaint has nowhere to go. The condescending tone in the Moscow conversation did not come from my interlocutor's personal malice either. It came from an architecture in which some histories are, by default, senior to others and more in the right. And the logic that tolerates no objection did not start up out of nowhere in 2022—its blueprint had been showing through long before, in all the previous chapters. You cannot hate a design; you can only understand it and rebuild it.

A Conclusion, Not a Grievance

Out of all this a grievance grows easily—against the empire, against the neighbor, against history. But a grievance is a poor compass: it looks for someone to blame and calms down once

it has found him, while the design, meanwhile, stays where it was. So the three conclusions this experience leads to are worth rewriting structurally—the way, in chapter six, the personal was rewritten into a mechanism.

First: it was never about “bad people at the top.” Remove a particular ruler, and an architecture without feedback will lift another just like him into the same place; Moscow and Kyiv each showed this in their own way. The fault lies not with the man at the controls but with the controls, to which no error-correcting cable has been run.

Second: the outcomes of the branches were neither chance, nor fate, nor the merit of anyone’s blood. They could have been predicted from two questions out of the same blueprint: is the wire alive (does the error signal get through from below, and does it change anything), and did the lever survive—the way to change power and correct the course without breaking the country. Where at least one is intact, error has a limit; where both are broken, it accumulates until it breaks through as catastrophe. This is not a moral bill presented to peoples, not “these ones are better than those.” It is the predictable output of one and the same architecture on different inputs.

And the third conclusion, the most uncomfortable one for me personally. Heirs do not choose their inheritance: no one alive is to blame for the code having come down broken. But to leave the wire cut (or to try to run it) is already a choice, and it rests on those at the controls now, in each of the branches. Architecture explains where the trouble came from; it issues no absolution to those who keep it in place. To understand the mechanism is not the same as to forgive the refusal to fix it.

A Past That Can Pass

Here the whole book comes together. Thirteen chapters have read one and the same legacy across the epochs and

arrived at a simple result: it was always broken this way (power in a single point, severed feedback), and only the operator could ever be replaced, never the architecture itself. And even the operator was replaced at a high price: Hungary, Prague, the Maidans paid in blood for that one lever.

This is where the real weight of the diagnosis lies. It is not that bad rulers came along. It is that humanity never had any way out other than replacing them one at a time, by hand, usually with blood. And every time getting another just like him in the vacated seat, because the seat stayed the same. Revolt, revolution, palace coup—all of it is a change of operator. The architecture (a single point, severed feedback, captured state) outlived them all and reproduced itself anew. Thirteen chapters are about exactly this: one and the same bug, from Rome to my own backyard.

That is why the Faulkner epigraph here is not decoration. The past really is not past. The Soviet code of 1991 is still executing, in several branches at once, before my eyes and the eyes of tens of millions. But the same phrase reads the other way too. There is one simple reason the past refused to pass for so long: the tool was missing. People always knew how to rearrange those at the controls. There was nothing to rewrite the blueprint itself with.

And engineering, which has served the whole book as a magnifying glass, at this point for the first time suggests not a diagnosis but a treatment. Distributed systems have long known how to do without a captured center: the truth in them is held not by a single server everyone is obliged to trust but by the agreement of many equal nodes, none of which owns the shared state alone. This is not a thought experiment and not a promise of the future. Thousands of independent machines around the world already keep a shared ledger this way: none of them dictates it, none can secretly rewrite it after the fact, and it stays consistent without a single boss.

And this fits the book's diagnosis point for point. No single point of failure: when any node fails, the rest keep computing; there is no place from which "everything at once" could come crashing down. No severed feedback: the nodes checking one another is itself continuous feedback, built into the work itself rather than granted from above and revocable at any moment. No captured state: no one owns the shared state alone, and it cannot be rewritten after the fact, the way history was rewritten in chapter twelve—there are too many copies, and they check one another. Three root failures that this book has taken apart from Rome to the post-Soviet ruins—and for the first time there is a working counterexample to each. Not a slogan. Not a pious wish. A working counterexample.

Carrying this over from machines to living people is a separate task, and a genuinely hard one. The tool has its own price, its own temptations, and its own, not yet studied, ways of breaking. They will have to be discussed as coldly as everything else. But the diagnosis itself is as old as the state, and the treatment is young—it was assembled literally before the eyes of a single generation. That is why the past took so long to pass: there was nothing to fix the architecture with. It was not our ancestors' lack of thought. The tool simply did not exist yet.

I write this having lived through three branches of one broken code, and with no illusions about ease. It is too plain to see what even a simple change of operator costs to be starry-eyed about changing the design itself. But this is the first time in all of history that the design itself can be repaired. The past is not past. And yet, for the first time, there is a visible chance that someday it will be. Where that chance came from, and why now of all times—that is what the next part of the book is about.

Chapter 15. Three Revolutions That Rewrote Power

“We shape our tools and thereafter they shape us.” — John Culkin, after an idea of Marshall McLuhan’s (1967)¹⁴¹

The Booth on the Strait

In 2026 the Strait of Hormuz was closed and opened again, and with each round it looked less and less like a common road. More and more like somebody’s gate, where people argue over the price of passage. Through this throat (about thirty kilometers wide in places, with shipping lanes only a few kilometers across) passes, in ordinary times, roughly a third of all the oil carried by sea. After a short and vicious war, Iran shut it with mines. Then it agreed to let ships through—but by its own corridor and on its own terms: the first weeks free of charge, while the minesweepers cleared the water. What would happen next remained a matter of bargaining. One side declared the strait “free forever”; the next day the other clarified that ships might, after all, pay—“not a toll but a fee for services.” The truce inside which this argument was going on did not live to see the end of summer. By August, about two percent of prewar traffic was

¹⁴¹ The epigraph. The formula “We shape our tools and thereafter they shape us” belongs to John Culkin (Father John M. Culkin, SJ)—from the article “A Schoolman’s Guide to Marshall McLuhan” (*Saturday Review*, March 1967), in which he set out McLuhan’s ideas. Often attributed directly to McLuhan: the thought itself is McLuhan’s (tools and media as extensions of man), but this chiseled wording is Culkin’s. Presented the same way as Swift/Twain in ch. 7: attribution to the author of the wording.

moving through the strait, not a single tanker among it, and the question of payment was still open.¹⁴²

Behind that qualification is a move familiar from chapter four: call tribute a service, and the racket dresses itself in an invoice. But more important than the word itself is that behind it there is no one who could contest it. There is no court above states (chapter six): whoever holds the shore of the strait sets the price of passage, and there is nowhere to appeal it. An arbiter capable of ruling the exactions unlawful simply does not exist. The booth stands exactly where the guns stand.

This is no invention of the present century. For four cen-

¹⁴² The Strait of Hormuz, summer 2026. On the order of a third of seaborne oil passes through the strait; at the narrowest point the shipping lanes are only a few kilometers wide. Chronology: the crisis began on February 28, 2026; April 8—a temporary US–Iran ceasefire, with the strait reopened; in May, Iran established the Persian Gulf Strait Authority, which issues “safe-passage permits,” and on May 15–17 announced a traffic-management mechanism with a fee on merchant ships; on June 17 the Islamabad Memorandum was signed—a 14-point framework document (Trump and Pezeshkian, with Pakistan as mediator)—suspending the per-ship fee for 60 days along with a ceasefire and mine clearance in the first month. The memorandum did not survive even a month. From June 19, Iran demanded that ships use only its corridor through its own territorial waters, declaring it the only safe one; on June 19–20 the strait was closed again; on June 27 the US Navy announced an extended route along the coast of Oman; on July 8 the ceasefire collapsed after Iranian strikes on merchant ships, and on July 10 Washington declared it no longer in effect. On July 28 Tehran rejected the Omani plan for a voluntary fee and demanded control over both shipping lanes. By early August 2026, traffic stood at about two percent of prewar (on the order of two ships a day, and no tankers), the US had reinstated a naval blockade (per CENTCOM, 44 merchant ships redirected, two disabled, two boarded and inspected), Iran says it will introduce a transit fee once the sixty-day period expires (around August 16–17), and Washington calls any payment unacceptable. Sources: en.wikipedia.org/wiki/2026_Strait_of_Hormuz_crisis; Al Jazeera, July 9, 2026; CNN, August 4–5, 2026; Council on Foreign Relations, August 2026 overview; euronews / The National / NPR reports, May–June 2026 (details in docs/research-hormuz-chokepoint.md).

turies and more, Denmark did the same thing. At Kronborg Castle in Helsingør (the very Elsinore where Shakespeare would later lodge Hamlet), from 1429 to 1857, there stood a customs house that no ship bound into the Baltic or back out of it could get past. The fortress guns looked out over the channel, and the argument was the same as the Iranian mines': you may pass—once you have paid. At times the Sound Dues brought the Danish crown up to two-thirds of all its revenue.¹⁴³

It was built with a meticulousness in which you can recognize the engineer. When the charge came to be taken on the value of the cargo, captains, naturally, understated it in their declarations. And the crown answered with a rule that struck at the very root: the treasury reserved the right to buy any cargo at the very price the captain himself had named. Name too little, and you risked having your goods bought up on the spot for a pittance; name it honestly, and you paid in full. Cheating was not forbidden. It was made unprofitable.

This customs house did not end because some court ruled the charge for passage unlawful. It ended in a buyout: in 1857 the maritime powers chipped in and paid Denmark, in a single lump sum, some thirty-three million rigsdaler—just so that it would renounce the right to collect tribute. Freedom of passage did not come as a triumph of law. It was simply bought: the

¹⁴³ The Sound Dues (Øresundstolden). Introduced by King Eric of Pomeralia in 1429; levied at Kronborg Castle in Helsingør (Elsinore) on ships passing through the Øresund into the Baltic and back. From 1567 the charge was taken on the value of the cargo (*ad valorem*), as stated by the captain; to stop understatement, the crown reserved the right to buy the cargo at the declared price. In the sixteenth and seventeenth centuries it yielded up to $\frac{2}{3}$ of the Danish crown's revenue; over the centuries, on the order of 1.8 million ships passed through the strait. Abolished by the Copenhagen Convention of 1857 ("on the redemption of the Sound Dues"): the maritime powers compensated Denmark in a lump sum of about 33.5 million rigsdaler (the largest share from Great Britain) for giving up the levy. Sources: en.wikipedia.org/wiki/Sound_Dues; havneguide.dk (history of the Sound tolls).

throat was bought out from its holder.

In four centuries the mechanism never broke once. Only the holder of the narrowness changed: one was bought out; on another strait, a new one rose. The design itself (“whoever holds the throat takes the toll”) outlived Kronborg and everyone who, after it, planted himself in someone else’s path. History knew how to change the holder of the narrowness. The narrowness itself, as a way of power, it never abolished.

Instrument Instead of Virtue

Here it is worth pausing on a distinction that will run through the rest of the book. To replace the one who sits in the center—and to remove the center itself—are two different operations, and through the whole of history it was almost always only the first that succeeded. The buyout of the Sound Dues, a new strongman on a new strait, a palace coup, a revolution—all of these are a change of holder. The architecture of power gathered into a single point outlived them all (chapter fourteen). The French Revolution cut off the king’s head. And eleven years later it crowned an emperor; the throne outlived both the executed and the executioners. That is how it came out time after time: the rebels took the old master’s place, and the place molded them in its own image faster than they could remake it to suit themselves. The tenant changed—not the house.

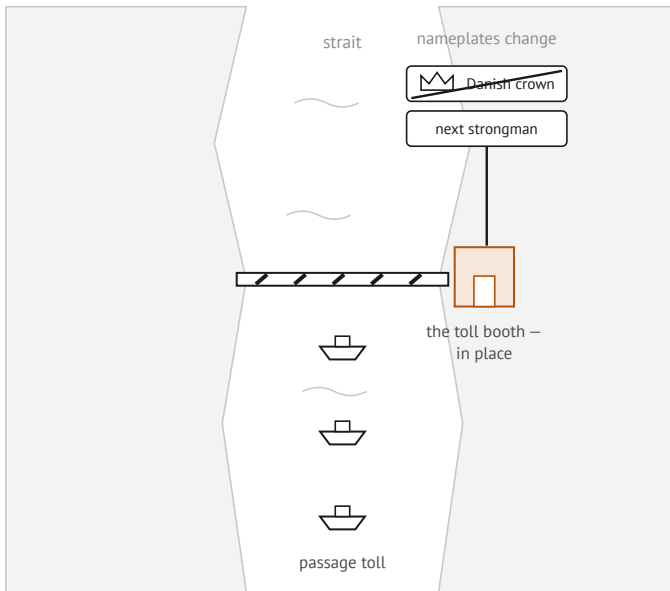
What, then, did change the arrangement itself—who gets power and who gets nothing? Not a sermon, and not an argument about justice. A new tool did. Over the last two and a half centuries, three times an instrument has appeared that redrew the whole map at once: who commands, who works, and who becomes superfluous.¹⁴⁴ And every time, power went not to the

¹⁴⁴ The division of modern history into “industrial revolutions,” and the very count of them, is an established convention, not an exact chronology;

FIGURE 15.1

The booth on the throat

a narrow strait; top view



*History changed who took the toll for passage,
never the toll itself*

most deserving but to whoever held the new tool in his hands.

The mechanism here is always the same. Power accumulates where there is a bottleneck—something you cannot do without and not everyone has. Land, as long as it alone feeds; the baker's hands, as long as bread is baked by hand; the strait, as long as ships go only through it. A new tool strikes exactly at the bottleneck: it either moves the scarcity to another point or dissolves it altogether. And power drains after it—to whoever sits astride the new bottleneck. From here on, the same story three times in a row.

Steam

First came steam. Between the middle of the eighteenth century and the middle of the nineteenth, the steam engine and the power loom rewrote where wealth comes from in the first place.¹⁴⁵ Before them, power sat on the land: whoever owned the land owned the source of everything—the harvest, the rent, the people who lived on it. Steam shifted that footing. Wealth began to flow from the factory, from the machine, from coal—from capital, not from tithes. The landed aristocrat lost his primacy not because his character suddenly went bad. He lost it because the tool pulled the ground out from under his feet, and the center of gravity moved to where the smokestacks were. The new masters were people yesterday's nobility would not have counted as their equals: owners of spinning mills and foundries,

the boundaries are arbitrary and disputed (the terms “third” and “fourth industrial revolution” were fixed in usage by, among others, J. Rifkin and K. Schwab). The dates here are given as ranges—as a frame, not as dogma; the productivity figures are cited for illustration, not as exact values.

¹⁴⁵ The First Industrial Revolution, ~1760–1840 (Britain): the steam engine (J. Watt, patents of 1769 and 1781) and the mechanization of spinning and weaving; the shift of the source of wealth from land to industrial capital. The periodization is disputed (see the footnote on convention above); the dating is given as a range.

upstarts from Manchester and Birmingham grown rich on coal and cotton. Before the eyes of a single generation, the family name lost to the factory smokestack.

And those who lived by the old skill turned out, all at once, to be superfluous. The handloom weaver, whose craft had fed generations, was worth nothing against the power loom. In 1811–1816, English weavers—the Luddites—broke into factories and smashed the machines.¹⁴⁶ It is customary to remember them as benighted diehards who rose up against progress. But they had read it all correctly: the loom really was turning their mastery to zero. The uprising did not save them. The machines won; the weavers were no more. Within a single generation, the handloom weaver's trade, so recently respectable and well fed, became a byword for destitution. The loom multiplied faster than the weaver could retrain, and the price of his labor fell until it hit zero altogether. Power followed the tool, not whoever objected the loudest.

The Assembly Line

Second came electricity and continuous flow. At the turn of the twentieth century, electric current, cheap steel, and, above all, the moving assembly line rewrote not the source of wealth this time but the very way things are made.¹⁴⁷

¹⁴⁶ The Luddites—a movement of English textile workers (1811–1816) who smashed the machines that were devaluing their craft; its centers were Nottinghamshire, Yorkshire, and Lancashire. Suppressed, including by military force and executions. Cited as an illustration that a skill displaced by a new tool is devalued regardless of resistance.

¹⁴⁷ The Second Industrial Revolution, ~1870–1914: electrification, cheap steel (the Bessemer process, 1856), chemistry, mass production. H. Ford's moving assembly line—1913: assembly of the Ford Model T chassis fell from about 12.5 hours to ~1.5 hours; the “five dollars a day” was introduced in 1914 (roughly double the going rate at the time). The shift of power to large industrial corporations; the devaluation of skilled manual labor through its division into simple operations. The dating is given

The baker here is the exact measure of the change. For thousands of years, bread meant a pair of hands that knew dough: the baker's skill was the bottleneck, and a bottleneck is always power, because you cannot do without it. The assembly line broke that bottleneck open. Bread became a process stamping out thousands of identical loaves, and the mastery that used to take years was broken down into simple motions a novice could pick up in a day. The hand that knew dough lost its value. Power moved to whoever owned the line and the process itself—to the industrial corporation. A new center—a new class of the superfluous: this time it was yesterday's skilled craftsman, whose skill, built up over years, the machine reduced to a set of memorized motions.

The figures for this turning point have survived. On Ford's line, the assembly of a car chassis, which used to take more than twelve hours, shrank to about an hour and a half. But the work itself, too, became the price of speed: a place that used to need a whole craftsman now needed a man for a single repeated motion—eight hours at a stretch. The famous five dollars a day that Ford set for the worker was, in essence, a premium for boredom, the price of agreeing to make the same motion all shift long. Skill was splintered into operations. And power went to the owner of the process.

Computation

Third came computation. From the second half of the twentieth century, the transistor, the computer, and networks shifted the center again. But now the tool moved neither iron nor bread but information.¹⁴⁸ Power went to those who hold

as a range.

¹⁴⁸ The Third (Digital) Revolution, ~1950s–2000s: the transistor (1947), computers, later personal computers and networks; the center of power shifts to those who own computation and data. The displacement of routine clerical work (typing, manual record-keeping, telephone switch-

computation and data.

And again someone became superfluous—this time the office clerk. The telephone operator who connected callers by hand at the switchboard; the typing pool; the clerk who kept the whole archive in his head and alone knew which cabinet held the paper you needed—entire professions that stood on the routine shuffling of information dissolved the moment a machine learned to sift through information. The automatic exchange put the two speakers through without a young lady on the line; the search query found the paper without a clerk.

It is worth lingering here, because the shift was subtler than the earlier ones. The clerk who knew the archive by heart held the same little monopoly the baker held over his dough: without him, nothing could be found. And that was his power. The database dissolved that monopoly: now anyone with access finds the record they need in a second. Knowledge stopped being something carried in the head and became something one has access to—and power moved to whoever owns that access, to the holder of the data. The same figure, the same move: a new tool, a new center, a new class of the superfluous.

The very substance of power changed as well. The old fortunes could be touched: hectares, blast furnaces, oil derricks, stacks of goods in a warehouse. The new wealth is intangible—information, code, networks, access rights. But the center went nowhere for all that: data, too, is held by someone (on their own servers, under their own key), and there is exactly one such place, just as the factory used to have exactly one gatehouse. For the third time the tool changed the substance of power, and for the third time it left power itself gathered into a single point.

boards). The dating, and the very singling out of a “third” and “fourth” revolution, are conventions (see the footnote on periodization).

The Same Blueprint

Three revolutions—and one and the same blueprint beneath them. Each redistributed power; none touched its design. Steam carried the center from the land to the factory; electricity, from the factory to the corporation; computation, to the holder of data. But there was always a center, and power always meant one and the same thing: to sit in it. The tool changed who sat in the center. To ask whether the center should exist at all never occurred to any of the three waves. Each carried new people to the top and called it liberation. And each merely moved power from one single point to another just like it. Whom you paid for passage changed; that you had to pay did not.

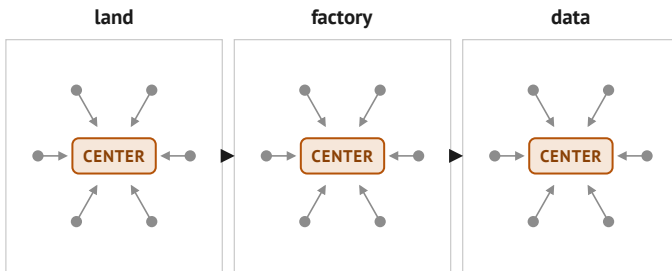
And this constancy came with a bill of its own. Since power always drew together into a single point, every transfer of it went like the taking of a fortress—by breaking, not by tuning. The old holder did not leave on a signal, because there was no signal in the design capable of displacing him (chapter nine); he had to be broken by force. The Luddites were put down with troops; thrones changed hands by way of the scaffold and war. The architecture of the single center did not merely outlive every revolution. It made every revolution unavoidably expensive. The tool changed the tenant; the price of moving was set by the house.

And every time, the one who was about to lose refused to believe it until the very last. The landed aristocrat could not conceive that a grimy factory would overpower land that had stood for centuries. The factory owner did not believe that a room of clerks with machines would one day matter more than his shop floors. Every holder of power reasoned from a world the new tool had already canceled, and never recomputed his picture (chapter eight). And the realization came when the place was already taken by someone else.

FIGURE 15.2

The center moves but stays

three eras – the same blueprint



the arrows of power converge anew each time –
on the same spot

*The tool changes who sits in the center,
not that there is a center at all.*

The fourth revolution is under way right now. Is this the same story (a new tool, a new holder of the same ancient throat), or has a tool of a different kind appeared for the first time: one that changes not the operator but the design itself? The booth on the strait stood for four centuries not because there was no one to replace it with. There was nothing to abolish the booth itself with. Whether such a thing has finally appeared—that is where the next chapter begins.

Chapter 16. The Fourth Revolution

“Any sufficiently advanced technology is indistinguishable from magic.” — Arthur C. Clarke, Third Law¹⁴⁹

From the Architect’s Chair

The previous chapter ended on a question: is this the same story (a new tool, a new holder of the same throat), or, for the first time, something else? To answer that honestly, I should say where I am looking from.

I design distributed systems—the very machinery this part of the book is about. That is not an argument, nor a credential to wave around: every chair has its blind spots, and the architect’s chair is no exception. Whoever builds a tool tends to overvalue the tool; and this tendency will have to be held under the same cold light in which the previous chapters held other people’s self-justifications. The chair’s temptation is known in advance. From it, the mechanism is beautiful, and the human mess the mechanism will have to be lowered into is barely visible. That is why an engineer so often mistakes “I can build this” for “this will work in people’s hands.” So every promise in this chapter will have to be dragged back to the cold question of the price, and of how it will break.

¹⁴⁹ The epigraph is Arthur C. Clarke’s Third Law: “Any sufficiently advanced technology is indistinguishable from magic.” First stated in a letter to the journal *Science* (1968); formally added in the 1973 revision of *Profiles of the Future* (as a footnote to the essay “Hazards of Prophecy: The Failure of Imagination,” orig. 1962). Sources: en.wikipedia.org/wiki/Clarke's_three_laws; en.wikiquote.org/wiki/Arthur_C._Clarke.

But from this chair you can also see what cannot be seen from the news. The fourth revolution is not magic and not the cover-story superintelligence. It is more concrete, more boring, and therefore more important than what people are being frightened with and seduced by. From here, “artificial intelligence” and “automation” stop being the single colossus of the headlines and break apart into separate functions: here is an operation the machine now does by itself; here is a skill that has stopped being rare; here is a bottleneck that has vanished; and here is one that, on the contrary, has only just formed. I am watching not whether the machines will rise up, but which wire is being switched where.

Magic and Mechanism

Clarke’s law works in both directions. Sufficiently advanced technology looks like magic—and “looks like magic” is exactly the territory where hype lives. Where the mechanism cannot be seen, you can believe anything: salvation or doom. That is why the fourth revolution arrives wrapped in two extremes at once—techno-rapture (it will save us all) and techno-panic (it will ruin us all). Both are a reaction to magic, that is, to an invisible mechanism; discern it—and rapture and panic settle at once.

The name itself is part of the fog. “The Fourth Industrial Revolution” as a label was minted at the Davos forum in 2016, on top of the German “Industrie 4.0” of 2011: a branded slogan, invented and sold the way any slogan is sold.¹⁵⁰ And a slogan is

¹⁵⁰ “Industrie 4.0” is a term from the German federal government’s high-tech strategy, publicly presented at the Hannover Messe fair in April 2011 (its promoters: H. Kagermann, longtime head of SAP; W. Wahlster; W.-D. Lukas)—originally about “smart” manufacturing. “The Fourth Industrial Revolution” (4IR) as a broad label was popularized by Klaus Schwab (founder of the World Economic Forum) in 2016: the Davos 2016 theme + the book of the

magic's favorite costume: it names the thing without showing it. Take the name off, and underneath you will find the automation of quite specific functions. No prophecy. And for an ordinary person, even the scale is not what matters. What matter are two simple questions: which functions, exactly, and what becomes of those who stood on them.

This magic has a market mechanics of its own. One and the same achievement is sold to the investor as a miracle and to the public as a threat. And both sales work for the same reason: neither the buyer of the miracle nor the buyer of the threat sees the design. Fear and hope are two prices of the same invisibility. And there is a sure sign of the switch: when a thing is described only through what it will *do* (save, destroy, overturn) and never through *how* it is built, you are looking at a costume, not a thing. This book has insisted on the opposite all the way: look at the mechanism, not the promise (chapters seven and twelve).

The Elevator That Drove Itself

The clearest example is old and not about computers at all. In September 1945, fifteen thousand of New York's elevator operators stopped work—an honest dispute over pay and hours, not a racket.¹⁵¹ But the city froze: a million and a half office workers never made it to their offices, the mail stood still, tax

same name. The very count and boundaries of the “revolutions” are a convention (see ch. 15, footnote on periodization). Sources: en.wikipedia.org/wiki/Fourth_Industrial_Revolution; iap.unido.org.

¹⁵¹ The New York commercial-building workers' strike, September 24, 1945: ~15,000 elevator operators, doormen, and porters (protesting cuts to pay and hours), backed by 250,000+ union members. Effect: ~1.5 million office workers unable to get into their offices; mail and deliveries disrupted; federal tax collection dropping by an estimated ~\$8 million/day. Almost no operatorless elevators were in service → skyscrapers paralyzed. Governor T. Dewey brought in an arbitrator; the strike was settled. Sources: en.wikipedia.org/wiki/Elevator_Strikes; npr.org (July 31, 2015, on skepticism toward operatorless elevators).

collection was dropping by millions a day. Why? Because every tall building had seated its vertical motion on a single living point. And when that point stopped, for whatever reason, everything above the third floor became unreachable.

It is important to hold this correctly. The elevator operators were not villains. They were workers with a legitimate claim who happened to stand at a bottleneck created not by their will but by the design of the building. What is at fault, as in the previous chapters, is the bare fact that there is only one such place at all (chapters thirteen and fourteen). When everything hangs on a single point, its stopping (out of greed or out of a just strike) brings everything down at once.

In this book's language, the New York of 1945 was a distributed system studded end to end with single points of failure—fifteen thousand of them, one per shaft. The strike laid the fragility of the design bare. And the conclusion the owners drew was not “treat the operators better” but “remove the dependency.” An engineer's instinct and, along with it, cold arithmetic: the cheapest way not to end up hostage to a worker is to be the one who needs no worker at all.

The resolution came not from a concession. It came from automation. The elevator that drove itself had existed for decades (Otis had had the technology since the turn of the century), but two things kept a living person in every car: passengers were afraid to ride without an operator, and the profession had taken root. The strike redid the owners' arithmetic. Within a few years Otis was selling “Autotronic” elevators that ran on their own; the first operatorless installation went in by 1950; by the mid-fifties the profession was dying.¹⁵² And to

¹⁵² The automatic elevator had existed technically since the early twentieth century (Otis) but did not displace operators at scale until mid-century. The Otis “Autotronic”—fully automatic control, introduced in 1948 (at first still with operators); the first operatorless installation, 1950 (Atlantic Refining Building, Dallas). By ~1956 the elevator operator's trade

calm a frightened public, a soothing recorded voice and quiet music were added to the car—the mechanism served up so that people would make their peace with it.¹⁵³ Magic, before people will believe in it, has to be made cozy.

Here is the rhyme with the previous chapter. Hormuz and the Sound told one story: history knew how to change who held the throat—buy Denmark out, seat a new strongman—but the narrowness itself it never removed. The elevator tells another: a tool can bypass the holder altogether. Nobody bargains with the operator, and nobody buys him out—the dependency on him is removed.

But let us trace where that dependency actually moved. The city stopped depending on fifteen thousand elevator operators—and started depending on Otis, on the power grid, on the maintenance contract. The bottleneck did not disappear; it moved—from a crowd of workers to the firm that owned the machine. And an entire profession became superfluous through no fault of its own—that very “new class of the superfluous” the previous chapter traced through every revolution. Automation by itself still relocates the center. It changes the holder. The holding itself it does not abolish. And the elevator operators, like every displaced class before them, were told the machine would set everyone free; they were set free first—and from their wages.

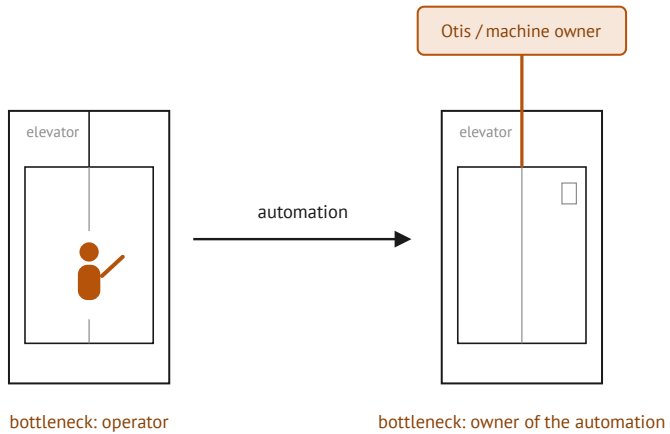
The same scene has since repeated in many places. The teller at the bank counter was pushed aside by the ATM—literally an “automated teller”; the collector at the toll plaza was replaced by electronic tolling; the information desk was

was fading away (Otis estimated the savings at ~\$7,000 per car per year). Sources: otis.com (history); elevation.fandom (Otis Autotronic).

¹⁵³ The obstacle to automation was not only entrenched labor but also the public’s fear of riding without an operator. Otis softened the transition: the recorded “Elevoice” voice (1948) and music in the car (1948, Palmolive Building)—to ease passengers’ anxiety. An illustration of the thesis: the adoption of “magic” runs up against trust no less than against technology. Source: npr.org (July 31, 2015); otis.com (history).

FIGURE 16.1

The center moves; it does not disappear



The tool changed the holder, not the holding.

displaced by the search query. Each time, the bottleneck where a person sat was bypassed with a machine; each time, the holding went nowhere. It moved to whoever owned the machine; and each time, someone became superfluous. The elevator here is the model.

A Skill Taken from the Gatekeeper

There is, however, a place where the fourth revolution does what the earlier ones could not: it makes a rare ability reproducible. In 1929, a man named Edwin Link built, out of organ bellows and pumps, a box that banked and rocked like a cockpit—so that a pilot could learn to fly blind, on instruments, without crashing.¹⁵⁴ By the end of the war, half a million American pilots had been trained in his machine. A skill that had once required a rare instructor, a rare airplane, and an acceptable risk of death began to be reproduced cheaply and safely.

The principle is broader than one trainer. The surgeon's hand, the welder's eye, the pilot's nerve—skills that used to stand behind years of access to a master, behind expensive equipment, behind the luck of being admitted—are more and more often what a simulator teaches.¹⁵⁵ The gatekeeper is the point here. For most of history, ability itself was the

¹⁵⁴ The Link Trainer—the first flight simulator, built by Edwin Link (Binghamton, New York) in 1929 out of organ-bellows parts and pumps; it simulated roll, pitch, and yaw and served for safe training in instrument flight. In World War II, a means of mass training: >500,000 US pilots were trained on Link trainers. Source: en.wikipedia.org/wiki/Link_Trainer.

¹⁵⁵ Modern VR/AR trainers continue Link's line: education and training are a long-standing core application of virtual reality (Britannica); the principle—"practice nearly equal to the real thing, but cheaper and safer." Applications as illustration (*not* a forecast): flight simulators, surgical trainers, the drilling of industrial skills (e.g., VR welding in vocational training). Source: britannica.com/technology/virtual-reality (Education and training).

bottleneck: knowledge sat behind the man who decided whom to let in. A tool that reproduces the lesson disbands exactly that checkpoint. Ability stops being something you are admitted to and becomes something you can practice.

It is worth saying this more plainly, through the motif familiar from the strait. A surgeon used to learn on the living and on the dead; a simulator makes possible the thousandth rehearsal of an operation, costing nothing and killing no one. And behind a change like that lies an old calculation. For most of history, the craft kept knowledge scarce on purpose: the guild, the license, the years of apprenticeship under a master served two ends at once—they vouched for the skill, and they kept the price of the skill high. The first end is honest; the second is the same booth on the throat, a fee for admission. A tool that reproduces the lesson cheaply strikes at the second: it does not abolish the need for mastery. It undercuts the toll at the entrance to it. The narrowness remains (the simulator has an owner of its own), but knowledge has fewer gatekeepers, and that is already a shift in the right direction.

What Happens to the Center

Now it is worth stepping back from the examples. Steam, electricity, computation—each carried the center over to a new holder (previous chapter). So far, automation does the same: it carries the center from the elevator operator to Otis, from the gatekeeper to the owner of the simulator. If that were all the fourth revolution amounted to, it would come out the same story for the fourth time—a new tool, a new holder of the old throat, and the only thing left to argue about would be who gets the booth.

But the same revolution shows something else too—and the hype misses this something else precisely because it is not showy. The genuinely new move is not to automate a function.

It is to arrange the affair so that no single point needs to be trusted at all. The holder is not replaced with a machine. He simply stops being drawn into the blueprint. This is the first thing in this whole history that strikes at the very need for a center.

Why remove the center at all, rather than simply occupy it better—every previous chapter shouts the answer. Any center, even the best-intentioned, remains a single point of failure and a booth that sooner or later will breed a toll of its own (Movements One through Three are about exactly this). To change the sitter is merely to rewind the clock of the same breakdown: the new holder behaves tolerably exactly until he makes himself at home in the chair, which itself pushes him toward the old behavior (chapter fourteen). Removing the center is the only move that aims at the disease itself: at the fact that the breakdown has anywhere to happen at all.

And here it matters most of all that I not get carried away. Saying a system has no center is easy. Building one that truly works without a center is hard. And nearly everything that boasts of it quietly smuggles the center back in: now a “decentralized” network in fact hangs on a single owner; now a shared ledger is held by one company that calls it shared; now “no one needs to be trusted” turns out to mean that you must trust the very promise that no trust is needed. In my own work, this is what I see most often: the center not removed but repainted and set back into the shadows. Whether it can truly be removed—and at what price—is a question of mechanism, not of enthusiasm. And a mechanism, unlike a slogan, can be checked.

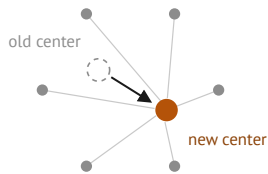
Both Moves at Once

Except that the honest count does not end there. The fourth revolution does not choose between the two moves—it makes

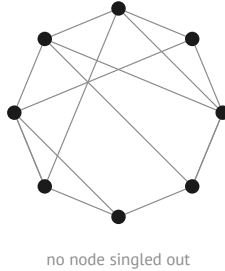
FIGURE 16.2

Two different moves

first move: relocate the center



second move: remove the need for one



*Three revolutions knew only the move from above;
the fourth: can it be done from below?*

both at once, and its move from above comes out more powerful than in its three predecessors combined. Machine intelligence is automation too, but what it automates is not muscle and not skill but judgment itself: a ready answer to a posed question. The arithmetic is the elevator's; the scale is not. Training large models is within the means of a handful of companies on the planet; the answers for everyone are computed by a few machine halls; and every question put to the machine instead of to your own head switches the wire of thinking over to someone else's booth. In the New York of '45 there were fifteen thousand bottlenecks, one per shaft. Here the bottleneck converges to a handful for the whole world—to the owners of the machines, who are now brought the questions people used to put to themselves. And no one is herded there. It is simply cheaper to ask for the ready-made than to think it through yourself—and cheaper means they will gather.

Let me say it from my own chair, because from here it can be seen without theory. Right now I am designing a distributed computing network: it deals machine work out to other people's idle machines; the whole idea is to disperse. Well then—even there, the honest early-stage blueprint keeps a center. A single someone matches supply and demand, sets the price, verifies execution, sorts out disputes; without that, the network simply does not start. Whether there is a center is, at the start, a closed question. There is. The open question is what it runs up against: records signed so that anyone can verify them without it; an exit that does not have to be asked for; an outside arbiter it has promised to let in—or a toll that quietly grows, because there is no one to check and nowhere to go. A center designed for replacement and verification versus a center designed for holding on—that is where the fork of the fourth revolution actually runs. And it runs inside every blueprint, including mine. Which move will win out—the coordination of trust without a center, or a center of ready answers of unprecedented size—cannot be

seen from the chair. What can be seen is that both grow out of the same revolution. The outcome is not written into the technology; it is assembled out of blueprints, one at a time.

The Quietest Thing in the Revolution

It turns out, then, that the deepest thing in the fourth revolution is not the part everyone argues about. The question is not whether the machine will start to talk and take away jobs: those are questions of automation, and automation, as is already clear, merely relocates the center. The deep part is quieter: for the first time, there may be a way to coordinate trust without a trusted center—the missing link that chapter fourteen pointed to. If such a link can indeed be strung, what changes is not a profession and not an industry but the very design of power that the earlier chapters diagnosed as unchanging. It is built more simply than it sounds: to show it, one village notebook will do.

Chapter 17. Trust Without a Center

“Trusted third parties are security holes.” — Nick Szabo¹⁵⁶

The Question Posed Anew

Every institution taken apart in this book rested on a trusted center. The captured “state” of chapter four, the single point of chapter nine, the keeper of the archive who rewrote the past in chapter twelve. All of them demanded one thing: that someone at a single point be taken at their word—a judge, a scribe, a central bank, an editor of the chronicle. And the whole diagnosis came down to one thing. Trust in a center is exactly the place where capture happens: whoever sits in the center owns it.

That is why the question that opens the second, constructive half of the book is narrow and hard. Can a shared undertaking be run without trusting any center at all? Not “find a more reliable center” (all the previous chapters showed why that does not save you), but remove the very need to believe anyone at the center. This is the missing link that chapter fourteen pointed to. Here is how it is actually built.

Why “more reliable” in particular does not save you, the book has shown more than once. A reliable center ages and clings to the obsolete, goes deaf to the error signal, grows a coat of yes-men. And sooner or later it turns its purpose inside out.

¹⁵⁶ The epigraph is from Nick Szabo’s essay “Trusted Third Parties Are Security Holes” (2001). Szabo, an American scholar (cryptography, digital contracts, the idea of bit gold), formulated the principle before Bitcoin: an intermediary everyone is obliged to trust becomes a point of vulnerability itself—precisely the thesis of this chapter. Source: Nakamoto Institute, nakamotoinstitute.org/library/trusted-third-parties.

The court starts protecting power from the citizens instead of the citizens from harm. The trouble is not that bad people take a good seat. The trouble is the very existence of a seat that can be taken and can be owned. So there is only one move that strikes at the disease rather than the symptom. Remove the seat itself. It sounds almost like a conjuring trick: surely a shared tally cannot be kept with no keeper at all. But that, it turns out, is exactly what can be built.

A Village Instead of a Scribe

It is simplest to start with the everyday. Picture a village that keeps one shared book of debts (who owes whom, and how much), and a single scribe keeps it. The scribe is convenient and mortally dangerous at once. Bribe him—and the record bends. Burn his book—and the record is gone. Capture the man himself—and every debt in the village is in your possession. One trusted center, and with it the entire set of breakdowns this book has been sorting through, chapter by chapter.

Now, one change. Instead of one scribe with a single book, let every household keep its own copy of the same book. And let every new entry be shouted out loud and written down by everyone at once. To forge a debt, you would have to break into most of the houses and swap most of the copies at one and the same instant. And any copy that diverges from the rest will be noticed and thrown out. There is no scribe to bribe. No single book to burn. No center to capture. The record will survive the loss of any household, and it cannot be altered quietly: to alter it is to shout out the entire village at once.

That is the whole idea, stripped of its learned vocabulary: many equal copies, checked against one another, agreeing by majority.¹⁵⁷ The shared truth is whatever the majority of the

¹⁵⁷ Basic notions of distributed systems (the frame of ch. 3, reused): replication—every participant holds its own copy of the data, there is

copies confirm. And no household needs to be more honest than the next: a lying copy simply loses the count. The honest majority overrides it in the cross-check.¹⁵⁸

It is worth pausing on what this means not for a book of debts but for power. The scribe is the captured “state” in miniature. The judge, the treasury, the land registry, the archive, reduced to a single point that everyone is obliged to trust and that need only be occupied to be appropriated. The village of copies is an institution without such a point. There is nothing in it to capture: no office, no seal, no single person whose signature decides. This is the very uncapturability at which the book’s diagnosis could only point a finger.

This simplicity has a catch, and it is better to name it at once. If every copy carries a vote, one can cheat by minting a multitude of counterfeit copies and gathering a false majority that way.¹⁵⁹ So holding a copy and a vote must cost something. Otherwise the village will be flooded by an army of phantom house-

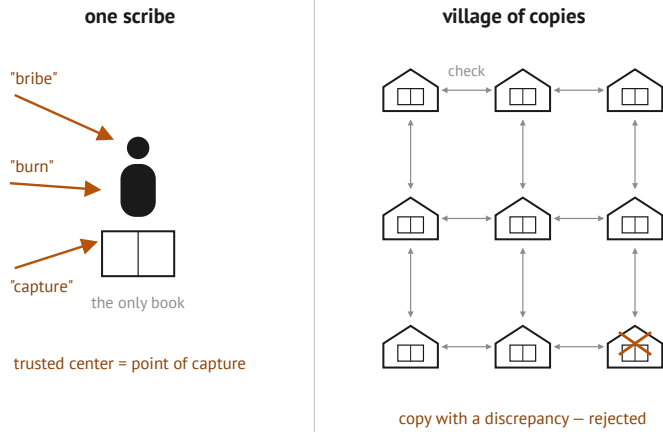
no single point; consensus—many equal parties converge on a shared record without a central boss; fault tolerance—the failure of an individual node does not bring the system down. “Agreement by majority” in the cross-checking of copies is put in everyday language deliberately (without the term “Byzantine fault tolerance”). Source: Tanenbaum & van Steen, *Distributed Systems*, 3rd ed., 2017 (sources.md, ch. 3).

¹⁵⁸ Agreement in the cross-checking of copies when some of the participants may lie or fall silent is a classic problem of distributed systems: reaching a common decision despite dishonest or failed nodes. The foundational work: L. Lamport, R. Shostak, M. Pease, “The Byzantine Generals Problem” (ACM TOPLAS, 1982). The term itself (“Byzantine fault tolerance”) is deliberately not introduced in the text—the mechanism is given in everyday language as “majority rule in the cross-check.”

¹⁵⁹ The naive scheme “a copy and a vote for everyone” is vulnerable to the forging of many identities: one participant spins up thousands of fake “households” and gathers a fictitious majority (in the literature, the Sybil attack; J. Douceur, “The Sybil Attack,” 2002). The defense is to make the right to vote costly, tying it to the expenditure of a real resource or to a stake, so that a false majority does not pay. Exactly how—and at what price, including the risk of renewed concentration—is taken up in ch. 18.

FIGURE 17.1

One scribe and a village of copies



No scribe – no point of capture.

holds, spun up by a single schemer. What exactly the right to vote is paid with, and why this does not simply hand power back to whoever has the most money, is a separate and uncomfortable question. Chapter eighteen takes it on directly. For now it is enough that the naive “let everyone have a copy” does not hold up on its own: resilience without a center has to be paid for, and paid for wisely.

Trust Made Unnecessary

Notice what has become of trust here. In the village with one scribe, you had to trust the scribe. In the village of many copies, you have to trust no one: not the scribe—there is none; not your neighbor—a lying neighbor’s copy loses its weight in the cross-check. Trust was not strengthened. It was made unnecessary. The design itself makes a lie detectable (others hold copies) and unprofitable (the effort of forgery is spent, and the cross-check exposes it anyway).

The difference is finer than it seems, and worth holding on to. Trusting a good scribe and needing no scribe at all are not the same thing, though on the first day both yield a true book. The first rests on a man: while he is honest and alive, all is well. But honesty is mortal, and a man can be bought, intimidated, or replaced. The second rests on no one: there is nobody to swap out, because there is no faithful man at the foundation to begin with. The whole book has examined how a trusted center goes bad: it ages, goes deaf to error, rewrites the past. A system that does not need to be trusted does not catch these diseases—it has no single someone to corrupt.

This is “design, not character” in its purest form. The task was never to find honest people. It is to build a design under which dishonesty does not pay. A crude version of the same device already appeared in chapter fifteen: the Danish crown discouraged understating a cargo by reserving the right

to buy it out at the declared price. There, it was one clever trick against a background of ordinary extortion; here, it is the entire blueprint.

Proving Without Showing

In the same family there is a sharper device. It sounds impossible until you see how it is built: prove that something is true without revealing what makes it true.

In everyday life it would look like this. At a door where age is checked, the visitor would prove that he is eighteen. And he would show neither the birth date, nor the name, nor the address that a passport bundles in with the one figure needed. In the same way one can prove that there are funds enough for a purchase without disclosing the balance; that a password is known without once saying it aloud where it could be overheard. Each time, the verifier receives exactly one bit (“yes” or “no”) and not a crumb beyond it. The proof convinces, and the secret stays secret.

This matters in substance—which becomes plain the moment you recall how verification is usually built. Nearly every present-day check requires you to bare yourself: show the passport, open up the account, hand your particulars to whoever will check them. But the baring is itself a point of capture. The one you have opened up to now holds your secret and is free to lose it, sell it, or turn it against you (chapters seven and twelve showed what knowledge collected on people turns into). The zero-knowledge proof severs this coupling: to prove and to open up stop being the same thing.

Mathematicians gave this a name and a method in 1985,¹⁶⁰

¹⁶⁰ The zero-knowledge proof is a way to prove that a statement is true without revealing the data it rests on. Introduced by Shafi Goldwasser, Silvio Micali, and Charles Rackoff, “The Knowledge Complexity of Interactive Proof Systems” (1985; first Gödel Prize, 1993). The vivid im-

and a few years later came the image that became the classic. Imagine a ring-shaped cave with a locked door deep inside, which only a secret word can open. Whoever knows the word will come out, every time, on whichever side of the ring is shouted by an observer standing outside, who cannot see the fork. Whoever does not know it will be caught the very first time the wrong side is called. After many rounds the observer is certain the word is known—and has never once heard it. Verification without trust and without baring. After trust in the scribe and trust in the neighbor, a third kind of forced trust dissolves as well: to prove you hold a secret, you no longer need to hand it over.

This Is the Missing Link

Lay these devices next to the book's diagnosis, and the match comes out exact—the same three breakdowns, and against each one its own mechanism.

The single point of failure vanishes. When everyone holds a copy, the collapse of any node does not bring down the whole: a household disappears, a house burns, a neighbor is bribed—the rest keep the tally, and the record is intact. There is no longer that one piece which, knocked out, topples the whole pyramid. There is nothing whose capture would capture everything.

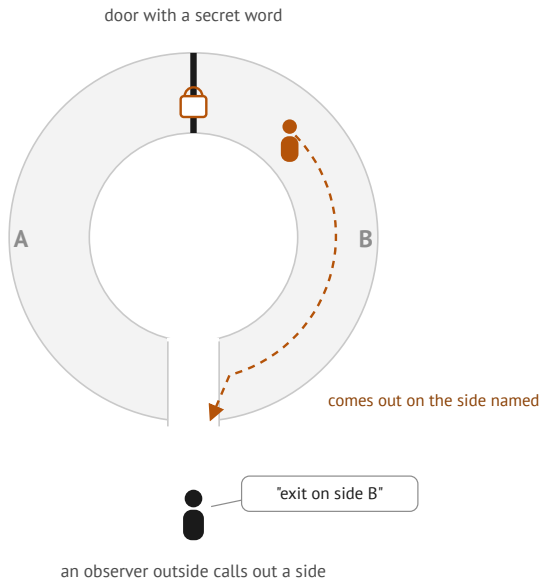
The suppressed feedback vanishes. And this is the subtlest part. Copies checking one another *are* the feedback—continuous and built in. The error signal is not granted from above by a ruler free to recall it; it is the ordinary, minute-by-minute work of the system. The feedback cannot be severed, because the feedback is the machine itself.

age of “Ali Baba’s cave”—J.-J. Quisquater, L. Guillou, T. Berson, “How to Explain Zero-Knowledge Protocols to Your Children” (1989). The text carries only the idea and the analogy, without mathematical detail. Sources: en.wikipedia.org/wiki/Zero-knowledge_proof; ResearchGate (Quisquater et al., 1989).

FIGURE 17.2

Proving without showing

a ring-shaped cave; top view



*Verification without trust, secret kept
(zero-knowledge proof).*

The captured “state,” the rewritten past—they vanish. No one owns the record alone, and it cannot be quietly rewritten after the fact: too many copies being checked against one another. A photograph cannot be retouched after the shot when the original is held by ten thousand hands. The past stops being clay in the hands of whoever sits in the archive.

But none of this is magic, and the cold light is obliged to name the price. Agreement among many is slow and expensive. One boss decides faster than a village votes, and that speed is what is paid for the absence of a center. The record is only as truthful as what is entered in it. The copies vouch that the record will not be forged *afterward*—not that it was true from the start. Enter a lie into the village book and get it agreed, and the result is an everlasting lie, certified by all. And the system sees only what is inside it. It cannot reach out to the things of the outer world and check whether something really happened. Someone still has to bear witness to that—and that someone turns out, once again, to be a point of trust smuggled back in. These are not reservations in the margins of the idea—they are its edges.

And there is one more edge, the most treacherous of all, because it brings back the very disease all of this was undertaken to cure. Resilience without a center rests on the copies and the votes being many and independent. But if the right to vote can be bought up or concentrated (with money, with hardware, by collusion), the majority gathers into one pair of hands again, and the center comes back through the back door, now under the name of “decentralization.” This is not an argument against the approach itself but a reminder: to remove the center once is not enough; it has to be kept removed.

Where This Leads

So “trust without a center” turns out to be not a slogan but a design that can be assembled—out of copies, mutual cross-checks, and proofs—with real teeth and real limits. It has one embodied, field-tested case: a record that no one owns and no one will rewrite, kept by a crowd of machines checking one another. The chapter’s epigraph says the same in a single line. A trusted third party is a security hole, and the way to close the hole is to do without a party everyone is obliged to trust. That case also has a name—wrapped in more noise than almost any other word in technology. To strip the noise off and see soberly what this thing can and cannot do is the business of the next chapter.

Chapter 18. Blockchain Without the Hype

*“Chancellor on brink of second bailout for banks.” — headline in The Times (January 3, 2009), stitched by Satoshi Nakamoto into the first block of Bitcoin*¹⁶¹

The Stone in the Foundation

Sealed forever into the very first block of the world’s best-known distributed ledger is a newspaper headline. Not a slogan composed by the author—a found object, the front page of that day: “Chancellor on brink of second bailout for banks,” The Times, January 3, 2009. In part it is a timestamp, proof that the block was not made before that date. But in part it is an indictment: the chain is born pointing a finger at the system it answers—at the banks being rescued that year at everyone’s expense (money, and those who create it, were chapter five’s business).

It is worth pausing on what that headline was. In the fall of 2008, banks were collapsing—banks that had handed out too many promises against too thin a collateral. Governments set about rescuing them with taxpayers’ money—the money of the very people who had handed out no promises. The profit had

¹⁶¹ The very first block of Bitcoin (the genesis block, block 0, January 3, 2009) contains the embedded text “The Times 03/Jan/2009 Chancellor on brink of second bailout for banks”—the front-page headline of The Times of London for January 3, 2009. In part a timestamp (the block could not have been created before that date), in part a comment on the bank bailouts after the 2008 crisis. Sources: en.bitcoin.it/wiki/Genesis_block; thetimes03jan2009.com.

been private; the loss was made common. To stitch that front page into the first stone is to say, without a single spare word, what the whole structure was built against: against an arrangement in which a trusted center gambles, loses, and sends the bill to everyone else.

That thing is Bitcoin, and more broadly the blockchain. It is the one embodied case of “trust without a center,” the thing the previous chapter was leading up to: a ledger no one owns, kept by a crowd of machines checking one another. And it is not a thought experiment: it has run from that day to this (more than fifteen years under open siege from thieves, swindlers, and scoffers), and the ledger has held. The price is worth arguing over; that it works is not. But around this core rose more noise than around almost any word in technology—promises, fortunes, sermons, and curses. This chapter strips off the noise and asks soberly: what can this thing actually do, and what can it not. The second half of the answer, the one about limits, comes out longer than the first. That is itself an important result.

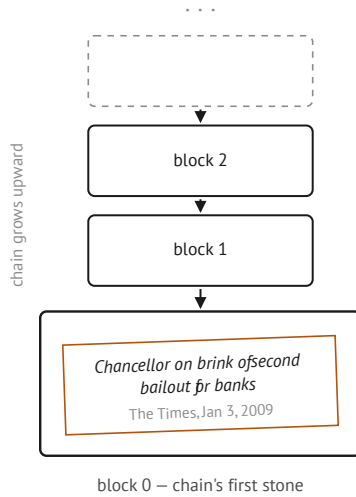
The Mechanism Without the Miracle

Take away the frenzy, and underneath is the previous chapter’s village of copies, assembled as a worldwide machine. Thousands of computers—nodes—each holding its own copy of one shared ledger; what counts as true in the ledger is decided by the agreement of the majority. The costly vote, without which, as the previous chapter honestly warned, the scheme does not hold, has here been given a name: mining.¹⁶² The right to write

¹⁶² Mining (proof of work) is the previous chapter’s “costly vote”: the right to add the next block goes to whoever first solves a deliberately hard computational problem, spending real electricity and hardware on it. The costliness is the defense: to fake a majority is to redo all that work. The text gives only the principle—no hash functions, no details.

FIGURE 18.1

The stone in the foundation



*The first stone indicts the system
it answers.*

the next page of the ledger goes to whoever spends real, provable work on it (electricity burned, computation churned), so that faking a majority would be ruinous.

And every page is stamped onto the one before it—hence “a chain of blocks,” a blockchain. To quietly doctor an entry on the hundredth page of a long chain, you would have to redo all the work from the hundredth page to the last. And do it faster than the entire rest of the world keeps adding new pages. That is a race you lose; that is why the past holds. This way of making the vote costly is not the only one, incidentally: instead of burned electricity you can demand a stake that is forfeited on cheating (the techniques go by different names, and the argument over which is better has not died down). What matters here is the substance, not the name of the technique: the right to vote has to cost something, or the majority will be faked for free.

That is the whole design.¹⁶³ No miracle—the previous chapter’s mechanism, run at planetary scale on a ledger without an owner. Satoshi invented no new magic. Out of long-known parts (copies, cross-checks, proven work) he assembled one thing that spins with no boss at the center, and proved that it spins. That is a real achievement. And it is exactly enough to begin the sober part of the conversation: because almost everything built up around this core is not the core.

Trust Returns Through the Back Door

An honest reading starts with the uncomfortable part: a tool conceived to abolish trusted third parties immediately

¹⁶³ Satoshi Nakamoto, “Bitcoin: A Peer-to-Peer Electronic Cash System” (October 31, 2008)—the anonymous paper that described the system. From the abstract: electronic cash goes “directly from one party to another without going through a financial institution”; and there too—“the main benefits are lost if a trusted third party is still required” (a direct echo of the Szabo epigraph, ch. 17). Satoshi Nakamoto’s identity is unknown. Source: bitcoin.org/bitcoin.pdf.

grew them back.

Almost no one runs their own node and holds their own keys. People keep their coins on an exchange—at a company that stores the keys for them. Which is to say, at a bank. Most often, a bank with no oversight, no vault, and no auditor. By 2014, Mt. Gox was putting through up to four of every five Bitcoin trades. In February it froze withdrawals and admitted that about eight hundred fifty thousand coins were gone.¹⁶⁴ In 2022, FTX lost up to eight billion dollars of other people’s money, having quietly lent it to an affiliated trading firm; the founder was convicted of one of the biggest frauds in US history.¹⁶⁵ Behind every round number are tens of thousands of people whose savings vanished in a single morning.

The folk wisdom of the crypto world packed the conclusion into a few words: not your keys, not your coins. Leave your coins on someone else’s server, and back comes exactly the dependence the whole escape was staged to flee—only now without deposit insurance, without oversight, and without a vault in the basement. A real bank has a vault, an auditor, and a law standing over it; an exchange often has only a website and a promise. This is chapter nine’s single point of failure and chapter four’s captured “state,” reassembled from new material: one institution taken at its word, which need only go bankrupt or be

¹⁶⁴ Mt. Gox—the largest Bitcoin exchange of the early 2010s (at its peak, 70–80% of all trades). On February 7, 2014 it froze withdrawals, then declared bankruptcy; ~850,000 BTC lost (~\$473 million at the exchange rate of the day); the theft had been running unnoticed since 2011. Sources: en.bitcoin.it/wiki/Collapse_of_Mt._Gox; NPR (February 28, 2014).

¹⁶⁵ FTX—a major crypto exchange; bankruptcy on November 11, 2022. Up to ~\$8 billion in customer funds went missing: they were being secretly lent to the affiliated trading firm Alameda Research. Founder Sam Bankman-Fried was convicted (November 2, 2023); prosecutors called the case “one of the biggest financial frauds in American history.” Sources: “Bankruptcy of FTX” (Wikipedia); SEC (press release 2022-219).

robbed for the savings of thousands to be swept away. The line from the previous chapter’s epigraph (trusted third parties are security holes) was confirmed once again, and confirmed by the very world that loves to quote it.

And this is not the stupidity of individual people; it is the same pull that gathered mining into pools: the convenient wins. Your own node and your own keys are a chore, a responsibility, and the fear of losing everything to one typo; an exchange is a website with a button. People flow to wherever is easier, and where everyone has flowed, there is a center again—one that can be captured. Resilience without a center demands effort exactly where people are used to convenience—and that is the main reason a removed center grows back.

The Majority, Back in One Hand

The fifth and most insidious limit from the previous chapter is here in plain sight. The whole scheme rests on the votes being many and independent. They are not independent. The costly vote, on inspection, favored scale: cheap current, factory hardware, pooled money. Today the two largest pools hold about half of the network’s entire computing power, four hold more than seventy percent, and nearly every block is issued by a pool from a short list.¹⁶⁶ The “thousands of independent households” turned into a short list of industrial operations—the cen-

¹⁶⁶ Mining concentration, data as of mid-2026. Exact shares jump around depending on the measurement window, so orders of magnitude are given here rather than a single figure: Foundry USA—roughly a quarter to a third of the network hashrate; AntPool—about 14–18%; the two together, around half; with F2Pool and ViaBTC, four pools account for more than 70%. Practically all blocks are issued by fewer than ten pools. The common security heuristic—“no single pool should hold more than 25–30%”—is violated by the leader constantly in practice. Sources: b10c.me (Bitcoin Mining Centralization); hashrateindex.com; pool-share roundups for April–August 2026.

ter has reassembled itself, now under the name “decentralization.”

And this is no accident to be fixed by exhorting people not to be lazy. Cheap current and factory hardware yield more vote per penny invested than a home computer—and wherever there is more vote per penny, that is where the money flows. Concentration here is not a malfunction but gravity: a removed center does not vanish forever, it creeps back together the moment the vote becomes cheaper to buy wholesale than retail. Removing the center once is not enough; keeping it removed is work done against a constant pull backward.

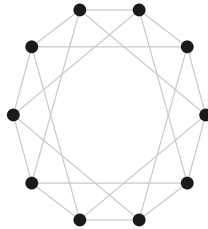
And the past? The previous chapter said it cannot be quietly rewritten. Quietly—no. But not never. In 2016, about sixty million dollars drained out of a high-profile contract on a major chain through a hole in the code. The community’s answer was to rewrite the ledger: split the chain, reach back, and undo the theft. The majority agreed; a minority refused (on the principle that the immutable must stay immutable, even to undo a crime) and stayed on the original chain. One chain became two.¹⁶⁷ The dispute was not about the money but about who is in charge here: the rule-as-code, or the people executing it. The minority held that the law is the code, even when it had been used to rob them; the majority decided that the law is, after all, people. The lesson is precise and uncomfortable: immutability is social, not magical. A record holds as long as the majority of those keeping it agree not to touch it; the moment they collude otherwise, the past is clay again. This is chapter twelve’s “control of the past,”

¹⁶⁷ The DAO—an investment contract on the Ethereum blockchain (2016, ~\$150 million raised). Through a vulnerability in the code, ~\$60 million in ether was stolen. On July 20, 2016 the community carried out a hard fork that rewrote the ledger and returned the funds; the dissenting minority stayed on the original chain—hence Ethereum (the forked branch) and Ethereum Classic (“code is law”). A telling case: “immutability” turned out to be a social agreement, not a property of stone. Sources: Gemini Cryptopedia (The DAO Hack); CoinDesk.

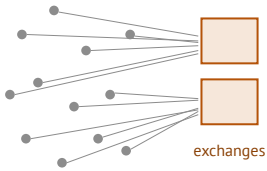
FIGURE 18.2

Trust through the back door

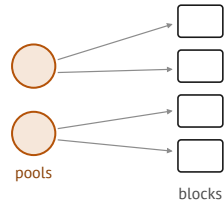
as drawn: a network of equals



in practice



almost all users –
via a few exchanges



almost all blocks –
from a few pools

The system without a center grew new centers.

come back in a new dress. The difference from an archive in one man's hands is the threshold: rewriting a shared ledger is harder and more visible than rewriting a chronicle held in one hand. A higher threshold—not a different breed.

The Edges of the Tool

The remaining edges deserve to be named just as plainly.

The chain knows only what is inside it. Whether something happened in the offline world (a ship sailed, a debt was paid off, a man died) it cannot check. Someone has to witness it and enter it—and that someone turns out, again, to be a point of trust smuggled back in. A contract that pays by itself on delivery still waits for a living person to confirm that the cargo arrived—and that person is again the weak link, moved one step back but not abolished. This is the oracle problem the previous chapter ended on, and it has not gone anywhere.

The chain is slow and cramped. Bitcoin's base layer carries a handful of transactions per second—where payment networks carry thousands.¹⁶⁸ It will not become the world's ledger in its present form without layers built on top, and those come with caveats of their own. At this pace the chain could not serve even one large city at rush hour, let alone the planet. What people like to call “the new financial system” moves, at the base layer, slower than the line at a neighborhood bank.

The chain's strength is paid for in heat. The costly vote burns roughly a mid-sized country's worth of electricity in a year.¹⁶⁹ Strength and price here are one and the same: such

¹⁶⁸ Bitcoin's base layer processes ~3–7 transactions per second (a block roughly every 10 minutes, ~1 MB); for comparison, payment networks like Visa handle thousands (peaking at ~24,000) per second. Hence the “scaling problem”; layers built on top (e.g., second-layer networks) soften it, but the base limit is exactly that. Source: “Bitcoin scalability” (Wikipedia).

¹⁶⁹ Estimates of the Bitcoin network's annual electricity consumption vary—

a ledger cannot be guarded cheaply, or the guard would be bought out wholesale and everything would collapse into the limit from the previous section. A defense that costs nothing defends nothing.

And garbage at the input stays inside. The ledger vouches that what has been entered will not be doctored later—not that it was true at the moment of entry. A forged record of land title, once entered and attested, becomes an eternal and universally respected forgery, now impossible to overwrite. The machine will honestly preserve someone’s lie as carefully as someone’s truth.

What Was Left When the Noise Receded

Take all of it away (the frenzy, the fortunes won and blown, the promise that everything belongs on a chain), and what remains is something narrow and real. A record that no one owns alone and that cannot be rewritten quietly. And a way to have rules carried out without a ruler to carry them out. Not a miracle and not a religion. A new brick—one buildable element where, for three movements running, there had been only diagnosis and no cure.

The mistake is to demand that it be everything. The right question is narrow: which mechanisms broke precisely because the missing link—feedback, rollback, a record without an owner—was the whole of their disease? The past three movements sorted through such wounds one by one: a court turned into power’s shield against its citizens; money printed into a few hands; a chronicle the victor edits; a reform strangled for being a signal. Not every one of them is cured by a shared

on the order of 95–170 TWh (the Cambridge CBECI index; ~0.78% of world electricity consumption), comparable to a whole mid-sized country (Norway ~124, Poland/Ukraine ~155–172 TWh). This is the price of the “costly vote”: a cheap defense would be bought out. Source: Cambridge CBECI / Judge Business School (2025).

ledger, and none by the ledger alone, without people ready to keep it and guard it. But for the first time in the whole book, the diagnosis does not dead-end in “and nothing can be done”: there is now at least one working material to attempt repairs with.

That is the work the next movement takes up. It does not replace politics with an engineering blueprint, and it does not promise that code will replace conscience. Of every institution taken apart, it asks one thing: where was the feedback wire cut here, and can a new one be run in? In some places the answer will turn out to be “yes,” in others an honest “no,” and both answers matter equally.

How to assemble a working building out of this brick—and which buildings can never be built from it—is the next movement’s business.

Chapter 19. The Human at the Center

*“Act so that you treat humanity, whether in your own person or in that of another, always at the same time as an end and never merely as a means.” — Immanuel Kant, Groundwork of the Metaphysics of Morals (1785)*¹⁷⁰

From the Drawing Board

For eighteen chapters this book took breakdowns apart. Took them apart coldly, asking of each failure what a crash investigation asks: “what in the design allowed this.” I ran them that way because that is what I am used to. I design systems, and an engineer’s first reflex in front of wreckage is to look for the flaw in the design—the one that will raise up another just like it in its place.

But crash investigation comes with a comfortable luxury. While taking apart, you may keep silent about what you would build instead. Criticism risks nothing: it points at the hole and walks away. A design risks everything—it is obliged to name what the whole should be. And here a question surfaces that the diagnostician simply does not have: what is this system even running for? What does it optimize?

¹⁷⁰ Immanuel Kant, *Groundwork of the Metaphysics of Morals* (Grundlegung zur Metaphysik der Sitten, 1785)—the second formulation of the categorical imperative, the so-called formula of humanity. The German original (academy edition, AA 4:429): “Handle so, daß du die Menschheit, sowohl in deiner Person, als in der Person eines jeden andern, jederzeit zugleich als Zweck, niemals bloß als Mittel brauchest.” English renderings differ slightly by edition. Sources: Kant, *Gesammelte Schriften* (Akademie-Ausgabe), vol. 4; first edition: Riga, J. F. Hartknoch, 1785.

Every system optimizes something—even if no one chose the goal out loud. The captured institutions of the previous chapters optimized honestly and recognizably: they worked for whoever sat at the center. The court protected power from the citizens. Issuance fed those nearest the press. The chronicle guarded the victor's version. The goal was the center, and the human outside was expendable: as chapter four's tax cattle, as chapter five's devalued depositor, as chapter twelve's subject-as-object, as a line in a report. He was counted as a means.

That line—for whom—is the weightiest and most rarely inspected decision in the whole design. It usually goes unwritten; it seeps in on its own, from whose convenience in the system turned out to matter more. And almost always the center's convenience wins—simply because the center sits closer to the drawing board. To name the goal out loud, and to make that goal the human rather than the center, is already half the redesign. Everything else in this movement of the book merely keeps watch that the structure not betray its own goal.

So the redesign begins not with the blueprint of an institution and not with a voting mechanism—those are still far off. It begins with one line in the design brief: for whom. And the first axiom here is the one placed in the epigraph, translated from the language of morals into the language of structure: the human is the system's end, not its expendable material. Not a “cog serving the whole,” but the whole for whose sake the system exists at all. Everything else in this movement is a consequence flowing from that one line.

Floor and Slope

An objection appears at once, and it deserves to be met head-on, not sidestepped. “The human is the end” slides easily into “an equal share for everyone, no matter what”—and that has worked nowhere and has been just nowhere. The one

who builds and the one who breaks cannot receive the same. Otherwise the system punishes contribution and rewards parasitism—exactly the torn feedback nerve half this book has been sick with.

So a just system hands out goods in proportion to contribution. But “contribution” must be understood broadly—far more broadly than the market price of labor. A contribution is any value society agrees to recognize: raising a child, supporting the old, keeping the next street over from turning bitter. Even “not being an anchor” is already a small plus. The narrow definition of contribution (only what money is paid for) is precisely the distortion that bred the warps of the planned economy, where “meeting the tonnage quota” crowded out “making what was needed.” A person who raises three children, or carries aging parents on their back for years, puts more into the common future than many a middleman. It is just that this contribution issues no invoice and is therefore invisible to narrow bookkeeping. A system that counts as contribution only what is paid in money is blind exactly where its own reproduction rests.

And here is an apparent contradiction the chapter is obliged to resolve, not hush up. If goods go strictly by contribution, then where is the unconditional part—where is the dignity of the one who right now contributes nothing measurable: the sick, the old, the one who stumbled? The answer is that these are two different things, not one: the floor and the slope.

The floor is unconditional. There is a level below which a person is not dropped under any tally of contribution, simply by the fact of being human. A minimum that provides food, shelter, and the chance not to drop out of life altogether. This is the idea of unconditional basic income: a regular payment to everyone, with no means test and no conditions.¹⁷¹ The floor

¹⁷¹ Unconditional basic income (UBI)—a regular cash payment to every resident, with no means test and no conditions of income or status. Key features: periodicity, individuality, universality, unconditionality. Source:

has a tangible human face as well. The right to food and shelter does not have to be proven over and over. A person is not stood before the choice between humiliation and hunger the moment he stumbles, falls ill, or simply proves of no use to the market this quarter and this year. The institutions of the previous chapters did the opposite: first they demanded that you prove useful to the center, and only then recognized your right to exist. The floor flips the order—dignity first, accounting second. This is no invention of recent years: a guaranteed minimum as a right, not as charity, was proposed as far back as the late eighteenth century by Thomas Paine. He wanted to fund it out of what belongs to everyone in common.¹⁷² And here is a detail that matters, so that this thought does not get filed into a single column of the political spectrum. A variant of the same idea (the negative income tax) was championed by Milton Friedman and Friedrich Hayek, figures from chapter five whom it is hard to suspect of sympathy for leveling.¹⁷³

The slope sits above the floor. Above the minimum, the system rewards contribution, and the more a person puts into the common pot (in the broad sense), the more they receive. The floor does not cancel the slope; the slope does not punch through the floor. They are easy to combine once you stop con-

“Universal basic income” (overview; en.wikipedia).

¹⁷² Thomas Paine, *Agrarian Justice* (1797): proposed a guaranteed cash minimum as a RIGHT, not charity, funded by rent on what belongs to everyone in common (the land)—one of the first sketches of the basic income idea. Earlier kindred thoughts in T. More (*Utopia*, 16th c.) and J. L. Vives. Source: *Agrarian Justice* (overview).

¹⁷³ The negative income tax—a variant of the same idea (the state tops up those whose income falls below a threshold)—was championed by Milton Friedman (*Capitalism and Freedom*, 1962) and Friedrich Hayek; a close scheme was proposed by Juliet Rhys-Williams in the 1940s. This matters for the above-the-fray frame: a guaranteed minimum is not a monopoly of left-wing thought. Callback to ch. 5 (Hayek/Friedman). Sources: Negative income tax (overview); Friedman, *Capitalism and Freedom*.

fusing dignity with a salary: dignity is guaranteed to all; the share above it is earned. And the slope here is not a concession to greed but the same feedback wire that kept snapping in all the earlier failures. A system where contribution and return are unlinked is blind to what works: it cannot tell the builder from the consumer and so it cannot learn. The link “put in more—get back more” is the signal by which society understands which efforts are worth repeating. To remove the slope entirely is to cut that same feedback wire again, only from the other end: there, they stopped punishing error; here, they stop noticing contribution.

The numbers I am deliberately leaving out. The concrete arithmetic of a basic income—how much, out of what, at what inflation—is a separate, heavy calculation with explicit assumptions. To serve it up as a finished estimate would be exactly the counterfeit certainty this whole book stands against. The floor and the slope are the shape of the solution, not its numbers; the numbers get computed for a specific economy, showing honestly where the model may not add up.

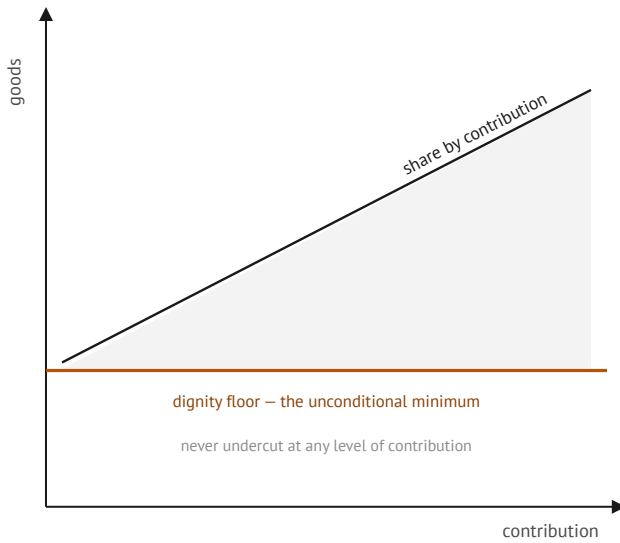
The Oxygen Mask

Humanism as a principle has a reputation for softness—as if it were about self-sacrifice, about giving away your last. From the designer’s chair it looks different. It looks like a survivability requirement.

Take the rule repeated before every takeoff: if the cabin loses pressure, put on your own mask first, then help others. It sounds almost selfish—and in fact it is the cold engineering of fault tolerance. A rescuer who has lost consciousness rescues no one; a system that burns out those who carry others loses first them, and then the ones they were holding up. You can see it in any burned-out caregiver. You can see it in the developer kept for years as the only one who understood the

FIGURE 19.1

Floor and slope



*Dignity is guaranteed to all, the share above it is earned;
floor and slope do not contradict each other.*

old system—until he went down, and with him went down everything that hung on him alone. A society built on the sacrifice of its load-bearers looks noble right up to the first load-bearer's failure. After that it crumbles in the very cascade chapter eleven described on empires—here it repeats on people. Putting the human at the center is not sentimentality; it is a way to keep the structure from crumbling down the chain. A load-bearing beam is not cherished for its beauty. The rest hangs on it.

The same calculus works from below. A person who has fallen beneath the dignity floor is, to the system, not merely unfortunate; he is a dropped sensor. He no longer learns, no longer works, no longer sends signals anyone can lean on—he has been taken out of the loop, and the system no longer sees the patch he covered. That is why the dignity floor is worth holding: it keeps people inside the feedback instead of pushing them out to where their signal is lost to everyone.

The Right to Prove Yourself

From this follows a consequence often mistaken for a separate, contentious topic, though it flows straight from the engineering. If a system grows more reliable the more working sensors it has and the wider its stream of contribution, then to shut someone off from the “right to prove yourself” is not only an injustice. It is a designer's stupidity: voluntarily switching off half your sensors and discounting in advance the contribution of those who were never allowed to try. Equal access to opportunity is not a concession and not a fashion; it is the widening of the intake that all the feedback rests on.

In my home city this argument was once proven by deed—long before anyone had learned to phrase it in the language of systems. In 1901, the Baku industrialist and philanthropist Haji Zeynalabdin Taghiyev opened the first secular school for Mus-

lim girls in the Russian Empire. Fifty-eight pupils, thirty-five of them from poor families.¹⁷⁴ Two walls stood against it at once: imperial officials and a conservative clergy that declared the whole undertaking impermissible. Taghiyev did not break the second wall by force—he went around it in its own language. He outfitted a mullah for a long circuit of the holy places of Islam (Mecca, Medina, Karbala, Mashhad, Cairo, Istanbul, Tehran) to gather from the most eminent theologians written assurance that girls' schooling does not contradict the faith.¹⁷⁵ The gatekeeper was outplayed with his own authority, not against it.

What kicked in next was precisely the systemic payoff, not one good deed. The school turned out to be a model that got reproduced: by 1915, Baku alone had five such schools. The same man, two decades earlier, had also built the city's first theater.¹⁷⁶ I bring this up not out of hometown pride. I bring it up because here, in a single private example a century old, the whole argument of this chapter can be seen live. To widen the

¹⁷⁴ Haji Zeynalabdin Taghiyev (1838–1924)—Baku oil industrialist and philanthropist. The school built with his money (officially, the Alexandrine Russian-Muslim School for Girls) opened on September 7, 1901: the first secular school for Muslim girls in the Russian Empire (often, “in the Muslim East”); 58 pupils, 35 from poor families (classes began September 7; the ceremonial opening was September 9). Sources: “Empress Alexandra Russian Muslim Boarding School for Girls” (en.wikipedia); azhistorymuseum.gov.az.

¹⁷⁵ Resistance came both from the imperial authorities and from the conservative clergy. To remove the religious objection, Taghiyev sent a mullah to the principal centers of Islam (Mecca, Medina, Karbala, Mashhad, Cairo, Istanbul, Tehran) to gather from the most eminent theologians written confirmation that Islam does not forbid secular education for girls. The pioneering project was reproduced: by 1915 Baku had five schools for Muslim girls. Sources: en.wikipedia (ibid.); azhistorymuseum.gov.az.

¹⁷⁶ Taghiyev's Theater—the first theater in Baku, built in 1883 with Taghiyev's money; in 1908 it hosted the premiere of the first Azerbaijani opera, *Leyli and Majnun* (Uzeyir Hajibeyov). Source: “Taghiyev's Theater” (en.wikipedia).

“right to prove yourself” is to include in the system those it previously did not count. And the winner is not only the one included but the system as a whole. And the reverse. Every wall cutting people off from opportunity (by origin, by sex, by poverty) is not merely unjust to those cut off. It also robs the ones holding the wall: the solutions and corrections that could have come from beyond the wall never come. Discrimination is expensive not only morally—it is expensive in engineering terms: a voluntarily narrowed intake on a system that lives by the width of its intake. Taghiyev was not building a utopia and was not peddling a slogan; he was plugging severed nodes back in—and the network grew denser.

Where This Leads

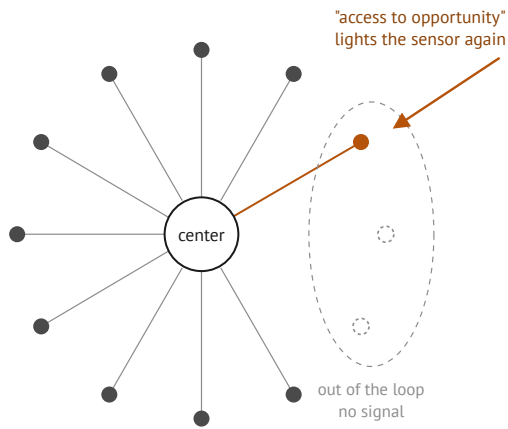
So the principle is drawn. The human is the end, not the means. Dignity is the floor, unconditional for all; the share above it is the slope, earned by contribution. Access to opportunity is wide, because a narrow intake impoverishes not only the one passed over but the structure itself. This is not a party program and not a promise of paradise; it is a design brief—the line “for whom, and by what rule,” without which the drawing must not begin.

But a principle not embodied in institutions remains a sermon, and this book promised to avoid sermons. Saying “the human at the center” is easy. It is far harder to build a court, a school, a treasury that hold this principle and yet do not fall at the first shove, do not stall, do not get captured by whoever is defter. What does an institution look like when it is designed to survive both the bad people inside it and the blow struck at it? Working examples exist, and the most convincing of them were written after catastrophes.

FIGURE 19.2

The severed node

society as a sensor network



Every excluded person is a sensor taken out of the feedback; wider intake, denser network.

Chapter 20. Institutions That Don't Fall

“A complex system that works is invariably found to have evolved from a simple system that worked. A complex system designed from scratch never works and cannot be patched up to make it work. You have to start over with a working simple system.” — John Gall, Systemantics (1975)¹⁷⁷

Reliability Isn't Instilled

The previous chapter ended with a promise that is easy to make and hard to keep: build an institution that survives both the bad people inside it and the blow from outside. “The human at the center” is a principle; an institution is a structure, and a structure must be held to account as a structure.

The first reflex here is almost always wrong. To the question “how do you make an institution reliable,” the everyday answer is “put good people in it”: an honest judge, an incorruptible official, a responsible boss. But a bet on the character of a node is exactly the mistake this whole book has been taking apart. A good person is mortal, replaceable, and bribable. An institution held up by his personal qualities holds exactly until he leaves, falls ill, or someone names his price.

Chapter Thirteen already framed the right question in Popper's words: not “who should rule,” but how to organize institutions so that bad or incompetent rulers cannot do too

¹⁷⁷ John Gall, *Systemantics: How Systems Work and Especially How They Fail* (1975)—the formulation known as “Gall's law.” The epigraph gives Gall's original wording. Sources: en.wikipedia, “John Gall (author)” / “Systemantics”; en.wikiquote.

much damage. That is a spec, not a wish. A good institution is one whose properties hold even when the people inside are mediocre, self-serving, or hostile. That, precisely, is the realistic load—not a rare stroke of bad luck.

The book has already named these properties, only with the sign flipped. Wherever a system fell, the same set was missing. Transparency—it could not be checked from outside. Distribution—there was a single point of failure, one node whose capture brought the whole thing down. Graceful degradation—it broke all at once instead of bending. Feedback—it did not know it was failing. To design an institution that doesn't fall is to build these four properties in from the very start, not to hope that good people will stand in for them.

And one more thing, from the epigraph. An institution that doesn't fall is not designed perfect on paper and not erected in one piece. Complex things that work grow out of simple things that worked, and a complex system designed from scratch does not start. So these properties are not proclaimed. They are grown and maintained, while the structure is allowed to bend and change. There is no such thing as a ready-made perfect institution; there is a simple working one that was allowed to grow.

One and the same failure will run through this entire chapter, and “bad people” are not the ones to blame for it. To blame is an institution that optimizes its own throughput or its own survival instead of its purpose. A captured court guards power instead of justice; a prison works for occupancy instead of safety. And the treatment is always the same in form: align the institution's incentive with its purpose, and make deviation detectable.

FIGURE 20.1

The four properties

institution that falls	institution that doesn't fall
✗ opaque	✓ checkable by anyone
✗ single point of failure	✓ no single point
✗ breaks at once	✓ degrades gracefully
✗ no feedback	✓ sees its failure

Reliability is not a virtue of those inside but properties of the structure; built in, not expected of good people.

A Surgeon, Not a Brother

The place to start is how an institution recruits—because this is where capture happens earliest and most quietly.

Lying down on the operating table, a person wants the best surgeon, not the brother he trusts most. Trust is pleasant and feels safe; what cuts and stitches is skill. An institution that selects for loyalty rather than ability is choosing the comfort of whoever sits at the center—that same closeness to the center which outweighed everything in the last chapter. A loyal subordinate tells the boss what the boss wants to hear; an able one tells him what is. Selection for loyalty mutes the second voice. And the institution goes blind exactly where it is supposed to see.

Chapter Thirteen showed this at the limit: an autocrat who had surrounded himself with the loyal decapitated his own command staff on the very eve of war. He put devotion above skill and met the blow without the people who knew how to repel it. But the same mechanism runs in a peacetime ministry and in an ordinary firm, without any executions. Wherever “is he ours?” gets asked before “can he do the job?,” the institution has already chosen its own comfort over its own task.

The counter-example is precisely about structure, not character. On December 28, 1978, the crew of a passenger plane near Portland spent almost an hour wrestling with a jammed landing gear until they had burned through all the fuel and the aircraft came down on a residential neighborhood. The captain had buried himself headfirst in the malfunction, and the first officer and the flight engineer, who saw the fuel running out, did not dare to cut him off. The captain’s authority weighed more with them than the instrument readings. After that crash, aviation rebuilt the chain of command in the cockpit itself: it introduced a rule by which a junior must challenge a senior out loud on seeing danger, and the senior must hear him out. Not “instill

courage in first officers,” but change the design so that a correct observation gets through over rank.¹⁷⁸ That is the fix through structure: the voice of competence is built into the procedure, not left to the courage of a particular person.

Loyalty is a property of a person. Ability together with accountability is a property of a structure: ability does the work, accountability catches the error, and that is the same feedback wire. An institution should be designed for the second, not the first. This is design against character again—the thesis of Chapter Thirteen, translated into a hiring rule. Not to search for angels, but to build so that the seat works even with ordinary people in it—so long as they can do the work and are set up to be checked.

A Court That Cannot Be Rewritten

This shows sharpest in the institution Chapter Fourteen left captured—the court. There it stood as power’s shield against the citizens: a captured court protects not the law but whoever captured it.

The everyday fix is again about character: appoint honest judges. But “trust an honest judge” is the same bet on a node as before. Honesty does not outlive the honest man: when he goes, it goes, and the chair remains.

¹⁷⁸ Crew Resource Management (CRM)—the system of flight-crew training that grew out of the investigation of the crash of United Airlines Flight 173 (a McDonnell Douglas DC-8, near Portland, December 28, 1978; 10 people died). The crew, absorbed in a landing-gear malfunction, ran out of fuel; the junior crew members, who noticed the dwindling reserve, did not press their case with the captain. The investigation’s conclusions (NTSB report, 1979) put the emphasis on “participative management” for captains and assertiveness training for the other crew members. The base principle of CRM: safety is a shared responsibility, and any crew member must speak up at a threat regardless of rank. Source: en.wikipedia, “United Airlines Flight 173”; digests on CRM programs.

The structural fix comes from Chapters Seventeen and Eighteen. A court whose process lands in an immutable ledger: what was decided, by which rule, on what grounds—recorded in many independently stored, mutually checked copies, so that a record cannot be quietly rewritten after the fact. Chapter Twelve showed the opposite: the retouching that erased an executed man from a photograph—there, the record of the past sat in the victor’s hands. An immutable ledger takes that hand away. The shift is the same: not make the judge worthy of trust, but make forgery of the process detectable. Trust in a person is replaced by the checkability of the record.

This is not a specific device, and not a single product. It is a class of solution, a property: the trace of what was decided, and by which rule, must be such that no single hand can doctor it.

The property has an honest limit, and it is worth naming right away. “Checkable” applies to the rule and to the process, not to the baring of every private detail. A court has legitimate reasons to close part of a case—victims, minors, a secret that itself becomes a weapon once laid out in the open. Transparency of the process and privacy of the participants are not the same thing. Confusing them is a separate breakage: the redesign must hold both properties at once, not trade one away for the other.

Who the Prison Pays

The third property is an incentive that coincides with the purpose. The opposite shows sharpest in the private prison.

In the United States, part of the prison system has been handed over to private companies, and the contracts with them often contain a guaranteed-occupancy clause—a “lockup quota.” In one review of such contracts, about two thirds carried an occupancy guarantee: most often ninety percent of beds, in places all one hundred. If the cells empty out, the

state still pays for them as if they were full.¹⁷⁹ Colorado, with crime falling, paid private prisons extra for empty beds—just to honor the occupancy clause. And then comes what follows naturally: the largest operators poured millions into lobbying and pushed for harsher punishment—mandatory minimum terms, longer sentences; in short, everything that keeps the beds occupied.¹⁸⁰

Reading this as a system is simple. The prison's purpose is fewer crimes; the contract pays it for more bodies in the cells. The feedback wire is connected to the wrong quantity. The meter counts occupied beds; nobody counts safety. And the institution rationally, without a single villain, starts working for its meter—lobbying for whatever fills the cells. A prison that earns on incarceration will produce incarceration. This is the racket-as-a-service of Chapter Four and the capture of Chapter Thirteen, only sewn not into a person but into a clause of a contract.

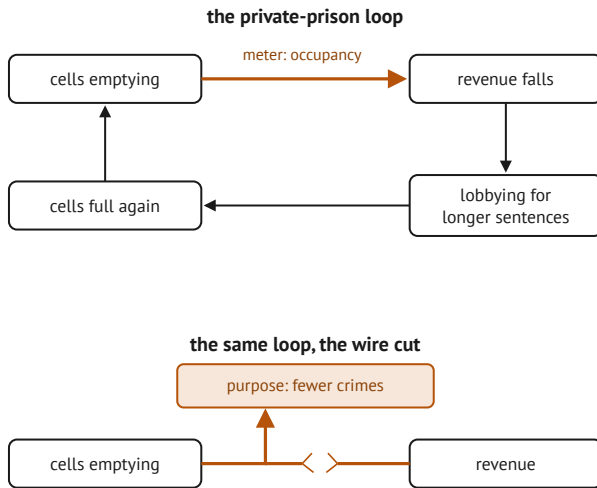
The direction of the fix is different. Neither an honest warden nor a decree banning profit works here: what must be cut is the line between the institution's survival and the number of

¹⁷⁹ In the Public Interest, "Criminal: How Lockup Quotas and 'Low-Crime Taxes' Guarantee Profits for Private Prison Corporations" (2013). Of the US private-prison contracts analyzed, about 65% contained an occupancy guarantee (from 80% to 100% of beds, most often 90%); several states (Arizona, Louisiana, Oklahoma, Virginia)—95–100%. Under the guarantee, the state pays for the beds regardless of actual occupancy; Colorado, with crime declining, paid private prisons extra for empty beds. Source: In the Public Interest (inthepublicinterest.org), 2013; digests in Prison Legal News and by the Brennan Center for Justice.

¹⁸⁰ The largest private-prison operator in the US (CCA, now CoreCivic) spent on the order of \$17–18 million on lobbying over a decade (roughly 2002–2012). Private prison companies have historically supported harsher punishment—mandatory minimums, truth-in-sentencing—and resisted its softening. The direct link "lobby → specific law" is documented by sources cautiously and in differing ways; the only thing beyond dispute is the direction of interest: occupied beds are revenue. Sources: digests of the In the Public Interest report (2013); Prison Legal News.

FIGURE 20.2

The wire connected to the wrong place



An institution works for whatever quantity its meter is connected to; connect the meter to occupancy – you get lobbying for repression.

people it holds. A facility built so that an extra inmate brings it nothing (public, not private) removes the motive to profit from the sentence.

But an honest sketch is obliged to name where it can break itself. “Self-financing” easily grows a perverse incentive of its own: covering its costs with inmate labor—the same trap from the other end, “more bodies, more benefit” again. So the goal of the design is an arrangement in which no part of the institution gains when the number of people behind bars grows. Neither a “profitable prison” nor even a “self-sustaining” one delivers that by itself. This is a direction and a named break point, not a finished recipe; the specific numbers and the design of such a facility are separate work with explicit assumptions.

Bending Under Load

Behind all three fixes stands one property. An institution that doesn’t fall survives the failure of its parts.

These are two requirements familiar from this book. No single point of failure—not one node whose capture or death drops the whole (distribution against the single point of failure). And graceful degradation—when a part fails, the whole bends and goes on serving instead of coming apart at once. This is the opposite of tight coupling, where the failure of one link cascades down the entire chain.

The difference is tangible. A power grid under overload can go two ways. If it knows how to shed load (dim the lights, cut the nonessential), it sags but stands: that is graceful degradation. If it is coupled too tightly, the failure of one line throws the current onto its neighbors, they give out, and the blackout rolls like an avalanche across whole regions. The same cascade, only in wires. A good institution is built like the first grid, not the second: it has somewhere to settle under load, and it has no link whose failure brings everything down at once.

Here the dignity floor from the last chapter returns—now as an engineering property. A society where no one falls below the floor is fault-tolerant in the human layer: when someone breaks—loses a job, falls ill, goes under—he sinks to the floor instead of falling out of the system altogether. The unconditional minimum is graceful degradation applied to people: the failed part degrades to the floor instead of disappearing. The dropped sensor of the last chapter stays in the loop. And an institution that lets its people fall straight through installs a single point of failure in every human being.

This is where the chapter's properties converge into one: transparency, no single point of failure, graceful degradation, feedback—and the dignity floor as graceful degradation applied to the human being.

Who Sets the Course

All of this is about surviving bad people inside and a blow from outside. But one loop remains open. The court can be made unrewritable, the prison unbribeable on occupancy, the staff selected for skill; still, someone has to set and correct the course of the whole. Who turns the institution around when it drifts the wrong way? With what do citizens say “wrong way” so that the signal gets through—and how do you replace the unfit man at the helm without breaking the whole structure?

This is Popper's question in its pure form: survive a bad ruler—but by which mechanism, exactly? That feedback wire and that rollback, now for power itself, are the right to vote. The next chapter is about how it gets repaired.

Chapter 21. Suffrage 2.0

*“The cure for the ills of democracy is more democracy.” —
John Dewey, *The Public and Its Problems* (1927)¹⁸¹*

A Low-Resolution Vote

The last chapter brought everything down to one channel. An institution that doesn’t fall has to be able to correct itself. Which means citizens need a feedback channel to power, and a way to replace the unfit man at the helm without breaking the whole structure. That channel is called the right to vote. And as a feedback channel it works badly.

To look at voting as an engineer is to ask about its bandwidth. Once every few years a person sends one bit upward, a few at best: one name from a list, one “yes” or “no.” That bit has to express everything at once—a position on the war, on taxes, on schools, on roads, on the thousand decisions the winner will make over the years to come. The signal is so coarse that what the voter actually wanted can hardly be reconstructed from it. The same check mark next to a candidate can mean “I agree with him about the war,” “I put up with him for the sake of taxes,” or “I cannot stand the other one.” And all three merge

¹⁸¹ John Dewey, *The Public and Its Problems* (1927), ch. V. Dewey calls this a “surface paradox” and at once qualifies it: the saying “is not apt if it means that the evils may be remedied by introducing more machinery of the same kind as that which already exists, or by refining and perfecting that machinery”; it is apt if it means a return to the idea itself, a clarifying of it, and a remaking of its political forms. Dewey’s full thought is closer to this chapter’s thesis than the short aphorism in circulation. The page number varies by edition (ch. V; ~p. 146/166). Source: Dewey, *The Public and Its Problems* (1927).

into one indistinguishable mark. A person who likes one party's economics and another party's foreign policy is forced to throw away half of his preferences at the entrance. What goes upward is not a will but a stump of one. Chapter nine called the severed feedback wire the root of stagnation; the vote is a wire not severed, but with a bandwidth of nearly zero.

And even this thin trickle of signal cannot be added up without loss. In 1951 Kenneth Arrow proved what has gone by the name of the impossibility theorem ever since. Once there are at least three options, no way of assembling individual preferences into a collective ordering satisfies, all at once, several obviously reasonable requirements—not to depend on irrelevant options, not to reduce to the will of one, to respect unanimity.¹⁸² This is not a defect of some particular ballot that could be debugged; it is a property of the task itself. The simplest example of this impossibility is older than the theorem. Suppose a third of the voters rank the first candidate above the second, and the second above the third; another third rank the second above the third, and the third above the first; the last third rank the third above the first, and the first above the second. Then a majority prefers the first to the second, and a majority prefers the second to the third. And a majority prefers the third to the first. The collective will goes around in a circle, though every individual voter is perfectly consistent. There is no ideal voting system; every system sacrifices something, and the honest conversation begins

¹⁸² Arrow's impossibility theorem: Kenneth Arrow, *Social Choice and Individual Values* (1951; Nobel Prize in Economics, 1972). With three or more options, no ranked system that aggregates individual preferences into a collective ordering satisfies all the "reasonable" conditions at once: unrestricted domain (any preferences are admissible), no dictator, Pareto efficiency (unanimity is respected), independence of irrelevant alternatives. In plain terms: there is no ideal voting system; choosing a system is choosing what to sacrifice. Sources: Stanford Encyclopedia of Philosophy, "Arrow's Theorem"; Britannica, "impossibility theorem."

with the question of what, exactly, is sacrificed.

On top of that, a coarse signal is easy to twist from outside: by the agenda of the vote, by the carving of districts, by the order of the questions. So the channel is narrow, and noisy, and open to tampering. The strange thing is not that people are unhappy with it—the strange thing is that they expect it to steer a complex society with precision.

Not One Recipe but Several Sketches

Since the problem has no ideal solution, it is more honest not to offer a single “correct” ballot but to lay out several sketches—and to name the price of each.

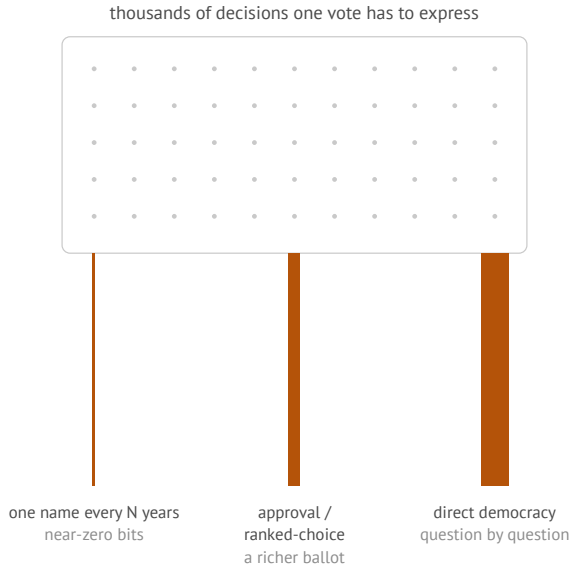
The most modest and the safest touch only the ballot itself. Approval voting: mark every acceptable candidate rather than one—and the “lesser evil” stops taking the vote away from a sincere choice. Ranked-choice: put the candidates in order, so that a vote for an eliminated candidate flows to the next one instead of being lost. These are not utopias. Both systems are already in use somewhere; both merely raise the resolution of the signal without touching whoever sends it. The price is a count that is harder to do and harder to explain.¹⁸³

Next come the bolder and riskier ones. Quadratic voting lets a person express not only the direction of a preference but its strength. Each person has a budget of votes, and every additional vote on the same question costs more than the one before—by the square, so that forcing one issue through at the

¹⁸³ Approval voting: the voter marks all acceptable candidates; whoever collects the most marks wins. Ranked-choice, or instant-runoff, voting (IRV): the voter puts the candidates in order; in the count the weakest are eliminated and their votes flow to the next names on the list. Both systems raise the ballot’s “resolution” and weaken the “wasted vote” effect; the price is a more complicated count and explanation. Sources: surveys of approval voting / ranked-choice voting.

FIGURE 21.1

The bandwidth of a vote



The vote is the feedback wire; a rare, coarse bit carries almost nothing, and its resolution can be raised in several ways — each with its own price.

expense of all the rest is expensive.¹⁸⁴ That gives a minority for whom something is vital a chance to outweigh an indifferent majority that does not care. But the price is named right away: as long as influence is bought with a budget, any skew in the budget becomes a skew in power. Tie that budget to money—and you get plutocracy in its pure form.

And the most attackable sketch is weighted voting, where different people's votes carry different weight. The lure of the idea is this: weight accrues slowly (through years of meaningful participation) and is lost quickly. And after every major decision the system asks "did things get better?" and adjusts the weights by the result, closing a feedback loop on the voters themselves. It sounds elegant, in an engineering way. And here one has to stop and say it plainly, with no softening: this is the most dangerous idea in the book. Weight tied to anything at all (money, education, "competence," seniority) instantly recreates exactly what centuries of struggle for universal suffrage were fought against. The property qualification, the literacy test, the poll tax at the door of the polling place—all of these were weighted voting under another name. Their whole point was that some people's votes weighed and others' did not. And this is no distant exotica. In Prussia, from 1849 to 1918, voters were divided into three classes by the tax they paid, and a vote from the top class weighed roughly seventeen times a vote from the bottom. For seven decades, weight tied to money

¹⁸⁴ Quadratic voting: the voter has a budget of "voice credits"; casting k votes on one question costs k^2 credits (the second vote costs more than the first, the third more still), which forces the voter to spend voting power only where the preference is genuinely strong; what is collected is redistributed equally. Proposed by Steven Lalley and E. Glen Weyl (working paper "Quadratic Voting," 2015); popularized by Eric Posner and E. Glen Weyl, *Radical Markets* (2018). Influence is tied to ability to pay $\rightarrow$ with a monetary budget it degenerates into plutocracy; taken here as an illustrative mechanism, not a recipe. Sources: Lalley & Weyl (2015); Posner & Weyl, *Radical Markets* (2018).

kept power in the hands of those who already had it.¹⁸⁵ Any weighting scheme owes an explanation of how it differs from such a qualification—and if it cannot explain, it is one.

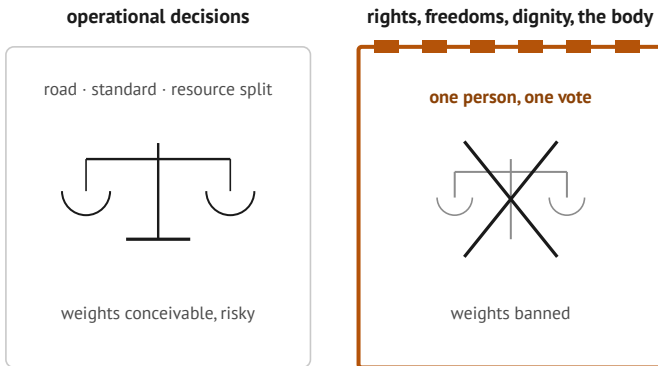
So any weighting has a line that must not be crossed, and it has to be drawn explicitly. There is a class of decisions where weight is forbidden as a matter of principle: basic rights, freedoms, dignity, the inviolability of the body. Here only “one person, one vote” applies, and no accumulated weight, no budget, no “competence” tips the scale. Rights are not voted on and not weighed. Weights (if they are allowed at all) are conceivable only for operational decisions: where to run a road, which standard to adopt, how to divide a shared resource. Never for who gets to be a human being with the full set of rights. Without this line, any talk of weights is talk of a new voting qualification.

None of this, however, is a verdict on the ideas themselves. The low resolution of the vote is a real problem, and richer ballots are worth trying. Not by decree for the whole country, but in limited, reversible experiments on operational decisions: roll it out, measure whether things got better, roll it back if they got worse. This is exactly the method the whole of this part of the book stands on: repair not by faith but by a checkable correction. Quadratic and even weighted voting as the subject of such an experiment is a legitimate engineering hypothesis, not heresy. Only one prohibition is inviolable: these experiments are not run on people’s rights.

¹⁸⁵ The Prussian three-class franchise (Dreiklassenwahlrecht): in force from May 30, 1849, to 1918 for elections to the lower house of the Prussian Landtag. Men over 24 were divided into three classes by the direct tax they paid, so that each class accounted for a third of total tax receipts, and each class elected a third of the electors (indirect elections). In 1849 the top class made up ~4.7% of voters, the middle ~12.7%, the bottom ~82.6%—so a vote from the top class weighed roughly 17.5 times a vote from the bottom. Abolished in November 1918, replaced by universal, equal, direct, and secret suffrage (for the first time including women). Sources: en.wikipedia, “Prussian three-class franchise”; *The Journal of Economic History* (2020).

FIGURE 21.2

The no-weights zone



Rights aren't voted on or weighed; with no wall, any "weight" slides into a qualification.

Switzerland: Showcase and Warning

Direct democracy has a living example that people like to cite: Switzerland. There, citizens vote on specific questions directly and often—on the order of ten questions put to a referendum a year. This is real, working feedback of far higher resolution than “one name once every four years”: people decide not “who will rule” but “whether to adopt this.”

But the same example is a warning, and it has to be named in the same breath, so as not to pass the showcase off as an idyll. That very direct democracy denied women the vote for decades. Swiss women got the vote at the federal level only in 1971—later than almost all of Europe. The question was put to a vote of men alone, and only then did the majority agree to give women a voice. And the last canton, Appenzell Innerrhoden, held out until 1990—women voted there for the first time only after the Federal Supreme Court upheld their right, against the will of the local male majority.¹⁸⁶

The lesson here is double. Yes, citizens are capable of carrying feedback directly, and it works better than a rare, coarse vote. And at the same time: a majority armed with direct democracy kept half of the adult population outside the franchise for half a century. The mere existence of a voting machine does not protect the one whose rights are put to a vote on that machine. The mechanism of the failure matters more here than the fact itself. The question of one group’s right was

¹⁸⁶ Switzerland—direct democracy: on the order of ten questions put to a referendum a year (several voting dates, several questions on each). The same system denied women the vote for decades. Federal suffrage for women was introduced by the referendum of February 7, 1971 (approved by 65.7%; only men took part, turnout ~57.7%)—later than almost all of Europe. The last canton, Appenzell Innerrhoden, admitted women only after the Swiss Federal Supreme Court’s decision of November 27, 1990; they voted for the first time at the cantonal *Landsgemeinde* on April 28, 1991. Sources: en.wikipedia, “Women’s suffrage in Switzerland,” “1971 Swiss women’s suffrage referendum”; swissinfo.ch.

decided by a vote of those who already held that right—and a majority that risked nothing by refusing found no reason, for decades, to share. This is why the line from the previous section is needed: basic rights must lie outside what a majority is entitled to decide—and first of all where the voters gain from someone else's lack of rights. Switzerland proves both halves at once: the power of direct feedback, and the necessity of putting rights beyond its reach.

Who Draws the Line

The line is declared—and at once a question comes up that is easy to skip past: who draws it? To say “rights are not voted on” is to move the argument one step back. What counts as a basic right and what as an ordinary decision; whether the language of schooling, the right to die, access to treatment fall inside it—honest people disagree on these questions. And someone still has the last word.

The answer cannot be “no one”: then the line is drawn by whoever is loudest at the right moment. To answer “a single supreme arbiter” is to bring back the very single room on whose account chapters eleven and thirteen were written.

Switzerland has already given an answer, and it deserves a close look. Appenzell Innerrhoden gave way not because the majority there changed its mind: women's right to vote was upheld by the Federal Supreme Court—a body standing outside that majority and reading a text written in advance. There are exactly three parts here.

The first is a commitment made before the dispute. A constitution, a charter, a set of bylaws: a list of what is taken out from under the vote, written down at a time when it is not yet known who will need it tomorrow. The point of the record is precisely the timing: it is made while no one knows whether he himself will end up in the minority.

The second is whoever reads that text, placed outside those whose dispute is being decided. A court, a panel, a chamber—one property matters: the reader must not gain from the outcome. The Swiss Federal Supreme Court could tell the canton “no” precisely because it did not sit in the cantonal *Landsgemeinde*.

The third is a threshold for changing the commitment itself, high enough that an ordinary majority in a heated week cannot clear it: a supermajority, a repeat vote a year later, the consent of several levels at once. The point is not to forbid change forever—that does not happen, and should not. The point is that it cannot be pushed through quickly and alone.

Not one of the three parts is reliable on its own. The text gets rewritten, the court gets captured (chapter thirteen took both stories apart in detail), the threshold gets circumvented. Only the interlock works: to tear down the line, you have to seize everything at once and for a long time, and that is the very “costly and visible” that the whole second half of the book comes down to. And the court that reads the text is subject to exactly the requirement chapter twenty put on every seat of power: replaceable, checkable, not alone.

The most honest way to put it is this. There is no final arbiter here, and there cannot be; there are several uncoordinated bodies, each of which can be taken—but not all at once, and not in a single go. This is weaker than one would like. It is sturdier than a single room.

Where It Gets Attacked

Any voting system lives in a hostile environment, and a sober conversation names the attacks in advance, not in hindsight.

Forged identities. If a vote is worth something, it pays to breed yourself a thousand voters out of thin air. This is the at-

tack chapter seventeen already met: for the right to vote not to be counterfeited wholesale, an identity has to cost something. And that runs straight into a hard question—who certifies that a person is real, and how, without turning into a new center, the very one that was supposed to be removed.

Vote buying. Where a vote can be handed over, it gets bought; the costly vote of the previous chapters wards off small-scale padding, but it does not cancel the fact that some people have more money. This is the same buying-up that turned “many independent votes” into a few large hands—only now at the polls.

The plutocracy of weights. Any scheme where influence can be accumulated or bought gravitates toward concentration—exactly as the “decentralized” mining of chapter eighteen slid into a few pools. Weight leaks to those who already have weight.

And on top of everything, garbage at the input. The counting procedure can be flawless and still honestly count a misinformed, bought, or intimidated choice. The firehose of falsehood from chapter seven leaves no fingerprints in the ballot box: a vote cast by propaganda or fear is indistinguishable, at the polling place, from a free one. Voting vouches for how the votes were added up, not for where they came from.

What a Registry Won't Fix

Hence a sober demarcation, because there is a lot of noise around electronic voting. “Put the elections on a blockchain and democracy will be fixed” is not true.

What the immutable ledger of chapter eighteen really can do is make the count checkable: if the total is added up from entries that can be checked against one another, the sum cannot be forged unnoticed, and anyone can recount it. That is valuable, and it solves a real problem of trust in the count.

What it cannot do is almost anything that is genuinely hard. Which of the voters is a real person and not an invention is a question of identity, not of the registry. Whether the vote was free or cast under coercion, with someone looking over the shoulder—the ledger does not see. Whether the secrecy of the ballot, without which there is no free choice, will survive—that directly contradicts the very idea of “write everything into an open shared ledger.” And secrecy here is not a whim of procedure but a protection: let a person prove exactly how he voted—and that same receipt will be demanded of him, for money or under threat from over the shoulder. The ability to prove one’s vote and the freedom of the vote are incompatible by their very design; the open ledger prized for its checkability pulls in exactly the wrong direction here. The better it proves, the easier it is to coerce. The hardest properties of voting (identity, absence of coercion, secrecy) lie where the registry does not reach. An honest engineer says where the tool helps and where it is powerless, and does not sell the second under the guise of the first.

The Attack Surface

So the vote is a feedback line to power, and it can be made thicker. Raise the resolution of the ballot, add direct feedback where it can be carried, put basic rights beyond what can be voted on, and name who holds that line. It is possible—and necessary—to name, along the way, what each step is paid with and where it gets forged.

What remains is to gather the weak points together—no longer one institution at a time, but across the whole redesign: where even the best of these structures breaks, where “decentralization” gets hijacked, where human nature gets its way.

Chapter 22. Where It Breaks

“For a successful technology, reality must take precedence over public relations, for nature cannot be fooled.”
— Richard Feynman, appendix to the report on the Challenger disaster (1986)¹⁸⁷

A Postmortem of My Own Project

For three chapters running, this part of the book has been building: the human at the center, institutions that don’t fall, a higher-resolution vote. All of these are proposals, and proposals carry the same obligation as any structure—to hold when they are hit. Chapter ten demanded a blameless postmortem of other people’s crashes, asking what in the design allowed the failure. Honesty means turning that same postmortem on my own project—before reality does.

And reality, as Feynman noted over the wreckage of the shuttle, does not read public relations. A rubber O-ring gone stiff in the frost took no interest in how many times management had called the launch safe: it failed to hold back the red-hot gas that broke through. And seven people died. You can call a structure reliable as many times as you like; what holds is not the name but the design. So this chapter is not

¹⁸⁷ Richard Feynman, Appendix F, “Personal Observations on the Reliability of the Shuttle,” to the report of the Rogers Presidential Commission on the *Challenger* disaster (Report to the President by the Presidential Commission on the Space Shuttle Challenger Accident, June 6, 1986). The epigraph gives the original wording. Feynman threatened to take his name off the report unless his observations were included—they were issued as a separate appendix. Sources: en.wikipedia, “Rogers Commission Report”; WIST Quotations.

a disclaimer slipped in before the curtain, nor a ritual “some caveats apply.” It is a postmortem of where what has been proposed breaks, conducted with the same coldness with which other people’s breakages were taken apart.

And straight away, the main caveat about the whole project. None of these solutions “fixes” human beings or power once and for all. They change only what is easy and what is hard: which attacks get cheaper and which get dearer. It is a different set of trade-offs—a better one, as the book has been arguing, but a set all the same. It does not become a way out of trade-offs. A system where betrayal costs more than loyalty is better than one where it is the other way around—but not the same as one with no traitors at all. Systems like that do not exist, and promising them is the first sign of the very public relations that Feynman put reality above.

It cannot be otherwise. A project that hides its breakages is no better than the utopias this book took apart in its first parts—promises of a final order after which history supposedly has nowhere left to go. Chapters eight and ten called that faith a stale cache: the smug “it can’t break here, this is not one of those cases.” A redesign that refuses to hear where it breaks is the same cache, only brand-new—and here the postmortem of the breakages is part of the project.

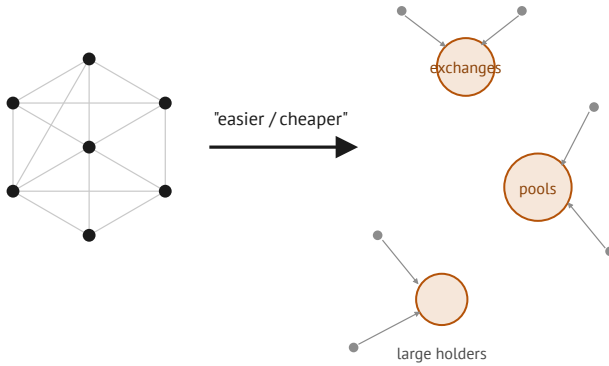
Decentralization Is a Verb

The most common illusion of the redesign is that the “decentralized” stays decentralized on its own. Chapter eighteen already showed how the mutually checked copies were pulled back toward a few exchanges and mining pools: wherever centralizing is convenient or profitable, that is where the system slides. The property is general. Decentralization is not a state achieved but a verb: an effort that has to be kept up, or else the gravity of convenience gathers power back into a single point.

FIGURE 22.1

The gravity of convenience

a network of equals



Decentralization is a verb, not a state; without constant effort, the gravity of convenience draws power back to a point.

It was this way long before any blockchain. The early internet stood on open protocols that belonged to no one. Within two decades it had contracted to a handful of platforms through which most of today's correspondence, commerce, and news flow. Nobody abolished the protocols. It is simply more convenient to use a ready-made platform than to keep your own, and convenience, multiplied by the network effect, assembled centers by itself where distribution had been intended. The same gravity as in the world of blockchain, only working slower and on a far larger scale.

Governance “by tokens” shows this in its pure form. The idea is beautiful: let the holders themselves make the decisions, voting with their shares, with no bosses at all. In practice, a vote tied to a share is plutocracy from day one, and, worse, it can be bought.

In February 2022, an entire organization was hijacked this way. Someone bought up the governance tokens of the Build Finance project and, with the hall nearly empty, pushed through a vote that handed him control of the treasury and the right to issue tokens. And he pulled out about half a million dollars. Formally, everything was “by the rules”—he had simply gathered more votes. That is exactly what makes token voting dangerous: it legalizes the coup. Anyone can buy power, and capture is only a question of whether it costs less than the loot.¹⁸⁸

The weakness is built in. Votes concentrate in the hands of

¹⁸⁸ Systemic weaknesses of “token governance”: concentration of votes among large holders (“whales”), chronically low turnout, the ability to buy up votes → capture and collusion. Token voting has been called a “legalized coup”: anyone can acquire power, and capture pays whenever it costs less than the loot. A telling case is Build Finance DAO (February 2022): with participants paying little attention, an unknown actor bought up enough governance tokens, passed a proposal that gave him control of the treasury and of token issuance, and drained about \$470,000; the organization lost control of its own infrastructure. Sources: Decrypt; The Block; arXiv (surveys of DAO governance, 2024). Cf. the concentration of mining, ch. 18.

a handful of the largest holders, turnout is chronically low, and the desired decision can often be pushed through by a negligible but motivated minority. The empty hall here is the normal operating mode, and it is precisely what makes buying power so cheap.

In the fall of that same year it came out more vividly still. The attacker who hit the Mango Markets exchange first pumped the price of its token and pulled out about a hundred and ten million dollars. Then he put before Mango's own vote a proposal to keep a hefty share of the loot for himself—and voted for it with those same stolen tokens. About ninety-six percent of the votes in favor.¹⁸⁹ A machine conceived as “the power of the community” obediently rubber-stamped the will of whoever had seized its votes.

What happened next is worth telling through to the end, because the end is more instructive than the beginning. The case

¹⁸⁹ Mango Markets (a decentralized exchange on the Solana blockchain), October 11, 2022: the trader Avi Eisenberg pumped the price of the platform's internal token, MNGO (by inflating a position in a derivative, which drove the price up several times over within minutes), and drained about \$110 million from the protocol. He then submitted to its own token governance a proposal to keep part of the funds as a “reward,” and voted for it with, among others, the stolen tokens; about 96% of votes in favor; he returned ~\$67 million and kept ~\$47 million. The fate of the criminal case: in April 2024 a jury found him guilty on three counts (commodities fraud, commodities manipulation, wire fraud); on May 23, 2025, federal judge Arun Subramanian overturned the verdict. On the commodities counts—for improper venue: the trades were made from Puerto Rico, while the case was heard in the Southern District of New York. On the fraud count—on the merits: a smart contract executes automatically, and no “false statement” can be made to it, so there is no deceived party in the legal sense. The prosecution appealed; as of mid-2026 the case is not concluded. Not to be confused: Eisenberg is serving a separate four-year sentence on a charge unrelated to Mango. Sources: bankinfosecurity.com; TRM Labs; Chainalysis (“Oracle Manipulation”); The Block and CoinDesk (May 24, 2025, the overturning of the verdict); Venable LLP, WilmerHale (legal analysis); DL News (the prosecution's appeal).

went to an ordinary human court—the very thing such systems promise to do without. In 2024 a jury found Eisenberg guilty. And in May 2025 the judge overturned the verdict.¹⁹⁰ Part of the charges fell away on a technicality: he had been trading from Puerto Rico, and New York turned out to be the wrong district. But on the main count the reason was far more substantial: a smart contract executes itself; you cannot make a false statement to it. There was simply no one to deceive. The prosecution appealed, and as of mid-2026 the case is not closed.

Linger here for a minute. The system failed to stop the capture of its own votes and sent the case outside. And outside, it turned out that fraud law gets a poor grip on a machine that has no one in it to be deceived. Execution with no human in it, which such designs pride themselves on, cuts both ways: it protects them from arbitrary power. And it also covers whoever has outplayed them.

¹⁹⁰ Mango Markets (a decentralized exchange on the Solana blockchain), October 11, 2022: the trader Avi Eisenberg pumped the price of the platform’s internal token, MNGO (by inflating a position in a derivative, which drove the price up several times over within minutes), and drained about \$110 million from the protocol. He then submitted to its own token governance a proposal to keep part of the funds as a “reward,” and voted for it with, among others, the stolen tokens; about 96% of votes in favor; he returned ~\$67 million and kept ~\$47 million. The fate of the criminal case: in April 2024 a jury found him guilty on three counts (commodities fraud, commodities manipulation, wire fraud); on May 23, 2025, federal judge Arun Subramanian overturned the verdict. On the commodities counts—for improper venue: the trades were made from Puerto Rico, while the case was heard in the Southern District of New York. On the fraud count—on the merits: a smart contract executes automatically, and no “false statement” can be made to it, so there is no deceived party in the legal sense. The prosecution appealed; as of mid-2026 the case is not concluded. Not to be confused: Eisenberg is serving a separate four-year sentence on a charge unrelated to Mango. Sources: bankinfosecurity.com; TRM Labs; Chainalysis (“Oracle Manipulation”); The Block and CoinDesk (May 24, 2025, the overturning of the verdict); Venable LLP, WilmerHale (legal analysis); DL News (the prosecution’s appeal).

And sometimes it is simpler still—with no capture at all. Plenty of projects wear the “decentralized” label while their creators keep a master key, or a small wallet shared among three, with which any rule can be quietly rewritten, the system halted, or the funds pulled out. From outside, a network of equals; inside, the same single point, just undeclared. That is already a false front. One question helps tell the two apart: what exactly can the creator not do alone? If the answer is “nothing,” you are looking at a center, whatever it calls itself.

The conclusion is uncomfortable, and it has to be named directly: “one token, one vote” is not the abolition of the center but its return under a new name. The same pull that in chapter eighteen drew mining toward a few pools here draws power toward a few wallets. Any scheme promising “no center” owes an explanation of what stops money and attention from assembling a center anew—and most often there is no answer.

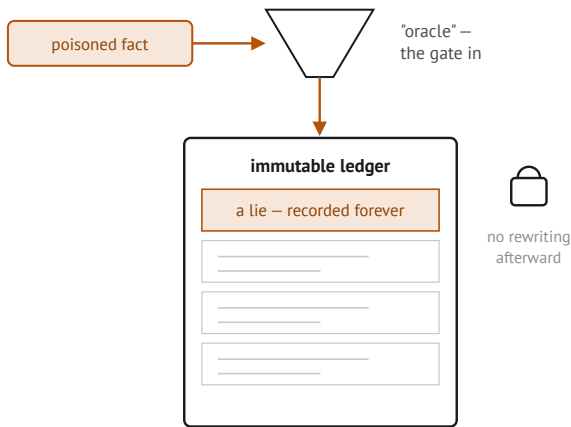
Garbage at the Input

There is a limit common to all immutable ledgers, and it has already been named: the record vouches for what was entered into it, not for whether it is true. It cannot be forged after the fact—but a lie can be entered into it from the very start, and then the lie becomes immutable on a par with the truth.

In the Mango case these are two sides of one attack. The system was deceived not by breaking into its protected part but through the input. The token price it leaned on as a fact was inflated from outside, and the “objective” machine honestly did its work on poisoned data. This is the oracle problem at full height: everything the chain knows about the outside world is told to it by someone, and that someone is once again a point of trust—the very thing that was so painstakingly being removed. Flawless accounting of garbage at the input yields flawlessly accounted garbage.

FIGURE 22.2

Garbage at the input



A record cannot be forged AFTER the fact, but it vouches only for what went in, not for truth; poisoned input → flawlessly logged garbage.

And this is not the isolated misfortune of one exchange: tampering with input data has grown into an entire class of attacks on such “objective” systems, one that has drained hundreds of millions from them time after time. The more blindly a system believes its input, the more a poisoned input costs it.

And at civic scale, not exchange scale, the input is also live testimony: did the event happen, was the work done, is this the right person. Every piece of testimony is entered into the flawless ledger by some particular witness. And the registry merely transfers trust onto him; nowhere does it abolish it. The record becomes imperishable; the question of what exactly it imperishably believes remains a human one.

The Human Layer

And the most stubborn thing of all. All these structures stand on top of people, and people do not change because the infrastructure under them has been swapped out. Collusion, apathy, venality, fear, fatigue—the human layer remains, and any mechanism works exactly as far as this layer lets it. You can spread the nodes across the whole world, encrypt the channels, make the ledger unerasable—and all of it will be bypassed by one colluding cartel or one shared fatigue. Exactly as the earlier, “analog” machinery of power was bypassed. The half-empty hall at the vote by which Build Finance was hijacked is human indifference, and no code will fix it.

The book has already called stupidity a condition under power—the surrender of one’s own judgment under the pressure of a slogan or of fear. An immutable ledger records that kind of judgment too; it does not make the record smart, it makes it indelible.

Chapter eighteen showed the reverse motion as well: when an immutable outcome did not suit a sufficient number of people, they rewrote it by a general collusion—split the chain in two.

So even mathematical immutability is, in the end, held up by human consent; let the consent vanish, and “cannot be rewritten” turns into “rewritten by everyone together.” The human layer is not only below, under the structure—it is also above, over it.

A stale cache does not recompute itself because it has been laid in distributed storage. Technology shifts the costs and removes some of the levers of capture. But it does not issue a new human being, and to promise otherwise would be to put public relations above reality once again.

The Layer of Force

The book’s oldest debt is here. Chapter six showed a space with no master—the anarchy between states—and asked whether an authority that both compels and answers for itself could be set above the players without giving birth to a new worldwide Athens. Chapter four laid a man with a club at the foundation of every rule; an immutable ledger will survive a fire in any archive, but it will not stop a tank. So the layer of force must have an answer of its own. Half of it exists, and it is assembled by the same grammar as everything in this part—from below, in layers. From the right to life follows the right to defend it: self-defense, above it the militia, above that a purchased service. The Swiss reservist keeps his rifle at home; Ukraine’s territorial defense grew up within weeks in 2022.¹⁹¹ Law and order and the defense of territory are things a society

¹⁹¹ Switzerland: soldiers of the militia army keep their personal weapons at home (the pocket ammunition issue was withdrawn in 2007). Ukraine: the volunteer battalions of 2014 stood alongside a weakened regular army; the Territorial Defense Forces of the Armed Forces of Ukraine have operated under the law “On the Foundations of National Resistance” since January 1, 2022, and grew many times over in the first weeks of the full-scale invasion. Sources: admin.ch (the Swiss Armed Forces); the Law of Ukraine “On the Foundations of National Resistance” (*Pro osnovy natsionalnoho sprotyvu*, 2021).

knows how to produce in a distributed way—that is practice already, not a manifesto.

But the answer has two limits. The first was named back in chapter four: two armies on one territory mean civil war until one swallows the other. A dispute between the clients of two security companies is settled either by an arbiter—a center again, only now they come to capture it with weapons—or by the companies themselves, and that is already war. History has tried hiring, too. The condottiere Francesco Sforza, whom Milan paid for its defense, took Milan for himself in 1450.¹⁹² The Wagner Group’s column in 2023 reached the approaches to Moscow—what stopped it was a deal.¹⁹³ An armed supplier differs from any other in one thing: only he can cancel your “exit” by force.

The second limit is scale, and here the 2020s have shifted more than the three centuries before them. Under fire, the one who survives is not the one with a shield but the one with nothing that a single hit can knock out. The city where I am writing this is being struck by ballistic missiles; by the summer of 2026 there were no interceptors left for them (in one of

¹⁹² Condottieri were the commanders of mercenary “companies of fortune” (*compagnie di ventura*), from whom the Italian city-states of the fourteenth and fifteenth centuries bought their defense by contract (*condotta*). The classic analysis is Machiavelli, *The Prince*, ch. XII: a mercenary army is useless and dangerous to its own employer. Francesco Sforza, a mercenary commander in the service of Milan, seized power in Milan itself in 1450 and founded a ducal dynasty. Sources: en.wikipedia, “Condottiero,” “Francesco I Sforza.”

¹⁹³ The Wagner Group mutiny of June 23–24, 2023: the company’s columns occupied Rostov-on-Don and moved on Moscow, getting to roughly two hundred kilometers from the capital; along the way six helicopters and an Il-22M airborne command post were shot down. What stopped the column was not a defense but a deal (brokered by Lukashenko). Two months later, on August 23, 2023, Prigozhin and the company’s top leadership died in a plane crash. Sources: Institute for the Study of War (chronicle of June 23–24, 2023); BBC News.

the August raids, one ballistic missile out of twenty-seven was shot down).¹⁹⁴ The city stands all the same: it dispersed and went underground. Weapons production—defensive above all—spread out across workshops and went below ground. The power system was reassembled out of thousands of small generators. A column at the border is stopped by a swarm of cheap drones, and artillery can be bought or machined—given the will and the money.¹⁹⁵ Bombing the dispersed from above is nearly useless—whether German industry in 1944 or the

¹⁹⁴ The public picture only, without details. Interceptors: in early August 2026, Zelensky stated that no anti-ballistic missiles for Patriot were left; in the raid on Kyiv of August 1, 2026, 27 of 35 missiles were ballistic, and one was intercepted—“simply because there are no interceptors for Patriot”; a week later, per the WSJ, none of 23 ballistic missiles was shot down. The global shortage of PAC-3 was aggravated by the US war with Iran (the same stocks were being burned on intercepts there); US production is on the order of 600 PAC-3 missiles a year for the whole world’s demand. Meanwhile Ukraine is designing its own anti-ballistic interceptor (FP-7.x) and asking for a license to produce Patriot; the manufacturers, according to press reports, are resisting, wary of a cheaper competitor. Production: drone output grew from the volunteer workshops of 2022 to millions of units a year; part of defense production has been dispersed and moved underground (public statements by the defense industry’s leadership). Energy: after the strikes on the grid, the country leaned on distributed generation—from household generators to small gas-turbine plants. Sources: CNBC (August 1, 2026); The Wall Street Journal (August 2026); Euronews (August 4, 2026); Army Recognition (FP-7.x); Radio Liberty (the depletion of PAC-3 stocks); CSIS and IISS (surveys of the Ukrainian defense industry).

¹⁹⁵ The rout of the columns on the approaches to Kyiv in February–March 2022 was the work of small groups with drones, ATGMs, and artillery. By 2024–2025 the saturation of the front with FPV drones had created a continuous “kill zone” tens of kilometers deep, in which massing armor became suicidal (analysis by RUSI, ISW). Artillery: the Czech initiative of 2024 gathered hundreds of thousands of shells for Ukraine through purchases from third countries; the domestic Bohdana self-propelled howitzer reached serial production at dozens of units a month. Sources: RUSI (J. Watling et al.); ISW; official summaries of the Czech initiative and of the Ukrainian defense industry.

Iranian program in 2025.¹⁹⁶ Survivability without a center is the thesis of this whole book; war turned out to be its harshest test.

Three things are not solved from below. The arms market runs on licenses: the seller holds the tap, and the interceptors ran out not because the buyer was poor. A war is not repelled from afar—it is endured, over years and with people. To the nuclear cudgel there is no answer from below: fear of it held back not so much Kyiv as its suppliers—those same crumbs with a glance over the shoulder from chapter six. Deterrence—so that the strong do not come at all—is still a question of force. Either the hedgehog, costly to bite into—and the 2020s made it affordable. Or an alliance—the same force, folded into a bigger fist. An alliance does not fall from the sky: politicians and diplomats bargain for it and hold it, and neither a drone nor a registry will replace that work. Melos was the self-defense of a small community—chapter six opens with how that ended. An authority above the players that does not give birth to a monster has still not been drawn—not in this book, and not anywhere else.

Where the Project Stops

Every project has a boundary beyond which it is honestly obliged to say, “past this point—not from here.” This book has

¹⁹⁶ Germany: the index of war production rose to its peak in July 1944—industry was dispersed and partly moved underground; the summing-up analysis is the United States Strategic Bombing Survey (1945). Iran: the US strike of June 22, 2025 (Operation Midnight Hammer, B-2s with GBU-57 bunker-busters against Fordow, Natanz, and Isfahan); public claims of “complete destruction” were contradicted by a leaked preliminary assessment by US military intelligence that the program had been set back by months; after the strike the IAEA lost access to the sites, and the fate of the stock of highly enriched uranium is unclear. Sources: USSBS, Summary Report (European War); Reuters, AP (June–July 2025).

been taking apart the design of power: where its single point of failure is, where the feedback wire is severed, how to run a new one. But there are heavy questions that cannot be solved from this optic alone, and which it has no right to touch in passing. Where collective decision ends and inviolable personal freedom begins. What a person is free to do with himself and his own life, even when the majority is against it. Here law, ethics, and force converge, and to reduce them to a feedback diagram would be to counterfeit certainty where there is none.

One such limit is worth naming directly, because it grows out of the project's chief virtue. The immutability that makes a record reliable also makes it merciless: what cannot be forged cannot be forgotten either. A person who stumbled once remains in the indelible ledger forever—with no statute of limitations, no right to start from a clean slate. Transparency taken to the limit turns into an eternal memory that forgives no one. Where to draw the line between “the past cannot be swapped out” and “one may outgrow one's mistake” is no longer an engineering question, and it cannot be closed with a feedback diagram.

So it is more honest to call these questions open and set them aside for a separate conversation than to close them in a single paragraph for the sake of a handsome finale. Acknowledging the boundary of one's own method is part of the same sober calculation: an engineer who draws beyond what he has calculated is more dangerous than one who admits outright that past this point he does not know.

How to Get There

So the redesign's weak points have been named: “decentralization” gets gathered back into a center, a poisoned input survives any honest accounting, the human layer stays where it is, deterring the strongest still rests on alliances, and some

questions the method leaves open altogether. And yet the list of breakages does not put this project on a par with what it is meant to replace. The difference is not that one structure breaks and the other does not—both break. The difference is that here the break points are named, measurable, and calculated for defense, whereas in the old design they were hidden and papered over from above with the promise that it could not break in principle. A bridge with its load limit posted is more reliable than one whose builder swears it will never fall. The first is engineering; the second is exactly the public relations that reality does not read. This is not a verdict on the project but its operating conditions. A structure whose limits are honestly named can be built; one sold as limitless cannot.

The last and most practical question remains. Suppose it is known what is broken and what a sound version might look like—how do you get from here to there without razing everything to the ground? After all, razing to the ground is exactly what this book took apart as the main breakage. Chapter fifteen showed how every revolution that smashed the old center put a new one in its place. An emperor replaced a king, one irremovable power replaced another. They broke the bearer of power, not the structure itself with its single point of failure. So the transition to a better design cannot be yet another demolition. Otherwise it will repeat the same breakage under new slogans. The question is neither rhetorical nor simple. The old structure cannot be stopped for the duration of the rebuild—it carries the courts, the money, the borders, and the people inside it are living right now. To replace a load-bearing wall without moving the tenants out—that is the task the next part is devoted to.

Chapter 23. Evolution, Not Revolution

“The future is already here—it’s just not evenly distributed.” — William Gibson¹⁹⁷

You Can’t Shut It Down for Repairs

Chapter twenty-two ended with a task, not a slogan: replace the load-bearing wall without moving the tenants out. The limits of the redesign have been named, the sound design described—what remains is the most practical question of all: how to get from here to there.

The first answer suggests itself, and it is wrong. Tear down what is broken, clear the site, build the right thing on it from scratch. But that answer is precisely the disease this book has been taking apart from the very beginning. Chapter fifteen showed how demolition ends: every revolution that smashed the old center put a new one in the vacated place. An emperor replaced a king; one irremovable power replaced another, harsher still. They broke the bearer, not the structure with its single point of failure—and the structure obediently grew itself a new bearer. Demolition does not remove the single point of failure. It merely frees it up for the next master. A revolution, read as an engineer reads it, is not a cure for the

¹⁹⁷ William Gibson, novelist. The epigraph gives the original English wording. The attribution is genuine, but the exact primary form is blurred: the earliest verified trace is the San Francisco Examiner, 1992 (in the form “The future has arrived—it’s just not evenly distributed yet”); the canonical formulation was spread by The Economist on December 4, 2003; Gibson repeated the thought in varying words more than once. Not apocryphal (the related earlier idea in Peter Drucker is a different thought). Sources: Quote Investigator; en.wikiquote, “William Gibson.”

disease but the disease itself in acute form. The fastest and most irreversible failure of the whole system at once, after which it is reassembled by whoever gets to it first. This book entered that failure as a diagnosis; it would be strange to offer the same thing as the cure.

There is a second obstacle too, cruder and simpler. A society is a system under load. It cannot be stopped for the duration of the rebuild. The courts judge, the money moves, the borders hold, the hospitals admit—right now, continuously, with no maintenance window. You cannot freeze the payment system for a year for an overhaul: wages are expected on Friday, medicine has to be bought on Saturday. Civilization has no scheduled downtime. Anyone who promises to stop everything first and switch it back on already fixed is promising the impossible—and the promise is not harmless. Chapter fifteen showed how it plays out. The clearing is always declared temporary—but it is precisely whoever runs the cleared site during that “temporary” interval who becomes the new irremovable center. The pause is exactly the moment when the wheel gets seized.

So there is one path, and its name is prosaic: the migration of a live system. Carrying a working operation over onto new supports—without stopping it and without tearing it down.

How to Migrate Under Load

Moving a live system is a well-rehearsed engineering procedure, and the book has already described its method. Chapter eighteen laid out the order of work for any change: introduce something small, measure what came of it, keep the ability to roll back. The same order applies to the transition itself.

No leap across the chasm—“either the old order or the new.” It is done differently. Next to the old support, a new one is put up. A thin slice of the real load is shifted onto it, and you watch

whether it holds under real weight. It holds—the next slice is shifted; it does not—you roll back, and the old support has been in place the whole time. The new grows in parallel with the old and takes over its work piece by piece; the old dies off not because it was smashed but because the load was taken off it.¹⁹⁸

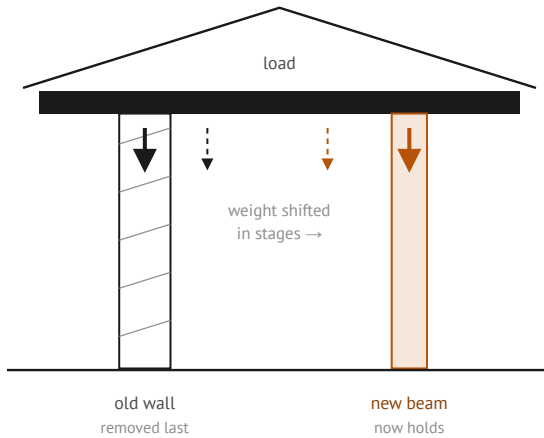
The image from the previous chapter (the load-bearing wall) becomes exact here. You do not knock out the wall under the roof in the hope that the ceiling will hold. You set a new beam beside it, shift the weight onto it slowly, check at every step. And you remove the old one only when the new one holds the house by itself. If the new beam cracks, the old one is still standing: that is what reversibility buys. A road with live traffic is repaired lane by lane, not closed all at once: the cars keep moving while the next lane over sets.

Not only a beam can be moved this way—an institution can too. Take a public registry, say, the records of title to land. The old way to move it is to close the offices by decree and on Monday declare the new database the only valid one. The price of a mistake here is the lost rights of thousands of people and not a single move back. The migration way is different. Next to the old office, a transparent immutable ledger is launched, which at first only repeats after it: it records the same transactions in its wake, deciding nothing itself. The office remains in charge; the ledger is checked against it, and you watch whether the records diverge. Then it is given a thin slice of the real work. Some registrations are now handled by it, while the paper office stays alongside as a reserve and a safety net. The share is widened exactly as far as the new ledger has proved its accuracy—by dis-

¹⁹⁸ Gradual replacement of a working system piece by piece, with the new built up alongside the old and taking over its functions one at a time until the old dies off, is standard engineering practice for moving large systems without a shutdown (in the trade jargon, the strangler fig pattern—Martin Fowler’s “StranglerFigApplication,” 2004). The essence is the same as in replacing a load-bearing support under load: there is no moment when the system is switched off as a whole.

FIGURE 23.1

Replacing the support under load



Migration, not demolition: small, reversible, backward-compatible step; if the new support cracks, the old remains.

putes and errors, counted against the old one. At no moment is the old registry switched off; if the new one fails, nothing is lost. The same three properties as in replacing the beam, only applied to an institution.

Hence the three properties of every safe step. It is small—so small that its failure can be survived. It is reversible—so reversible that failure is not fatal. It is backward compatible—the old keeps working alongside the new for everyone who has not yet moved over. A step lacking even one of the three is not a reform but the same one-shot, irreversible demolition, merely renamed “decisive change.” And how demolition ends has already been said.

The Sprouts Are Already There

And here is what the impatient miss: this migration is not a dream waiting for permission to begin. It is already under way, in pieces, unevenly—the very distributed future of the epigraph.

Estonia. The e-Residency program was launched in 2014. By its eleventh anniversary it had issued a digital identity to more than 132,000 people from 185 countries, and about 39,000 companies had been founded through it.¹⁹⁹ And straight away, the limits, so as not to overrate it: e-Residency is not citizenship, not a visa, not a residence permit, and not a way to get out of taxes (a person remains a taxpayer where he lives). It is something far more modest—and the whole point is

¹⁹⁹ e-Residency is an Estonian state program launched in 2014; by 2026, more than 135,000 “e-residents” from 185 countries, and more than 39,000 Estonian companies founded through the program (5,556 of them in 2025 alone). Important: e-Residency does NOT confer citizenship, a residence permit, a visa, a right of entry to or residence in Estonia or the EU, or tax-resident status—it is solely a state digital identity for remote access to services and for doing business. Sources: e-resident.gov.ee (official statistics); en.wikipedia, “E-Residency of Estonia.”

in that modesty: a single state-issued digital identity that lets you run a business from anywhere without asking anyone's permission. A sprout, not a tree—but a living sprout.

And here is what in e-Residency belongs to this chapter's method: the program cancels nothing. Becoming an e-resident does not mean renouncing your country, surrendering your passport, moving anywhere. The digital identity is added on top of your former life, alongside it, as one more layer, and at any moment it remains optional. The old is not abolished here for the sake of the new: the parallel is simply added, and the former is kept. The same backward compatibility as with the beam and the money rail—now in the civic design.

Beneath this sprout lies an older layer. X-Road, the open layer of secure data exchange that Estonia has kept running since 2001. It links hundreds of institutions and thousands of their systems; about 99% of public services are available online through it. And at its base lies the “once-only” principle: a person hands over information about himself once, not afresh to every government office.²⁰⁰ And the most structurally curious thing: the data stay in their source registries instead of being dumped into one central megabase. There is simply no single trove where one break-in is enough. This is the “no single point of failure” principle from the diagnostic chapters, implemented in a real state. And implemented without any blockchain—which is worth saying outright, so as not to confuse the principle with one particular tool.

²⁰⁰ X-Road is the open-source layer of secure data exchange, the foundation of Estonia's digital state since 2001; it links hundreds of institutions and thousands of information systems, and about 99% of public services are available online. The once-only principle: a citizen provides data about himself a single time. The key property: the data are stored in their source registries rather than in a single central database—that is, there is no single point of failure, and this was achieved without blockchain technology. X-Road has been adapted in one form or another in more than 25 countries. Sources: e-estonia.com; en.wikipedia, “X-Road.”

None of this is yet a finished society without a center, and to promise otherwise would be exactly the overreach the previous chapter warned against. These systems are run by ordinary states, which are free to rewrite the rules tomorrow. And the defense of this whole establishment is not carried by X-Road itself. The militia from the previous chapter Estonia does have—the volunteer Kaitseliit (the Estonian Defence League); but the borders are held by NATO’s Article 5, the pledge of thirty-odd armies.²⁰¹ A registry withstands a database breach, but not a column of tanks. Deterring the strongest, as the previous chapter admitted, comes from outside. But what matters more is something else—they work. Not on paper and not in a manifesto. Today, in a real state that already conducts almost all of its business with its citizens through them. Ten years ago there were zero e-residents; now there are over a hundred and thirty thousand, and the curve is going up. This is what the epigraph promised: the future is unevenly distributed—but it has already arrived, you can touch it, and it spreads the faster, the more people shift their weight onto it. The components of the design are working parts waiting for assembly. No utopia waiting for a new human being.

Digital Money Runs Two Ways

Both the right path and the wrong one show most clearly in money—because one phrase, “digital currency,” names two

²⁰¹ Kaitseliit (the Estonian Defence League) is Estonia’s volunteer territorial militia: founded in 1918, disbanded under Soviet rule, restored in February 1990; together with its affiliated organizations, tens of thousands of members. Estonia has been a NATO member since March 29, 2004. Article 5 of the North Atlantic Treaty (Washington, 1949) is the principle of collective defense: an armed attack on one member is considered an attack on all (32 states in the alliance as of 2026); it has been invoked once—after the attacks of September 11, 2001. Sources: kaitsemiit.ee; nato.int (“Collective defence and Article 5”).

opposite things.

The right direction is a backward-compatible rail that people move onto by choice. There is no need to retell chapter five: it already described the crack in the monopoly. Regulated stablecoins backed one to one (the GENIUS Act of 2025) are a private money rail running alongside the old money and keeping the exit open.²⁰² Whoever wants to uses it; whoever does not makes do with the old. The old money works as before, and whoever has moved over can come back any day, one to one. If the new rail fails, the holder falls back onto the old money having lost nothing: the same reversibility as with the new beam. That is a migration step: small, reversible, parallel.

The wrong direction wears exactly the same word and means the opposite. A surveilled retail central bank digital currency is money in which the issuer sees every transaction of the end user and can programmatically restrict how, where, and on what it is spent.²⁰³ Such money can be given an

²⁰² For more, see chapter five. In brief: the GENIUS Act (United States, 2025) introduced regulation of stablecoins backed one to one—private “digital dollars” with a reserve. In the logic of this chapter, a backward-compatible money rail added alongside the old money and keeping the exit open, rather than replacing it by compulsion.

²⁰³ CBDC—central bank digital currency. The concerns about the retail variant: the issuer (the central bank) receives data on end users’ transactions, which opens the way to mass surveillance, and the programmability of such money makes it possible to restrict how, where, and on what it is spent. The position as of mid-2026: only a few small economies have launched a full-fledged retail CBDC (the Bahamas—the Sand Dollar; Jamaica—Jam-Dex; Nigeria—the eNaira; the Eastern Caribbean Currency Union’s early DCash project ran with interruptions); not one large economy and not one G7 central bank is among them. According to the Atlantic Council tracker (2026 update), 146 countries and currency unions are exploring the CBDC idea in one form or another—over 98% of world GDP; there are 41 active pilot projects. The breadth of interest is deceptive, though: Jamaica’s Jam-Dex by early 2026 made up about 0.1% of the country’s money in circulation. Sources: Atlantic Council CBDC Tracker; en.wikipedia, “Central bank digital currency”; surveys

expiration date to spur spending; barred from buying certain things; tied to a place—and the holder will not be asked. A convenient wallet on the outside, a lever of control on the inside. This is not the dispersal of money but its tightest possible reassembly into a single point—under the name of “convenience.” Exactly the trap the previous chapter named: where “no center” is promised, the center quietly returns. The state of play as of 2026: only a handful of small economies have fully launched such a currency—the Bahamas, Jamaica, Nigeria. Not one large economy, not one G7 central bank is among the launchers—though more than a hundred countries are studying the idea, and dozens are trying it in pilots.

The lesson is not that digital money is good or bad. It is that one word covers two opposite directions. What tells them apart is the same test the whole book has used: does the step leave the exit open and the feedback wire live—or does it quietly solder in a new single point of control. The backward-compatible and voluntary passes the test; the surveilled and programmable does not.

The Same Split—Not Only in Money

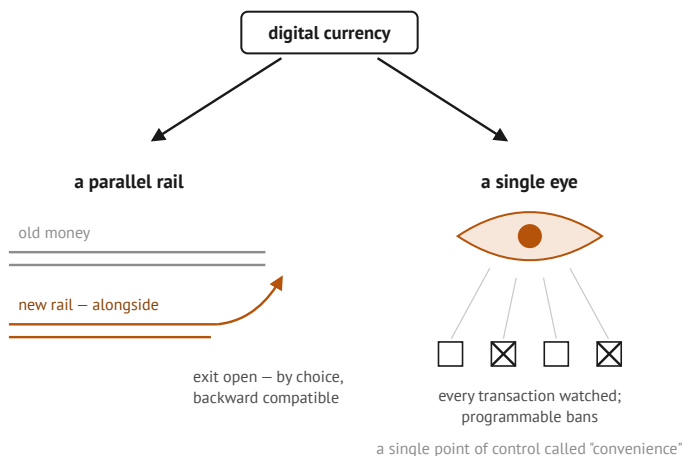
Money is only the most visible case; the same fork runs through any digital infrastructure a state puts between itself and a person. Digital identity and access to public services—the same choice. Estonia’s X-Road, described above, is the right branch of this fork: the data sit in their source registries, there is no single database, no single point of failure, and use is by choice. The same idea has an opposite pole as well—and it is not a hypothesis.

By 2026 Russia has rolled out a “national messenger,” MAX: one app into which messaging, calls, a digital ID, access to pub-

of CBDC privacy.

FIGURE 23.2

The two directions of “digital currency”



*One word – two opposite directions; the test is the same –
is the exit left open and is the feedback wire alive.*

lic services, and payments have been folded.²⁰⁴ The technology

²⁰⁴ MAX is a Russian messenger and “super-app” platform launched by the company VK in 2025 (developed by its subsidiary Kommunikatsionnaya Platforma, “Communication Platform”). In 2025 the government declared MAX the “national messenger”; the legal basis is the federal law “On the Creation of a Multifunctional Information Exchange Service...,” signed in June 2025. Since September 1, 2025, the app has been mandatory for preinstallation on all smartphones and tablets sold in Russia (on the list of mandatory apps it replaced VK Messenger). The platform folds messaging and calls together with a digital ID (via ESIA, the state identification system), an electronic signature, access to public services, and payments. The compulsion works through bottlenecks: tying sign-in for public services to MAX is being introduced in stages, and in Moscow, since mid-June 2026, an application for an international passport through the mos.ru portal has been accepted only through the “My Documents” (Moi Dokumenty) chatbot inside MAX: a single button remains on the service page—“fill out the form”—and it leads into the bot. The capital’s “My Documents” centers disputed this (June 27, 2026), stating that the form can also be filled out on site and that the federal Gosuslugi portal remains available; an advance booking through the bot in MAX is nonetheless required to obtain a biometric passport through a self-service biometric kiosk (a “cryptobiocabin”). That is, it is the city channel specifically that has no alternative, not the service as a whole—the claim in the chapter text is limited to that. Privacy concerns: under the service’s terms, metadata are collected (IP address, contact lists, activity markers) with permitted transfer to third parties, including state bodies; a technical teardown (March 2026) found traffic being sent to third-party servers and probing of the reachability of a number of domains (Telegram, WhatsApp, Google, Gosuslugi). In parallel, Roskomnadzor was restricting calls in WhatsApp and Telegram. A separate example of compulsion through need is Russian-occupied Crimea: amid a fuel crisis (supply disruptions after strikes on fuel logistics), from May 31, 2026, gasoline was put on coupon rationing (in Crimea, AI-95 at the ATAN and TES chains; in Sevastopol, AI-92 and AI-95), and from June 6 the coupon became a personal QR code issued only through a bot in MAX: one code, up to 20 liters; the next for the same car, after seven calendar days—that is, access to fuel was tied to installing the messenger. Sources: en.wikipedia, “Max (app)”; Interfax and TASS (mandatory preinstallation, September 1, 2025); Meduza and The Moscow Times (international passports, June 27, 2026); France24 and EUvsDisinfo (surveillance, 2026); Ukrainska Pravda, UNN, and The Moscow Times

itself is ordinary—a messenger; what is wrong is the architecture around it. It is not set up alongside the old; it is soldered in as the sole channel. Since the fall of 2025, preinstallation on every smartphone sold in the country has been mandatory by law. Access to government services is gradually being locked onto it. In Moscow, by the summer of 2026, an application for an international passport through the city portal could no longer be filed except through a bot inside MAX. And where there is nothing to compel with administratively, need itself is made the lever: in Russian-occupied Crimea, the fuel crisis of the summer of 2026 put gasoline on rationing. And the QR coupon for a fill-up is issued by the occupation administration only through a bot inside that same app; access to fuel was made the doorway into the messenger. The exit that the right direction leaves open is absent here: refusal means losing access to what only the state issues. And inside is a single point through which everyone is visible: metadata are collected and, under the service's own terms, may be passed on—to state bodies among others.

The test is the same as with money: a convenient app on the outside, a single point of control on the inside. The exit is shut, and the feedback line is laid one way—from the watched to the watcher, not back. The same word, “convenience”—and the same quiet return of the center the whole book has warned against. What tells the directions apart is not the country and not the people but the assembly itself: is the exit left open and the return line alive—or is the sole channel closed onto a single point.

What One Person Can Do

And none of this is the business of states and central banks alone. The migration of a live system does not run only from

(fuel coupons through MAX in occupied Crimea, May–June 2026).

above. It runs from below as well, in steps small enough for one person—and reversible enough to cost little if they lead the wrong way.

Hold your own keys instead of handing every last cent to a custodian. Use open, verifiable tools where they exist instead of opaque ones. Keep your own judgment instead of surrendering it to whoever shouts loudest. None of these actions is a “rise up”: an uprising is exactly the revolution this book rejects. It is the same method at personal scale—a small, reversible, backward-compatible step that can be taken without anyone’s permission and undone without ruin. Migration is made up of steps like these, not of a single signal to launch the assault.

And these steps are not lost one by one. Each of them is also a signal by demand: it shifts a tiny share of the load onto the new rail and thereby shows that someone needs the rail. Out of many such shares the parallel system grows to the scale at which institutions begin to follow it. So the feedback by which this book measured every power works on the migration itself as well: the vote is cast not by shouting but by what you shift your weight onto.

The Load-Bearing Element Is a Human

But all these steps (the sprouts in institutions, the parallel rails, the personal actions) share one dependency. Each of them requires a person who has not surrendered his judgment: one able to tell a real sprout from an overhyped one, a voluntary rail from a surveilled one under the same name, a reversible step from an irreversible leap.

The best institutions, transplanted into a population that has handed its thinking over to the loudest slogan, will be captured back as inexorably as the “decentralized” systems of chapter eighteen slid back toward a few exchanges. This surrender of one’s own judgment the book has already named as the soil

in which power sprouts; a migration that does not notice the soil transplants the old weed into it. The load-bearing element of the whole migration is neither a protocol nor a registry. It is a different type of human inside the system—one who keeps his judgment in his own hands.

And that is no longer a technology that can be installed. It is something more like an operating system that a person runs in his own head. That is what we will be setting up.

Chapter 24. Critical Thinking as a Personal OS

“Sapere aude—dare to be wise.” — Horace²⁰⁵

The State You Keep to Yourself

Chapter twenty-three ended on a condition. Migration (moving a live system onto new supports without demolition) rests not on a protocol and not on a registry but on a person who has not surrendered his judgment. Without him, the best institutions slide back toward a few centers as surely as the “decentralization” of chapter eighteen slid. So the book’s last practical question is no longer about the structure. It is about the one who stands inside the structure.

The question is personal, and it will have to be answered in the first person. For eighteen chapters I took apart other people’s systems (states, money, empires) with one and the same cold optic: where is the single point of failure, where has the feedback cable been severed. This chapter turns the same optic on the observer’s own head—and I am not sparing my own. Because a human being has exactly the same weak points as a system, and stands on the same principles.

²⁰⁵ Horace (Quintus Horatius Flaccus), *Epistles* (Epistulae), book I, epistle 2, lines 40–41 (c. 20 BC): “Dimidium facti, qui coepit, habet. Sapere aude: incipe!”—“He who has begun has half done. Dare to know: begin!” For Horace this is a practical rule of living. Kant made the phrase the motto of an age (see the next note), but the primary source is Horace, which is why the epigraph is attributed to him (and not to Kant a second time—Kant’s formula of humanity already stands as the epigraph to ch. 19). Source: en.wikipedia, “Sapere aude.”

Chapters seventeen and eighteen described a system with no central owner of state: the record does not sit in one head that can be bribed or captured—it is with everyone at once, and it cannot be rewritten on the quiet. A human being has a direct analog. You can keep your judgment to yourself—or you can offload it to someone else’s center: to a leader, to a slogan, to a ready-made answer computed by somebody else. A person who has handed his judgment out is captured state: his “convictions” are changed by whoever holds the controls. And the most dangerous part is that captured judgment does not feel captured: someone else’s answer, long settled in the head, is experienced as one’s own firm conviction. A cache, as we have seen, always feels like knowledge. It never feels like a borrowed card. Chapter nine already had a name for such a person—a fool by position: one who, under the pressure of fear or a slogan, has laid down his own reckoning. A person who keeps his judgment to himself is that very state without an owner, which cannot be rewritten by a single order.

That, translated into today’s language, is the old maxim from the epigraph. Horace tossed off his “sapere aude” as everyday advice—dare to be wise, begin. Two millennia later Kant sharpened it into the demand of an age: have courage to make use of your own understanding, step out of the immaturity you have driven yourself into.²⁰⁶ Immaturity, in Kant’s sense, is exactly offloaded state: judgment handed over to someone else’s center for safekeeping. And if so, here is the

²⁰⁶ Immanuel Kant, “An Answer to the Question: What Is Enlightenment?” (Beantwortung der Frage: Was ist Aufklärung?, *Berlinische Monatsschrift*, 1784): “Sapere aude! Habe Muth, dich deines eigenen Verstandes zu bedienen!”—“Sapere aude! Have courage to make use of your own understanding!” Kant defines enlightenment as “man’s emergence from his self-incurred immaturity” (selbstverschuldete Unmündigkeit)—an immaturity that comes not from a lack of understanding but from a lack of resolve to use it without another’s guidance. Source: de.wikipedia, “Beantwortung der Frage: Was ist Aufklärung.”

practical part: waiting for the system to migrate before you start living this way is neither necessary nor allowed. Migration is slow and uneven. But judgment is the one part a person can take back under his own control immediately, without asking anyone. That is where the transition begins.

Seven Questions as an Operating System

The book has already issued the tool for this. Chapter eight, taking apart faith as a crutch, left behind a set of seven questions—the inspection every large “it’s all obvious anyway” deserves to be met with before it is allowed to hold up something heavy in your life. Where did it come from. What could refute it. Who finds it convenient that you believe it. Do you want it to be true a little too much. Is the evidence proportional to the claim. Is there a simpler version. Will you notice that you were wrong.²⁰⁷

There it was a one-time inspection—take a belief off the shelf, check it, put it back. Here the same set runs all the time—as the operating system of judgment. Chapter eight distinguished two gears of thinking: the fast, cheap one that grabs a ready-made card from the cache, and the slow, expensive one that recomputes. The seven questions are precisely the way to shift deliberately into second gear where the first, out of habit, would have grabbed someone else’s ready-made answer. The world does not wait for a person to get around to thinking; it

²⁰⁷ The seven questions were introduced in chapter 8 as the “inspection” of load-bearing beliefs; behind them stand proven instruments—Carl Sagan’s “baloney detection kit” (*The Demon-Haunted World*, 1995), the ECREE rule (“extraordinary claims require extraordinary evidence,” the Laplace→Truzzi→Sagan line), Hitchens’s razor (“what can be asserted without evidence can also be dismissed without evidence”) and Hanlon’s razor (never attribute to malice what is adequately explained by stupidity—or by design). Here the apparatus is shown at work; for the full version, see ch. 8.

serves up answers ready-made without pause—by advertisement, by slogan, by headline, by the firehose of falsehood from chapter seven. The inspection stands as a background process between someone else's ready-made answer and assent to it.

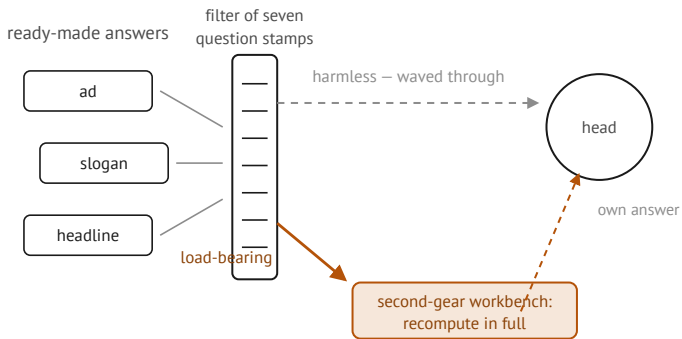
It works in mundane ways. An advertisement promises a remedy that cures everything at once: who finds it convenient that you believe it—the seller; is the evidence proportional—the claim is enormous, and the grounds are testimonials and promises; is there a simpler version—there is, people recover on their own too, and the remedy takes credit that belongs to someone else. A familiar voice announces that all our troubles are the fault of these people right here: where did that come from and what could refute it—and if nothing could, then what stands before you is not knowledge but a fortress, and chapter seven has already shown who builds such fortresses, and why.

The same inspection comes to the rescue with money. Someone offers an investment with guaranteed high returns and no risk whatsoever: is the evidence proportional—no, high returns without risk contradict the very design of money; is there a simpler version—there is, the early investors are paid out of the deposits of the late ones, and that is called a pyramid; will you notice that you were wrong—that is the whole trap, you will not notice until the collapse itself, because right up to it the scheme dutifully shows a profit. One set of questions exposes the medical charlatan and the financial charlatan alike: the scenery changes, not the mechanism.

What matters is what this system does not do. It does not order you to doubt everything in a row (total doubt paralyzes no worse than blind faith)—and that is exactly what you are pushed toward by whoever profits from a person throwing up his hands: “everyone lies, nothing can be checked.” Doubt is an expensive resource. The operating system of judgment spends it with discrimination: on load-bearing inputs (on what you vote by, on whom you trust with your money and your children), and lets

FIGURE 24.1

Inspection as a background process



Critical thinking is not total doubt but shifting deliberately into second gear where the first would grab someone else's answer.

the harmless through without a look. This is what the discipline of a free person consists of. There is no need to recompute everything in the world. What is not allowed is something else—handing someone else’s slogan the right to compute, for you, the thing your life stands on.

Testing It on Myself

The seventh question of the seven is the most uncomfortable, because it is the only one turned inward. Will you notice that you were wrong? On other people’s beliefs it drills easily. On your own it does not. So what follows is my own case.

In October 2022 I sat down and wrote a forecast for the coming six months to a year—eight points, with dates and geography. I called it armchair analysis and ended with a promise to come back and see what had come true.²⁰⁸ The test, it turns out, I set myself—which means it has to be carried out.

One point hit: I wrote that Kherson would be liberated by winter, and it was liberated three weeks later. After that it gets harder.

I wrote that no later than the end of spring 2023 Russian troops would be pushed out of mainland Ukraine—spring

²⁰⁸ The author’s Facebook post of October 18, 2022: “Here is a bit of armchair analysis, to try to predict what will happen to the region over the next 6–12 months. It will be interesting to come back and look; I hope Facebook reminds me.” Then eight numbered points. In the chapter text they are **paraphrased, not quoted**: the original post is written in a wartime register, with profanity and ethnic labels that have no bearing on the subject under examination. The checkable content of the points is conveyed unchanged; the check against the dates—Kherson liberated on November 11, 2022 (point 3, came true); points 4 and 5 (expulsion from the mainland no later than the end of spring 2023, the return of Crimea by diplomatic means, the breakup of the Russian Federation into zones of influence) and point 8 (“the war cannot drag on for years”) did not come true. Source: the author’s personal archive (Facebook export); there is no public link.

passed, and they were not. I wrote that Crimea would come back by diplomatic means, by the goodwill of Putin's successor—it did not come back. I wrote that Russia would stop being a federal state and come apart into zones of influence (there was even a list of who would get which region)—it did not come apart. I wrote that the war could not drag on for years. It dragged on.

One out of eight.

And now the uncomfortable part. The conclusion itself I do not withdraw. Today I still expect roughly the same ending. Under the current world order I see no other logical way out of this situation. I was not wrong about where it all ends up. I was wrong about three quantities I plugged into the calculation.

International law I overestimated—both its strength and the willingness to use it. Ukraine's ability to stir up the national question inside Russia I overestimated too—there were neither the resources for that nor, frankly, the desire. And the inertia and learned helplessness of the Russians themselves I underestimated badly.

The first thing even remotely like what I had been waiting for got going only in the summer of 2026, when the strikes reached Russian logistics. In three weeks—some twenty warehouses of a marketplace across a dozen and a half regions, roughly a quarter of the company's warehouse space, dead on the night shifts, over a hundred wounded.²⁰⁹ That was when

²⁰⁹ The Ukrainian campaign of long-range strikes on the warehouses of the Wildberries marketplace began on the night of July 18, 2026 (logistics complexes in Kotovsk, Tambov region, and Elektrostal, Moscow region). By July 24, at least nine warehouses and sorting centers had been hit in nine regions—over 1.2 million square meters, about a quarter of the company's warehouse space; at least nine people were killed and more than a hundred injured. The dead were night-shift workers: seven in Kotovsk, one in Elektrostal. By early August the number of facilities hit had reached roughly twenty in a dozen and a half regions; on August 4 a strike on warehouses in Chekhov, Moscow region, killed five more. The

they began to feel the war over there. The economists who watch Russia recorded it in almost the same words: for the first time, it touched everyone.

And still the magnitudes are incomparable. A burned warehouse is not an occupied city. Nobody came to their homes. Nobody aimed an APC at civilians. Nobody raped the civilian population.

This is not about callousness. It is about signal strength—about the very feedback half this book is devoted to. For four years the war reached Russian society as an echo so faint that it almost did not reach it at all. A burning warehouse is louder than the television. But it has never once seen a tank in its courtyard, and so it still has nothing with which to measure its own misfortune against someone else's.

And now the thing this whole section is for. I have just done exactly what I warn against. The forecast did not come true. Did I abandon it? No. I moved the date. This is the classic move of a belief that has failed to come true—it loses its numbers and

Ukrainian justification: Wildberries's involvement in military logistics (sales of body armor, tactical helmets, camouflage) and sanctions evasion; the company's founder, Tatyana Kim, called the strikes "an act of international terrorism." Sources: Meduza, "A Week Ago the Ukrainian Armed Forces Began Striking Wildberries Warehouses," July 24, 2026; CNN, July 18, 2026; CBS News and The Washington Times, August 4, 2026; the floor-space estimate is from the Kyiv Post. The figures are as of August 8, 2026.

The assessment that they "began to feel the war" rests on the reactions collected by Meduza (*ibid.*): the economist Maxim Mironov—"people began to feel the war because of the fires"; Sergei Guriev calls it a blow that "touches every Russian." This is not the only position, and in the chapter text it is deliberately not passed off as the consensus: Andrei Pivovarov sees no military sense in the strikes; Ruslan Leviev describes what is happening as a "self-sustaining spiral of retaliation" in which war crimes are committed by both sides. The chapter uses this episode as a case of weak feedback, not as an assessment of whether the strikes are legitimate; the question of legitimacy is neither examined nor decided here.

crawls over into the next year, still feeling like being right.

The difference, if there is one at all, is exactly one, and it rests on the second question of the inspection. What could refute it? My conclusion stands on the three quantities above, and I can name them out loud. If international law turns out to work, and the inertia of Russian society turns out to be not temporary but final, then the conclusion is wrong. And I will see it. A belief that stands on nothing of the kind can never see itself as wrong.

The difference is small. But it is there, and it is the only one.

I did not delete the post. It is valuable for exactly what makes it uncomfortable: it had a date. A forecast with a deadline can be checked and can fail. I was wrong publicly, in writing, and with numbers. That is cheaper than being wrong privately and endlessly.

What School Doesn't Teach

If this system is so useful, it is strange that it is not installed first thing. School, as it is built now, teaches anything but it. It drills the retelling of facts, rewards the correct ready-made answer, and almost never teaches the main meta-skill—checking the answer itself. Harsh, but in essence right: school should teach survival and critical thinking, not the multiplication table.

This is not against arithmetic—knowing what seven times eight makes is useful. It is against a school that stuffs the head with ready-made cards and never once shows how to inspect a card. Such a school produces exactly what Arendt called the ideal subject: a person with a full cache of other people's answers and no habit of recomputing even one.

Installing the meta-skill does not mean adding one more subject to the timetable. It means changing what gets praised: rewarding not the guessed ready-made answer but the honest question “how do I know this?”; ranking “I don't know yet, I

need to check” above a glib recitation. A child who has been taught to ask what would prove him wrong will reach adulthood with a working inspection instead of a warehouse of facts—the very OS that will not later have to be installed after the fact on top of a hardened cache.

And this is not malice, not a secret conspiracy of those who need the obedient. For such cases we already have a razor: what is explained by design should not be attributed to malice. An institution optimizes its own reproduction, not its declared purpose—chapter twenty showed this with the prison that profits from inmates and the court for which throughput is more convenient than truth. A system that needs obedient order-takers will not seriously teach the skill that makes an order-taker disobedient. And it does not. There is no collusion here: to do otherwise would be to undermine itself. Chapter sixteen showed the same double function in any training: it confers a skill and at the same time guards admission to it; school hands out the certificate but keeps the key to thinking for itself.

The conclusion is practical and cheerless: nobody will install the checklist on time and on your behalf. Installing it in the one who comes after is the job of those nearby; and it has to be installed early, before the ready-made cards harden into a load-bearing wall.

Different Wiring

This ability (to see the structure where others see a given) has one personal side, and I have no right to walk around it. My head is not assembled by default; what is customarily called neurodivergence in practice means different wiring—a mind that systematizes whether it wants to or not, and notices rules

and seams where the default gaze slides over the smooth.²¹⁰ For many years I knew this wiring only from the underside—as the thing that makes me inconvenient, out of step, not like everyone else. That the same wiring lets you see the structure where others see air came out much later, and was far from an immediate consolation.

The handiest way to describe it is as a different routing of the cables in the head. Where the ordinary mind takes the established order as air (“that’s how it’s set up, end of story”), the differently built one trips on a seam and asks: why this way? who laid this? what happens if we cut right here? This whole book, in all honesty, grew out of that tripping: to see in the state an architecture with a single point of failure, you first have to stop taking the state as weather.

From the small and the everyday: I cannot simply walk through a turnstile or fill out a form. The head completes the picture on its own—what this construction assumes, where it will break, whom it has silently left outside—and so with everything the eye lands on. In a queue this is exhausting, and at times I envy those who can manage not to notice; at the drafting board the same inability to switch off pays for itself in full. But such wiring has its price too, and naming it is more honest than keeping quiet: a mind used to trusting its own

²¹⁰ “Neurodivergence”—an umbrella term for variants of brain function that deviate from the typical norm (the autism spectrum, ADHD, and others). The thesis “different wiring → a stronger pull to systematize” rests on a contested research tradition—Simon Baron-Cohen’s empathizing–systemizing (E–S) theory and “hyper-systemizing” (S. Baron-Cohen, *Autism: The Empathizing–Systemizing Theory*, Annals of the NYAS, 2009): a disposition to look for patterns and rules. The theory is criticized (a possible confound of socioeconomic status behind the “surplus of engineers”; weak empirical support for a number of the links; criticism of the “male brain” gender frame). That is why here it is presented as a LENS and a personal anchor, not a firm scientific claim—and without a hierarchy of castles of mind. Source: en.wikipedia, “Empathising–systemising theory.”

model takes an elegant scheme for reality itself more easily than most—and needs all the more those same seven questions, turned on its own conclusions.

Only it is precisely a lens, not a pedestal. And I say this as someone who knows the temptation of the pedestal. Different wiring sees one thing better and another worse. The very mind that reads a blueprint clearly slips easily past the human layer that chapter nineteen insisted on—past the living person who cannot be reduced to a diagram. Sharpness for structure and sharpness for people are unevenly distributed, and neither is above the other; a healthy society, like a healthy system, needs both kinds of sight at once. So the point is not that one cast of mind is better. The point is that the instrument itself (the seven questions, the habit of checking) is universal and can be installed by anyone, whatever the wiring. The lens only helps you notice what is worth checking. The checking is done by a discipline available to everyone.

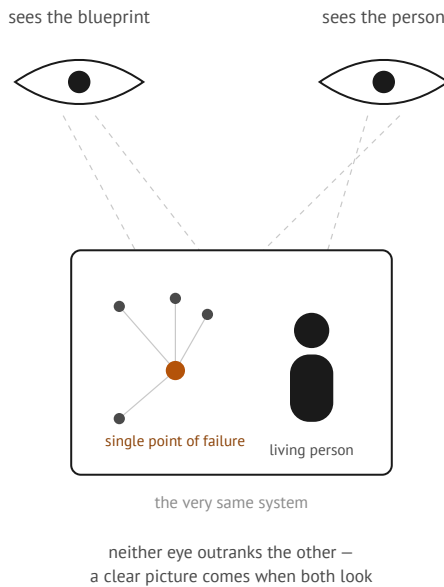
Without Waiting for Permission

Putting it together is simple. The person the migration rests on is neither a hero nor a chosen one. He is someone who has taken back three things: agency—the right to act without waiting for the system to fix itself; his own judgment, not offloaded to someone else's center; and a working inspection—the seven questions, running all the time. None of the three requires anyone's permission, and all three can be taken back today.

And each of the three is the same feedback line, run at the smallest, personal scale. Agency restores the link between “I don't like this” and “I act”; one's own judgment, between a fact and assent to it; the inspection, between someone else's claim and its checking. The same engineering that repaired institutions in the previous chapters repairs a single head as well: the cure is the same everywhere—reconnect the severed wire.

FIGURE 24.2

Two lenses



*The systematizing gaze is a lens, not a pedestal;
the instrument of checking is universal and open to any wiring.*

This is not a call to rise up: rising up with flags the book rejected back in the previous chapter as that very revolution which merely changes the master at the controls. This is something quieter and sturdier—a refusal to hand over your judgment even when handing it over is convenient, safe, and customary. The hundred-thousandth e-resident from the previous chapter began with a single reversible step. The critically thinking person begins the same way: by ceasing to accept the ready-made answer without a look.

What Remains Is the Choice

So everything is in place. There is a diagnosis—the single point of failure and severed feedback, the same breakdowns across the centuries. There is a tool—trust without a center. There is a redesign, and there is a way to move to it without demolishing the house. And there is a person able to hold that transition. What remains is the last thing, and it is no longer engineering: which world, exactly, to choose out of all this. And the question is not rhetorical—tools, once they appear, do not choose for a person how to dispose of them; the choice stays with whoever holds them in his hands. That is what the last chapter is about.

Chapter 25. Which World We Choose

“Any human power can be resisted and changed by human beings.” — Ursula K. Le Guin²¹¹

One Line Through the Whole Book

The whole of this book can be compressed into one line, and the line is shorter than it seems.

First, the diagnosis, and it was the same one the entire time. Power gathered into a single point, whose failure brings everything down at once. The severed feedback wire—a device that does not learn of its own error until the error has become a catastrophe. And captured state—shared memory that one party controls, and that same party rewrites it after the fact. Three breakages—and the book met them everywhere. In Rome and in the Soviet empire, in the monopoly on money and

²¹¹ Ursula K. Le Guin (1929–2018), American writer. The words are from her speech on accepting the National Book Foundation’s Medal for Distinguished Contribution to American Letters (National Book Awards, New York, November 19, 2014). Verbatim, in the original: “Any human power can be resisted and changed by human beings.” The sentence closes a passage in which Le Guin compares the seeming immovability of the present order of things with the once equally immovable “divine right of kings”: both are human institutions, and therefore neither is eternal. In the original, the passage opens with words about the market economy; what is taken here is its universal closing line—about any human power, not about any one economic system (the book quotes both Hayek and Friedman with no hostility toward the market). The abridgment is deliberate and stated, like the abridgment of the Arendt quotation in chapter one. Source: the official text of the speech—ursulaklequin.com/nbf-medal (the rights holder has permitted quotation); video recording and transcript—PBS American Masters, NPR (November 20, 2014).

in the monopoly on the chronicle, in Baku that January and in the fifteen post-Soviet branches of one source. The dates and the flags changed. The design repeated. Not because history is prone to repeating itself. Because the structural flaw is one and the same, and it surfaces every time power is assembled around a center.

Then the treatment, and here is what was new in it: for the first time, each of the three breakages had a working counterexample. Trust can be held without a trusted center—the tool for that already exists and works. An institution can be designed so that error has a limit and power has a rollback lever; so that the system optimizes for the human being rather than for its own convenience. The post-Soviet fork in the road from chapter fourteen showed this on living material. The outcome of every branch was decided by one single question: whether a way to change power and correct the course without breaking the country had survived. And the transition to such a design is itself a migration, not the next revolution: carrying a working system over onto new supports piece by piece, with no shutdown and no demolition. Because demolition is that very disease in acute form—an instant, irreversible failure of everything at once, after which the wheel goes to whoever reaches it first.

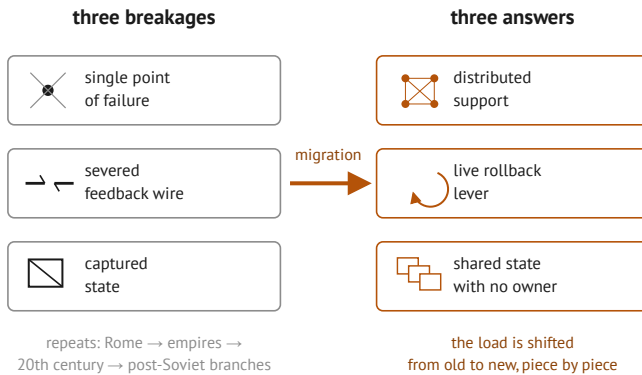
That is the whole book in one blueprint: it was always broken in roughly the same way—and for the first time there is something to fix it with, without breaking. But the blueprint does not show three things, and they matter more than the lines: whom it is for, from where it was read, and who, in the end, chooses to build by it.

Whom It Is All For

Every system has a line that is almost never written out explicitly: whom it is for. No one writes it down; it seeps in on its own, from whose convenience in the structure turned out to

FIGURE 25.1

The whole book in one blueprint



*It was always broken in much the same way –
and the first tools to fix, not break.*

matter more. The captured institutions of the early chapters all answered it the same way, without pronouncing the answer. For the center. The court protected power from the citizens, issuance fed those nearest the press, the chronicle guarded the victor's version. And the human outside was expendable: as tax cattle, as a devalued depositor, as a subject-as-object, as a line in a report. Chapter nineteen named this outright and put a different line at the foundation of the whole redesign: the human is the system's end, not its expendable material.

And this is an engineering requirement, without which one cannot even begin to design. All the machinery of this book (distributed trust, the feedback wire, migration instead of demolition) is not an end in itself. These are means, and they have the one thing that makes them worth assembling at all: a human being who must not be dropped to the level of material. A scheme that has forgotten this line (however elegant, and with no single point of failure) simply grinds up, more neatly, the very people it was supposed to be built for. To distribute power and not remember whom it is for is to end up with a well-tuned mill and no grain.

And behind this line, once again, stands engineering. A human being dropped below the dignity floor is the dropped sensor from chapter nineteen. Taken out of the loop, he stops sending signals, and the system no longer sees the patch he covered. The dignity floor is worth holding precisely because it keeps people inside the feedback. To make the human being the end is also to keep the structure from going blind exactly where its own future is held. That is why the redesign begins with the answer to the question "for whom," not with a protocol—and keeps that answer under watch down to the last drawing.

Back to Where It Began

This book began with a city and a night, and it is only honest to end it where it opened.

On the night of January 19–20, 1990, an army entered Baku—not an enemy capital, but its own city. By morning there were more than a hundred dead residents in the hospitals and morgues. I was born there the following year, in an already independent Azerbaijan, but the first piece of paper in my life was still Soviet: at the top of it stood a country with mere months left to live. I appeared exactly in the gap between two states—where one state is already gone and the other has not yet set.

Someone who, at the very start of life, watched a state change its state of matter like water finds it hard to believe that the ice was always there and always will be. To a person who has lived a whole life inside one country, it is air: the only one possible, because there is nothing to compare it with. To one who has passed through several and put down roots in none of them (Baku, Moscow, Kyiv), states stop being a phenomenon of nature. They become what they are: man-made structures, assembled by people, at a specific time, for specific tasks, with specific mistakes inside. What for most people is a landscape is, for a person outside, a blueprint. And a blueprint, unlike a fate, can be revised.

Hannah Arendt, with whom the book began, called the very first of rights the right to have rights: simply put, to count as one of their own in some community. I grew up where that frame was being reinstalled before my very eyes, and probably that is why I never took it for an eternal backdrop. In every country, sooner or later, you are given to understand where the line runs: on one side of it, the real ones; on the other, you. And you were not the one who drew it. That line has divided me so many times, and by such different, sometimes opposite, criteria, that

the criterion itself stopped looking like the point. The point is that the line is a drawn line everywhere. And what is drawn can be erased and drawn another way—that is the whole of it. The man-made can be corrected. And now what is at stake is the design that everyone lives inside.

I began the book with myself not for confession's sake: that entry point—from outside, from the gap—is the very optic the whole of it is written with. Not a grudge against the state. You do not take offense at a mechanism; you take it apart. A calm reading, schematic in hand—the same one with which an engineer looks at somebody else's failed node and sees not a roster of villains and victims but a failure class. Twenty-five chapters later, the frame closes where it opened. In the city where I first saw that a state has more than one possible state—and therefore another possible form. Back then I did not know it in words. But it seems that from that night on I was walking toward this page.

Not Fate but a Blueprint

From here comes the book's last and most important argument. An engineering argument, not a moral one. The design you live inside is not fate, not nature, and not the crown of history. It is a blueprint: it has an author, a date, and mistakes inside.

Chapter ten took apart the most stubborn illusion on this score—the cache that never gets recomputed. Every era's conviction that it, at least, has reached the end of the road and is therefore insured. The most scholarly of its recent versions (the “end of history” proclaimed at the turn of the 1990s) ended the way all the earlier ones did: the wheel turned over again.

The same goes for the present design of power. It looks unshakable in exactly the way the divine right of kings once looked unshakable—and that was merely a human institution,

which humans themselves abolished. Chapter eleven showed such “eternal” supports up close: empires that seemed to be the very backdrop of the world, as unchanging as the sky, and crumbled the moment their single load-bearing point failed. They looked eternal only until the day they stopped being eternal. Any power that looks indestructible turns out, on inspection, to be somebody’s blueprint: assembled at a particular time, for particular tasks, with particular flaws inside. And if so, it can be redrawn.

This is not a promise that the new design will necessarily come out better. It is possible to design badly from scratch, too. That is exactly why chapter twenty-two showed where even the corrected version breaks, and which human layer no protocol can hold up. This is the removal of one single illusion, the most paralyzing of them all: that there is no choice. There is always a choice where the man-made is concerned. And it is not made once and for all, by somebody’s decree from above. What sets the man-made apart from fate is precisely that it is corrected constantly, a step at a time—by the very method of small reversible changes in which the whole last third of the book is written. Not one leap across the chasm but many measured steps, each of which can be undone if it led the wrong way. The question has long since stopped being whether things can be otherwise—they can, and the entire second half of the book is about that. The question is which blueprint to choose.

Which World You Choose

I have made my choice, and this book is that choice. I choose a design assembled around the human being, not around the throne: with a distributed support instead of a single point of failure, with a live feedback wire instead of a severed one, with shared state that cannot be rewritten after the fact. I choose it not out of faith in inevitable progress. That is precisely what I do

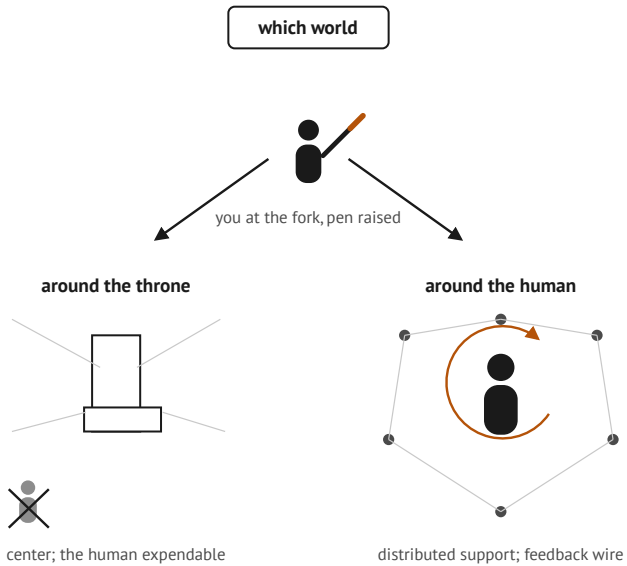
not believe in. I choose it because I have seen up close the price of the other blueprint and do not want to sign under it by default, by silence alone. That is what the whole book was written for. Not to rally you under a banner—there are no banners here. To show the blueprint clearly enough that it stops looking like the sky overhead.

And from here it is your move, and yours alone. I cannot choose for you and would not, even if I could. A system in which one person chooses for everyone is exactly the single point of failure the book began with. Anyone who offers you a ready-made, turnkey world and asks only that you trust and not look into it is repeating the very structure this book has been taking apart since its first page. The most this text can do is take away your comfortable excuse that there is no other way and nothing here to think about. There is another way; there is something to think about; the deciding is yours. A blueprint makes sense only when it is read and corrected by everyone who has to live by it.

That is why the book ends with a question—the one in its title, only now addressed directly to you. The state is not weather, to be waited out until it clears up on its own. It is a blueprint, and there are signatures under it—yours among them, given, or at the very least never contested. Its old version you have seen all your life. The other one, being assembled alongside it piece by piece—now you have seen that too. Which world do you choose?

FIGURE 25.2

The fork in the road that you close



*Anything man-made is a choice; the signature
under the blueprint is yours.*

Afterword

In the foreword I said that I had spent fifteen years translating—not between languages, but between people. I stood in the doorway between the one who cannot name their problem and the one who can solve it. This book was the same work aimed at a bigger object—a translation of the state from the language in which it sells itself into the language in which you can see it as a blueprint. The translation is finished. Now I will step out of the doorway and say plainly a few things that could not be put into the translation itself: they would have turned it into a sales pitch.

First, how the book is made, because that is its only argument in its own favor. One rule from the first page: the facts lead, not my mood; numbers and events come with footnotes; where I am not sure, I say so outright. I tried to hold to that through the last chapter. Everything that can be checked has been checked and comes with a source. The epigraphs are deliberately drawn not from the culture whose states are taken apart most severely here—so that the critique would run by the schematic of the design, not by blood. The heavy examples are there as a teardown of the design, not as a bill presented to peoples. Wherever I caught myself at a beautiful phrase with no fact underneath, I struck the phrase out. That does not make the book true—it makes it checkable. You can still catch me at sleight of hand; if you have, then I did the work badly, and nothing about that has changed.

And right away, the limits of this optic, because not naming them would be the same sleight of hand. The view from the edge that this book is written with sees seams well. And sees worse what hangs on no seam. The same systematizing mind that takes power apart into nodes and wires slips easily past the

living human layer, which hangs on no wire at all. The book itself warned about this in the chapters about the human at the center. So the more honest way to read it is not as a full picture but as a single lens, focused sharp. It shows what usually gets slipped past, at the price of slipping past other things itself. There is no full picture in a single lens.

Now the most uncomfortable part—and therefore, first of all, uncomfortable for me.

Through the whole book I argued not for a product but for a class: that trust can be held without a center, that an institution can be assembled around the human being, that the transition is a migration, not a demolition. Not once did I say “here is a ready-made solution, take it.” That was by design. But one thing cannot be left unsaid: I have my own instance of this class, and I am invested in it with more than thought.

So before naming it, I will turn on myself that same inspection from the eighth and twenty-fourth chapters—the seven questions the book taught you to test other people’s claims with. The main one here: “Who does it suit that you believe this?” The honest answer: partly me. I am building a project called VERV—an attempt to assemble this book’s principles into one working instance. And since that is so, you have direct grounds to read everything I say about solutions with a correction for my interest. That is my conflict of interest, named out loud and named first, before any description. Which is exactly how the book asked you to treat anyone selling you something. Making an exception for myself would be strange.

What VERV is—in one paragraph and without blueprints, because the blueprints are the second book. It is an attempt to implement the very principles taken apart here. Rules—a “constitution”—that cannot be rewritten after the fact in someone’s interest: the principle of tamper-proof state from the chapters on trust. A money rail with an open exit: the principle of the fifth chapter and the twenty-third. Digital

belonging on top of the old kind, by choice and not in its place: the class demonstrated by Estonian e-residency. And a personal toolkit of judgment: the “operating system in your head” that the twenty-fourth chapter was written for. Not a new revelation—an assembly of what has already been proven into one working instance. It is something I am building, not a turnkey world—and to present it otherwise would be to break my own bargain.

And here is what matters more than VERV itself. The class does not depend on it. If my particular build turns out badly (as first attempts mostly do), the book’s argument does not fall with it. Trust without a center, the institution around the human, migration instead of demolition are true or false on their own, by their own proofs, not by my success. VERV is one bet on the class, not the class itself. The class should be measured on its own arguments. As for VERV, I will lay it out as an engineering specification in the second book. There it can be taken apart and attacked, the way a specification should be—not taken on my word in an afterword.

There remain questions this book deliberately did not touch—questions of identity and belonging. What holds people together as a community at all when the single center that once assigned who counts as one of us disappears. I have no ready answer, and I will not pretend to have one. They stand open, and the series will take them on directly—without the national frame such questions usually get wrapped in right away.

As for the second book—it will be different in genre. This one was about why and about which class; that one will be about how: an engineering specification on top of the principles taken apart here. It will be a book you can read with a pencil, arguing with every line—which is what I want, because a specification that cannot be attacked is worth nothing.

And the thanks at the end go not to people—though to them too—but to one habit: the discipline of fact instead of faith. Ev-

everything in this book that holds up holds up not because I am persuasive, but because footnotes stand under the claims and an honest “I don’t know” stands under the doubts. If the book has taught anything, it is this habit; from there, each person draws their own conclusions.

At the very beginning, in the epigraph, it said: you do not defeat the obsolete by fighting it—you make it unnecessary by building alongside it something that works better. I have tried to show that this “alongside” is no longer a dream: the class of tools exists and is being assembled before our eyes. Building it at full scale is beyond any one person and any one book. Nor should it be: a system assembled by one person alone is the very single point of failure where all of this began. So the last word in this book is not mine. It belongs to what you will build.

Glossary

Brief definitions of the book's key terms—engineering concepts applied to the design of power. Next to each, the chapter where the term is introduced and unfolded. The definitions are given in the sense the words carry in this book, not as universal dictionary entries.

Stateless (no retained state). The property of a system that keeps no “memory” of the client between requests: each request is self-contained. Carried over to society—belonging and rights not tied to a capturable center. The book’s title term. (ch. 3)

The state as a monopoly on violence. Max Weber’s definition: the state is not an end but a means; the thing that holds the exclusive right to legitimate coercion within its territory. (ch. 4)

Sensor. The point with which a system “feels” reality; in this book, the person a decision lands on. A disconnected sensor makes control blind. (ch. 9, 19)

Trust without a center. Agreement that rests not on an honest intermediary but on design—replication, consensus, the costly vote, zero-knowledge proof—so that there is no one to trust and no need to. (ch. 17)

Proof of work (the costly vote). A vote made deliberately expensive (resources spent), so that counterfeiting a majority would be ruinous. (ch. 17, 18)

Single point of failure. A node whose fall brings down the whole system; the diagnosis of centralized power that runs through the book. (ch. 3, 11)

Consensus. Agreement of a majority of nodes on what counts as the recorded truth in the shared ledger. (ch. 17, 18)

Cache. An answer saved in advance so it need not be re-computed every time; in this book, belief as cache: fast, but it goes stale and gets poisoned. (ch. 8)

Migration. Moving a live system onto new supports without demolition—in small, reversible, backward-compatible steps. The book’s theory of change: evolution, not revolution. (ch. 23)

Feedback. The “bottom-up” signal: works / broken, fix it. Without it, the one at the controls is not evil but blind. (ch. 9)

Backward compatibility (the rail). A new system laid down alongside the old one and working with it, so that the transition does not bring society to a halt. (ch. 5, 23)

Rollback. Returning a system to its last known-good state; in politics—a built-in mechanism for undoing a mistake and changing who rules without breaking the system. (ch. 13, 14, 18)

Fault tolerance. A system’s ability to keep working when part of it fails: graceful degradation instead of collapse, no single point of failure. (ch. 20)

Replication. A full copy at every node, so that no single scribe can be bribed or burned. (ch. 17)

State. The data a system remembers about itself; in this book—the captured “state” of institutions (records, money, law) that the center owns. (ch. 3)

Agency. The right to act on your own, without waiting for the system to fix itself. (ch. 24)

Node. A point where lines converge; a person or institution that concentrates an irreplaceable function. (ch. 3)

Fork. A branch off a shared codebase that went its own way; one body of Soviet legacy code, forked into three trajectories. (ch. 13, 14)

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Collected here are the books, scholarly articles, and key documents this book rests on—each source once, in alphabetical order. It is not a replacement for the footnotes but a support: the footnotes at the end of each chapter pin a claim precisely to its source and often add an explanation. Journalism, investigations, and reference compendia (news agencies, EUvsDisinfo, Bellingcat, encyclopedia entries, and the like) stay in the footnotes where they occur and, as a rule, are not carried over here.

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