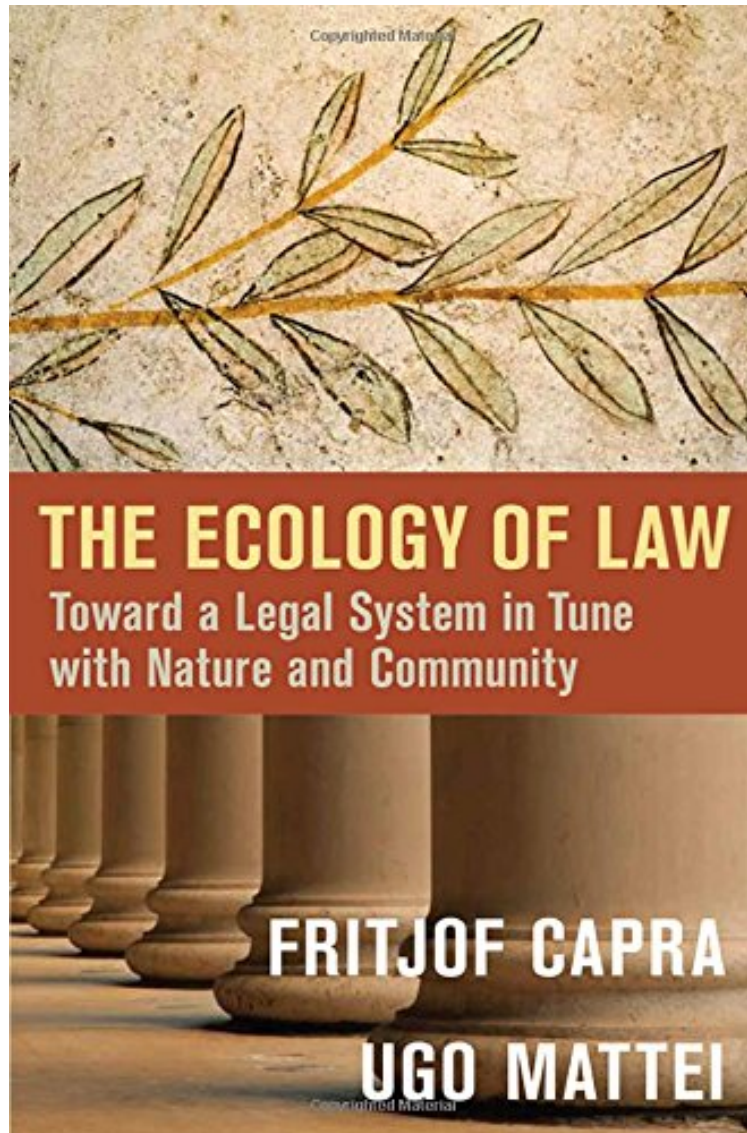


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The Ecology of Law: Toward a Legal System in Tune with Nature and Community

Fritjof Capra, Ugo Mattei
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Fritjof Capra, Ugo Mattei : The Ecology of Law: Toward a Legal System in Tune with Nature and Community before purchasing it in order to gauge whether or not it would be worth my time, and all praised The Ecology of Law: Toward a Legal System in Tune with Nature and Community:

6 of 6 people found the following review helpful. A milestone in the collective journey towards a new ecological order By Ferrando Tomaso The history of law and of the Western modern legal thought is deeply characterized by the

construction of nature as a series of commodities that can be seized, occupied, traded and destroyed. As a consequence, human laws authorize, legitimize and protect people (and wealthy people above all) when they enclose natural resources, grab land, privatize water and trade food throughout the world as an item whose value depends on exchanging and not on using. In this excellently written and enjoyable book, Fritjof Capra and Ugo Mattei combine their theoretical and practical backgrounds to expose the ecological unsuitability of "mechanistic" paradigm and propose a new and appealing "ecolegal" order that challenges the deepest and most rooted assumptions of most jurists, businessmen and political leaders. At a time when global warming is "changing everything" and when there is an increasing realization of the need for a new holistic paradigm is needed and urgent, the first seven chapters of the book (pars destruens) take scientists and jurists - but also non expert readers - through the history of ideas that contributed to the creation of the current (entrapped) state of the world and its naturalization. The last three chapters, which are highly destabilizing of the legal status quo and thought provocative, discuss the 'commons' and some of ongoing revolutionary struggles that try to make the new paradigm a reality as the funding pillars of "an ecologically transformed law [that] can transform capital into natural commons by producing a sustained investment into a sharing economy, into ecologically compatible architecture, or into environmental care." This book is for those who think that another world is possible and those who are convinced that the current legal and scientific paradigms are inevitable and 'natural'. They should read this book and will find in it new and convincing arguments to support a shift away from the mechanistic worldview of modernity and to participate to the emergence of a new legal system that is inclusive, bottom up, participated, holistic and in line with the limits and potential of our planet. 4 of 4 people found the following review helpful. Real food for thought

By William Walton
In this groundbreaking book Capra and Mattei set the record straight by challenging the most deep-rooted assumptions of the Modern era and by propounding a feasible and desirable alternative to the status quo: a new ecological Weltanschauung and a new ecolegal order. The authors help us understand that many concepts and categories we are familiar with are not indisputable truths but just one version of the story (the dominant narrative). The dominant mechanist worldview, the extractive mentality, the idea of an atomistic society built around the notion of individualism whereby every human relation is reducible to a property relation, where everything is to be done in consideration for something else, whereby competition replaces cooperation, are all factors that contributed to the current social, economic and ecological crisis. Now, more than ever, a paradigm shift from competition to cooperation, from extraction to reproduction, from privatization to access, from exclusion to inclusion is needed and this book pursues this goal. Capra and Mattei gifts us with an invaluable resource: a critical guide which helps readers to be active thinkers and not merely passive will-takers! 1 of 1 people found the following review helpful. Humans have through their actions and inactions almost put into danger every other species and now try battling to save themselves

By Customer
By: Alagie Jinkang
Until now, analysts of all types have found it difficult to comprehensively bring to focus what has hold us to this status quo of bastardisation. Why we perpetuate with seemingly no signs of progress to maintaining our ecology is because science and law has never been in common terms. A book of such nature from a scientist and a legal scholar of our modern age is of cause apt and has come at a time where we are almost eaten by our own misdeeds. The newest and only book that has brought long thinking scientific, legal and political problems many solutions has finally knock at you brain doors. The climate of fear which The Ecology of Law presents, most be attended to through dialogues between world powers with the steering wheels of science and jurisprudence. The authors who are well endowed with knowledge especially in the areas of science and law (which are the main scope or themes in the book) has left no single stone unturned in recovering our ecosystem and preserving the scared and threaten living stems. Human beings are in this century the most treacherous creatures the authors here try to euphemistically put it. Humans have through their actions and inactions almost put into danger every other species and now try battling to save themselves just like the satire given in the use of the Nile perch. I compare the excellent narrative and analysis of The Ecology of Law to be a recapitulation of the climate of fear we are almost losing energy to resist. The two excellent scholars maintain that while the rhetoric of science and jurisprudence may bind people together it could also blind them. They vehemently belief in the restoration of dignity particularly to the dispossessed people via collaborative networks among all stake holders especially scientists and legal scholars and with these they believe is a significant pathway to resolving our ecological crises the expression I assumed best suit our calamities. They consider peaceful intellectual and collaborative negotiations and participation to be the solution at the heart of our ecological crises. The order in which we live cannot be natural and never could it be attributed amicability between science and jurisprudence. The reason is obvious. Science cannot call for self-extinction and even where it mistakenly does, law would not be that blind not to sniff the truth. In this book, we are told that our contemporary tribulations where the driven forces (science and jurisprudence) have not been living completely indifferent from each other, are now about to meet over the same drawing table and we will sooner say yes to the new global shift in defending our ecology and preserve the commons from vanishing. As it is clearly under manifestation that our everyday troubles are principally as a result of the failure of science and law, the authors in this record-breaking book does not only reiterates that fact but also they do simplify a lot of misconceptions between the two essential branches themselves and also among the ordinary people. To better claim our ecosystem, a better understanding is first and foremost solicited which the scholars here have unequivocally given. Of course we all at

some point think without any iota of doubt that a stronger collaboration is needed for our ecological system but hardly do scholars put down what they categorially meant by that. However, *The Ecology of Law* has sermon everyone together by hitting the nail on the head. Our overdue tribulations has been a lack of combine endeavours between science and law which is now on the verge of becoming history. The very essence of this paradigm shift is a fundamental change of metaphors: from seeing the world as a machine to understanding it as a network of ecological communities, Capra and Mattei. However, science has always being generative rather than extractive as the authors put it. Nowadays, we are confronted with a system of total forgetfulness (to be civilise) in being responsible to the preservation of our own lives. The industrial age that is dictated by the capitalist market pay no attention to the repercussions it cost to the environment. They are blindly profit driven at all cost even where it means recognising or seeing every living thing an endangered species. What these venture inhumane capitalists are mostly preoccupied with is their selfish gains through devastating the fauna and flora. Unfortunately we will continue to bear the brunt of evil capitalism where the minority decides for the majority of the poor and the unprivileged at a very heavy cost where they can hardly climb the social ladder. It is no time soon according to the transparent jinx seen in our modern studios and laboratories that we will reach a common understanding towards a common goal, meanwhile, such a brilliant efforts by Mattei and Capra in calling the attention of all stakeholders to do their utmost is a great achievement. The new shift of paradigm that *The Ecology of Law* is campaigning for, in all the senses of the narration is that of a common baseline of understanding, co-operation(not in the capitalist sense), and collaboration first to seeing our problems as being systematic rather than being disorganised natural orders. Finding any solution to the already uncontrolled ecological crises as the authors prefer to express it, must come first under science and law and others only secondarily. We are now faced with choosing either to be friendly with our ecology of with we are not exclusive or choose to confront unbeatable battle of preventing our untimely extinction. The scholars call to convergence between the law of nature and the law of man to combat todays global ecological crises and prevent that of the future. Modernity pays more attention to market without fundamentally given consideration to where the products are coming from and how they should be used to regenerate more. To the capitalist market, the end justifies the means. However, the two humanists here(Mattei and Capra), calls for a responsible shift from science and a corresponding one from law to give a chance to human civilization and craft better a new ecological other in our laws. Stories has almost become one and perspectives the same. Mattei and Capra have call for a new revolution in the Western legal thought where social realities are correctly attended to. *The Ecology of Law* is the only book that sounds like seeing all the mishaps that are destroying our social fabric thereby becoming so antagonistic to our own environment. The way in which themes of such are discussed here, shows that we a badly in need of an objective framework in protecting the commons from total extinction. Law should not be seen as a means of violence or power but rather it should solidify the cultural and traditional lives of the people and make them sovereign. Only in this way, the commons could be generative. *The Ecology of Law* sufficiently and aptly presented how better institutions could lead to better ecology and stronger people. Nevertheless, with all the optimism the authors portrayed constantly and concretely here, they are in doubt if the politicians and business tycoons will heed to this new evolution forgetting their profit oriented minds and shower some solidarity compensation to those they are causing harm to. They remain pessimistic that our beautiful ecosystem will survive without all and sundry converging together to make our earth habitable, until and until then, *The Ecology of Law* would be regathered a complete evolution.

WINNER OF THE 2015 IBPA BENJAMIN FRANKLIN AWARD IN POLITICS/CURRENT EVENTS
The Ecology of Law Fritjof Capra and Ugo Mattei argue that at the root of many of the environmental, economic, and social crises we face today is a legal system based on an obsolete worldview. Capra, a bestselling author, physicist, and systems theorist, and Mattei, a distinguished legal scholar, explain how, by incorporating concepts from modern science, the law can become an integral part of bringing about a better world, rather than facilitating its destruction. This is the first book to trace the fascinating parallel history of law and science from antiquity to modern times, showing how the two disciplines have always influenced each other until recently. In the past few decades, science has shifted from seeing the natural world as a kind of cosmic machine best understood by analyzing each cog and sprocket to a systems perspective that views the world as a vast network of fluid communities and studies their dynamic interactions. The concept of ecology exemplifies this approach. But law is stuck in the old mechanistic paradigm: the world is simply a collection of discrete parts, and ownership of these parts is an individual right, protected by the state. Capra and Mattei show that this has led to overconsumption, pollution, and a general disregard on the part of the powerful for the common good. Capra and Mattei outline the basic concepts and structures of a legal order consistent with the ecological principles that sustain life on this planet. This is a profound and visionary reconceptualization of the very foundations of the Western legal system, a kind of Copernican revolution in the law, with profound implications for the future of our planet.

The modern-day legal system is seldom tied to current unsustainable ecological practices. Yet in this thoughtful treatise, co-authors Capra and Mattei show how tenets of western jurisprudence, such as private property rights and

eminent domain, have eradicated older precepts. Natural resources were considered 'commons' that belonged to no one, to be shared by everyone. This older way of thinking gradually disappeared as community-based justice was replaced by codified laws serving elites, as in ancient Rome. American law, inherited largely from the English common law tradition, developed under the influence of Enlightenment-era concepts of favoring mercantilism and industrialization practices that approach the natural world as something to be subdued and exploited. The authors propose a philosophy and jurisprudence that is deeply radical upending centuries of Western tradition and culture but possibly crucial to solving looming environmental problems. If there is a flaw in their book, it is perhaps their faith (expressed almost without doubt) that there exists a reasonable possibility of the world jettisoning global capitalism in order to 'decentralize power to small scale communities in tune with the laws of ecology.' Simply reading about Capra and Mattei's vision is a paradigm-changing experience. Realizing it would require a seemingly impossible, but perhaps crucial, global transformation.

- Publishers Weekly

Confronting the systemic roots of our ecological crisis is far from easy, but there is a heartening side: we remember that the rules of our economic system are culturally constructed -- and that means they can change. This book is not only a dazzling map of the legal order underpinning capitalism, but also a visionary call to transform that system, reminding us that communities can and must drive the process of renewal and regeneration.

Naomi Klein, author of *This Changes Everything* and *The Shock Doctrine* Rules restrain but also enable. Law elevates this capacity onto a higher plane but succumbs to its dark side when shaped by vested interests extending cleverly their tyranny upon humanity and nature. Things do not have to be this way. As this book vividly explains law can be turned into an instrument for defending the planet and its inhabitants from the encroachments of financialized commodification.

Yanis Varoufakis, former Minister of Finance of Greece "The Ecology of Law is a fast-paced, historical tour de force, placing the law in the various contexts that have shaped its utilization for good or ill. The contexts discussed by these bold thinkers - science and technology, the natural world, and the commons as a legal institution - provide fresh and functional perspectives on the evolution of law for the just society. For all those readers who think, wonder, and bridle at the law in their lives, this book is your tonic."

Ralph Nader

Fritjof Capra and Ugo Mattei fill a gap in our understanding of how the mechanistic paradigm that shaped a science for the exploitation and domination of nature was exported into law to 'naturalize' resource grab and the enclosures and privatization of the commons. From the tragedy imposed on the old and young in Greece, to the farmers' suicides in India, the enclosures of the commons is now threatening the very survival of humanity. The Ecology of Law lays the conceptual foundations for the recovery of the commons, and through it, the rejuvenation of our economies, our democracies, our lives.

Vandana Shiva, scientist, philosopher, activist, and author of *Making Peace with the Earth*

About the Author

Fritjof Capra, PhD, is a founding director of the Center for Ecoliteracy in Berkeley, California. He is a fellow of Schumacher College in England and serves on the council of Earth Charter International. He frequently gives management seminars for top executives. Capra is the author or coauthor of over ten books, including *The Tao of Physics* and *The Web of Life*.

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INTRODUCTION

The Laws of Nature and the Nature of Law

The Nile perch is among the largest of freshwater fish, capable of achieving a length of more than 6 feet and a weight of more than 400 pounds. The perch is native to the sub-Saharan and is found not only in the Nile but also in the Congo, the Niger, and other rivers, as well as in Lake Chad and other major basins. For more than half a century, however, it also has been found in Lake Victoria in east Africa, where it is not native, and where it has subsequently become one of the best-known examples of the unintended consequences of introducing a species to an ecosystem. A brilliant documentary by Hubert Sauper, *Darwin's Nightmare*, made this story known to a wide public in 2004. As a top-level predator of extraordinary size, might, and greed, the perch will eat most anything, including its own species. It has a potential life span of sixteen years, giving it enormous potential for ongoing destruction. Its introduction by humans to Lake Victoria for commercial harvest has caused the disappearance of most of the endemic species in the lake and has created disastrous social and economic consequences. For instance, large-scale fishing operations, typically geared toward export, have robbed many local people of their traditional livelihood in the fishing trades. Towns along the lakeshore arose to service fishery workers, but these towns offer little in the way of basic services such as water or electricity. Local people who have not been assimilated into the new local cash economy have been forced to leave their homes in search of work. Prostitution, AIDS, and drug abuse by street children are rampant. Moreover, the Nile perch cannot be sun-dried in the traditional way but instead must be preserved through smoking, which has caused a severe depletion of firewood in the region. It is difficult to find a better metaphor for the impact of the modern economic and legal paradigm on a local community. Across the world, over and over again, this paradigm of short-term extraction, state sovereignty, and private ownership fueled by money (itself a legal abstraction concentrated in the private hands of corporate banks) has produced huge benefits to a few at the expense of the environment and local communities. State and capitalist ownership, most notably the modern transnational corporation, not unlike the Nile perch itself, displays cannibalistic tendencies, with various players eating each other by way of war or takeover.

1 Similar examples can be

found all over the world. In the Pacific Northwest, a century of extractive clear-cutting practices in forestry have devastated the landscape, silted streams, and endangered salmon habitat. As the trees have disappeared, so have many local livelihoods. In California and across the West and Southwest, the overuse of water for growing desert populations and industrial agriculture has resulted in depleted aquifers and over-stressed watersheds, worsening the effects of drought and threatening livelihoods and food security. Across the world, food shortages, disease, and overpopulation, often resulting from short-term economic incentives or other human action, have played a part in creating income disparity and environmental degradation.² Just as the Nile perch has devastated its new environment and may potentially eat itself out of Lake Victoria, it is no exaggeration to say that human civilization, together with many higher forms of life, may disappear from the planet unless we can reverse our extractive, destructive ways in time. Nor is it too far-fetched an idea to see modern capitalist institutions behaving as the Nile perch in many places of this world. For instance, the disruption caused by the development projects of global corporations to attract rich tourists in the global south is never taken into consideration by the celebrative narratives of the development and economic growth they produce. But deciding on a remedy first requires understanding how this system came about. We did not end up with our current shortsighted economic and political system by accident, although, as we shall see, it wasn't quite planned, either. Our main thesis in this book, as stated in our Preface, is that jurisprudence (the theory of law), together with science, has contributed significantly to the mechanistic modern worldview. Because modernity, at least since the seventeenth century, has produced the materialistic orientation and extractive mentality of the Industrial Age, which lies at the roots of today's global crisis, both scientists and jurists must share some responsibility for the current state of the world. As we explore the relationship between science and law, we shall discover that jurisprudence is an intellectual discipline with a history and a conceptual structure that show surprising parallels to those of natural science. We shall also see that their mutual interactions evolved over time, as did the relationship between the laws of nature and human laws. In science, the mechanistic paradigm that began in the sixteenth and seventeenth centuries includes an emphasis on quantification, introduced by Galileo Galilei, and on the human domination of nature, championed by Francis Bacon; the view of the material world as a machine, separate from the mind, advanced by René Descartes; Isaac Newton's concept of objective, unchangeable laws of nature; and a rationalist, atomistic view of society promoted by John Locke. In jurisprudence, the rationalist, mechanistic paradigm, developed by seventeenth-century jurists like Hugo Grotius and Jean Domat, views reality as an aggregate of discrete definable components, owners whose individual rights are protected by the state. Indeed, ownership and state sovereignty, respectively championed by John Locke and Thomas Hobbes, are the two organizing principles of legal modernity.³ Moreover, still in the Cartesian tradition, the law is seen as an objective framework separate from the individual subject. During the past three decades, a radically new paradigm has emerged at the forefront of science.⁴ At the heart of this change of paradigms from a mechanistic to a holistic and ecological world-view we find a profound change of metaphor: from seeing the world as a machine to understanding it as a network. Networks, of course, are patterns of relationships; hence, understanding life in terms of networks requires an ability to think in terms of relationships and patterns. In science, this new way of thinking is known as systems thinking, or systemic thinking. We have also realized that nature sustains life through a set of ecological principles that are generative rather than extractive. A corresponding paradigm shift has not yet happened either in jurisprudence or in the public understanding of law. Such a shift is now urgently needed, since the major problems of our time are systemic problems all interconnected and interdependent and our global crisis is an ecological crisis in the broadest sense of the term. In this book, we call for a profound change of legal paradigms, leading to a new ecology of law. At the heart of this new ecological legal order lies a view of social reality not as being an aggregate of individual building blocks but rather as being composed of social networks and communities. Law, in this view, is not an objective structure, but emerges from actively engaged citizen and legal communities as the legal embodiment of their self-organization.⁵

FROM HOLISM TO MECHANISM

Until the end of the Middle Ages, cultures around the world observed nature very closely and adapted their way of life accordingly. Their observations were often couched in religious or mythological language, and, in general, nature and its laws were seen as emanating from God or some other divine power. These beliefs implied rules for human behavior that everyone was expected to follow; even law itself was a deeply spiritual concept, based on obligation and on the proper role of an individual within a community and in relation to the life-sustaining earth.⁶ The Latin term agriculture, or cultivation of the land, reflects this deep sense of obligation, which was perceived as a process of creation and generation through labor, knowledge, and skill, and certainly not as a process of extracting value. This early holistic, communal conception of the universe and the planet continued to be dominant until the Scientific Revolution of the sixteenth and seventeenth centuries, which championed the study of matter and brought forth the mechanistic science of Galileo, Descartes, and Newton. Nature was now seen as a machine made up of discrete, measurable parts. Galileo postulated that scientists should restrict themselves to studying the measurable, quantifiable properties of material bodies, such as shape, number, and movement. Other qualitative properties, such as color, sound, taste, or smell, were merely subjective mental projections and should be excluded from the domain of science and its goal of describing nature in mathematical terms. Galileo's strategy of directing scientists' attention to the quantifiable properties of matter proved extremely successful in classical physics, but also exacted a heavy toll. During

the centuries after Galileo, the focus on quantities was extended from the study of matter to all natural and social phenomena. The subsequent mechanistic scientific worldview of Descartes and Newton, in addition to excluding qualitative properties, also omitted more complex qualities, such as beauty, health, or ethical sensibility. The emphasis on quantification prevented scientists for several centuries from understanding many essential properties of life.

POWER IN SCIENCE AND LAWAs the holistic view of nature was replaced by the metaphor of the world as a machine, the goal of science became knowledge that could be used to dominate and control nature. A similar movement was afoot in legal thought. Jurists like Grotius and Domat, both contemporaries of Descartes, promoted the view of reality as an aggregate of discrete definable components (free individual actors), and ownership as an individual right, guaranteed by the state, to develop nature, that is, to transform it into physical objects. Indeed, ownership and state sovereignty championed in the seventeenth century by John Locke and Thomas Hobbes, respectively are the two organizing principles of legal modernity, known to jurists also as legal absolutism.⁷ At the same time, law began to be seen as an objective framework separated from its interpreter another legacy of Descartes that is still present in today's legal thinking.

The human dominance of nature advocated by lawyer and scientist Francis Bacon has produced the ongoing exploitation and destruction of nature with ever more powerful technologies.⁸ The world of Bacon and his contemporaries was characterized by a tremendous abundance of common resources, such as forests and fisheries, and of communal institutions, such as professional guilds and village structures, known collectively as the commons. The capital needed to develop manufacturing and industry was dramatically scarce. Institutions such as individual private property, stock corporations, and sovereign states and also general freedom of contract and fault liability were created to transform some of these commons into concentrated capital. The success of this institutional scheme has been staggering. In less than three hundred years the conditions have been reversed: today we experience a dramatic scarcity of commons and an overabundance of capital.⁹ The law has played a fundamental role in naturalizing this power.¹⁰ The sovereign state and the sovereign private owner have acted as two mighty allies in the destruction of the previous legal order based on social relationship and the adaptation of humans to the ecological requirements of nature. Law has served as an instrument of human domination over nature, incrementally pushing people away from participating in nature's reproductive processes, overcoming the old medieval organic wisdom. Henceforth, nature was seen as belonging to humankind, and nature's main purpose was deemed the satisfaction of human needs. While the daily experience of life in traditional agricultural civilizations, hard and brutish as it might have been, linked human communities to the land and sustained a symbiotic relationship with it, law and science converged with the rise of modernity to intellectually contrast humankind with all other creatures, freeing humans from our ecological chains. Other creatures were seen to live in a state of nature, but humans no longer belonged to the same category. Through science, humans could understand nature; through technology, we could transform it; and through the legal institutions of property and sovereignty, nature's essence could be transformed into a commodity, a physical object that humans could exploit or improve.¹¹

Today, the current mainstream vision is essentially the same, which is why most people considered it natural legal and even beneficial to development and growth to introduce the Nile perch to Lake Victoria. The general public broadly shares the conviction that, in relation to a common holding such as a lake or any other potentially profitable resource, the natural self-interested behavior is to benefit from it by extracting value. Introducing the Nile perch, developing an uncontaminated cove, digging Alaska for oil, and fracking the land are all exercises of economic freedom protected by private property, which grants sovereignty to individuals. The only agent that can check such freedom is the sovereign state in a zero-sum equation between the two (more state government equals less freedom of property; more freedom equals less government), itself perceived as a law of nature. If the law (an external limit) does not restrict a given action, the rational actor is assumed free to extract. Moreover, these apparently mutually exclusive domains are deemed to be governed by an irrefutable logic: more market equals less state, and more state implies less market.

MARKET AND STATEThis mechanistic vision of property and sovereignty is responsible for the dramatic state of affairs on our planet. Property rights, granting power to corporations and supported by the state, made it natural for BP to increase profits by neglecting various safety measures on its Deepwater Horizon oil rig, which resulted in the devastating pollution of the Gulf of Mexico; and for Exxon to avoid fixing the radar on the Exxon Valdez, leading to the destruction of the ecosystem of Prince William Sound in Alaska. Through this culturally constructed mechanism of free extraction, the subprime mortgage bubble was produced, AIDS and malaria have remained untreated in Africa, arms trafficking is rampant, and financial creativity has endangered the lives of many people. The concentration of power in state institutions determined the nuclear catastrophes of Chernobyl and Fukushima; and the view of nature as a machine, to be adapted to human use, has led to the tragedy of Lake Victoria and similar ecological catastrophes.

Modern property rights, as structured, not only determine the behavior of participants in the legal system but also, most importantly, display a remarkable independence even from the power concentrated in governments.¹² When corporations are granted charters that allow them to live forever but to legally avoid long-term consequences, they can easily evade their civic responsibilities. The law, built on property rights centered on the individual, has a life of its own and can defeat even the most well-intentioned and mighty forces of change. Today, all political debates are firmly anchored in the powerful academic discipline of economics, which, by successfully claiming to be an exact science, determines

policy making and legislation. Unfortunately, economics still applies a short-term, reductionist, linear, and quantitative bias typical of traditional scientific thought, a consequence of the mechanistic paradigm.¹³ Having conquered the legal system through economics, this obsolete mainstream view, rooted in the duopoly of property and state, now fuels our ecologically destructive practices. So-called economic laws produce major distortions because they are based on the assumption that it is natural and desirable for an institution to set growth targets that induce extractive individual behavior while discouraging virtuous practices. For example, if one considers water as just another commodity, the laws of scarcity deem it desirable that water should carry a price and not be freely available for human use. Economists make much out of this observation by telling us that the increase of price reduces the amount consumed, so they use an ecological argument to recommend that public water systems be transferred to for-profit corporations. Unfortunately, the laws of supply and demand make it natural for a corporation to sell as much of its product as possible in order to grow and prosper. So corporations profit from the excessive lengths of showers that many Western people enjoy. Rather than taking into consideration the long-term need for ecological balance, economic actors naturally act to expand their own business opportunities with more investment in producing individual wants by means of advertising, so that the production of useless, environmentally harmful commodities is their top priority.¹⁴ Shampoo companies, for example, promote the desire for long, refreshing showers as a condition of individual self-fulfillment, and mineral water companies induce the need to drink bottled water transported in polluting trucks because it is as much as five hundred times more profitable than tap water. In California, for example, the average cost of tap water is \$1.60 per one thousand gallons while the average cost of bottled water is about 560 times higher at 90 cents per one gallon.¹⁵ The disastrous effects of our laws and economy are rather clear at this point, but this understanding has not affected policy making. Instead, the legal system has cast our unsustainable model of development in stone as property rights. Current political and economic debates are dominated by fragmentation and linear thinking, with an especially unwarranted faith in both technological progress and infinite growth on a finite planet. The idea of development is fundamentally quantitative; it is rooted in seventeenth-century notions of improvement and today employs the concept of gross domestic product as the measure of social wealth. But development does not recognize that unrestrained extraction and exploitation of natural and human resources is at odds with the fundamental principles of ecology. The violation of these principles has consequences as lethal as ignoring the law of gravity while climbing a mountain, but because the effects are spread across time and often are not located in any specific individual, they are more difficult to vividly depict in the immediate terms that might spur action. Skepticism, very often itself corporate-determined, can thus be alive and well even in the face of such scientific truths as human-induced global warming.¹⁶ Both the state and the market are determined by human-made law but are presented as natural realities that can be described with scientific rigor as objects of an external world. However, as we will see, rather than being natural, the state and the market are only cultural products. We often lose sight of the fact that they do not represent an immutable status quo but can be, and actually are, changed all the time by human agency. This mutable characteristic of law, if properly harnessed, represents a path away from destruction and toward a generative, ecologically sustainable human endeavor. To take this path, we first need to carefully reassess the current worldviews of science and law.

A NEW SCIENTIFIC PERCEPTION Over the last three decades, the forefront of science has seen a dramatic change of paradigms from the mechanistic and reductionist worldview of Descartes and Newton to a systemic and ecological worldview. We have discovered that the material world, ultimately, is a network of inseparable patterns of relationships; that the planet as a whole is a living, self-regulating system. The view of the human body as a machine and of the mind as a separate entity is being replaced by one that sees not only the brain but also the immune system, the bodily tissues, and even each cell as a living, cognitive system. Evolution is no longer seen as a competitive struggle for existence, but is rather viewed as a cooperative dance in which creativity and the constant emergence of novelty are the driving forces. With the new emphasis on complexity, networks, and patterns of organization, a new science of qualities is slowly emerging. At the very heart of this change of paradigms from a mechanistic to a systemic view of life we find a fundamental change of metaphors: from seeing the world as a machine to understanding it as a network. As we have mentioned, a corresponding paradigm shift has not happened in law or in economics. In this book, we plead for a change of the legal paradigm, inspired by the recognition of basic principles of ecology and by the new systemic thinking in contemporary science. The mechanistic scientific approach has served us, and continues to serve us, very well in many ways one can still build a bridge using the principles of Newtonian physics, for example. But the limitations of this approach are becoming increasingly clear, particularly in relation to law. By protecting corporate property rights of extraction as natural, we have created a kind of Frankenstein's monster in which individual actors, who are actually the creators of law, no longer seem to have the power to curb the more destructive results that this approach encourages. Despite the systemic thinking at the forefront of science, the disciplines of law and economics continue to support a short-term vision, viewing reality in a mechanistic way. They put at the center of their vision an atomized and abstract individual owner. This atom can exercise his ownership of the Earth by extracting value from the commons at the expense of others, thus generating the famous metaphor known as the tragedy of the commons, which is a classic example of self-fulfilling prophecy.¹⁷ The dominant concept of ownership as an individual right, protected by the state to allow short-term accumulation and extraction, became the

natural building block of the current legal order; as such it has been responsible for crisis after crisis. The current collective perception of law as an objective or preexisting framework through which the behavior of the individual atoms can be classified as legal or illegal, far from being natural, is just a cultural construction of modernity. Modern law thus embodies the Cartesian separation of an objectified legal order analogous to Descartes's *res extensa* (the object of thought) that is essentially separate from the everyday realm of human agency located in the domain of the *res cogitans* (the thinking subject) (see chapter 2).¹⁸ This state of affairs is not inevitable. Humans were able to employ science and law to transform common holdings into a commodity and then into capital; we also have the ability to reverse this path, transforming some of our now overabundant capital into renewed commons. An ecologically transformed law can transform capital into natural commons by producing a sustained investment into a sharing economy, into ecologically compatible architecture, or into environmental care. Such law could also transform capital into social and cultural commons by protecting the Internet against privatization or by mandating the deployment of systems of generative property law instead of protecting the freedom of extraction. This process is urgently needed and overdue. It is as simple and revolutionary as the Copernican revolution, which at the dawn of modernity displaced the Earth from the center of the solar system in favor of the Sun as a result of new knowledge. This process requires that we now, as a consequence of our new ecological knowledge, displace the individual owner from the center of the legal system in favor of the commons. To do this we must rethink the most intimate structure of the law to reflect the basic principles of ecology and the new systemic thinking of contemporary science: no mechanistic separation between subject and object; no individual atom, but community and relationship as building blocks of the legal order. The reality follows what we collectively think and do. The legal order is the most important vehicle through which a worldview is enforced and transformed into social action, and thus human law is also the agency through which we may implement new ideas and values. We must rethink our human laws and their relationship with the laws governing the ecology of a living planet. Such a rethinking, a kind of Copernican revolution in the law, must use nature as a mentor and model, putting the commons and a long-term vision at center stage. We must move from thinking of a mechanism of law and move toward an ecology of law. We shall discuss the nature of such a paradigm shift in law, and compare it to the change of worldview that is now happening in science, in detail in the following chapters. As a kind of preview, the basic points of our argument are summarized in the table on page 13.

PARADIGM SHIFTS IN SCIENCE AND LAW	SCIENCE	LAW
The Mechanistic Paradigm (World as Machine)	Physical reality is an aggregate of separate building blocks. Social reality is an aggregate of discrete individuals. Scientific knowledge is used to dominate and control nature. Law is used to protect extractive ownership as an individual right. Scientific truth (the laws of nature) can be arrived at through reasoning. Natural law is based on human reason. Scientific descriptions are objective, independent of the human observer. Law is an objective framework separate from a human interpreter. The	Systemic, Ecological Paradigm (World as Network)
Physical reality is a network of inseparable relationships. Social reality is composed of social networks and communities. Scientific knowledge (ecological literacy) is to be used to learn from and cooperate with nature. The new ecological legal order is to be used by ecoliterate citizens to protect and generate commons. Scientific knowledge is always approximate; it emerges from a process of establishing consensus in the scientific community. Law emerges from actively engaged citizens in self-organizing communities. Scientific descriptions depend on the human observer and on the process of acquiring knowledge. Law is what is deemed to be law by civic and legal communities; it depends on human interpretations of social reality.	THE ECOLOGY OF LAW	
In the strict scientific sense, ecology is the science of relationships between the members of an ecological community and their environment. In this sense, then, the ecology of law refers to a legal order that is consistent with and honors the basic principles of ecology. The ecology of law implies a process of transforming legal institutions from being machines of extraction, rooted in the mechanistic functioning of private property and state authority, into institutions based on ecological communities. The ecology of law seeks a quality of economic life aimed at nurturing and preserving nature in the interest of future generations and overall human survival. The law should mimic the natural strategies of long-term ecological survival, including the reduction of waste and consumption. In a broader, more metaphorical sense, ecology refers to a pattern of relationships that define the context for a certain phenomenon. ¹⁹ For example, the ecology of education would refer to the relationships between education and knowledge, careers, economics, wisdom, ethics, politics, and so on, all of which would be perceived as being part of a total pattern of relationships. In this broad sense, we use the term the ecology of law to refer to a legal order that does not see the law as a separate social field independent from politics, economics, justice, religion, social norms of good behavior, morality, and so forth. Nor does this conception separate the law into a domain of facts and a domain of values, show the law as it is and a domain of values show the law ought to be. In other words, an ecological vision of law does not reduce law to a professionalized, preexisting, objective framework out there, separate from the behavior it regulates and tries to determine. Instead, law is always a process of commoning a long-term collective action in which communities, sharing a common purpose and culture, institutionalize their collective will to maintain order and stability in the pursuit of social reproduction. Thus the commons, an open network of relationships rather than the individual, is the building block of the ecology of law and what we call an ecological order. Such an ecological order is built on the recognition that human survival on this planet is not guaranteed by the destruction of life and by the domination of nature in search of growth. Rather, it seeks		

a quality of economic life aimed at nurturing our living planet and focusing on generative, complex patterns of relationships. In order to work properly, such a legal order will require a basic public understanding of its operation and nature, because the law is deeply affected and determined by its component parts, the social actors/individuals. Today, such basic understanding and awareness of the law is dramatically lacking. The revolution we need, like those that led us here (Copernican, scientific, industrial, bourgeois), is a collective enterprise. It is independent of race, class, or gender but requires everyone to develop some basic ecological literacy as well as an understanding of the nature and function of law in today's world. We must learn from our history, looking at both law and science as cultural artifacts, collective enterprises, parts of the fascinating and dramatic journey of humanity.