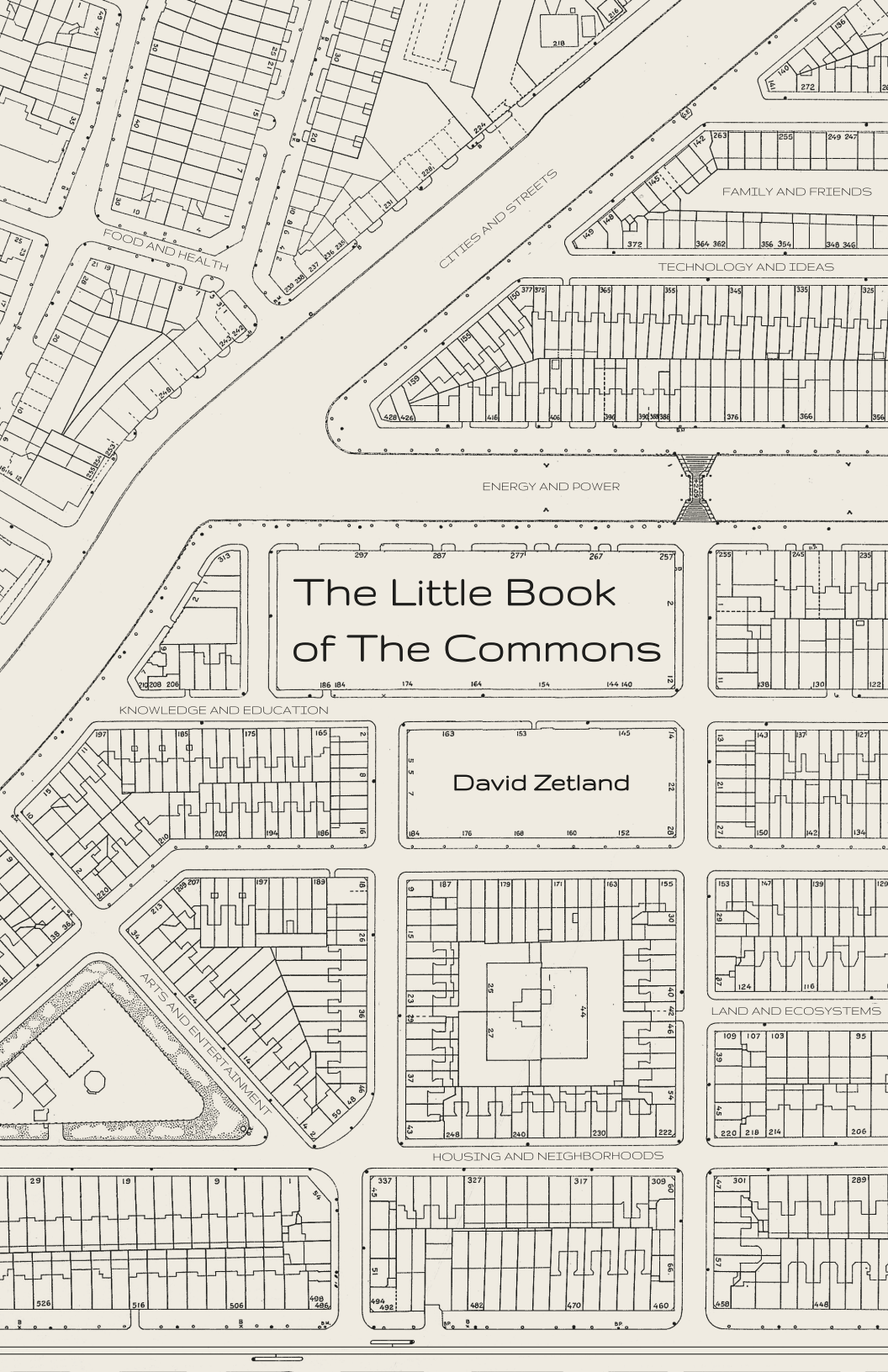

The Little Book of The Commons

David Zetland

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The Little Book of The Commons

PDF Version

David Zetland

KYSQ Press
Amsterdam

2022

Dedicated to my colleagues and neighbors.

Lara Di Fiori designed the cover. You can see more of her work at www.behance.net/laradifiori or her IG (@ldf_lab).

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Speaking of mistakes, typos or unclear text, please send those you find to dzetland@gmail.com, so Version 1.3 is better!

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Contents

The commons we swim in

David Foster Wallace told this story to the 2005 graduating class of Kenyon College:

> There are these two young fish swimming along, and they happen to meet an older fish swimming the other way, who nods at them and says, "Morning, boys, how's the water?" And the two young fish swim on for a bit, and then eventually one of them looks over at the other and goes, "What the hell is water?"

Foster went on to remind the graduates that the world before their eyes is not a fact, but an image in their mind. Biases matter, and people who mistake their bias for reality make life harder for themselves and others.

A similar myopia impedes our appreciation of the existence, role and value of the *commons* — goods that are useful to all but owned by none.[2] Lose them and suffer. Build them and prosper. The commons are to humans as water is to fish: the essential medium that allows us to live, move, collaborate and flourish.

Any discussion of the commons is complicated but start with a simple fact: We — you and me, our families, neighbors and fellow travelers in life — interact with commons on many scales: the commons of imagination, streets, culture, trust,

[2] Words are defined when they appear in *italics*.

ideas, and political and economic systems that support communities, nations and civilization. These human commons also depend upon and influence the commons of nature, ecosystems, and the environment.

Nobody owns the commons; they belong to all. No one person can save the commons; we share responsibility for their existence and future. Some build and strengthen the commons; others weaken and destroy them. Some commons last for minutes, others for eons.

I've written this little book to help you understand the commons, using description, history and examples. Understanding the commons will help you appreciate their value and vulnerabilities to humans. That said, this book has no magical revelations. It only highlights the commons we swim in.

The book has two parts. Part I explains and defines the commons. Part II explores examples of the commons.

There is no Part III. I'd love to write a universal guide for building, strengthening and saving the commons, but I cannot. That's because the nature of any given commons depends on a combination of geography, history, culture, political rules, economic incentives, and so many other factors that…yeah. The reality is that every commons is unique, which is annoying for those who want global solutions but empowering for anyone eager to improve their local commons.

Such actions are increasingly needed as more and wealthier humans burden the commons in every direction. Yes, people are great, and our wealth is empowering, but good intentions and money are not sufficient to save "priceless" goods. I'll explain more in later chapters, but contested streets and polluted ecosystems are only two examples of our need to do more. Keep reading. You'll see.

Part I

Getting to know the commons

Overview of Part I

Part I begins with my story of getting to know the commons. Many of you have surely had similar experiences of growing to understand more about the world and yourself. Although the commons are important to everyone (whether we realize it or not), my awakening was driven by my desire, as a thirty-something, to better understand the world and my opportunity, as a PhD student, to think about it.

Chapter 2 explains theories of the commons. Many of these ideas will be familiar but some academic jargon isn't. Try to learn the jargon; it will help you connect these ideas to your experiences and surroundings.

Chapter 3 explains how we've come to understand the role and importance of the commons and especially how these social goods differ from market goods.

Part II contextualizes the ideas of Part I by providing many examples of the commons we swim in.

CHAPTER 1

I discover the commons

I was born over fifty years ago in San Francisco. I went to school, rode in cars, buses and planes, ate whatever, and played on the sidewalks and in the local games store. California in the seventies had smog, disco, inflation and gurus. In the eighties, I feared HIV-AIDS, nuclear war, and car-radio thieves. I graduated from high school without knowing what it was like to be poor, sick, non-White or non-American. Homelessness, crime and traffic jams were normal. The system worked for some and failed for others, but I didn't know why.

After graduating from UCLA, I left America for the first time to travel for four months in Europe. I encountered different foods, people and cultures. California had diversity — but not like this! Thousand-year-old streets, churches and mosques. Tiny coffees, endless cheese, wine at lunch. Leather hats, no shoes inside, sleeper trains, and cars on sidewalks. Always bargain for carpets!

After returning to California, I worked long hours for bad pay and betrayal. I learned about luck, loyalty, and stupid pranks. I didn't have any life path or goals, so I decided to go learn. I dropped my life savings into the "spend bucket" and went traveling for five years.

In 100-plus countries, I've seen dire poverty and outrageous wealth, private lives in public spaces, and history's echoes in current events. I could travel far with a passport, some money, and a willingness to trust strangers.

After stopping in 2000, I didn't know what to do. I worked briefly at a technology start-up before taking an administrative job at the University of California, Berkeley. My strongest skill was organizing data, people, and processes. That academic environment inspired me to go for a PhD. I decided to study the economics of development and how government failures impoverish citizens.

Government failures and market failures occur when good intentions lead to bad outcomes. *Market failure* occurs when trade harms participants and bystanders. *Government failure* occurs when a policy backfires. Both failures impoverish the defenseless. In the 1970s, I breathed the smog of market failure while government failures spurred inflation, unemployment and unrest.

When I began my PhD at the University of California, Davis, I wanted less government and more market, because markets help people (obviously).

But then a funny thing happened.

A professor told me about a fight over water in Southern California. The San Diego agency responsible for managing local water was fighting with neighboring agencies: Who would get water? Who would pay? "Why fight?" I asked. "Why not use markets?" Those questions led to three years of research, numerous conferences, talks and papers, and my PhD dissertation.

I left Davis with different views of where markets ended and the commons began, and how markets and the commons were both critical to our survival and prosperity. I understood that "tragedies of the commons" were possible but not inevitable. I admired the institutions of cooperation that took

centuries to refine. Yes, economic growth, reliable energy and a strong currency are useful, but those obsessions of politicians, news anchors and the twitterateri depend on widespread, robust commons.

The commons help humans prosper. The commons are everywhere, but they are neither inevitable nor invulnerable. The commons record the advances of civilization and our successes in cooperation. Market and government failures harm the commons. Strong, functional commons can prevent or compensate for those failures.

I am writing as the Coronavirus pandemic interacts with many commons. The virus spreads through infected air. Research contributes data and innovations. Governments compete for vaccines. Trolls and fear-mongers spread disinformation. Trust is vulnerable to paranoia and bad behavior. In each of these sentences are commons we share: of air, data, vaccines, information and trust.

I've been reading, writing, listening and speaking about the commons for nearly twenty years since that first "why?" The questions are endless, but their answers follow familiar patterns. I'm writing this book (and giving it away) because I want you and others to see these patterns.

A fish's ignorance of water doesn't mean it can live without it. The same is true of our commons. If we understand their value, then we will protect them. If we don't, then they decay and we suffer. The gaps between failure and success are visible in our diverging outcomes: Far too many of us live in poor slums, threatened by collapsing ecosystems and savage wars. Far too few of us enjoy safe streets, thriving biodiversity and peaceful harmony. Our future depends on closing those gaps.

The next chapter defines the commons in more detail.

CHAPTER 2

Defining the commons

This chapter defines the commons and related concepts. These definitions will make it easier to follow the next chapter, which reviews the history of these ideas.

Figure 2.1 on the next page introduces specific vocabulary and shows how different goods relate to each other.

Start with *good*. In economics the word refers to something of value, whether or not it is for sale, physical, abundant or unique. Sandwiches and shoes are goods but so are affection and security. Money can't buy you love, but it can buy you a sandwich. Economists say that your willingness to trade love for a sandwich depends on the time, place and people involved. We often face these trade-offs. Parents go hungry so their children can eat. You can't be in two places at once. People trade love for "sandwiches" of security, emotion or calories. Morality and fairness are less important than value when it comes to defining or allocating goods. Individuals have subjective *values* for various goods. Differing values affect the production, regulation and consumption of goods. Prices help us reconcile subjective values, but price and value are rarely equal. A *price* can be paid in money, time, or other scarce resource. The buyer values a good at more than its price; the seller at less, so they trade.

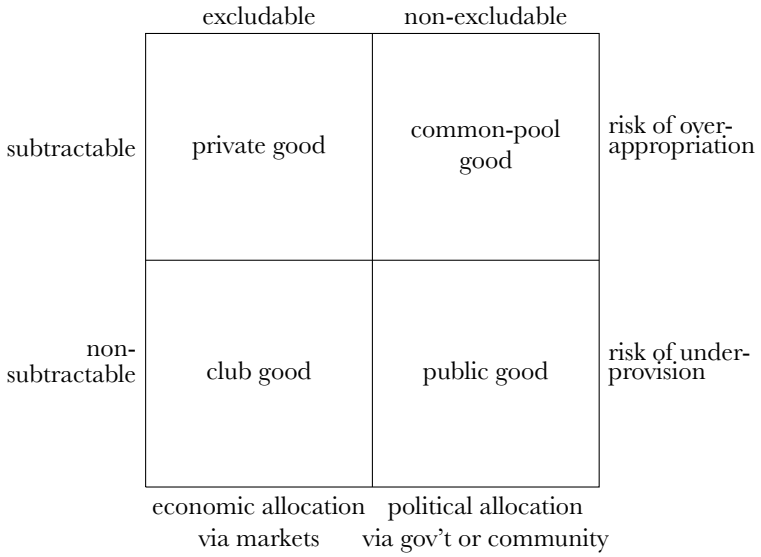

Figure 2.1: Four types of goods.

Figure 2.1 uses rows (subtractable and non-subtractable) and columns (excludable and non-excludable) to define four groups of goods. A *subtractable* (or "rival") good decreases in quantity or quality with use. Beer is subtracted, one pint at a time. Airplane seats are subtractable because passengers do not (yet) sit on each other. A physical book is subtractable when I take it home but not if it is read aloud to a group or distributed digitally. A theater performance? A sunset? These are usually non-subtractable, but they can be subtractable if watching the play requires a seat or someone blocks your sunset view.

An *excludable* good is legally, morally or physically reserved to those who own the good. I can't consume beer in the store before I buy it, but I can drink freely at a party with an open bar. Books in my bag are excludable; books left on the neighborhood's free-to-take bookshelf are not. Air, whether clean

or polluted, is non-excludable.

Combinations of (non)subtractable and (non)excludable define private, club, common-pool and public goods. Although these everyday words have different meanings to different people, they have specific definitions in this book.

A *private good* is excludable and subtractable. Your mobile phone, wallet and bike are private goods, as are your email address, appetite and one-on-one conversations with a friend — assuming Alexa is not listening. A plane seat is a private good but a seat in the (non-excludable) public park is not.

Club goods are excludable but non-subtractable. Golf clubs promise that members with reservations can play without waiting. A toll-road (club goods are also called "toll goods") sets a price on access to limit the number of cars, thereby allowing those who pay to avoid the congestion of "freeways." The library guarantees that you can get a book (club good) but not if it is checked out (rivalry). A family party is a club good for relations in good standing but a private good when excluding ex-spouses and spendthrift children.

Note that all goods can be classified into one of these four categories (or types or groups). Is this claim too academic for real life? I have not encountered any exceptions. The next chapter will clarify why these four fit together so well. This scheme also clarifies challenges and opportunities. Do we like the current quantity and distribution of goods? If not, then should we change their type? How they are managed? Supply or demand? Should drinking water be sold as a private good or shared as a club good?

Public goods are non-excludable and non-subtractable. Information (anything from $e = mc^2$ to a dad joke) is a public good because anyone can share it without reducing its availability to others. All citizens benefit from secure borders. Flowers on the street and sunsets in the sky are public goods for viewers.

Domestic security and the justice system are generally classified as public goods, but unequal access would make these club goods for the privileged. Definitions do not deliver justice or efficiency. They highlight gaps between promise and performance, or the direction needed for change.

Common-pool goods are non-excludable but subtractable. In theory, anyone can consume from a diminishing supply. Will supply be exhausted? There is no single answer. Sometimes fisheries collapse or birthday cakes disappear in tragedies; sometimes everyone can have fish and cake — but maybe not in one bite!

Let's pause for two clarifications. First, a good can move among types as circumstances change. A backyard pool is private for the home owner and a club good for their family. If there's a party, then it is a public good for the first guests but a common-pool good when people are jumping, floating and swimming in each other's way. The pool is physically the same; its nature as a good has changed. Think of the four types as helpful indicators rather than permanent identities.

Second, I use "commons" to refer to both public and common-pool goods, since both are non-excludable. Even more confusing, "commons" and "common-pool" sound similar, "commons" can be either singular or plural, and even "common" is a common word, so just try to follow the context without getting distracted by these overlapping uses. Now is not the time for language reform!

Okay. So how should we *sustainably* manage goods, i.e., maximizing the long-term social, economic and environmental benefits of their existence and use?

Excludable goods can be managed via familiar methods. Exclusion allows for property rights, so excludable goods can be traded in markets and/or rationed via price. That is why we have markets for private goods (food, clothes, housing, etc.)

and club goods (streaming video, social media, sports clubs, and so on), and why prices balance supply and demand in those markets. Markets can be distorted by bad regulations, misinformation, market power and misplaced costs, but they are still the best mechanism for managing private and club goods.[1]

Markets don't work for non-excludable goods. It's hard to sell something anyone can grab (the "over-appropriation" risk mentioned in Figure 2.1), just as it is hard to get anyone to provide something for everyone without hope of payment (the "under-provision" risk).

That is why goods in the commons must be created, allocated and/or protected through *political* mechanisms managed by some combination of government (top-down, formal rules) and community (peer-to-peer, informal norms). Non-exclusion is why governments pay for census data or the GPS-satellite network. Communities manage non-excludable goods by enforcing rules and norms surrounding members' rights and obligations. Families and roommates share responsibility for cleaning and expenses. City parks have rules separating dogs, kids and picnics.

Before exploring over-appropriation and under-provision, let's consider political mechanisms. Most of you are well aware of the power of government and the difference between good and bad leadership. We've seen *corruption* — the abuse of public office for private gain — in many forms, and it is hard for normal citizens to reduce corruption. In democracies, voting in competitive elections can reduce corruption, but sometimes the system is corrupt. Citizens can emigrate, protest, or accept such a situation.[2] Although I could say much more

[1] Economists say a *negative externality* results when an actor's choice unintentionally harms others. Pollution is a negative externality.

[2] See Albert Hirschman's 1970 book, *Exit, Voice and Loyalty*. See "Works Cited" at the end of this book for details on sources I mention.

about leadership and corruption, this book is not for bosses and leaders, so I will focus more on how your community can manage its commons.

Community management involves cooperation (or *collective action*) among peers to overcome problems of over-appropriation by *defectors* who take too much or under-provision by *free riders* who give too little. As you can see, group dynamics and socio-political forces are very important. That is why questions like "what are you doing for the environment?" are misleading. No one individual can save the environment; it's a group project.

Now to the risks that threaten the commons.

Over-appropriation means unchecked demand outpaces the limited supply of a common-pooled good. A fishery or aquifer can be depleted. A city street can be congested with cars, garbage or pollution. When some people finish the beer at an open bar, they leave nothing for others. The challenge is to limit demand.

For public goods, the challenge is *under-provision* of supply, rather than (non-subtractable) demand. People can ask for money in exchange for creating public goods, but they cannot exclude others from using them, which is why they are often funded by government tax revenues or voluntary contributions from the community. This is why religions emphasize donations: they bind the community and help neighbors in need.[3]

Although it is tempting to blame over-appropriation on under-provision (additional supply *could* meet excess demand), such logic does not help when supply is relatively fixed. It's like

[3]The Torah and Old Testament denounce insufficient giving as stealing from God: "Will a man rob God? Yet ye have robbed me. But ye say, Wherein have we robbed thee? In tithes and offerings. Ye are cursed with a curse: for ye have robbed me, even this whole nation." — Malachi (8–9), KJV.

blaming the host for providing too little beer to the drunks or fixing traffic jams by widening streets onto sidewalks.

I am focusing on the mismanagement of non-excludable goods, but excludable goods can also be mismanaged. Stores need to manage shortages (sold out!) and surpluses (on sale!). Clubs can suffer from crowding. Property owners understand these issues, and they have a (profit) incentive to fix them. Those incentives do not apply for non-excludable goods threatened by over-appropriation or under-provision. In these cases, solutions depend on political actions and institutions that defectors and free-riders try to ignore, block or destroy.

Institutions are the formal rules and informal norms that reflect and direct human interactions. They vary with time and place. They reflect long-enduring, slow-changing factors such as culture, language, religion, geography and history, but also laws, rules and social norms that change more quickly. Culture varies with time and place. Americans drive long distances to work and socialize. The Dutch tend to eat lunch together (typically cheese sandwiches with milk). Some Japanese workers drink late into the night, but they and their possessions are safe when they fall asleep on Tokyo's subway. In some countries, changes in social norms have revised the institution of marriage to include non-heterosexual couples. Institutions can last for minutes, months or centuries, from the rules of street games, to one's behavior during a pandemic, to the reciprocation of gift-giving.

Under-provision and over-appropriation are not destiny; neither is a tragedy of the commons. In the next chapter, we will learn more about Elinor Ostrom, who spent most of her career exploring how we avoid tragedies. She said a commons was sustainably managed in a *situation* but endangered in a *dilemma*. What explains the difference? Institutions.

Institutions take many forms. Some address problems of over-appropriation or under-provision. Others apply to exclud-

able goods; markets depend on property rights, queuing, and insurance, for example.

What is interesting is that institutions, which are critical to managing any commons, are themselves a sort of commons. Expressions such as "who watches the watchers?" capture these interdependencies. Watchers are needed to prevent defectors from over-consuming Good X, but watchers might be tempted to free-ride (leaving the watching to others), which means they need to be watched, which implies another mechanism that needs to be managed. Such a situation — with its implication of "watchers all the way down" — can only be addressed by different institutions.

In sum, markets and economics are better for managing excludable goods and government/community and politics are better for managing non-excludable goods. "The commons" can refer to either public and common-pool goods, since they both need to be managed with institutions that can prevent situations from turning into dilemmas. Formal or informal institutions reflect collective decisions by leaders, citizens, neighbors and strangers. I am writing this book to highlight these roles, but the responsibility for success and failure rests with communities, not academics or outsiders.

The next chapter tells the story of these ideas. Does that mean that the commons did not exist before they were described? Or that they were managed effortlessly? Not really. It's just that our attention to the commons has increased as their importance and vulnerability has grown.

CHAPTER 3

A history of the commons

A decent history of how humans have understood and managed the commons would run for hundreds of pages, so I am going to give a brief, "just-so" history of how we shared the commons, extracted private goods from the commons, disagreed over whether some goods were excludable or not, and then how we came to understand the commons. These topics are linked to controversies over the rights and obligations of citizens, the division between market and state/community, and reconciling old ways with new ideals or challenges. The first half of the chapter focuses on the line between excludable and non-excludable. The second half focuses on the non-excludable commons, i.e., the public and common-pooled goods whose importance has grown since WWII.

In the beginning

Early human troops and tribes probably had a strong sense of the commons. They shared food, shelter and other resources in their ongoing struggles with nature and other humans. Although private property such as clothes and tools existed, most consumption depended on converting public goods such as wild foods into club goods (shared calories). Individuals didn't use money; they traded gifts and obliga-

tions. "Wealth" meant reputation, or the ability to influence others.

The oldest institutions — social norms conveyed by stories and sayings — helped migrating troops find food, water and shelter. Knowledge passed as a public good from old to young, from master to apprentice, from the wise to the adventurous. Tribes developed rules and norms for internal order and protection from other tribes. Groups with the strongest internal loyalties dominated those with more individualistic traits, driving cultures to evolve towards respect and collaboration.[1] These dynamics are still visible in team sports, cults, gang and mafia loyalties, the military, and other groups of like-minded folks.[2]

Migratory people traveled light, but they also brought goods from areas of abundance to scarcity. As skills grew, it is easy to imagine how comparative advantages would produce specialists who collected and processed raw materials into valuable trade goods. Full-time traders settled in convenient locations where they developed security institutions to protect residents and visitors against theft and violence. Citizens specializing in trade, storage, security and production owned houses, workshops and warehouses. Settlement increased the value and use of private goods as well as public goods such as knowledge and local security. Clean water, fish or wild animals would be so abundant that they would be *de facto* public goods rather than the common-pooled goods they are today. Club goods depended on organizational capacity, e.g., building walls and gates to protect citizens from outsiders. The

[1] Joseph Henrich's *Secret of Our Success* (2015) vividly explores this cultural evolution.

[2] In my 2017 paper, "Exploring group cooperation in the provision of public goods," I quantify the increase of internal cooperation among team members competing with other teams. I did not discover this ancient dynamic, but it is nice to see it in the data.

mix of goods reflected the opportunities, pressures and institutions of the time.

A Roman standard

Although different settlements had different systems for understanding and managing goods, some came to dominate. Romans differentiated goods — *res* means "thing(s)" — according to ownership.[3]

Res nullius: Owned by nobody, like wild animals.

Res privata: Owned by individuals, like farms.

Res communis: Owned by all, like running water.

Res publica: Owned by the government, like a park or fountain, or owned by the People, like a Republic.

These four types match reasonable definitions of property, but what if ownership and use conflict?

Take *res nullius*. No owner means no humans around, since one human could declare the good *res privata* and multiple humans add the options of *res publica* or *communis*. Thus, it was only a matter of time before someone would privatize an escaped slave, wild animal or abandoned building. Indeed, that's why the British declared Australia *terra nullius* in the late 18^{th} century. They wanted a legal excuse for ignoring the *res communis* rights of the indigenous Aboriginals; *res nullius* allowed colonists to take land as *res privata*.

What about running water or a park? Is running water still *res communis* if it runs across my land? Or is it converted to my river? Is a park still *res publica* if it is on the emperor's gated estate? Or is it now a "garden"? What if the government converts a republic into an empire, as it did when Augustus

[3] I got this information from Wikipedia, which should not — according to theories of self-interest — exist. Its existence shows our ignorance of intrinsic motivation (Akerlof & Kranton, 2000).

was declared emperor in 27 BCE? Should Roman citizens have been compensated for their loss?

Property rights are important for managing excludable goods, but they don't work for managing non-excludable goods. We will consider that issue in the next section, but let's first look at an example of how property-rights definitions matter, i.e., how a change in institutions and property rights led to big changes in wealth and power.

I'm sure that you've heard of the taboo on incest that was codified in limits on marriages among members of the same family or tribe. States and the church have condemned intermarriage for over 1,000 years, but why? According to scholars, intermarriage kept power and wealth within the tribe whereas marriage to outsiders dissipated those assets. (Birth defects and other health issues only became troublesome in prolonged cases of sibling intermarriage.) The prohibition of intermarriage thus shifted power from tribes to the church and state. We see the old system today in tribal societies such as Somalia, Yemen or Libya where the state is weak and tribes are strong. But we also see the same tension in federations such as the US, EU or UN, where centralizers ("state") and locals ("tribes") tussle over autonomy, harmonization and the distribution of costs and benefits.

These struggles over power and wealth have influenced institutions for millennia. Now let us turn from central versus local control to private versus collective property, starting in the late Enlightenment.

Collectives versus markets

In 1755, Jean Jacques Rousseau cursed private property:

> The first man who, having fenced in a piece of land, said "This is mine," and found people naïve enough to believe him, that man was the true founder of civil society. From how many crimes,

> wars, and murders, from how many horrors and misfortunes might not any one have saved mankind, by pulling up the stakes, or filling up the ditch, and crying to his fellows: Beware of listening to this impostor; you are undone if you once forget that the fruits of the earth belong to us all, and the earth itself to nobody.

Although poetic and passionate,[4] Rousseau misses an important point: Wars have been fought over private property, but they have also been fought over the commons.

If Rousseau actually cared about civil society, reducing poverty and promoting peace, then he would not have extended a narrow insight (some fruits of the earth belong to all) to a broad delusion (all fruits of the earth belong to all). Rousseau was wrong to condemn the private ownership that contributed to the growth of markets, economies and wealth, but he was right to worry about privatized commons. What Rousseau lacked (and we have) is a means of separating good and bad privatizations.

In Figure 2.1, I claimed that excludable goods are best managed in markets. Markets allow individuals to exchange based on their tastes and resources. Buyers pay if a good's value exceeds its price; sellers profit when the price exceeds their cost.

In 1776, Adam Smith explained how self-interested individuals created social benefits by moving goods from lower to higher-valued uses, thereby increasing the wealth of nations "as if guided by an invisible hand." Rephrased in modern terms, trade maximized the efficient allocation of scarce resources by helping consumers find the best producers for the goods they valued. The greater the divergence in producer

[4] Rousseau was born to a bourgeois family in Geneva. His life was a whirl of excess and disruption, political scandal, and popular redemption.

skills and consumer wants (*comparative advantage*), the greater the gains from trade and wealth of a nation's people.

What about "crimes, wars …horrors and misfortunes"? Perhaps Rousseau thought the existence of private property created incentives to steal or plunder, but collective ownership does not end violence. A tribe living according to Rousseau's principles might share its collective goods in peace and harmony among its members, but only until covetous neighbors conquer it. This sad scenario might upset one's ideals, but humans have yet to find a way of maintaining peace in the presence of defectors who chose theft over work. After centuries of fighting, we created states, empires and nations as institutions that did a better job at securing domestic property rights and reducing conflict among groups.

But what about "the fruits of the earth belong to us all"? Ignoring fruit (a private good) but allowing for Rousseau's poetic analogy (ecosystems as non-excludable goods), we should indeed manage collective goods for all. Figure 2.1 clarifies how the commons can be overwhelmed by self-interested individuals "guided by an invisible hand," but that outcome is not inevitable.

In his 1759 *Theory of Moral Sentiments*, Adam Smith suggested humans have an instinct to behave honorably "as if advised by an Impartial Spectator." In today's jargon, *intrinsic* motivation (from inside) can support pro-social behavior when *extrinsic* incentives (from outside) are weak or anti-social. Should I take advantage of others? The Impartial Spectator (think angel on your shoulder, whispering in your ear) would say "no" while selfishness (think devil whispering in the other ear) would say "yes."

Community, planners and clubs

If honorable behavior is possible, then why not rely on it to manage collective goods and replace greed-driven markets?

In his 1944 book, *The Great Transformation*, Karl Polanyi, a modern-day Rousseau, argued that the rich had commodified land and labor to exploit the poor. He was right that "enclosures" had, over centuries, privatized the British commons in favor of large landlords. That was outright theft. But his claim that all commodification impoverishes the poor defies our experience and evidence. It is possible for people to share land and work on smaller scales, but those systems rarely last — Israel's *kibbutzim*, for example, didn't stay collective for long.

Can collective non-commodification work on larger scales? That question was central to the so-called "planning debates" of the mid-20th century. Many governments took greater control of their economies as the Great Depression persisted and WWII began. Many intellectuals argued that rational planning should replace the chaos of markets. The Soviets claimed scientific management beat free markets. Most of us are fortunate to have escaped these visions.[5]

In the post-war period, most capitalist systems reverted to markets, spurred by a combination of experience, financial pressures, and the unmanageable complexity of a consumer economy relative to a war economy. Many economists argued that free markets could better serve society, with F.A. Hayek as a notable proponent. Hayek's 1944 book, *The Road to Serfdom*, presented the impoverishing tyranny of command and control. His 1945 article, "On the use of knowledge in society," explained how actors used prices to cooperate — as if guided by an invisible hand — and thus why it was important to allow "wasteful" competition among market participants seeking the best mix of cost and value.

[5] For more on planning failures, read Conquest (1986); Easterly (2001); Flyvbjerg, Bruzelius, and Rothengatter (2003); Scott (1998) on famine under collectivization, wasted foreign aid, value-destroying infrastructure, and bureaucratic myopia, respectively.

From Rousseau and Smith to Polanyi and Hayek and beyond, there will always be debates on the division between private and collective goods. Vague definitions of "communal" and "collective" contribute to ongoing disputes. A "communal" piece of land can be private (to a family), public (open to all, who are few), common-pooled (open to all, who are many), or club (open to members, who follow rules).

The next section focuses on public and common-pooled (non-excludable) goods, and club goods are relatively easy to understand as excludable goods, but I want to bring up an interesting debate over whether some non-rival goods should be club or public, i.e., excludable or not. I had assumed that a good was always club or public, but what if one was trying to decide if a good like a school should be managed as one or the other?

In his 1965 article "An economic theory of clubs," James Buchanan argued that clubs, not government, should provide goods such as schools. He disagreed with another economist, Paul Samuelson, whose 1954 article ("A pure theory of public expenditure") suggested that governments should fund schools as public goods. It will take a few steps to unpack their dispute, but they will help clarify if a good should be managed as excludable or not.

Begin with Samuelson's claim for government provision of "public goods," which relies more on the *res publica* definition of a good owned by the government than on the non-excludable, non-subtractable definition of a public good. Schools can be locked and seats are subtractable, but it is also possible to supply enough school seats for all comers (i.e., making schools non-excludable and non-rival) if adequate taxes are devoted to that target. Samuelson claimed that such spending would be socially beneficial because the private and social gains from free access to education would more than compen-

sate for the cost to taxpayers.[6]

Buchanan argued taxpayers would balk at paying the sums needed to supply goods that people could get for free. Put differently, he worried that free-riding would lead to an underprovision (in quality or quantity) of those public goods.

But, even if free-riding was avoided, Buchanan also opposed government provision of such goods. He disagreed with Samuelson's claim that the government (or anyone) would be able to calculate the socially optimal quantity of a good needed by a community, let alone an entire country. This argument echoes Hayek's critique of central planning, but it goes further. Hayek defended markets for allocating private goods, but Buchanan claimed government should not provide any good that *any* citizen valued at less than their tax burden.

Buchanan's vision implied a tiny government that only provided goods with huge benefits and negligible costs, but he didn't present it that way. He saw clubs as complements to government. Club goods would be provided efficiently, in quality and quantity, to club members whose membership fees would align with each member's willingness to pay. Everyone's benefits would exceed their costs. Clubs could adjust prices, supply and access rules to avoid the congestion, defection and free-riding that creates dilemmas.

Although Buchanan is right about the advantages of club goods, his proposal to use them in place of public goods (in the *res publica* sense) brings us back to the market-versus-state debate. Should the government or the market provide drinking

[6]Economists use the "Kaldor-Hicks criterion" to evaluate policies that may harm some while benefiting the majority. This criterion implies compensation to losers, which allows for more policies than the "Pareto improvement" criterion, which does not allow for policies that create losers. Although Kaldor-Hicks suggests that winners of 100 units could compensate losers of 20 units, that side payment is often forgotten, which leads to protests from losers.

water? What about prisons, schools, broadcasting, security, standards, or housing? This debate is ongoing, fractious, and beyond the scope of this book, so we can skip most of it, except for two points.

First, I am sidestepping ownership and provision (the line between market and state) because I want to focus on how the good is used, in the sense of exclusion or rivalry. My goal is to understand if management and use match, and the implications when they don't.

Second, Buchanan's perspective contradicts the assumption that citizens should have equal access or rights to some goods. Although I don't think it is a big deal if a sports club or amusement park excludes non-paying members or customers, it is much trickier to speak of excluding non-paying members from schools or drinking-water systems. It is obvious that freedom of association includes the right to exclude others, but what if your association lowers quality of life for the excluded? What if some citizens support private schools for their kids but refuse to pay taxes supporting public schools for others' kids? That question is not just rhetorical — it echoes the exact logic used to support the "separate-but-equal" racist doctrine that delivered *de facto* apartheid in the US for so many decades and whose echoes continue to burden the poor in America. It is also an injustice that Buchanan, a Southern conservative, ignored.

At the start of this book, I promised to show you the commons we swim in, their role and significance. Although the last few pages might have pushed you a bit under water, air is near! Now we can move from the private versus public debate to look deeper into the commons.

More and more collective goods

World War II provided life-and-death incentives for technological innovation. In the post-war years, people were ea-

ger to prosper, and wartime advances in chemistry, engineering, physics and other sciences helped us convert natural resources into consumer wealth. Some resources (e.g., minerals, oil, soil and trees) were private goods whose consumption resulted in harmful pollution and damage to the commons of biodiversity, ecosystems, and public health. Other resources were public goods (e.g., air, fisheries and water) that turned into common-pool goods as depletion and pollution burdened their self-renewing potential and depleted their "unlimited" abundance.

Why were we exceeding these limits? In my opinion, it was because fossil fuels provide power more quickly and conveniently than renewables such as wood, wind or water. Cheap energy extended the impact of scientific advances, just as it contributed to our rising expectations of "basic" consumption. In fact, we probably wouldn't have had much of an Industrial Revolution without coal and oil. That said, a majority of fossil fuel consumption — and thus pressure on the commons — came after WWII. Using CO_2 emissions as a proxy for fossil-fuel consumption, you can see the surge in the data: In 1800, cumulative emissions were 0.8 billion tons (BT) of CO_2. By 1900, cumulative emissions reached 45 BT. They exceeded 200 BT in 1945 and hit 1,650 BT in 2020. Nearly 90 percent of CO_2 emissions have occurred since WWII.[7]

Emissions and impacts were not recognized everywhere as bad, but nature lovers were concerned. In his 1949 *Sand County Almanac*, Aldo Leopold pleaded for the protection of nature, but his work was not widely read until the sixties, when the environmental movement arose in the West.[8]

[7]For readings on damages to ecosystems and biodiversity due to our "weapons of mass consumption," see Costanza et al. (2014); Dasgupta (2021), respectively.

[8]These days "the West" is not a geographical reference but a group

Protecting the commons

What triggered the environmental movement? In 1962, Rachel Carson published *Silent Spring*, a book critical of the government's over-enthusiastic embrace of chemical pesticides (e.g., DDT) that were killing insects but also birds, fish and other species. Carson had a masters degree in zoology and, in 1936, became the second woman hired by the United States Bureau of Fisheries. Her work as an aquatic biologist, careful research, and publication experience — combined with support of other scientists and conservation organizations — helped her book appear over objections from the chemical industry and US Department of Agriculture. The book was controversial, but it reached a huge audience when the Book-of-the-Month club sent millions of copies to its members.

Carson never mentions the commons. She connected with readers by warning of dangers to "our" environments. Readers rose in opposition to environmental destruction, but progress was slow. Protesters chant "the people, united, will never be defeated," but defeat and inertia are much more common than victory and change. Why?

In 1965, Mancur Olson published *The Logic of Collective Action*, which investigated group dynamics, minority and majority politics, and mis-alignments between private benefits and social costs. He explained how "the small exploit the large" or how a *special-interest* group could organize more easily than — and profit at the expense of — a larger group.

Olson reasoned that larger groups would, in the absence of intrinsic motivation, under provide public goods due to two issues. The first issue is monitoring. In a group of four people, it is easy to see who is contributing resources to the public

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of richer, democratic countries that we are comparing to poorer and/or less democratic countries. I discuss "Western" perspectives later in the chapter. Until then, please treat my narrative as a starting point for deeper conversations.

good, but monitoring is harder in a group of forty, forty thousand or forty million. The second issue is finding group members to monitor and organize the group on behalf of everyone else.[9] Who wants to work when they can free ride?

Using Carson's example of agricultural chemicals damaging the environment, we can identify "the small" (farmers, chemical companies, and the USDA) and "the large" (the public). The small can easily coordinate, and they gain much more per member from the use of pesticides than each citizen loses. It is easy to assemble a group of 100 willing to spend one week (cost $5,000 each) in collaborating to earn 1 percent each out of the gains from destruction ($250,000 out of $25 million). It is much harder to get anyone from a 1000-times-larger group to spend a week (cost $5,000) to earn 0.001 percent of the much larger gains from conservation ($2,500 out of $250 million). From a social perspective, conservation is 10 times more valuable than destruction. From an individual perspective, destruction is 100 times more valuable than conservation. These inverted ratios explain the existence and persistence of collective-action problems.

Besides these ratios helping the small exploit the large, there are additional challenges to enforcing cooperation within the group. It is not easy to enforce compliance in a group of 100, but industry associations and other communities of interest use membership, branch officers, and regular updates to keep members in line. It is practically impossible to enforce cooperation among 100,000 strangers with diverse interests and limited attention.

Part II reviews many examples of these dynamics. For the moment, let's agree that societies will have a hard time pro-

[9] A policy of paying monitors only shifts the free-riding problem back a step, to collecting voluntary donations from a group in which free-riders wait for others to donate first. Recall the "watchers all the way down" discussion from the previous chapter.

tecting their commons when a small group can grab benefits while leaving the costs to everyone else, which leads us to an important question: Is tragedy inevitable?

The commons at risk

In 1968, Garrett Hardin published "The tragedy of the commons" and Paul Ehrlich published *The Population Bomb*. Both worried that overpopulation would strain Earth's carrying capacity. They argued that (private-good) children create benefits for parents while exhausting (common-pooled) resources essential for life.

Over-population fears date to Thomas Malthus's 1798 *Essay on the Principle of Population*. Malthus suggested population growth would outpace increases in food supply, leading to starvation. His "Malthusian disaster" failed to materialize for three reasons. First, the Industrial Revolution brought food-producing innovations such as mechanization, artificial fertilizer and cheaper transport. Second, people could use technologies and techniques instead of children to increase output. Third, since food is a private good, scarcity would lead to higher prices that would spur production. Although Hardin and Ehrlich were right about rising population (it grew from 3.6 billion in 1968 to 7.9 billion in 2022), these neo-Malthusians were wrong about inevitable hunger.[10]

It's therefore annoying that they put their finger on the right problem (burdens on the commons) for the wrong reason (weak food systems). Although their concerns contributed to action — one billion people participated in the first Earth Day in 1970, the same year President Richard Nixon signed the Environmental Protection Agency into existence — their confu-

[10] Amartya Sen, a Nobel-Prize-winning economist from Bengal, argues that political choices, not shortfalls in production, led to famines in Ireland (1845–49), the Ottoman Levant (1915-18), Soviet Ukraine (1932–33), British Bengal (1943), China (1959–1961) and Ethiopia (1983–85).

sion over the commons distorted environmental policies (more below). That said, their confusion also illustrates how our understanding of the commons was evolving, so let's continue, first with Ehrlich and then with Hardin.

Ehrlich studied butterfly ecosystems, but he did not clearly separate the (common-pooled) natural resources supporting ecosystems from the (private) natural resources supporting farms. The same was true for the authors of *The Limits to Growth* (1972). In that book, they used computer models to show how increases in population, agricultural output, and industrial production would deplete natural resources and pollute ecosystems. Both works were popular, but they confused the public by using "natural resources" to describe two different types of goods: commons that were at risk and private goods that were not.

Critics saw opportunity. Extractive lobbyists asked for more exploration and extraction. The economist Julian Simon argued that humans were not the problem but the solution. They were "the ultimate resource" in his 1981 book of the same name.

In 1980, Simon proposed "The Bet" to Ehrlich. Since Ehrlich claimed overpopulation would deplete resources (causing their prices to rise), Simon invited Ehrlich to put five "non-government-controlled raw materials" into a hypothetical basket in 1980. If the inflation-adjusted price of that basket rose in the ten years to 1990, then Simon would pay Ehrlich the difference. If the price fell, then Ehrlich would pay Simon. Ehrlich accepted the challenge, choosing chromium, copper, nickel, tin, and tungsten. In 1990, the inflation-adjusted price of all five had fallen, and the basket cost $424.93. Julian Simon proudly hung Ehrlich's framed $575.07 check on his wall.

The Bet was a propaganda coup for "cornucopians" such as Simon who argued against limits on human activities.[11] As

[11] Julian Simons was a prolific writer. From my reading of two essays

such, it was also a tragic example of misunderstanding the commons. Astute readers might already have noticed that Simon offered Ehrlich a sucker's bet (did you?) by confounding two types of goods.

The key factor in The Bet was "price" since prices imply markets and…private goods. Simons was right to assert that humans would find ways to avoid scarcity of priced goods. Ehrlich was wrong to assume that population pressures would raise raw material prices in the same way as they burdened ecosystems. Indeed, there is abundant evidence that our impact on those (non-market, non-excludable) commons has worsened over time, with the greatest harm accruing in the least excludable commons such as the atmosphere, oceans, and biodiversity.[12]

Now what about Hardin? His article was extremely popular but misunderstood in three ways. First, most people remember the commons in his paper as a grazing meadow. Although he illustrates his idea of private benefits and collective costs using a "just-so" story in which herders destroy a common grazing area by adding too many cows, his real topic was over-population, i.e., parents destroying the Earth's ecosystems by adding too many children. Second, his solution to overpopulation — self control — was hypocritical (he had four children) and wrong (female reproductive freedom is key). Third, while he was correct to worry about some

on his perspective (Aligica, 2009; Swaney, 1991), it seems that he was not ignorant of the commons as much as convinced that humans, as a creative and social species, would direct self-interested behavior through markets to stretch limited resources and augment environmental carrying capacity. Given the nature of the commons as a non-excludable good, his hope seems misplaced. Indeed, the best market-driven environmental intervention I know of — a market to reduce sulfur emissions — was established and destroyed by political actors (Schmalensee & Stavins, 2013).

[12]Indices such as the "Genuine Progress Indicator" show that our economic activities (flows) are depleting natural resources and ecosystems (stocks) at an increasing rate, leaving less and less for our future.

commons (ecosystems, biodiversity, climate), he was wrong to claim all commons were doomed. In many cases (fisheries, groundwater, urban congestion, and so on), the commons can be protected and preserved through a mix of regulation, negotiation, and/or collective action. Each of these methods deserves some discussion.

Managing collective goods

The use of state power to allow, require or prohibit certain behaviors, or *regulation*, creates more benefits than it costs when it is relatively simple to explain, implement and enforce (low *transaction costs*), but regulation can also fail badly. Part II has many regulation examples.

For negotiation, start with the structure Ronald Coase proposed in his 1960 essay, "The problem of social cost." Coase begins by noting how regulation can be inefficient for tackling nuisance if it fails to match local conditions. Coase suggests that both sides to the nuisance negotiate. If transaction costs are not too big, then concerned parties will be able to find an efficient, win-win compromise. Say, for example, that Fran's noise bothers Ed. Where does the negotiation start? Does Ed have the right to silence, or does Fran have the right to make noise? Coase argued that a negotiated outcome was feasible in either case, as long as one side has clear rights, i.e., Fran has the right to make noise *or* Ed has the right to quiet. If Ed has the right, then Ed gets quiet or Fran pays Ed to make some noise. If Fran has the right, then Ed has to accept the noise or pay Fran for quiet. Either way, rights plus negotiation allow for locally appropriate solutions that work better than external regulations.

My students always worry about Coase ignoring justice (those with rights get paid), but his logic underpins many successful policies — allocating rights to the spectrum used by mobile phones, for example. Coase's ideas do not work for large

numbers of people because transaction costs rise quickly, but they are useful in simple situations where regulation can be unwieldy.

What about situations without regulations or rights?

Now we can introduce Elinor ("Lin") and Vincent Ostrom's work on the commons and collective action.[13] In the discussion around Figure 2.1 in the last chapter, I mentioned that either government (using formal top-down rules) or community (using informal peer-to-peer norms) can manage non-excludable goods, without saying which was appropriate when. Now we can connect government to regulation and community to the collective-action institutions the Ostroms studied. (Coasian bargaining combines top-down rights with bottom-up local compromises.)

When should we rely on top-down versus bottom-up? It depends on the situation.

Consider pirates. In his *Invisible Hook: The Hidden Economics of Pirates* (2009), Peter Leeson explains how 18^{th} century pirates created constitutions, elected captains and quartermasters, and punished rule-breakers. This system of bottom-up governance allowed them to cooperate as they plundered. It worked because everyone agreed to the rules, and everyone grew richer when they followed and enforced them. Incompetent captains were deposed; corrupt quartermasters were demoted; the most dangerous defectors were left to die on remote islands.

Piratical and other bottom-up models of collective management receive less attention than top-down models of author-

[13] Elinor (1933–2012) and Vincent Ostrom (1919–2012) married in 1963 when she was a PhD student and he was a professor at UCLA. After she received her PhD in 1965, they moved to Indiana University where they founded the Workshop in Political Theory and Policy Analysis in 1973. The Workshop was extremely influential as an international hub for understanding the commons.

ities wielding royal, theological or political powers. I think authority models get more attention for three reasons. First, we tend to admire individuals more than groups (the "great man" theory of history). Second, academics need to publish, so they focus on simple, measurable cases rather than complex dynamics (studying one general rather than 200 lieutenants). Finally, the powerful happily subsidize the study of authority (themselves).

Next, why study government and community methods for managing non-excludable goods when those goods can be made excludable? Coasian methods work this way by creating property rights that convert a common-pooled good into a private good. Government regulations can create rights such as a right to pollute or a right to clean water. True, but some rights are hard to convert, and governments are often absent or incompetent.

Thus, we will pay attention to the cases where communities need to solve their problems, without recourse to outside authority (extrinsic motivation), which means we will focus on intrinsic motivations that vary with people and place. Those motivations are part of cultures, or institutions, that determine the performance of systems that address similar problems but vary in form, such as norms around littering, for example. Culture is really complicated, but I want to discuss a big cultural divide between "the West and the Rest."

Culture matters

Remember the example of tribes, incest and marriage from a few pages back? Although all states have played their role in this dynamic, the Catholic church magnified its importance worldwide. The church preached in favor of families and against clans and incest. Tribal children depended on family. Non-tribal families worked with strangers. Their independent kids were more individualistic and curious. Freedom

to trade rewarded education, education led to rights, and rights led to democracy. Competition drove innovation and increased wealth. Innovation and money armed and paid for armies that spread from Europe. The Romans coined the terms Occident (*occidens* refers to sunset, thus west) and Orient (*oriens* refers to sunrise, thus east) for geographical purposes, but the terms gradually evolved into "civilized" and "colonized" — or the West and the Rest.

Joseph Henrich (mentioned earlier in the chapter) says Western, Educated, Industrialized, Rich, and Democratic (*WEIRD*) people behave differently; they are more individualistic and less tribal, more comfortable with markets than communities. These differences might explain why regulations and property rights are used to manage the commons in WEIRD societies while collective-action solutions work better in non-WEIRD societies accustomed to interdependency. The Ostroms' Workshop was populated by scholars and case studies from non-WEIRD countries, so they found many non-tragic commons.

How did the Ostroms study the commons? Part II gives many examples, so I will focus here on the emergence of these concepts. In the 1960s, Vincent Ostrom was already working on *polycentricity* (the interaction of different levels of government) and bureaucratic behavior (where intrinsic motives dominate). In 1965, Lin Ostrom finished her PhD dissertation on groundwater management in Southern California, which explored how water managers communicated, negotiated and compromised in order to create useful institutions for collectively managing their shared groundwater.[14] Although her sunny outlook was a big asset, the 2009 Nobel Prize was for her work

[14]My dissertation covered a similar geography, but I focused on fights among water managers over the cost and supply of surface water. For Lin, the glass was half-full; for me, it was half-empty. I compare our work and provide download links here: https://kysq.org/aguanomics/2018/04/a-comment-on-elinor-ostroms-work/.

exploring and explaining examples of successfully managing the commons. (Vincent's complementary work did not focus on the commons.)

Tragedies are not inevitable

One of her early concerns was overcoming the pessimism of Hardin's "Tragedy." She built on her groundwater work to show how a commons can endure in a *situation*, but suffer from under-provision or over-appropriation in a *dilemma*.[15] She studied how situations became dilemmas and vice versa. She promoted the successes of overlooked stakeholders who had sustainably managed their commons without resort to outside enforcers or privatization. "Commons" does not always mean "tragedy."

Ostrom and collaborators cautioned against vague academic theories; they used field studies to understand how local institutions separated dilemmas from situations. A commons dilemma is characterized by a sub-optimal outcome and the existence of institutions capable of changing that outcome.[16] The *outcome* criterion means participants would benefit from better choices. The *capability* criterion means that these choices can be made with existing or reformed institutions. These criteria will not rewrite laws, prevent natural disasters, or turn angry neighbors into friends; they highlight feasible, actionable solutions.

How does the solution process work? Ostrom suggested the parties to the suboptimal outcome cooperate to improve institutions. Cooperation will win if everyone agrees that long-term prosperity is easier with a commons situation than a dilemma. As we will see in Part II, institutions can be formed

[15]The Ostroms' paper "Public economy organization and service delivery" (1977) has the earliest version of Figure 2.1 I have found.

[16]I'm drawing on her co-authored 1994 book *Rules, Games and Common-Pool Resource Problems*.

from varying mixes of formal rules and informal norms that reflect values, histories, information, power and so on. The key factor is using rules or incentives to change strategies, so choices and actions help the group move from dilemma to situation. That process takes time, but every step, mistake, and correction converts local conditions and individual desires into better institutions.

In conclusion (for now), let's recognize the importance of the commons, the challenge of managing them, and the many different paths to managing them well or poorly. In some cases, understanding success in one place can inspire improvements elsewhere. In other cases, such generalizations are counter-productive. Hopefully, these ideas will help you think about commons that matter to you.

Part II explores the commons in differing scales and applications. Those examples should help you understand suboptimal outcomes and feasible alternatives, whether they be in your house (dirty dishes), neighborhood (noisy neighbors), region (ecosystem stress), nation (corruption) or the world (climate change).

The first step to solving a problem is realizing you have one, or as Will Rogers put it "If you find yourself in a hole, stop digging." Let's stop digging and start filling!

Part II

The commons in our lives

Overview of Part II

I've ordered these chapters from smaller to larger, i.e., beginning with family & friends and moving to global institutions & technologies. I could have started much smaller, with the commons of our bodies, but I do not know enough about the microbiome to explain those commons. As this limitation illustrates, these chapters use a loose organization, as it is practically impossible to diagram various commons into logical, exclusive categories. That is because most commons reflect human choices rather than natural laws. If you add local variations, then it is clear that the commons are as diverse as cultures, which also do not fit nicely into hierarchies.

As a rule, it is harder to protect the commons on larger scales due to problems of *collective action*, i.e., a lack of shared knowledge or trust that would reduce defection (taking too much) and free riding (giving too little). Collective action problems also explain why the private benefits of globalization bring greater challenges to the commons: larger markets reward diverse skills, resources and tastes, but cooperation is harder at global scales.

In each of the following ten chapters, I briefly explain the commons-dimension of each topic, challenges, and potential solutions. As you read, remember how our reliance on the commons has evolved over time. More wealth means more consumption and more pressure from resource use and pollution on the environmental commons, but it also allows people to escape the interdependence that dominated our history.

Freedom means choosing one's friends, job and home, but it also weakens the social-safety nets of trust, obligation and security. Freedom, like dependence, is a double-edged sword. Freedom is great when you are healthy and secure but it is no help when you are sick, broke, or just need a hug.

Keep these pros and cons in mind as you read Part II. It is easy to acquire private goods in win-win transactions. It is harder to collectively create, share and protect common goods. The commons force us to compromise, but compromise is essential for building and protecting our shared prosperity.

No man is an island.

CHAPTER 4

Family and friends

Families introduce us to the commons. Millions of years of evolution have made sex, pregnancy and child-raising into natural processes that blend instinct (genes) with sociability ("it takes a village to raise a child") and planning (from parental leave to college savings accounts). On the smallest scale of mother, father and child, the baby depends on a family commons of food and shelter. A baby can over-appropriate time and energy, but their smiles and affection can create abundant public-good happiness.

I don't have kids, but many parents have told me "it's worth it…changed my life…made me a better person," so it is fair to say — as well as conclude, judging by population growth — that family commons are more often situations than dilemmas. Sure, there are broken families, and maybe sleep-deprived parents rationalize their suffering into joy, but the biggest exception to happy-family narratives begins with uneven parenting. In some families, mom takes care of the house and dad takes care of money, but problems arise when parents disagree over who should do what, which is why marriage and birth rates initially drop as women get more rights. It takes time to re-balance norms and expectations.

As babies grow into children, households change shares of

space, time and resources. Someone needs to make dinner, which is a public good for middle class families. Someone needs to clean the common-pool-good dishes — and the rest of the house. In poorer families, food is a common-pool good. "Save the big piece for daddy" can mean hunger for the mother and children. Poor families must share space, perhaps living in one room, sleeping in one bed and listening to one radio. With wealth comes more space and luxury: one's own bedroom, TV, computer and clothes. In poorer families, it is possible to get along and live happily, but there are greater obligations. The process of negotiating these interdependencies can be annoying in the short run, but they create bonds, sympathies and understanding that contribute to long-run security. As a middle-class kid from California who has traveled in 100+ countries of varying wealth and social habits, I've come to think that money brings less happiness than many assume. That is because money is a private good and the family is a commons.

As children grow into adults, roles change. Adult children care for themselves; parents have more free time.[1] Eventually, children become caregivers. In some cultures, pensions or families pay for "privatized" aging in retirement homes. Sometimes government programs care for the aged, but common-pooled budgets can limit access and quality. It is also common for people to live in extended families from birth to death, taking different roles as takers and givers over their lifetime.

Friendships are easier to start and end, so people live with a mix of short- and long-term friends. Friendships can be more satisfying than family relations, but they need care. Youthful friendships can be outgrown. New friends can affect old friendships. Friendships can grow or end in adversity. Jeal-

[1] In self-reported measures of happiness, parents are least happy with small children and most happy when their nest empties and they have more time and resources.

ousy, politics or moving can sever ties. Enduring friendships rely on trust, bonding and respect.

A friendship is a club good for the friends but a private good to excluded outsiders, who must find others for sharing time. Within a friendship, a situation means both friends give without taking too much; imbalance can lead to a dilemma and break up. Romantic relationships bring stronger feelings of love, sacrifice and commitment, which makes them more intense, rewarding and/or disastrous.

You can choose your friends but not your family. Both are critical to our personal, professional and social lives.

CHAPTER 5

Knowledge and education

"Information wants to be free" goes the old saying, but who pays to produce it?

Information and ideas are public goods. If you tell me $2 + 2 = 4$, then you've given me a good without losing it yourself (non-subtraction). If you collect data, discover a vaccine, or translate a book into another language, then everyone can benefit from your work as soon as one person can, because it is hard to prevent access (non-exclusion). The challenge in the information commons is getting paid.

Some people provide public goods for the intrinsic joy, as with Wikipedia. Some people refuse payment for their discoveries, like Dr. Jonas Salk with the polio vaccine. Some people, like academics or public broadcasters, are paid to provide accurate information ("goods") to the public. Advertisers, lobbyists, and trolls are paid to provide inaccurate information ("bads").

The mix of good and bad information depends on whether we reward or punish those who help or harm our information commons.

Consider research, public broadcasting and Wikipedia. Research funding encourages discovery but which proposal deserves the money — the safe bet or edgy game-changer ?

Broadcasters only have one time slot for many shows. Wikipedia has far more pages for English-reading, middle-class men than for other demographics. The Game of Thrones entry has 2,000 words and 400 references. The Turkish-language entry for "birth control" has 400 words and 9 references.

It is hard to know the type or quantity of information to create or distribute without prices or customer feedback, but it is possible to encourage different initiatives and learn what works. Our prosperity is built on the creation and sharing of public goods (recall Henrich's *Secret of Our Success*), so it is reasonable to assume that the benefits of wins will greatly outweigh the costs of failures.[1]

Languages are public goods in the sense that everyone benefits from their existence. Languages do not suffer much from under-provision because each speaker gains from use. Speaking, listening, writing and reading result in new words, easier grammar, and clearer constructions. Small-scale collaborations avoid collective-action problems while contributing to the whole, one discussion at a time.

Silence, not copying, weakens a language. A language's value rises exponentially with its count of speakers, which explains why English is the world's lingua franca,[2] and why ethnographers and others worry about the decline of minority languages. A dominant language facilitates communication, but it can also ignore or misplace the nuances, perspectives and information embedded in less-popular languages.

All four types of goods are relevant to schools. A classroom

[1] It is possible to create public goods that are not worth the cost, just as it is possible to lose money on private goods. With mistakes, the creator takes the loss and moves on. With success, the private-good creator profits, but the public-good creator's contribution multiplies. Non-rivalry means that benefits rise with each user while costs do not. Exponential benefits explain the value of public goods.

[2] Mediterranean traders in the Middle Ages combined languages into one *lingua* to communicate with foreigners, who were known as "Franks."

seat is a private good. A teacher's time is a common-pool good if questions over-appropriate its limits. Lectures and discussions are club goods to listeners, but ideas can leak out as public goods, via streamed lectures or conversations with outsiders. Battles over budgets are battles for the commons of spending on teachers or administration, textbooks or computers, poorer or richer neighborhoods. Schools are complex.

Most of us are buried in information. The Internet hosts libraries of text and images. Smart phones can access content anywhere. Social media uploads per minute outpace the content we can view in a year. In an attention economy, we run out of time before money, which is why we rely on algorithms and editors to filter content. Paid filters deliver what we want. Free filters like those from Facebook or YouTube deliver whatever advertisers are selling. Sometimes free information is worth less than nothing.[3]

[3]Missionaries provided an early example of "if the product is free, then you're the product." Sure, their heaven is free but is that the right heaven for you?

CHAPTER 6

Art and entertainment

People disagree on the difference between art and entertainment so here is my definition: Art is unique while entertainment can be reproduced. An original oil painting by Dali is art; a Dali image on a t-shirt is entertainment. A theatre performance is art; its television broadcast is entertainment. Your child's finger-painting is art; their Tik-tok video is entertainment.

Fortunately, these definitions are irrelevant to a discussion of the commons, which focuses on our old friends (non)exclusion and (non)subtraction. Any gate allows exclusion, so a museum of priceless unique works is a club good, just like a Netflix account or theatrical production. The good is only available to some, but congestion can reduce enjoyment of museums or bandwidth. There are different means of limiting demand or increasing supply to reduce congestion, but they all cost time and money.

Digitization makes it easy to make endless perfect copies of text, music, images and video. These public goods benefit consumers, but their creators may not get paid. Digitization has commodified industries and destroyed business models. Music companies sold records and CDs, but streaming and sharing have replaced pay-to-play with listen-without-limit.

Many musicians now depend on live concerts to make money. They can charge for access to their club-good, here-and-now uniqueness.

Pornography, as usual, has been quick to adopt. After switching from seedy theaters to tapes and DVDs, porn companies went online, only to be buried in hours of amateur sex. These days, the punters pay "cam girls" for private-good interactions or subscribe to club-good unlimited XXX streaming. Non-porn creators face similar competition from YouTube and Tik-tok. They have pivoted to mega-blockbusters, branded goods, and (again) streaming subscriptions.

Laws protect *copyright*, or the assertion of ownership, but it is often violated. The bad guys pirate text, music, and video. The good guys sample older music into new tracks or convert common images into memes.

In theory, copyright laws balance benefits and costs by temporarily privatizing work so artists can charge royalties before it is released into the public domain as a public good. US laws protecting copyright for decades after the creator's death have lost that balance.

Property rights privatize profits and socialize losses in other ways. In the early days of rock and roll, it was very common for White performers such as Elvis to reproduce the music, lyrics, and moves of Black performers without acknowledgement or compensation. Rich-world media routinely publish the images of people in poor countries without permission or payment.

Most of us are willing to pay for access to art, but those payments may go to middlemen instead of the artist. One Amsterdam gallery, for example, sells tickets to see street art torn off public walls. Artists can try to sell their work, but digitization makes it easy to get audio, video and images for free. NFTs (non-fungible tokens) allow creators to sell "digitally

unique" copies of their work, but I'm not sure how long people will pay for private-good serial numbers linked to public-good images.

When I began blogging in 2007, success came from "being famous or working hard," so I built my audience post-by-post, for 6,000 posts. Some people might have used my ideas, and I made some money, but my main gains were insights: First, readers are better than revenue. Second, actions and results are better than views and likes. Third, use your day job (mine is professor) to subsidize your public-good production. It is for these reasons that I give away my blogs, books and podcasts: If information wants to be free, then its best price is zero.

CHAPTER 7

Food and health

We need food and water to live, but healthy food and clean water are not public goods. They are collected, stored and distributed via institutions that have developed over thousands of years. Hunter-gatherers immediately consume most foods so they have institutions of sharing. Skilled hunters and gatherers enjoy status; the unskilled and helpless are fed in exchange for other work or loyalty. Tribes and families use rules to ration scarcity — everything from "you split, I choose" (private good) to feasting on excess (public good) to potlach traditions in which the rich compete to give away the most food (club good).[1] Scarcity means a group's food is a common-pool good that is either shared (a situation) or stolen (a dilemma). Groups that are better at collectively acquiring and sharing food will conquer those who are not.

The commodification of land converts it from a commons into a private good. Private plots yield crops that are private goods for the owner to eat, store or exchange. Although some claim privatization increases hunger, we know from history that collectivization is no panacea. Collectivization in the Soviet Union and China aggregated "selfish" private plots into

[1] One theory posits that humans domesticated wolves by feeding them surpluses from big kills.

"progressive" common-pooled farms, which allowed workers to eat more ("to each according to their needs") while working less ("from each according to their [unknowable] abilities").

During collectivization, farmers were killed for refusing to give up their property. In the absence of private-good incentives, yields collapsed, leading to hunger and starvation. Historians estimate 10 million Soviets starved in the 1930s.[2] In the 1950s and 60s, 30 million Chinese starved. For comparison, consider that 40 million people died in those two countries during WWII.

Collective food security works with small groups where personal relationships minimize defection and free-riding. At larger scales, impersonal markets and prices provide more food than bureaucratic distribution of production from common-pooled farms.

Indeed, China showed exactly how markets can incentivize farmers to grow more food at lower prices. In the post-Mao 1970s, Deng Xiaoping allowed farming collectives to assign plots to families as private property. Under the "household-responsibility" system, families could sell any surplus remaining after they fulfilled fixed government quotas. This system encouraged innovation without undermining stability. Surging output reduced hunger and poverty for everyone.

Taxes, subsidies and regulations affect food production and distribution, and these policies are nearly always designed with some commons in mind. Taxes on water pollution, pesticides and other harmful practices aim to "internalize externalities" by charging farmers for the cost of their pollution of

[2]In December 2021, Vladimir Putin shut down Memorial, an NGO dedicated to remembering victims of Soviet rule, for their ongoing provision of public goods that contradicted his revisionist history and position as a Russian hero — fake news, extra-judicial murders, and foreign invasions included.

shared waters, air or land. Crop subsidies try to increase supplies and lower prices. Regulations on food safety, storage or distribution are meant to protect consumers and correct "market failures" such as companies lying about food quality. These policies do not always work as advertised because politicians make "adjustments" in exchange for bribes. Dietary recommendations, for example, are often bad for your health but good for agribusiness.[3] Other countries harm their citizens when they adopt distorted US guidelines. Not all public goods are worth their price.

When you get sick, you can rest in bed (a private good), but you may need help from the family commons or a doctor whose schedule may be a private, club or common-pool good. If you're contagious, then your germs can pollute the commons affecting others' health. Our bodies evolved to cope with cuts, colds, broken bones, and food poisoning, but they have limits. Accidents, cancer, violence, pandemics…there are many ways to die.

Many traditions of death evolved to avoid dangers from corpses. In African countries stricken by the Ebola virus, mourners contracted Ebola when they touched their dead in farewell. Those corpse-handling traditions changed more quickly than they did in the nineteenth century, when scientists were arguing over the existence of germs. Perhaps the saddest example was the thirty years doctors resisted advice to wash their hands between performing autopsies and delivering babies. The deaths of young mothers from *streptococcus* infections plunged after doctors began disinfecting the commons of their hands. From a social perspective, it is important to

[3] One of my students documented how US dietary recommendations gradually forgot about sugar, thereby condoning the excess sugar consumption driving the obesity crisis. (Sugar disrupts insulin levels, which promotes unhealthy fat in the liver and weight gain.) Watch "That Sugar Film" for more.

note that men tend to be the ones causing problems of hygiene in the commons (e.g., peeing everywhere) whereas women have to deal with the consequences (e.g., caring for the sick).

I'll end with health insurance. In theory, insurance is a club good in which all members facing a risk pay premiums and the unlucky few are compensated for their losses. Statisticians (*actuaries*) set premiums so revenue covers the large payments to losers. In free markets, insurance is actuarially fair, meaning that companies compete for customers' risks based on unregulated prices.

In reality, health insurance is complicated: governments may not require coverage; employers may provide "free" insurance; insurance may cover self-harm and non-critical services (e.g., smoking or headaches). These factors combine to produce a common-pool dilemma in which rising patient demand increases costs, which increase premiums, which further increase demand from patients trying to get "their money's worth." Can people ask for less care? Will healthy people pay for insurance? The answers depend on whether your society has an "every-man-for-himself" or a "one-for-all, all-for-one" culture.

CHAPTER 8

Energy and power

Humans use energy as a tool. We burn wood for heat, light and cooking. We domesticated beasts of burden to provide "horse-power."[1] When we could replace animals with inanimate kinetic and stored energy, we took the easier-to-control option.

Kinetic energy comes from flowing sources like sunlight, water and wind. Solar power is usually a public good that many can use simultaneously. Water power is trickier. A small water wheel can extract energy from flowing water, but dams — which convert kinetic into potential (gravitational) energy — need to block rivers, which privatizes the water behind the reservoir before it is released through turbines to flow downstream to others. Dam operators may say reservoir water is a club good shared among recreational boaters, irrigators receiving water in summer, and hydro-electric customers, but

[1] Many people use "power" and "energy" interchangeably, but their meanings differ. Power means energy over time. Energy is potential work. We measure power in watts (joules per second) and energy in watt/hours, which cancels the time component, leaving energy consumed. It takes the same energy to walk or run one kilometer, but running uses more power because the same energy is expended in less time. Extra energy augments our power, which is why we use it to do more work or the same work faster.

these uses change the timing of flows and increase evaporation, thereby harming the environmental commons.[2] Relative to solar, wind turbines have less public goodness to draw on, as they compete for locations, wind currents and grid capacity, but those common-pooled dilemmas are easy to convert into situations.

Non-renewable energies are more complicated. Fossil fuels such as peat, coal, oil, and natural gas form after organic residues are compressed over millennia (peat) or eons (the rest). These forms of concentrated sunlight are *non-renewable* because we consume them faster than they are created. Fossil fuels are extracted, processed and used as private goods but each of these steps brings *negative externalities*, or harmful spillovers, to the commons. The processing and consumption of fossil fuels damages local air, land & water quality and increases the stock of greenhouse gases (GHGs) driving climate change.

Here is a short summary of the climate change dilemma: In theory, harms to the commons can be reduced by internalizing the externalities via regulations and carbon taxes, but the actions taken so far to slow GHG emissions are too weak to prevent a slow-motion catastrophe. Our doom can be traced to what I call the "80/20 rule," which refers to the difficulty of convincing the indifferent 80 percent to take the same actions as the well-meaning 20 percent. For fossil fuels, the 80/20 rule hinders collective action because most users can't be bothered to use less or organize a change in policies, which leaves an enormous, perhaps insurmountable task to the well-meaning minority. Why can't activists, as a special-interest group, coordinate to drive change? Because they face a richer, better organized special-interest group: the fossil fuel

[2]Annual evaporation from "Lake" Mead — the reservoir behind Hoover Dam in the desert next to Las Vegas — is greater than the annual water consumption of Los Angeles.

industry. So yeah — climate change is indeed the toughest collective-action problem humanity has faced.[3]

I'll end with non-renewable nuclear and wood power. The commons problem of nuclear power is not spacial but temporal. A nuclear leak or explosion will harm those close to the power plant, which usually means the issue can be managed as a situation rather than a dilemma — as we saw with the leak at Three Mile Island (1979, no radiation deaths) and Fukushima-Daiichi (2011, one radiation death). A famous exception — the Chernobyl disaster (1986, at least 100 deaths) in Soviet Ukraine — endangered neighboring countries when the Soviet Politburo attempted to hide the accident. The threat from nuclear power is tiny compared to the threats from fossil fuels, i.e., the annual death of thousands from air pollution and existential threat to humanity from GHG-driven climate change. I much prefer the challenge of managing the potential environmental threat of radioactive nuclear waste for a few thousand years over the current existential threat of climate change.

What is non-renewable wood power, and how is it bad for the commons? Begin with a simple example of a tree that grows (absorbing carbon) and burns, releasing the exact same amount of carbon back into the atmosphere, resulting in zero net-carbon emissions. Now imagine a lumberjack arrives, cuts the tree with a chainsaw, and hauls the wood in a truck to

[3]Although global justice would advise focusing on per-capita GHG emissions, political reality means per-country emissions get attention. On a per-country basis, China emits the most GHGs, the United States is in second place, and the EU and India are in third or fourth place, depending on whether you're measuring where GHGs are produced or consumed. On a per-capita consumption basis, the ranking is US, EU, China and India, which consumes at 10 percent of the US rate. (Many small, energy-intense countries consume more per capita.) The fact that a country can be high or low in a ranking — depending on whether you're looking at national, per-capita, current or historical emissions — explains why nations disagree on who should do what in reducing GHGs.

a nearby cabin where it is burned. The fossil energy powering the chainsaw and truck mean this process is no longer carbon neutral. GHG emissions increase more when we add logging roads, distance, and processes to prepare the wood for combustion in a power plant. Additional negative externalities come from habitat destruction, air and water pollution, and damage to ecosystems. These losses in global-public goods will be worst in primary ("virgin") forests with the greatest biodiversity, but they are still relevant in the plantations that replaced them. The consumption of wood as a private good harms the commons of the atmosphere and the habitats supporting humans and other species.

I enjoy cheap, reliable energy like anyone, but "too cheap" increases destruction now and danger in the future. Policies to internalize those externalities would cost every energy consumer more in the short run but avoid the long-run costs of suffering, illness and death.[4]

[4]Lobbyists promoting "affordable" energy are like no-money-down salesmen profiteering off their impoverished clients. Lower fossil energy costs help heavy energy users (the rich) more than poor people who use less energy and who face greater risks and damages from fossil-fueled externalities.

CHAPTER 9

Housing & neighborhoods

Your front door only partially protects you from the neighborhood. Sounds, smells and vibrations sneak in. Friendship and enmity follow you, adding or subtracting from your happiness. Our sense of home grows with time, spreading from the living room to the sidewalk to shops and parks and then into neighbors' homes. This chapter looks at the bottom-up perspective of homes. Chapter 10 looks at cities and streets from above.

A house or flat is a private good to outsiders and a club good for inhabitants. Rivalry and non-exclusion convert the club good into a common-pool good if housemates disagree over the remote control, long showers, or dirty dishes. In most cases, formal rules ("dad says so") and informal norms ("I cook, you clean") combine to prevent situations from becoming dilemmas. Sometimes technology or money can solve problems, but time horizons also matter. Snoring might be okay for one night in a hostel but not for a semester in the dorms. Neighbors usually find solutions when they are stuck with each other, but annoyances can also become feuds. Detached homes sell for more because they keep neighbors at a distance. An association of homeowners can maintain a situation (harmony among neighbors) or exacerbate a dilemma

(expanding one fight to other areas).

Communes and *kibbutzim* try to balance private and collective goods. In their early forms, adults had private sleeping spaces but shared kitchens, bathrooms and living areas. Children were raised by the community. Food and other goods were jointly produced. Income was shared. The "insurance" of mutual aid meant savings were unnecessary. Such systems worked as long as the group was like a family: small, cohesive, and cooperative in setting and reaching goals. Groups that grew too big lost collective identity; free-riders failed to enforce rules on defectors who privatized gains for themselves while socializing costs onto others. Leaders struggled with agreement but carried blame for failures. Very few communes persist beyond their idealistic founders. Those that endure rely on frequent meetings, evolving agreements, and collective vigilance against defectors.

A neighborhood is a weaker commune. More private property means less negotiated cooperation. Neighborly impacts decrease with distance, but neighborhoods affect the value and enjoyment from one's private-good home. Litter, noise and violence lower values, just as fresh bread, flowers, and skilled musicians increase it.

Gentrification — the process of converting a community of poorer people into a settlement of richer people — affects neighborhood dynamics. Although I do not agree with those who say gentrification can be slowed by preventing people from entering or leaving neighborhoods, I do think neighborhoods and residents need to be protected from rapid change. I would not slow change by preventing home sales (the exchange of private goods) but by protecting existing renters from changes in rents that exceeded, say, the rate of inflation plus/minus adjustments for maintenance.[1]

[1]Limits on price increases between tenants discourage people from moving. In Amsterdam and Stockholm, the wait for social (below-market-

Rights for renters are justified, in my opinion, by a need to protect the community. A resident of twenty years knows their neighbors and understands community dynamics. Complex links among residents give neighborhoods character and persistence. Jane Jacobs described these relations, vulnerabilities and benefits in her groundbreaking 1961 book, *The Death and Life of Great American Cities*, which opposed the ongoing destruction of New York neighborhoods by city planners who promised renewal but delivered decay.[2] It is for these reasons that I would give long-term residents more say over neighborhood matters, e.g., building permits, public spaces, and related topics. Their investment of time could be recognized, for example, in the right to cast one vote per year of residency.

I will discuss the need for such bottom-up consultations in the next chapter, but let's spend a little more time thinking of how they would apply to opening and closing businesses. First, there is no point in saving a failing business. Second, many poor neighborhoods have a bad mix of businesses: convenience shops instead of grocery stores, payday lenders instead of banks, liquor stores instead of cafes. Yes, this mix reflects local conditions, but it also reflects profit-seeking by landlords and businesses. A neighborhood's veto of another liquor store probably strikes the right balance between a landlord's property rights and a community's right to protect its commons.

Would this system encourage NIMBYism? We know from Coase's theory of bargaining that the "right" price explains the difference between no change and good change. NIM-

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rate) rentals is more than a decade!

[2]Her main target, Robert Moses, drove motorways through Black urban neighborhoods in a quest to please White suburban commuters. When most people talk about the evils of gentrification, they are thinking of how this Modern Moses invited his "chosen people" to drive through the ruins of communities.

BYs are not opposed to progress. They oppose outsiders profiting at their collective cost. A neighborhood is like a puzzle whose pieces are made of people, history, relationships and collective goods, and its residents are best equipped to fit those pieces together.

CHAPTER 10

Cities and streets

We do not know how or when humans began to live in permanent, dense settlements. One story says rulers taxed agricultural surpluses to pay for hierarchical cities whose physical layout put every resident in their place. In his insightful 1998 book, *Seeing Like a State*, James C. Scott described the driving force behind such landscapes: an assertion of control over spontaneity and freedom. Although we see cities built along those lines today, I doubt cities began that way.

In her 1969 book *The Economies of Cities*, Jane Jacobs suggested that cities began as trading posts whose residents specialized in manufacture, storage, and trade with nomadic neighbors. Jacobs's theory of individuals settling in handy places seems more realistic than the city-of-power hypothesis.

Indeed, it is easy to visit the past in the centers of long-standing cities. In Rome, Kyoto, Cairo, New York or Calcutta, you can see narrow, bustling streets twisting among buildings, shops, and homes. Order is subservient to the historical footprints of wondering livestock, infrastructure, trade, technology and social disruptions. Streets reflect tensions among private spaces, public commons, and collective risks. This struggle is still present below your feet, in the sewers separating private bads from the commons.

Cities can be filthy and dangerous. Residents convert clean air and water into pollution and waste. Sparsely settled areas allow one to collect resources and dump waste without care. Such a situation cannot persist as more people arrive; nuisances rise exponentially with population density. To avoid chaos, a community must make rules to protect drinking water, remove waste, reduce fire risk, and protect people, goods and services in public spaces. We know rules are necessary, but that doesn't mean they are easy to design, implement or enforce.

The Romans protected their urban commons. Roman aqueducts, for example, brought water to "hubs" with outlets at different levels. The highest outlets filled pipes serving private houses. The middle holes brought water to public baths. The lowest holes fed public fountains with drinking water. If flows to the hub were low, then private houses lost water first, preserving public-good flows for the masses. Discharges from the baths flushed waste through sewers, away from populated areas.

Roman cities shrank as their empire disintegrated, economic activity fell, and political power diffused, but knowledge of sewers, water and hygiene persisted. The Islamic practice of washing five times per day required organized water systems. Collectors of "night soil" have sold human waste to farmers for millennia. The rise of modern sewers dates to 1850, when scientists and "hygienists" (today's public-health advocates) identified contaminated water as the vector for cholera and other communicable diseases. Although many did not want to spend the money needed to protect the commons of drinking water from private-toilet contamination, epidemics forced action. Many communities subsidized sewer systems as public goods.

Many of us are fortunate enough to have escaped filth, but others live with the stink of shit, piles of rubbish, and diarrhea

that strikes without warning. After many years of travel, I have concluded that "civilization" is synonymous with clean water and functioning sanitation.[1] Those services do not just mean less bodily stress; they also make it easier for neighbors to live with less friction over collective needs. More than three billion people still live in uncivilized conditions. They know a healthy commons is important, but they struggle to protect it.

If your water commons are in a situation rather than a dilemma, then you have less to worry about, but there are other commons that may need improvement. Consider the impact of cars (private goods) on public spaces. In some cases, cars occupy club-good spaces (toll roads and garages) but most of the time they use "free"-ways and streets that are public goods until rush hour turns them into congested, common-pooled goods. Drivers idling at stop lights or waiting for parking may think they are suffering, but what about the lungs they pollute or the space they take from bicyclists and pedestrians? Cars lower life expectancy, raise stress and degrade urban life.

Few cities (Singapore, for example) charge drivers for their burdens on roads, air quality and public safety. Drivers kill roughly 6,000 pedestrians per year in the US. In San Francisco Bay Area (home to eight million people), less than 25 percent of drivers face criminal charges for killing pedestrians; of these, less than 3 percent spent more than a year in jail. In the US, around 16,000 people are murdered per year, and most murderers are punished. What about the drivers who kill 6,000 people per year? They go free because the American car industry spent decades transferring rights from pedestrians to drivers, privatizing the urban commons for cars. And where America goes, many other countries have

[1] I discuss these themes in my 2018 article "Water civilization: The evolution of the Dutch drinking water sector."

followed, which is why cities around the world suffer from traffic jams, pollution, and dead pedestrians.

Can a city work with fewer cars? Yes, if it charges the full price of parking, prioritizes public transport ("public" in access, not necessarily ownership), and designs streets for walking, biking and interaction. It is ironic that so many people drive to shopping malls for safe socializing. In the past, it was easy to do the same on city streets, but cars have made those streets anti-social.

What about businesses that "need" car access? My first suggestion is that they pay the full cost of access (parking and congestion). My second is that cities encourage neighborhoods to choose for fewer cars as a means of improving quality of life. Since many neighborhoods are unsure of how a reduction of traffic might affect them, I would suggest using an auction to find where to start. In the auction, residents and businesses on a given block can bid for the opportunity to close their street to cars for a trial period of one year. The block with the highest bid closes their street to cars and opens space for pedestrians. Their bid helps pay the costs of closing the street. If the trial is popular with residents, businesses and visitors, then they can extend it; if not, then the trial ends. Such a mechanism can be used for one or a dozen blocks at once. Its elegance arises from the way it helps neighbors collaborate, the data provided by winning blocks, and the stimulation of conversations about the best uses of the neighborhood's commons.

CHAPTER 11

Land and ecosystems

An ecosystem supports a variety of species competing for space, light, water and soil resources. Most ecosystems are circular in the sense that biomass is maintained as various species live and die in predator-prey, symbiotic and/or parasitic relations. Ecosystems are simultaneously brutal (kill or be killed) and efficient (maximizing possible metabolic activity from the resource base).

In a way, ecosystems are fully privatized. Plants and animals compete for resources and food. Very little of value stays in the commons without getting eaten, absorbed or otherwise used. Some matter will leak in and out of ecosystems, even on a planetary scale. Spillovers of excess production enriches and diversifies neighboring ecosystems.

Humans, as apex predators, deplete common-pool ecosystems, leaving less for other species. I have visited many countries and seen few exceptions to our tendency to consume as much as possible, as quickly as possible. In communities where conservation plays a central role, that priority is often the result of a long, painful learning process in which overconsumption led to additional vulnerabilities, suffering and death via starvation, natural catastrophes, and so on. This is why, in my opinion, indigenous people have strong con-

servation ethics: Those who did not die from their mistakes bestowed useful habits and knowledge on their descendants.[1] Humans living in densely populated areas understood the hard-earned lessons of their ancestors, but they forgot them when they migrated to "virgin" territories where the menu — once indigenous people were removed — was all-you-can-eat.

The Anthropocene era is named for the massive scale of human activities and impacts. We are consuming "renewable" resources such as fish, water, and forests at a pace that "mines" them as *de facto* non-renewables. Meanwhile, the production and consumption of regular non-renewables (e.g., fossil fuels and metals) is damaging and destroying the ecosystems that maintain biodiversity, clean air and water, and regulate climates within ranges we've evolved to enjoy.

In economic terms, we have privatized and consumed so much of the commons that our species risks decline and extinction. We have two choices: we can share what is left by consuming less and reducing stress on the commons, or we can grab what is left, privatizing a shrinking commons and leaving losers to perish.

At the moment, we are doing more grab than share. That is not because we are evil or misunderstand the consequences, but because our species does not have a functioning system for managing the global commons. Such a system would put a tax on carbon to help us shift to non-fossil fuels. Such a system would set aside "one half for Earth" to allow ecosystems to flourish while we live in the other half. Such a system would protect the poor and vulnerable so they are not forced

[1] I do not want to underplay the damage humans inflicted while learning those lessons. Early humans hunted many species of mega-fauna to extinction. My point is that their institutions eventually settled on conservation, even if only because they hit the limits of their exploitative technologies.

to invade richer countries in search of food and safety. But we don't have those systems because it is very hard to get people to consume less while defectors are consuming more.

The last two chapters investigate global commons that might help our species avoid long-term decline.

CHAPTER 12

Technology

In this chapter, I will discuss technology as a commons as well as technology's influence on other commons. The following chapter explores similar questions related to institutions. (An institution can also be seen as a type of technology; technology and institutions can reinforce or interfere with each other.)

How can we discuss technology as a commons? Speaking broadly, technology can be defined to include ideas, information and techniques (IITs) that help us cooperate, do more with less, and so on. These intangible concepts are public goods, in the sense that my use of IITs does not prevent you from using the same IITs. Patents, encryption and other mechanisms convert IITs into excludable goods that can be rationed or sold. Such methods must be well-designed, since IITs are about as easy to hide as the water slipping through your fingers.

There are many examples of IIT theft. The British stole tea plants from China. The Americans copied British steam-engine technology. Every spy buys truth and sells lies. Humans routinely create, share, and borrow IITs via debate, gossip, and competition. Although copying reduces control and profits to IIT-owners, the net benefits to society are usually

much greater. The world would be much poorer if only the French could bottle wine, the Americans make beer, or the Chinese grow tea.

As you can see from these examples, the role and range of IITs (an abbreviation I just made up) is much older and greater than mere I(C)T — information (and communications) technology. IITs can be digital, mental or physical, which means they include ICTs.

That said, it is also easy to compare IITs to ICTs. For each of the Internet, software and hardware, there are both open (public goods) and closed (private goods) versions of the same idea. Anyone can use the Internet or email, but Facebook requires registration (exclusion) to make it easier to collect users' private-good data. Facebook and its users are in a market in which Facebook gives you access to your "friends" in exchange for your data, which it sells for billions. With software, there is a tension between open-source (e.g., Linux) and closed systems (Windows, OSX). Open source is free to use, and its code is visible for audit. Closed, proprietary systems must be purchased; they cannot be audited or modified. For hardware such as phones, smart speakers and other gear, a complex manufacturing process makes public-good copying much harder. The real tension arises from trying to control, alter or repair a device designed for surveillance. Manufacturers only sell smart speakers below cost because they sell your personal data for profit.

Turning to technology as a facilitator for (mis)managing the commons, consider sustainability and public discourse.

Nearly 50 years ago, some academics (now called industrial ecologists) started to describe our negative *impacts* on ecosystems in terms of *population*, *affluence*, and *technology*. Their IPAT formulation helps us understand how greater population and affluence (consumption) increase impacts while improved technology (e.g., cheaper solar panels) can reduce impacts. IITs

can help protect the sustainability commons.[1]

Social media companies do not protect the commons. They sell it. Facebook and YouTube are "social" because users create and share content on those platforms, but their attention is sold to advertisers. The platforms encourage attention, or engagement, with algorithms that make people mad. The private worlds of social-media feeds strengthen biases, distort reality, and undermine respect. We need to work and live with each other, which means we need to understand our trivial existence in a world of nearly eight billion individuals. Social media does not encourage such maturity, which is why so many debates (over vaccination, justice, and so on) go from civil to dumpster fire in record time.

[1] Although institutions could possibly be defined as a "technology," I would say they define how P, A and T transform into I(mpact). In mathematical shorthand, I'd write $I = f_i(PAT)$, where f_i is function whose i (institutions) influence how P, A and T transform into Impact.

CHAPTER 13

Institutions

Institutions are the formal rules and informal norms that limit, allow, and/or oblige our actions. As with technology, institutions can be seen as commons in themselves or as instruments affecting how we manage other commons. But institutions are also unlike technology. First, the use and interpretation of institutions can evolve with the conditions or people involved in a given situation, whereas technology tends to be uniform. A conversation about work is different with a friend compared to a boss. A grandmother's birthday party in a village is different from a teenager's birthday in the city. Second, bad institutions can crowd-out good institutions for years whereas bad technology is upgraded. The US tax code is notoriously convoluted, but inertia and lobbying block reform.

Institutions vary from flexible and appropriate to outdated and baffling. What explains the difference? Although this question deserves an entire book, I'd start with three factors: isolation, competition and collective action. By isolation, I mean that all parties to the institution experience its costs and benefits over time. Under these conditions, people who are stuck with each other will find ways to improve institutions. Reforms may take years to negotiate and implement,

but they can avoid decades of costs. Isolation also reduces outside influences that can disrupt reform. Competition implies porous boundaries around the community, which allow people to choose communities they prefer and ideas to circulate and evolve.

Collective action is a mechanism for building cooperation in the group. Collective action is easier when participants are *cooperative* (prioritizing group welfare) but harder when *defectors* undermine trust to take from the group. *Reciprocators* play a key role in cooperating when others do by punishing defection.

Collective action is also harder when defectors veto choices or divert energy towards irrelevant tangents. Such actions can produce a *tragedy of the anti-commons* in which one person can prevent everyone else from cooperating.[1]

There is a long list of institutions that help manage the commons: laws and regulations, religion and belief, culture and tradition, friendship and citizenship. You surely have examples of how good or bad institutions promote good or bad outcomes. Crime in Japan is extremely rare due to institutions, just as crime is common in failed states where people must choose between family and law. Working habits are institutions: Americans work 1,780 hours per year (34 hours per week); Dutch hours are 1,430 and 28, respectively. Both countries are rich, have educated populations, and are close in output (PPP-adjusted GDP per capita of $68,300 and $60,400 respectively). So why do Americans take 24 percent more time to produce 13 percent more output? The answer lies in a web of institutions that include laws, history, and collective attitudes towards commuting, vacation, and success.

[1] Recall that a *tragedy of the commons* results when uncoordinated, individual actions destroy the commons.

The anti-climactic bottom line is that active, functional institutions strengthen the commons while missing or dysfunctional institutions weaken them.

What principles characterize long-lasting effective institutions? Luckily for us, I can copy/paste a summary from page 72 of *Sustaining the Commons*:[2]

> **"Clearly defined boundaries:** The boundaries of the resource system (e.g., irrigation system or fishery) and the individuals or households with rights to harvest resource units are clearly defined.
>
> **Balance of benefits and costs:** Rules specifying how many resources a user is allocated are related to local conditions and to rules requiring labor, materials, and/or money inputs.
>
> **Collective-choice arrangements:** Many of the individuals affected by harvesting and protection rules are included in the group that can modify these rules.
>
> **Monitoring:** Monitors, who actively audit biophysical conditions and user behavior, are at least partially accountable to the users and/or are the users themselves.
>
> **Graduated sanctions:** The punishments to those violating rules-in-use are light at first, but they grow stronger if — depending on the seriousness and context of the offense — they do not change their behavior. Punishment can come from peers or officials accountable to users.
>
> **Conflict-resolution mechanisms:** Users and their officials have rapid access to low-cost, local action situations to resolve conflict among users or between users and officials.
>
> **Minimal recognition of rights to organize:** Users devise their own institutions outside the influence of external

[2] The book is free from https://sustainingthecommons.org.

governmental authorities, and users have long-term tenure rights to the resource."

You can read their book for a longer description of these seven principles.

My summary is that a group will succeed if it can work together for some time, observing what others are doing, rewarding cooperation and punishing defection, and gradually improving its collective outcomes.

Easy, right?

Afterword: Swim on!

Okay, I was being sarcastic when I wrote "easy, right?" In reality, it is not easy to understand, let alone fix a commons. But you're different. You've read this book, and now you can take action, beginning with identification.

Identifying your commons

Does it concern you? If not, then move on. Is it excludable? If so, then let the owner(s) manage it.

If it is non-excludable (affecting you without permission or helping you without effort), and it has many beneficiaries without owners or many victims without guilty parties, then those commons concern you.

Helping your commons

Commons are everywhere and important, but those facts don't help us understand how well or poorly they are managed, or how to change dilemmas of under-provision or over-appropriation into situations.

Understanding takes time, many conversations, and agreement within a community on how to collectively build, protect or manage its commons.

Now that you see the water you're swimming in, you need to find fellow swimmers and set a destination. Go!

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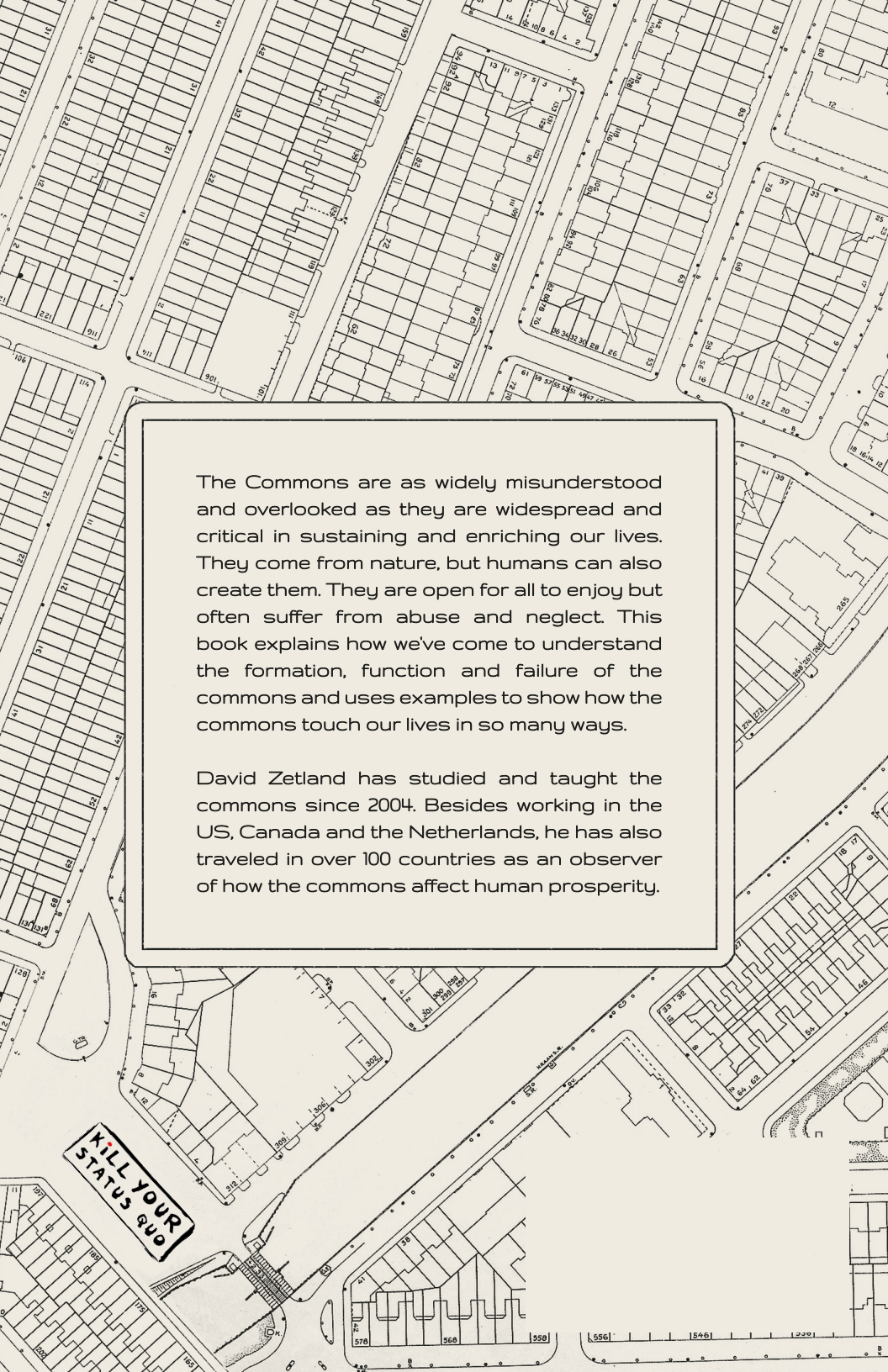

The Commons are as widely misunderstood and overlooked as they are widespread and critical in sustaining and enriching our lives. They come from nature, but humans can also create them. They are open for all to enjoy but often suffer from abuse and neglect. This book explains how we've come to understand the formation, function and failure of the commons and uses examples to show how the commons touch our lives in so many ways.

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