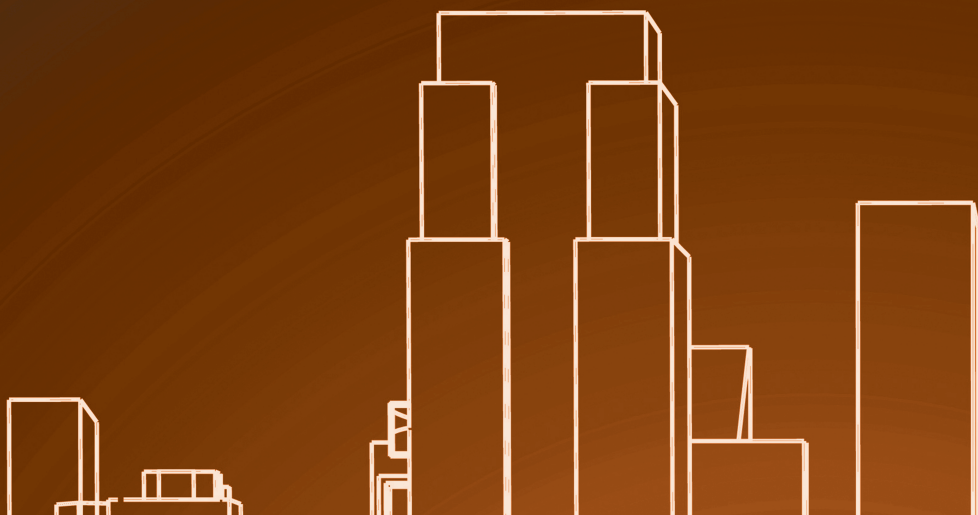




Economics and Humanities

CAPITALISM AS MEGAMACHINE

A NEW HISTORICAL, LEGAL AND POLITICAL APPROACH

Jacques Richard



Capitalism as Megamachine

The concept of a “megamachine” – a closed system operating to a pre-established utilitarian purpose which results in the mechanisation of humanity – has existed in various forms since at least the late 19th century.

This book builds on previous attempts to define and analyse the machine and argues that modern industrial capitalism is at the heart of it. The first part of the book takes stock of previous attempts to explain the origin and nature of the Megamachine phenomenon, from Nietzsche to the 21st century, including Mumford, Latouche and Scheidler. The second part of the book proposes a new analysis of the nature of the Megamachine, beginning with a historical, sociological and political exploration of the development of modern capitalism from the Middle Ages to the present day. It is shown that the modern world is under the yoke of accounting and corporate laws which ratify, on an international scale, the systematic protection of financial capital to the detriment of natural and human capitals: a Megamachine of accountants and managers. Defeating the machine will require more than minor reforms such as carbon pricing and integrated reporting: it will be necessary to initiate a programme of cooperation, education and economic policy reorientation on a global scale.

This vital book on the crisis of capitalism, the concept of the Megamachine and the future of global society will be of great interest to readers across the social sciences and humanities.

Jacques Richard is Emeritus Professor at the University of Paris Dauphine, France. He is also an ex-Chartered Accountant and Counsellor of Trade Unions and ex-member of the Authority of Accounting Standards (Paris). In 2013, he received the “Best Manuscript Award” from the Academy of Accounting Historians.

Economics and Humanities

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Preface

The Social Costs of the Megamachine – by Sebastian Berger

One of the odd contradictions exposed by this volume is that despite the quantitative superlative implied by the discourse on the Megamachine, there seems to exist something at its core that has been largely unnoticed or underappreciated by thinkers, scholars and scientists on the subject. It is as if the delicate detail of the core technical mechanisms of the Megamachine was able to hide in broad daylight. Perhaps it was perceived as too obvious, too innocent or too difficult to merit more thought by social, political and economic thinkers who have a history of ignoring matters of accounting which have been treated as mere technicalities of little importance for the bigger picture. Perhaps this was the strength of the Megamachine to grow to world domination by obfuscating its core, which itself is a deception technique.

This has since become part of the systematic scientific creation of doubt about where the many diverse problems of the world stem from, and nobody can find a point of attacking the root cause of the problem. While its victims are busy blaming each other more than their oppressors, freely inventing fake causes of their malaise and fake solutions, such as scapegoating the weakest of society, they fail to understand the core and key legal and technical mechanics of the problem, installed 600 years ago at the heart of the Megamachine. We are speaking here of its calculative centre, its dual core processing unit of double-entry bookkeeping, calculating in terms of capital money value sums, that reifies algorithmically the other pre-existent mechanisms of the Megamachine. But it does so in particularly nefarious ways that cause specific and additional problems which is far from an innocent programming error, but principally makes humans and nature the enemies and victims of accounting logic, the principal goal of which is to conserve capital and obtain a profit. In other words, it is here that capitalism is reified into a system of cost shifting, where the problems of unpaid and unnecessary social costs are systemically enshrined. As with other human-made technical inventions, this algorithm-techne becomes institutionalised in the sense that it begins to shape habits of thought which are largely unconsciously followed. Reducing human reasoning to algorithmic operations is void of Being, meaning that the core of the Megamachine emerges from and guides civilisation further down the path of oblivion of Being. Capitalist calculation has thus turned from tool to hidden master akin to Plato's

puppeteers setting the rhythm of the Megamachine. So long as this mechanism is not fully understood it remains *the* deception technique of make-believe that permits capitalists to get something for nothing. The cynicism underlying this techne has been labelled *the* moral problem of modern Western civilisation.

It is indeed fascinating to see what diversity of problems originate from this algorithmically reified cause, making a single-flaw doctrine seem almost a tempting proposition that focuses not merely on property, debt or money as metaphysically backed pre-capitalist institutions either individually or in conjunction but on their institutionalised capitalist calculative frame as core operating system. Any “rage against the machine” is well advised to not get lost in emotions, general accusations against “the system” that are too vague and fail to specify what the core calculative technique of the system is, and not to resign to the moralistic tone of blaming human immorality, higher natural forces beyond the control of humans or external enemies for recurring crises. As in Homer, one needs to detect its Achilles’ heel, which the Megamachine worked so hard to hide and shield from attacks: double-entry bookkeeping.

In a moment of clarity arising thanks to the new possibilities seemingly opening up in the wake of the Russian Revolution, the issue of economic calculation and accounting became the subject of the socialist calculation debate amongst economists in the 1920s and ’30s. Notwithstanding their object of critique, socialist economists in their attempt to overcome the issues arising from capitalist calculation, namely unpaid and unnecessary social costs, showed little interest in and knowledge of the techne of capitalist calculation, namely double-entry bookkeeping. It is as if they were too eager to escape into a completely new world or reality based on ad hoc and novel “in-kind” cost calculations that leave capitalism behind for good. In this desire they overlooked the core of capitalist calculation’s limitations and ignored potential ways of changing them to better outcomes.

Besides prioritising cost accounting and calculation void of financial capital accounts, many socialist economists were diverted by Mises’ neoliberal challenge to look at the informational characteristics of markets.¹ Mises’ argument concerning the essential necessity of financial capital markets for rational, meaning monetarily efficient, allocation did likewise go underappreciated. Otherwise, the focus might have shifted to fixing financial capital accounting rather than switching to mere cost calculations as the essence of socialism. In all this it was forgotten that the essential mechanism of the Megamachine is not market exchange, which pre-existed capitalism, but double-entry bookkeeping based on capital as a money sum of debt. Socialist economists were probably also blinkered by Leninism and a variety of tenets of Marxism such as the insistence on eradicating private property, the priority of State central planning and the negative attitude towards accounting based on market exchange values. They thus avoided the question of the needed accounting and calculative basis for individual firms’ allocation decisions and how to make it subservient to social goals.

The most serious limitation of socialist contributions to the socialist calculation debate is that it did not provide a solution for reforming individual firms’ accounting and calculation achieve technical efficiency, financial efficiency, as well

as social and environmental viability. One of the ironies of this blind spot was the historical development in which the Soviet Union ended up employing capitalist double-entry bookkeeping to manage its factories, creating levels of social costs similar to those in capitalist countries. In other words, the example of the Soviet Union may be showing that if the core mechanics of the Megamachine had been better understood another post-capitalist development path might have been envisioned. But perhaps this is a gross historical counterfactual misunderstanding. The historical globalisation of the Megamachine, including its calculative core of the algorithmically reified frame, demonstrates that post-capitalism has so far not been widely adopted as an alternative. Instead, what has been adopted globally whether called capitalism, socialism, communism or whatever, is the Megamachine described by Nietzsche's "Economics Fragment" as a technically misguided will to power finding expression in "economic optimism" that reduces human beings to the status of cogs in a machine of quantitative optimisations that comes at a tremendous cost to the Human.² This true cost can never be repaid as it is a qualitative irreversible loss that cannot be quantified, has no exchange value and might be best understood according to Heidegger as the "oblivion of Being."

Economists' bypassing the option of reforming capitalist accounting from within is still a bit surprising, while it does follow a long-standing tradition since the time of Adam Smith, when accountants and economists parted ways professionally. It is surprising, because Veblen³ had developed a detailed critique of capitalist calculations. In this he targeted the reduction of capital to discounted monetary magnitudes of make-believe expected business earnings based on the depletion of natural resources and the make-believe inflation of all monetary values set off by debt leverage and advertisement, followed by overproduction, deflation, financial crashes and busts, and the huge social waste implied in this vicious cycle. It may be that Veblen and his followers believed that capitalist accounting practices were unfixable either due to some inherent impossibility, or due to political barriers. Or, they believed based on some unquestioned inherited habits from the Marxist tradition and the possibilities presented by the Soviet Union that the solution must be physical centralised calculation, either aiming at purely technical maximum efficiency or socially evaluated least costly path of social provisioning. Either way, they either ruled out or avoided the question of how money capital as debt to private owners and economic micro-freedoms based thereon can be made consistent with socio-ecological goals through a reformed calculative frame.

Indeed, the aversion to monetary exchange values as decision-making criteria and the lack of interest in attempting to reform capitalist accounting stands out amongst thinkers of social costs and social waste. The quest to rethink capitalist accounting for post-capitalist calculation was lost. This despite being present in insipient form in Veblen's epistemological definition of capital as the community's know-how (*techne*) to secure a livelihood. This definition led Veblen to propose technocracy based on a technocratic ethics arising from the instinct of workmanship in which human flourishing is guaranteed by the rule of engineers (accountants of nature?) who secure maximum output and zero waste (defined in physical terms). It is questionable whether this is a solution to the problem of the Megamachine as

described by Nietzsche, or its apotheoses by different means. Kapp (2011) later attempted to translate Veblen's concept of capital into his Minimum Adequate Living Conditions (MALC) proposal which aims at satisfying basic needs based on "in-kind" calculations embedded in social valuation.

The question that needs answering is whether this thinking about capital as know-how concerning social provisioning for human needs (substantive or material rationality based on "in-kind" or "physical" calculations) can be adequately translated into post-capitalist firms accounting model presented in this volume that aim at conservation of factors of production through full cost accounting (based on monetary exchange values from input factor markets). This would mean an effective blending of substantive and formal rationalities first distinguished by Carl Menger and Max Weber.⁴ Indeed, the socialisation of depreciation and user costs of natural and human resources by capitalist firms amounts to a computational avoidance of responsibility, is the main sources of profits, of getting something for nothing, and the phenomenal social waste that results. While the flaws of capitalist accounting, in particular the lack of accounting for the full depreciation or user costs of assets, have been decried by notable economists such as Veblen, Keynes, Schumacher and Kapp, even these rare and brave pioneers of a heterodox economics followed the rest of the profession in not proposing concrete reforms for capitalist accounting. Perhaps one reason for this stems from their slight suspicion that the calculative frame of capitalism is not the depth-realist mechanism of social costs but just an epiphenomenon, event or effect, rather than the true underlying cause.

Veblen, in particular, viewed predatory instincts underlying the institution of the leisure class⁵ as the primary evolutionary mechanism or cause. In this view capitalist accounting would be nothing but an epiphenomenon of bio-culturally rooted mechanisms. The Megamachine as a whole would then appear to be just an epiphenomenon of predatory instincts, as underlying material cause, which has been assigned a firm place in the field of social-biology.⁶ Indeed, while Kapp's argument on social costs started as a critique of capitalist accounting, his unpublished manuscript⁷ roots social costs in Veblen's theory of the leisure class and its predatory instincts. Much like the leisure class itself, capitalist calculation, which was invented by this very class, may be the habitual and thus largely unconscious expression of these instincts. The discourse on the Megamachine itself suggests that this object of analysis consists of various elements in reciprocal causation, such as the State, the military and organised religion, including metaphysical mythologies of progress, etc., and (profit-driven) science. This is not far off Veblen's description of the Leisure Class complex that governs predatory societies and which results in high levels of social waste.

This implies that cost shifting, socialisation of costs, leaving costs unpaid and creating unnecessary social costs and social waste are expressions of an instinct of predation. Sociobiology links this instinct historically with greater chances of survival of offspring with knock-on effects on the composition of the population's gene pool. Following Veblen, predatory instincts are the mechanism behind today's Megamachine, which creates events resembling an externalising machine that maximises entropy whether we want to acknowledge it or not, whether the rich are

still able to shield themselves from it or not. It remains to be scientifically investigated in socio-biology whether predatory instincts which are bio-culturally linked to a competitive race for higher levels of conspicuous consumption (social waste) are indeed the kind of entropy-maximising mechanism at the root of the Megamachine. Due to its calculative frame the latter maximises monetary efficiency through maximising engineering efficiency (maximum output per time). This implies in purely engineering terms a higher amount of energy/matter wasted than maximising output over input, which can only be achieved by minimising waste. The predatory and entropy-maximising Megamachine then causes a vicious cycle of social costs which, based on self-reinforcing causation between socio-ecological systems aided by tipping points, becomes unstoppable and self-destructive. Pecuniary profits arising in calculations based on capitalist accounting, were deemed as “gifts of god” by the original promulgators in the middle-ages. In reality they are a freely invented myth that covers up the rising sea of entropy surrounding the Megamachine. The instinct-based root of this mythically firmly instituted machine would explain why publicly funded science and rationality have been so impotent in dismantling this myth.

Nevertheless, Kapp⁸ also insisted, despite the predatory instincts of the leisure class society, on the fundamental openness of human being and the ability to plan and engage in collective decision making⁹:

“Whereas the animal is capable of experiencing the world only directly in terms of immediately felt sense perceptions, man has added a new dimension of experience: the abstract attitude. [...] In short, he is able to turn toward the future and toward that which does not exist or which exists only in his imagination. In this sense he lives in an open world – a world, moreover, which is to a large extent of his own making and which he can enlarge in his mind at will.” (Kapp 1961, p. 145)

“The distinct organization of the human organism makes it necessary that our system of needs and of motivational drives which direct the final action remain flexible and open to development in the light of new experiences.” (Kapp 1961, p. 149)

In other words, the spirit of post-capitalist accounting based on scientific studies of full depreciation costs subjected to democratic process is an important fill-gap for the lacunae of the socialist calculation debate. Nevertheless, some points deserve a fuller analysis to come to further interlink critical accounting and heterodox economics. Paying full depreciation costs for human and natural resources to minimise entropy and social waste production implies a reduction of profits to whatever the traffic will bear in terms of mark-up pricing and consequently the size of the leisure class’s Megamachine that currently “kills its host.”¹⁰ While this is not impossible, it will certainly face behavioural barriers to do with breaking habits. By implication, Richard’s present proposal to “kill the Megamachine” through full cost accounting would demonstrate that the physical surplus due to the entropy law at best approaches zero but is mostly negative as per stock accounts of abiotic and biotic resources. By implication, full cost pricing will not just shrink profit margins, but also mean reduced covering of entrepreneurial opportunity costs, and possibly lower quantities demanded at higher prices. This brings degrowth or stagflation forward, easing society into it, rather than steering it rapidly towards catastrophic sudden collapse-degrowth later. The concrete

effects will depend in each context on how pricing occurs, how consumers respond, and how remaining incomes are divided. Furthermore, given that CARE/TDL bases its hope on science and democracy we need to carefully remember Veblen's insights that the rise of modern science and democracy were since the start part and parcel of the leisure class's predatory project, that is, they were not in any way opposed to the Megamachine. The dialectical forces overturning the Megamachine such as the working class or engineers described by Marx and Veblen have so far not materialised. Rather, Schumpeter's evolutionary nightmare of bureaucracy and Weber's "iron cage" describe more adequately the solidification of the State-incorporated Megamachine that is perhaps beyond repair.¹¹

Notes

- 1 Mirowski, Philipp and Nik-Khah, Edward (2017) *The Knowledge We have Lost in Information – The History of Information in Modern Economics*, Cambridge.
- 2 Nietzsche, Friedrich (2019) "Economics Fragment" in De Gennaro, Ivo *Principles of Philosophy – A Phenomenological Approach*, Verlag Karl Alber, p. 352.
- 3 Veblen, Thorstein (1908) On the Nature of Capital, [Parts 1 and 2](#), Quarterly Journal of Economics, Vol. 22: 517–42; Vol. 23: 104–36.
- 4 Berger, Sebastian (2024) "K. William Kapp's and Karl Polanyi's Arguments on Social Costs: Is there a Common Revolutionary Raison D'être?" *Ecological Economics*, Vol. 219, Article No. 108131. (<https://uwe-repository.worktribe.com/output/11658077>)
- 5 Veblen, Thorstein (1899) *The Theory of the Leisure Class – An Economic Study in the Evolution of Institutions*, MacMillan.
- 6 Volland, Eckart (2023) *Soziobiologie – Die Evolution von Kooperation und Konkurrenz*, 5, Auflage, Springer Spektrum.
- 7 Kapp, K. William (2011) *The Foundations of Institutional Economics*, Routledge.
- 8 Kapp, K. William (1961) *Towards a Science of Man – A Positive Approach to the Integration of Social Knowledge*, The Hague, Martin Nijhus.
- 9 Kapp, K. William (2011) *The Foundations of Institutional Economics*, Routledge.
- 10 Hudson, Michael (2015) *Killing the Host, How Financial Parasites and Debt Bondage Destroy the Global Economy*, CounterPunch. (Open Access at https://archive.org/details/isbn_9780989763752).
- 11 For a recent contribution to this theme see Graeber, David (2015) *The Utopia of Rules: On Technology, Stupidity, and the Secret Joys of Bureaucracy*, Melville House.

General Introduction

The theme of the existence of a Megamachine that will rule the world and bring it to ruin has recently been revived with the publication of Fabian Scheidler's book *The End of the Megamachine: A Brief History of a Failing Civilization* (2020). Among the many praises that accompanied the publication of this bestseller, often considered fascinating, we can mention this sentence from Noam Chomsky: "The subject couldn't be more important" and this appreciation from Bill McKibben: "a fascinating new look at the parts of human history that got us where we are." But this is not a new issue, to tell the truth. In fact, as this book shows, it traces the date back to the late 19th century and, with at least three major works, to the 20th and 21st. The purpose of this book is twofold. On the one hand, in the first part, it aims to take stock of previous attempts to elucidate the nature of this famous and mysterious global Megamachine of which we are insidiously the victims. On the other hand, it proposes a new description, but especially new means to fight it more effectively.

This study will therefore consist of two main parts. In the first, I will present the nature and content of the first attempts to explain the origin and nature of the Megamachine phenomenon, in particular those of Mumford. I will also show how authors such as Latouche and Scheidler have been able to reinterpret this concept today. In the second, I will propose both a new analysis of the Megamachine's nature and a series of concrete proposals to finally end its harmful activities.

Part I

Birth and Development of The Idea of the Megamachine

From Nietzsche to Scheidler

At the end of the 19th century, the general idea of a kind of machine that would rule the world seems to have been first mentioned by Nietzsche. As [Gomez Muller \(2017, pp. 16–17\)](#) shows, the author of "Thus Spoke Zarathustra," influenced by the theses of the economist Emmanuel Hermann¹ (1887), believes that in his time

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there is an expansion of a model of technical rationality that he calls “Machinery.” And that this machinery is the organisation not only of the economy but also of the human world in general according to the model of the machine,² that is, a closed system of gears linked and predetermined by a pre-established utilitarian purpose, a system that leads to the mechanisation of humanity.

It is likely that these broad Nietzschean theses³ inspired Lewis Mumford (1966) to develop his idea that, as we shall see, the great Western machine was prefigured by an institutional reduction of human beings to the state of machines. Indeed, the thesis of the existence of machinery is supported in detail by Mumford on two occasions: first in 1934 in his work “Technics and Civilisation” (TC for short), then in 1966 in another work titled “The Myth of the Machine.” Two contemporary authors have since taken up the subject: Latouche in 2004, with his “Mégamachine,” and Scheidler in 2020, with his “End of the Mégamachine.”

Analysis of all these works, whether by Mumford, Latouche or Scheidler, shows that there are significant differences in their views of what this famous Megamachine really is. To prove this, I will devote each of the following three chapters of this first part to a detailed analysis of their respective positions. I will try to summarise their ideas as faithfully as possible on the basis of their texts.⁴ In a first chapter, I will analyse Mumford’s position as it appears in the two works he wrote in 1934 and 1966. In a second, Latouche’s (2004), and in a third, Scheidler’s (2020).

Notes

- 1 E. Hermann *Cultur und Natur* (1887). “Studien im Gebiete der Wirtschaft,” Berlin. See also Wolfgang Müller-Lauter. *De l’économie et de la nature chez Nietzsche*. *Revue Germanique Internationale* 11 1999 (translation by O Mannoni).
- 2 According to the Bordas dictionary (1997, p. 260), a machine is a “complex mechanical device designed by man for a specific application,” mechanics being “the science of movements and the causes which produce them.”
- 3 To my knowledge there is no detailed information about the nature and the functioning of the Mashinerie in the works of Nietzsche.
- 4 To facilitate verification of the sources used, I will endeavour to indicate the relevant pages of the works analysed.

1 Mumford's Position on the Megamachine (1934 and 1966)

First, in the eight sections that follow, I will analyse in turn the eight chapters of his 1934 work "Technology and Civilization," which has been one of the essential references for all subsequent studies on the subject, including his later work of 1966, more specifically devoted to the birth of the Megamachine, a work that I will examine later, in Section 9.

1.1 Cultural preparation¹

In this first section [Mumford \(1934\)](#) largely traces back in time the appearance of the phenomenon of machinery. Indeed, he believes that the origin of techniques and machines which could involve a "Mashinerie" is much older than Nietzsche thought and that their methods of use are very variable: according to him, the first important machine (key-machine) is the mechanical clock invented in the 13th century in Europe then developed in the 14th century.² However, this is obviously not yet and as such an instrument of mass production. Mumford then identifies the second fundamental change as the rise of capitalism, which transformed a barter economy into an international credit system based on abstract symbols of wealth, ultimately just numbers. This played a major role in the emergence of new habits of abstraction and calculation. Thus, Mumford clearly positions himself as a critic of capitalism. He also correctly dates the appearance of these new techniques in the cities of northern Italy, particularly Florence and Venice, to the 14th century.³ However, unlike Sombart, he does not mention the invention of the double-entry book at this time, nor does he describe it at any other point in his book. There is also no mention of it in his appendix to the list of major inventions, whereas the invention of the mechanical clock in 1370 is duly reported.⁴ He confines himself to stating of this major accounting invention that "by the mid-sixteenth century, double-entry bookkeeping, bills of exchange, letters of credit and futures speculation had all developed in essentially their modern form."⁵ He concludes on this point by saying that "whereas the procedures of science were not refined and codified until after Galileo (1564–1642) and Newton (1642–1727), finance has emerged in its present-day dress at the very beginning of the machine age,"⁶ meaning therefore apparently the 15th and especially in the 16th centuries. He adds in this regard that Jacob Fugger (1459–1525), one of the main figures of the new German capitalism at that

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time, and J. Pierpont Morgan, an American capitalist of his time, “could understand each other’s methods and point of view far better than Paracelsus and Einstein.”⁷ I will show later that this last assessment is entirely justified.

On the other hand, Mumford considers, in a much more questionable way, that “technical capitalism has existed in other civilisations, which had low development; and technics made steady improvements from the tenth to the fifteenth century without the special incentive of capitalism.”⁸ Here, as we shall see, he seems to be confusing types of private management, particularly in agriculture, based on rudimentary accounting and very long-term objectives, with modern capitalism, based on double-entry accounting, which is much more aggressive and short-term (see below). Moreover, he is wrong about the birth of this modern capitalism, since he seems to put it in the 15th century: I am going to prove that it existed from the 14th, if not the 13th century. Unlike a historian such as Yves Renouard (1949), he does not see the systematic link between this modern capitalism and the development of techniques, although he does acknowledge that it is highly doubtful whether machines would have been invented so rapidly and promoted so assiduously without the added incentive of commercial profit.⁹ Yves Renouard, for his part, speaks of the appearance in northern Italy in the 13th and 14th centuries of a new technical culture, previously unknown, and even, as regards the capitalists themselves, of a completely new type of man. Mumford’s fixation on the 15th and 16th centuries is further manifested when he claims that, from the 15th century onwards, invention and regimentation worked in tandem.¹⁰ From then on, it was the methodical routine of the drillmaster and the accountant, of the soldier and the bureaucrat, that forced society into a regimental mould. He believes that these masters of regimentation came into their own in the 17th century, although he never makes a concrete analysis of the profession of capitalist accountant¹¹: it is therefore in the 17th century that he locates the victory of the new bourgeoisie which, according to him, “in counting house and shop, reduced life to a careful, uninterrupted routine: timed payments, timed contracts, timed work, timed meals.”¹²

Mumford goes on to argue that the abstractions of capitalism preceded the abstractions of modern science, and that the power that was science and the power that was money were ultimately the same kind of power: the power to abstract, to measure, to quantify. Indeed, he makes the very interesting point that it was no accident that the founders and patrons of the Royal Society in London in 1660 – indeed, some of the first experimenters in the physical sciences – were merchants from the City.¹³ With reference to Sombart, he claims that capitalism has transformed human beings from the tangible to the intangible: its symbol, as Sombart observes, is the account book; its value in life lies in the profit and loss account.¹⁴ He points out that if it is true that the main instruments of finance were a product of Catholic Europe, the special contribution of Protestantism was to combine finance with the concept of a godly life.¹⁵ He then concludes that by the 17th century “the organism of medieval culture was dead.”¹⁶ Under these conditions “mechanics became the new religion and gave to the world a new Messiah: the machine.”¹⁷ This occurred in the context of the “steady accretion of mathematical and physical knowledge.”¹⁸ Having stressed the importance of this alliance or confusion between the capitalist and scientific spheres of the period, he is able to state that, from the 17th century

onwards, the machine served as a substitute for religion¹⁹ and that, by the middle of the 18th century, the first preparations for this mechanisation of society had been made. But he will return to this problem of preparation in his second chapter.

1.2 Agents of mechanisation²⁰

In this chapter, Mumford shows how the machine was prepared between the 10th and 18th centuries. His emphasis is particularly on the role of the mining industry. He agrees with Georg Bauer's "De Re metallica" that "the mine is nothing less than the concrete model of the conceptual world which has been built up by the physicists of the seventeenth century."²¹ He then underlines the impacts of deforestation due to this type of activity: "[W]hat was only an incidental and local damage in Bauer's time became a widespread characteristic of Western civilisation just as soon as it started in the 18th century to rest directly upon the mine and its products."²² He also particularly insists on the connection between this type of activity and capitalism "more closely than any other industry mining was bound up with the first development of capitalism"²³ and "[by the sixteenth century] it had definitely set the pattern for capitalist exploitation."²⁴ Again, he focuses on the 16th century to situate the emergence of this new economic system. In particular, he mentions the existence of partners in the context of absentee ownership and the alliance between landlords and merchants.²⁵ This will lead to a division of the classes, in particular the alliance between the capitalist owners of the mines and the feudal nobility against the poor during the so-called terrible "Peasants' War" of 1525.²⁶ He points out that Luther had actively sided with the knights against the poor peasants.²⁷ For him the result of these events was the abolition of the medieval cooperative guild as basis of the mining industry and wage slavery.²⁸ He also insists on the role of big capitalists like the Fuggers²⁹ as suppliers of silver metal to the rulers (i.e. kings) spurred on by the unpaid notes and driven to new conquests, which means the dreadful combination of war, mechanisation, mining, and finance.³⁰ For him the general indoctrination of soldierly habits of thought in the 17th century was a great psychological aid to the spread of machine industrialism. Army and in fact factory became almost interchangeable terms.³¹ Notably, the army will be the ideal form towards which a purely mechanical system of industry must tend.³² After this general presentation of the development of factors of techniques and machines, he will show their appearance by distinguishing three major phases over time: the eotechnical, palaeotechnical and neotechnical phases. He does so by specifying that for him these three phases are overlapping and interpenetrating, thus forming what we can call industrial civilisation.³³ The "eotechnical" phase is based on a "water and wood" complex, the "palaeotechnical" phase on a "coal and iron" complex, and the neotechnical phase on an "electricity and alloy" complex. We will now study in detail the chapters devoted to these three phases.

1.3 The first industrial revolution: the eotechnic phase³⁴

According to Mumford this phase lasted from 900 to 1700³⁵ and was important as a period of preparation, when the key inventions occurred or were foreshadowed. The process of inventions was slow, but it was the germ that would universalise the

machine. Mumford considers it as one of the most brilliant periods in history³⁶ and finds it interesting from the point of view of ecology because it was based on free sources of energy, notably wood, water and wind. He insists it could have provided an example for a modern industrial revolution. Of course, the greatest technical progress was to be made in connection with the presence of abundant supplies of wind and water: notably, in the case of watermills and windmills.³⁷ But he also mentions the case of shipping with the inventions of the mariner compass, the two-masted ship (15th century), then the three-masted ship, hence international transport. These maritime inventions were particularly the case of the two dominant cities, Venice and Amsterdam.³⁸ On the other hand, Mumford underlines England's weak participation in this eotechnical revolution,³⁹ which can be properly understood once the next phase is reached, which we will now approach.

1.4 The second “industrial” revolution: the palaeotechnic phase⁴⁰

According to Mumford, this second revolution took place between 1700 and 1900 and would be realised in 1750, notably in England.⁴¹ It was characterised above all by a quantification of life. But it was not entirely new, for it had precedents. Mumford points out that historians have failed to appreciate the debt of the English navy to Italian shipbuilders, of its mining industry to imported German miners, and of its silk mills to the Italian models copied by Thomas Lombe.⁴² According to Mumford, as noted above, the palaeotechnic (PT) period was marked by a sharp shift in interest from life values to pecuniary values, and this affected not only the merchant and leisure classes: work became an all-important end for most people.

In addition, industry moved to new regional centres outside the regulatory sphere of the cities, employing a landless and traditionless proletariat.⁴³ These people lived and died having experienced nothing but the coal pit or the cotton mill, working 14 to 16 hours a day for wages never far above subsistence level. Mumford characterises this development as an “upthrust into barbarism”⁴⁴ and speaks of a “Carboniferous capitalism.”⁴⁵ Indeed, coal (along with iron) was the linchpin of this economic system,⁴⁶ which would be at the origin of new technical discoveries. From the mine came the inventions of the steam pump and presently the steam engine,⁴⁷ notably with Papin and Newcomen (1712), then with Watts.⁴⁸ These very costly coal-based investments explain why many manufacturers, including the textile industry, decided to extend the working day of their employees and to locate new and larger factories along the main transport routes.⁴⁹ Iron also became the universal material, especially for armies. As a result, according to Mumford, the arms industry fuelled competitive fears and rivalries between nations: he mentions the wreckage of the 1927 International Conference on Armaments.⁵⁰ For him the entire PT period was ruled by the policy of blood and iron.⁵¹

Due to this development of coal and iron industries, the first mark of the PT period was the destruction of the environment, notably the pollution of the air and of the rivers.⁵² The consequences were fogs (with clear skies only during strikes or depressions) poisoned streams (notably from human excrements) and dirty cities.⁵³ The second mark was the physical, moral and intellectual degradation of the

workers, mainly due to the lengthening of the working day and the maniacal intensity of work imposed by the automatic machines.⁵⁴ Mumford, in this respect, making reference to Marx, asserts that the desire for gain was a causal factor in this development.⁵⁵ This accusation of capitalists as uneducated, with reference to Malthus, appears in several places in this chapter.⁵⁶ But we also find other explanations involving a wider population: that of the notion of progress as the cardinal virtue of the educated classes, which motivates constant increases in production.⁵⁷ In Mumford's view, it is at this time that a new form of class struggle emerges: whereas previously, especially in the Middle Ages, these struggles were sporadic and did not have as their aim the questioning of the economic system and of politics itself, they become continuous and are directed against this system, among other things against the organisation of the factory itself.⁵⁸ However, he believes, these struggles are being hampered by the development of nationalism.⁵⁹

1.5 The third "industrial" revolution: the neotechnic phase (after 1900)⁶⁰

For Mumford this phase is dominated by the rise of a new energy: electricity,⁶¹ which is a source of hope. In fact, he says, it would be marked by "a counterweight to the passionate desire to reduce all existence to terms of immediate profit and success." Indeed, he believes that "the scientists of the first order, a Faraday, a Clerk-Maxwell, a Gibbs, were untouched by pragmatic sanctions: for them science existed, as the arts exist, not simply as a means of exploiting nature, but as a mode of life good for the states of mind they produce as well as for the external conditions they change."⁶² On the other hand, he was clearly influenced by the theses of Auguste Comte (1825), who saw the rise to power of a group of engineers who, together with scientists and industrialists, would make it possible to create a new social order.⁶³ Finally, he considers that electricity is a form of energy that favours the development of small production units. It is these considerations that will lead him, in the last two chapters of his work, to see positive developments in the economic system and in the political system. He also points out that, unlike coal, the production and use of electricity could be carried out in such a way as to allow for a more sparing use of the natural environment.⁶⁴

With this fifth phase, we have completed the presentation of the historical phases that Mumford sees as marking the development of machines. We are now approaching the last three chapters of his work, in which he describes the struggles against capitalism and the machinery it produces, but also the possibilities of transforming it, if not eradicating it.

1.6 Compensations and reversions⁶⁵

This section aims to show the various types of resistance against the hegemony of machines, and against the "counting house."⁶⁶ In the case of machines, these are direct attacks against them, consisting in particular of smashing the offending machine itself or murdering its inventors,⁶⁷ forms of rear-guard struggles of which Mumford shows the lack of success in a context of unequal struggle in favour of capitalists and more

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broadly technical progress. On the other hand, in the particular case of the fight against the materialistic way of life promoted by the caste of accountants, he seems to grant much more credit to a current of ideas like that of the “romantic reaction” with its three main different forms: the cult of history and nationalism, the cult of the return to nature⁶⁸ or to the primitive,⁶⁹ and also the cult of the isolated individual and the revival of ancient theologies and theosophies.⁷⁰ He also cites sport as a possibility of reaction against the machine and the quantification, but he shows that it has become one of the mass duties of the machine age: it is part of that universal regimentation of life for the sake of private profits or nationalistic exploit.⁷¹ Finally, he evokes the “sport” of war as the supreme drama of a completely mechanised society, which, far more than the sports field, provides the necessary compensations for the routine.⁷² He concludes this chapter by urging us to abandon our futile and deplorable ways of resisting the machine by stultifying relapses into savagery, by resorting to anaesthetics and shock-absorbers, and by praising the fundamental validity of the romantic process against the machine.⁷³

1.7 “Assimilation of the machine”⁷⁴

In this section, Mumford, in a fit of optimism, will support the thesis of the domination of the machine and the neutrality of order: he believes that with the development of the sciences and the articulation of the machine in practical life, the realm of order is transferred from the absolute rulers, who exercise personal control, to the universe of impersonal nature and to the particular set of artefacts and customs we call the machine. The kingly phrase “I will” is translated into the scientific causal terms “It must.” Thus, science would prepare the way for a more effective control of the agent, humanity itself, by partially replacing the crude desire for personal dominion with impersonal curiosity and the desire to understand.⁷⁵ He sees this process as positive. In fact, his thesis is that whatever the politics of a country may be, the machine is communist, which implies the collaboration of countless workers and the tendency towards the elimination of social distinctions.⁷⁶ So much so that capitalism, which together with war played such a stimulating part in developing technology, now remains with war the main obstacle to improving it.⁷⁷ This optimistic thesis of a communist machine leads him to believe that the economy could be redirected on this basis.

1.8 Guidance⁷⁸

In this last section Mumford presents the bases of an anti-capitalist economic reform in favour of an optic that he describes as “communist.” He assures that “once the objective of industry is diverted from profit-making, private aggrandisement, crude exploitation, the unavoidable monotones and restrictions will take a subordinate place, for the reason that the process will be humanised as a whole.”⁷⁹ Especially, by the completion of our machine organisation, we can recover for work the inherent values which were robbed of by the pecuniary aims and class animosities of capitalist production. Thus, according to him, the worker, properly excluded from mechanical production as slave, comes back as director: if their instincts of workmanship are still unsatisfied by these managerial tasks, they have by reason of the power and leisure

they now potentially command a new status within production as an amateur. The gain in freedom here is a direct compensation for the pressure and duress, for the impersonality, the anonymity, the collective unity of machine production.⁸⁰ Building on this programmatic thesis, he criticises the limited action of American unions: according to him these unions are, for the most part, sought only for obtaining a greater share in income or somewhat more favourable conditions of labour.⁸¹ On the other hand, he believes, with the proponents of the famous managerial thesis, that the revolution he proposes will be facilitated by the fact that administration and ownership, which had natural affiliation in small-scale enterprise, are now almost completely divorced in the major industries. This leads him to think that "since the present shareholders of industry have already been dispossessed by the machinations of capitalism itself, there would be no serious jar if the system were put on a rational basis, by placing the banking functions directly under the state, and capital collecting directly out of the earnings of industry instead of permitting it to be routed in a runabout fashion through acquisitive individuals, whose knowledge of the community's needs is empirical and unscientific and whose public interest is vitiated by private concerns – if not by outright anti-social animus."⁸²

For him, these measures, supplemented by production and consumption planning,⁸³ will make it possible to put an end to passive dependence upon the machine and our failure to achieve rational social cooperation.⁸⁴ This will then be the end of the arrogance of the machine,⁸⁵ It will also be the end of the 19th-century myth of progress in a single line without goal or limit: all this because, according to him, our machine system is beginning to approach a state of internal equilibrium, not indefinite progress.⁸⁶ This is the overall very optimistic vision that emerges from the last pages of his 1934 work, a vision that seems to have been strongly influenced by his belief in the possibilities of the emergence and development of a new type of economy in the USSR. This would no longer be the case some 30 years later, when he turned to these questions in an even more extensive work titled "The Myth of the Machine" (1966). In the last two chapters of this first part, we will look at the main features of this work, highlighting the main differences with the 1934 work, in particular the appearance of a new concept, that of the "Megamachine," which he had never used before.

1.9 "The Myth of the Machine" and the concept of Megamachine⁸⁷

In this book, Mumford will significantly broaden the scope of his historical study. This, we believe, is what will lead him to discover and propose his new concept of the Megamachine. While in "Technics and Civilization" he was practically content to observe the history of the evolution of techniques from the Middle Ages to the 20th century, in "The Myth of the Machine" he expands the historical dimension of his study of techniques: he will start from the Palaeolithic (2.6 million years to 10,000 BC) to the 20th century, passing in particular through the Neolithic (10,000 to 2260 BC), a period towards the end of which the great Egyptian (3100 BC to 525 BC) and Assyrian (2000 BC to 609 BC), among others, civilisations were born. Furthermore, he will put the importance of tools and machines into perspective, these tools and

machines being defined as instruments of production. Thus he asserts that “the misleading notion that man is primarily a tool-making animal, who owes his inordinate mental development largely to his long apprenticeship in making tools and weapons, will not be easy to displace. Like other plausible conceits, it evades rational criticism, especially since it flatters the vanity of modern Technological Man.”⁸⁸

He then gives as an example of a fundamental non-technical revolution (therefore not oriented exclusively towards production tasks): the cumulative inventions of the Palaeolithic age, beginning with language.⁸⁹ We could add the invention of writing in Sumer around 3200 BC and that of numeration in Mesopotamia around 3500 BC: all these inventions are not used exclusively for tasks of producing objects as are simple machines. It is this focus on the great Mesopotamian and Egyptian civilisations that will lead him to identify the birth of what he calls the Megamachine. In fact, he tells us that in these ancient civilisations, particularly in Egypt, we witness a drastic change in power with the institution of kingship.⁹⁰ He then shows, using ancient Egypt as an example, how this royalty will be supported by two castes: on the one hand, the priests, who will give it the support of the religions of the time, and on the other hand, the bureaucrats, in particular the scribes, that is to say, the caste of accountants of the time, responsible for calculating costs and economic performances (in particular production volumes).⁹¹

He then identifies in this triple alliance the formation of the first Megamachine in humanity: the one which links the three values of political power, religious prestige and profit, an attribute of accountants, values which appear both in the time of Assur and that of Ancient Egypt. The Megamachine which was then born is therefore, in summary, first of all an infernal alliance between the powerful castes of politicians, religious people and accountants, an alliance which will lead to the total domination of other sections of the population. He then adds that to ensure its power against possible opponents, this triple caste will favour and finance the formation of armed groups in its service. He can then speak of a complex machine, which he will describe in certain cases as “invisible,” a “labour machine” when utilised to perform work on highly organised collective enterprises and a “military machine” when applied to acts of collective coercion and destruction.⁹² But when all the components, political and economic, military, bureaucratic and royal must be included he will usually refer to the “Megamachine,” in plain words the Big Machine. And the technical equipment derived from such a Megamachine then becomes “Megatechnics” as distinguished from the more modest and diversified mode of technology. According to him, this Megamachine has had a long influence from some 5,000 years to the present day.⁹³

However, he sees a remission in the Middle Ages with what he calls “the medieval equilibrium,”⁹⁴ practically from around 1200 to 1500. For him this brief period was fundamentally marked by a new, more democratic economy due to the influence of the monasteries and the medieval guilds. Indeed, they not only laid down a fresh basis for association in craft and trade but they restored to work the aesthetic and moral values, conditioned by religion, that governed the rest of life. They too, were autonomous corporate bodies, which established a common discipline for the performance of work and the regulation of wages and prices. He insists that with the gradual retreat of both slavery and serfdom, abetted and hastened by the scarcity of labour

in the 14th century, after the Black Death, the status of the worker improved and the demand for machines widened.⁹⁵ Thus, thanks to this emerging economy which combined handicraft skills with mechanisation and power machinery, something like a balance had been brought about, more favourable to a diversified and human life than anything that earlier technics had ever before achieved. This in radical contrast to the forced labour economy of the pharaohs or that of the absolute monarchs, like Louis XIV and Peter the Great, who claimed similar powers in the 17th century.⁹⁶

But this remission would not last according to him because, from the sixteenth century on, the secret of the Megamachine was slowly rediscovered. The expansion of the Megamachine – its kingdom, its power, its glory – gradually became the chief end, or at least the fixed obsession, of the West. And within a century or two, the ideological fabric that supported the ancient Megamachine had been reconstructed on a new and improved model. Power, speed, motion, standardisation, mass production, quantification, regimentation, and control, above all control – these became the passwords of modern society in the new Western style.⁹⁷ But why this backlash? Apparently, according to Mumford, first because of the entry on the scene of scientists in the 16th century, if we judge by the following sentence: “[O]nly one thing was needed to assemble and polarise all the components of the Megamachine: the birth of the Sun god. And in the sixteenth century, with Kepler, Tycho Brahe, and Copernicus officiating as obstetricians, the new Sun God was [again] born.”⁹⁸ Subsequently he underlines that the second industrial revolution of the 17th century, influenced by the capitalist spirit (cf. the thesis of the link between capitalist and scientific spirit) will reinforce this rebirth of the Megamachine.⁹⁹ This last observation, which shows his interest in the influence of capitalism in the development of the Megamachine leads us to examine in more detail his conception of this economic system and its origins.

1.10 Capitalism and the Megamachine¹⁰⁰

The first thing that has to be emphasised is that, for Mumford, capitalism is an economic system that has been in existence for a very long time, apparently with little change, since the time of the Egyptian and Assyrian kings. Indeed, he asserts in his [chapter 5](#) “The Mechanization of Mammon,” that capitalism is not, of course, a modern phenomenon: one means here by capitalism the translation of all goods, services, and energies, into abstract pecuniary terms, with an intensified application of human energy to money and trade, for the sake of gains that increased primarily to the owners of property, who ideally are prepared to risk their savings on new enterprises as well as to live off the income of established industrial and commercial organisations. Thus, for him, capitalism, defined in these broad terms, begins to appear in its primitive mercantile form soon after kingship. He points out that as scholars dig more deeply into the early Mesopotamian and Egyptian records, it seems likely that state capitalism, with the merchant as an official of the state, may have preceded private capitalism. Thus the capitalist, as landlord, merchant, speculator, might in the early stages be likened to jackals feasting on the less attractive offal left over from the royal hunt. For a long time, in fact, trade, industry and banking were at the mercy of the sovereign power.¹⁰¹

Mumford, however, sees a first development favourable to capitalism in the Middle Ages thanks to the Catholic religion. In this regard, he contests Weber's famous thesis on the fundamental role of the Protestant religion in the evolution of this economic system. Indeed, for him the classic theory of capitalist accumulation was first set forth in the Middle Ages, not by economists, but by the schoolmen in their purely theological doctrine of the Treasury of Salvation: the piling up of earthly merits through continence and sacrifice for the sake of an immense future reward in heaven. He underlines that one of these scholars, Vincent de Beauvais, in the 13th century, admonished people to work, not just for a living but for the sake of accumulation, which would lead to further production of wealth. Thus, scholars who go repeating Max Weber's anachronistic equation of the spirit of capitalism with Protestantism should admit the abundant medieval data that contradict it. Moreover, according to him, Protestantism, as it first appeared in the doctrine of the heretic merchant Peter Waldo, in the 12th century, was in fact a vehement protest against the new capitalism and a repentant effort to go back to the way of life of the early Christians, who despised worldly goods and the insidious temptations of trade. The social outlook of the Waldensians, the Wyeliddites, the Lollards, the Beguins, the later Anabaptists, were first and last militantly anti-capitalist; and so for that matter were the autarchic economic principles and the anti-usury polemics of Martin Luther.¹⁰²

For Mumford, this position of the Catholic Church would have fundamental consequences: within a few centuries, the new capitalist spirit challenged the basic Christian ethic and the capitalist scheme of values in fact transformed five of the seven deadly sins of Christianity – pride, envy, greed, avarice, and lust – into positive social virtues.¹⁰³

But Mumford will detect a second development favourable to capitalism and even, it seems, to the formation of a new capitalism in the Middle Ages: that of the generalisation of calculation. In this respect, he echoes Werner Sombart's observation that if he were forced to give a date for the inauguration of capitalism, he would say that the publication of Leonardo Pisano's "*Liber abaci*" as the first popular treatise on arithmetic would be that date: 1202 AD. This because one of the most important traits of the new capitalism, its concentration on abstract quantities, was furthered by such instruction. Indeed, according to him counting numbers began here and, in the end, numbers alone counted. This was ultimately a more significant contribution to capitalism than any of the actual goods the merchant bought and sold. Thus wherever the capitalist spirit took hold, people became familiar with the abstractions of the counting house: timing, weighing and measuring, in ever more exact amounts, became the mark of this whole regime. From the 13th century on, the grammar school, with its fundamental courses on reading, writing and arithmetic, inculcated the elementary symbols for the long distance buying and selling, for information and careful forecasts. Bookkeeping and record keeping set the pace, in standardised uniformity, for all the other parts of the machine. In this regard Mumford emphasises that the failure to reckon with this mathematical aspect of mechanisation, as a prelude to industrial inventions, has resulted in a warped and one-sided picture of modern technics. This account gives to specific tools and machines by themselves the priority in effecting changes that first took place in the

human mind and were translated later into institutions and mechanisms.¹⁰⁴ In sum, for Mumford, where capitalism prospered, it established three main canons for successful economic enterprise: the calculation of quantity, the observation and regimentation of time ("time is money") and the concentration on abstract pecuniary rewards.¹⁰⁵ Mumford particularly underlines this last point: account keeping and timekeeping had not merely been secularised by the 16th century but they had ensured that such sacrifices as this regimen exacted were attached to the promise of a tangible reward. Under kingship, rewards for privileged classes had not flowed directly from their services but were dependent upon the caprices of the ruler, while under the new accounting of capitalism failure was directly penalised by loss, and even more significantly success, tied to efficiency and foresight, was abundantly rewarded. In short, capitalism exploited and universalised a powerful positive motivation that had never been tapped in more primitive societies.¹⁰⁶

For Mumford, therefore, "[Modern] capitalism had begun to establish a new style of thinking by the sixteenth century."¹⁰⁷ But he emphasises that he "did not operate alone and that he could hardly have made headway so rapidly without gaining support of other institutions and interests, in particular the help of scientists of the 16th and 17th centuries¹⁰⁸: He also ends his work with a reference to some of these men of science: only one thing was needed to assemble and polarise all the new components of the Megamachine: the birth of the Sun God. And, according to him, in the 16th century, with Kepler, Tycho Brahe, and Copernicus officiating as obstetricians, the new Sun God was born,¹⁰⁹ which means that the Megamachine had been resurrected with, among other phenomena, its share of wars, notably those of 1914–18 and 1939–1944. In other words and in short, according to Mumford, the resurgence of the Megamachine in Europe in the 17th century is fundamentally due to the alliance between scientists and new types of capitalists who appeared in the 16th century and who were obsessed with the numerical measurement of economic performance. In his analysis we can consider that the Megamachine resurrected in the 17th century is essentially a co-product of these two types of actors. This observation closes this first part devoted to the fundamental texts which dealt with the appearance of the Megamachine before the end of the 20th century. I will now analyse more recent texts that appeared in the 21st century, starting with a work by Latouche.

Notes

- 1 Section 1 of *Technology and Civilization* Mumford (1934, pp. 9–59).
- 2 Mumford (1934, pp. 14–15 and 269): "The first characteristic of modern machine civilization is its temporal regularity. From the moment of waking, the rhythm of the day is punctuated by the clock" (269).
- 3 Mumford (1934, p. 23).
- 4 Mumford (1934, pp. 438–439).
- 5 Mumford (1934, p. 23).
- 6 Mumford (1934, p. 23).
- 7 Mumford (1934, p. 23).
- 8 Mumford (1934, pp. 27–28).
- 9 Mumford (1934, p. 26).
- 10 Mumford (1934, p. 41).

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- 11 Mumford (1934, p. 42).
- 12 Mumford (1934, p. 42).
- 13 Mumford (1934, p. 25).
- 14 Mumford (1934, p. 23).
- 15 Mumford (1934, pp. 42–43).
- 16 Mumford (1934, p. 44).
- 17 Mumford (1934, p. 45).
- 18 Mumford (1934, p. 47).
- 19 Mumford (1934, p. 53).
- 20 Section 2 of Mumford (1934, pp. 60–106).
- 21 Mumford (1934, p. 70).
- 22 Mumford (1934, pp. 72–81).
- 23 Mumford (1934, p. 74).
- 24 Mumford (1934, p. 74).
- 25 Mumford (1934, p. 74).
- 26 Mumford (1934, p. 75).
- 27 Mumford (1934, p. 75, 85).
- 28 Mumford (1934, p. 75).
- 29 For Mumford (1934, p. 86): “Jacob Fugger was the first of the new type of financier and investment banker”.
- 30 Mumford (1934, p. 76).
- 31 Mumford (1934, pp. 84–85).
- 32 Mumford (1934, p. 89).
- 33 Mumford (1934, p. 109).
- 34 Mumford (1934, section 3, pp. 107–150).
- 35 Mumford (1934, p. 155).
- 36 Mumford (1934, p. 111).
- 37 Mumford (1934, pp. 113–115).
- 38 Mumford (1934, pp. 121–122).
- 39 Mumford (1934, p. 152).
- 40 Section 4 in Mumford (1934, pp. 151–211).
- 41 Mumford (1934, p. 151).
- 42 Mumford (1934, p. 152).
- 43 Mumford (1934, p. 153).
- 44 Mumford (1934, p. 154).
- 45 Mumford (1934, p. 156).
- 46 Mumford (1934, p. 157).
- 47 Mumford (1934, p. 158).
- 48 Mumford (1934, p. 160).
- 49 Mumford (1934, pp. 162–163).
- 50 Mumford (1934, pp. 164–165).
- 51 Mumford (1934, pp. 165–166; cast iron being, however, invented in the 14th century).
- 52 Mumford (1934, pp. 167–169).
- 53 Mumford (1934, pp. 169–183); Mumford asserts that the cities of the 13th century were far brighter and cleaner than the new Victorian towns.
- 54 Mumford (1934, pp. 174–176); This expression by Mumford exhibits “Ellulian” accents, one would say nowadays, and shows that from time to time Mumford ignores the real responsible for this situation: not the machines but those who regulate their speed.
- 55 Mumford (1934, p. 176).
- 56 Mumford (1934, pp. 187–189).
- 57 Mumford (1934, p. 182, 185).
- 58 Mumford (1934, pp. 188–189).
- 59 Mumford (1934, pp. 190–191).
- 60 Section 5 in Mumford (1934, pp. 212–267).

- 61 Mumford (1934, pp. 229–231).
62 Mumford (1934, p. 219).
63 Mumford (1934, pp. 219–220).
64 Mumford (1934, p. 255).
65 Section 6 in Mumford (1934, pp. 268–320).
66 Mumford (1934, p. 295); This phrase reflects very well the criticism of the calculative spirit of accountants that recurs throughout Mumford's work.
67 Mumford (1934, p. 284).
68 Symbolized, in particular, by Rousseau.
69 He is particularly harsh on this type of movement, which he saw as an admission of total failure (p. 299).
70 Mumford (1934, p. 287).
71 Mumford (1934, p. 307).
72 Mumford (1934, p. 309).
73 Mumford (1934, p. 319).
74 Section 7 in Mumford (1934, pp. 321–363).
75 Mumford (1934, p. 325).
76 Mumford (1934, pp. 354–355).
77 Mumford (1934, p. 353).
78 Section 8 in Mumford (1934, pp. 364–435).
79 Mumford (1934, p. 412).
80 Mumford (1934, p. 414).
81 Mumford (1934, p. 418).
82 Mumford (1934, p. 421).
83 Mumford (1934, p. 431).
84 Mumford (1934, p. 426).
85 Mumford (1934, p. 427).
86 Mumford (1934, p. 429).
87 Section 9 in Mumford (1966).
88 Mumford (1966, p. 22).
89 Mumford (1966, p. 23).
90 Mumford (1966, p. 94).
91 As he explains "this new interest [...] in the calculable coincided with the birth of kingship," Mumford (1966, p. 174).
92 Mumford (1966, p. 188).
93 Mumford (1966, pp. 188–189).
94 Mumford (1966, p. 272 et passim).
95 Mumford (1966, p. 272).
96 Mumford (1966, p. 273).
97 Mumford (1966, p. 294).
98 Mumford (1966, p. 294).
99 Mumford (1966, pp. 275–277).
100 Section 10 in Mumford (1966).
101 Mumford (1966, pp. 274–275).
102 Mumford (1966, pp. 275–276).
103 Mumford (1966, p. 277).
104 Mumford (1966, pp. 278–279).
105 Mumford (1966, p. 279).
106 Mumford (1966, p. 280).
107 Mumford (1966, p. 281).
108 Mumford (1966, pp. 287–294).
109 Mumford (1966, p. 294).

2 The Resurgence of the Megamachine Concept at the Beginning of the 21st Century

Latouche's Position (2004)

In 2004 Latouche published “La Mégamachine” a new important piece in the history of this concept. Firstly, I will seek to clarify the nature and definition that Latouche gives of this Megamachine; then, secondly, I will draw, in a critical way, the consequences of his choices.

2.1 Nature and definition of the Megamachine according to Latouche

This nature and this definition are not obvious. Several passages in his work initially lead us to believe that it is the capitalist system which is fundamentally at fault. Indeed, from the beginning of his book the author affirms that the capitalist system “is an extraordinary megamachine”¹ while specifying, in conjunction with the theses of Marx, that the two essential elements of this machine are the “double reel of the accumulation of capital and the proletarianization of workers.”² Another expression, towards the end of his book, also testifies in favour of this thesis. He speaks in particular of the “mega slot machine.”³ In fact, despite all its importance, the capitalist system clearly does not allow it to truly characterise what this Megamachine is that dominates the world. This for three main reasons. First, in a sort of attempt to define this concept, he states, “Modernity, the West, the Great Society, but also development, progress, rationality, technology are so many key words that signal each other, refer to each other and can replace each other to a certain extent to designate the same complex or the same paradigm, that of the Megamachine.”⁴ He then brings in another element of complexity by invoking another component of the Megamachine: that of economic rationality which is at the foundation of techno-scientific research. Thus, progress is the condition but also the result of the economisation of the world and the unlimited accumulation of capital, merchandise and material and immaterial goods. Technology is the condition of growth and development but also, to a certain extent, its result and its engine. He then states, specifying the geographical horizon in which this Megamachine is located, that it is quite another name to designate: the West.⁵

In summary, as he asserts, the Megamachine is at the same time modern, Western, developmentalist, progressive, rational, and technoscientific.⁶ As we can see in this passage, a very special place is given to the importance of economics, the rationality of which, as he emphasises, is at the foundation of techno-scientific

research while the term of capitalism does not appear. One might believe, at first glance, that this economisation which is the basis of progress, a progress which he will qualify as a war machine and specify that it is measured by the gross national product (GNP),⁷ is confused with the practice of the capitalist Megamachine, but this is not the case. Indeed, as he emphasises, the invention of progress cannot be reduced to an ideological construction of the bourgeoisie. He therefore criticises in this regard the thesis of George Sorel, who, in his book "The Illusions of Progress" (1908), believed on the contrary that the theory of progress reflected the rise in power of capitalism under the leadership of the conquering bourgeoisie.⁸ As we can see, despite the fact that Latouche speaks of an extraordinary capitalist Megamachine, he practically attributes to it only a secondary role in the appearance of his Megamachine with a capital M. This is all the more so since, as he specifies, the illusions of progress that Sorel speaks of will not only be those of capitalists but also those of socialists and communists. The main role in this matter therefore seems to be played by progress, itself stimulated by the economy. But then where does this idea of progress which fundamentally underlies the concept of Megamachine come from? For him it comes from the ideas of the Renaissance, mainly those of Bacon (1521–1626) first, then of Descartes (1596–1650). According to Latouche we would indeed find in Bacon both a rejection of the authority of the Ancients and an anticipation of the inventions of science and technology. For the first time undoubtedly, progress is conceived as unlimited and infinite. Roger Bacon anticipated modern inventions: the car, the plane, the diving suit, and even the prolongation of existence.⁹

Latouche insists in this regard that it is well the Renaissance, which will do a lot for progress because it rejects (medieval) authority, develops the positive spirit and multiplies the discoveries which broaden the field of knowledge and constitute a cumulative whole. The geographical, astronomical and technical great discoveries (in particular printing) are the result of both a prior change in the horizon and a very effective agent of propaganda for the belief in progress.¹⁰ In this regard, he cites the writings of Giordano Bruno, Nicolas of Cusa and Paracelsus, which attack the superiority of the Ancients over the Moderns, as well as those of Jean Bodin who criticises the myth of the age of gold and who sees in the state of nature a miserable situation.¹¹ For Latouche, therefore, Francis Bacon and Descartes are the true pillars of the modern doctrine of progress. Concerning the latter he emphasises that while the Middle Ages lived more or less in the conviction that all knowledge – that was useful and good for humanity – had been transmitted once and for all and that the others were dangerous. Descartes, pushing as far as ultimately the right of reason to make a clean sweep of the past, opens the path to progress by eliminating its main obstacle.¹² However, for him, Francis Bacon is certainly the first great systematic theorist of progress because he speaks of the increases that science can receive, the title of one of his works being "De augmentis."¹³ Above all, Latouche adds, science is considered by him from a utilitarian point of view, from the angle of its practical applications. He thus makes the link between the accumulation of knowledge and the improvement of people's secular and daily lives. By increasing humanity's power over nature we increase happiness, a consequence of material

well-being. In “Nova Atlantis” Bacon describes the effects of progress in technology and science by anticipating the future. While Descartes and the rationalists tackle only one of the obstacles to progress, Bacon contributes to propagating the vision of earthly happiness as a quantifiable object, as an accumulable object. The greatest sum of happiness becomes an obsessive imperative for human societies.¹⁴

Once this thesis of Bacon’s great contribution to the spirit of quantification of earthly happiness is presented, Latouche will show that the concrete realisation of this quantification cannot be carried out without the help of the economy. Indeed, he underlines that such calculable happiness can only be well-being, that is to say a material standard of living identifiable by a quantity of priced goods. If progress is the foundation of the economy, the economy in return is necessary for the establishment of progress. Without a price system, it is impossible to give meaning to something like a GNP per capita, and without an increase in GNP, how can we be convinced of an improvement in the fate of humanity? All other progress is abstract and no perfection of the human spirit would delight if daily life were not made easier.¹⁵ Once the importance of this contribution of the economy to the putting into practice of the idea of progress and more generally of the Megamachine has been established, Latouche seeks to detect the origin of this discipline. He thinks that “undoubtedly the French doctrine of progress rather emphasizes the perfectibility of the human spirit, but it still relies on the increase in luxury for the ruling and rising classes.”¹⁶ As a result, he believes that the English, in a less spectacular way, did more by secularising social objectives in a very down-to-earth and basely materialist way. In this regard, contrary to Mumford’s position on this subject, he seems to agree with Max Weber’s theses on the fundamental role of Puritanism in the development of economic thought. Indeed, for Latouche, Protestantism contributed greatly to imposing the progressive conception of the world. The Reformation, of course, participated in the work of undermining respect for the authority of the Elders. Puritanism took a complementary step by arousing self-confidence and sanctioning the modern conception of knowledge as experimental knowledge progressing by successive accumulation. It is undoubtedly no coincidence that Bacon had a very Puritan mother and that he was considered a secular Puritan.¹⁷

On the other hand, according to Latouche, it is remarkable that, until a very recent period, Catholic theologians have, on the contrary, refrained from taking sides in favour of progress, when they have not been fierce opponents of it. Notably, Jansenius condemns scientific research and the discovery of the secrets of nature. Likewise, the Catholic Church will remain hostile to work and will refuse to reduce the number of public holidays. The Pope opposed such a request from Henry IV and it was not until 1848 that Catholics timidly attempted to construct a Christian theology of progress. Until a very recent period, the hostility of the Church extended to development: salvation is not of this world, and the exclusive search for well-being distracts from true good and contradicts the spirit of poverty.

On the other hand, Latouche, relying on studies by Delville (1910, p. 515), believes that there exist true Protestant theologians of progress like Price, Priestley and Paley.¹⁸ Concerning the latter, he emphasises that this adversary of the French Revolution, like Burke, has a theology which very closely resembles political economy:

property is at the origin of the division of labour and progress. And work is the source of property, so is eminently moral. Rejecting belief in the possible and real improvement of things in the world is a form of impiety and unbelief. Latouche notes that according to Delvaile (1910, p. 224) it was in the 17th century that the idea of progress became common but he deems that this judgment is a little excessive. It seems to him rather that, on the philosophical level, the idea of progress found its consistency in the 17th century but that it would enter the public domain only in the 18th century with Turgot, the abbot of Saint-Pierre and Condorcet, before becoming a real prejudice in the 19th century with Kant, then Auguste Comte and Herbert Spencer.¹⁹ Once again we see the importance of the central role that political economy plays for Latouche in the genesis of the machine of progress and, more broadly, of the Megamachine. As we have just seen, he cites in particular the economists Turgot and Condorcet. But in other passages he gives primacy to Adam Smith. For him Adam Smith, with the invisible hand, is the great prophet of the great modern machinery, with the demonstration of the marvellous automatisms of the market. The men of the Enlightenment, fascinated by automatons, knowingly wanted the social world to be regulated in a mechanical way. This machination is part of the project of modernity, of a total rationalisation of the social. It was achieved beyond their expectations.²⁰

Finally we can say that for Latouche the great merit of economists in their contribution to the construction of the Megamachine is, on the one hand, to have proposed methods of calculating progress (in particular, the concept of GNP) but also instruments for making it automatic, mainly the market and its invisible hand. Latouche emphasises in this regard that the resulting rationality is a techno-economic rationality characterised by a link between two logics.²¹ He can then affirm that the economy-technology-progress triangle is the base of modernity.²² He also indicates that this Megamachine takes on its full extent only with the collapse of the compromise between market and societal space achieved in the nation (i.e. the end of national regulations). He underlines that we can very precisely date this jump of what we call the third industrial revolution when new technologies are deployed on a planetary scale and their dynamics are immediately transnational. Thus, then, the laws of science and of technology are placed above those of the state.²³ This statement leads us to the next point.

2.2 Consequences of the definition of the Megamachine according to Latouche

We have just seen that Latouche, unlike Mumford, does not give a major role to the capitalist system, and even, more broadly, bourgeois ideology, in the rise of the Megamachine. For him, it is a very complex phenomenon which arises from a multitude of very diverse actors and not from a specific, clearly identifiable social group driven by the same convictions and united by bonds of solidarity. He logically draws the conclusion that it is a machine which can be described as infernal because it escapes the control of its (multiple) designers and constructors.²⁴ However, he believes, this is precisely what happened with the social machine we are talking about. Anonymous and irresponsible, it has become practically uncontrollable. He even

goes so far as to speak, with very Ellulian accents (see below for more information on this qualifier), of a rebellion of the machine and believes that this rebellion manifests itself in three different and complementary ways: it escapes any political regulation; it leads to an impasse; and it is profoundly unjust.²⁵ Given the primordial importance of these three theses, we will reproduce them extensively below.

2.2.1 First thesis: the Megamachine escapes all regulation

According to Latouche, these days we are on board a racing car which is moving at full speed but which has lost its driver. Such a machine seems doomed to crash into an obstacle or disappear into a precipice at one point in its mad race: such is the consequence of the shift from simple technique to the techno-socio-economic Megamachine.²⁶ For him this situation is relatively recent: when the economic dynamic functioned within national spaces, it was still conceivable to subject the machine to the control of social and political forces and to maintain a minimum of surveillance from political authorities: in short a certain influence of society on the progress and use of techniques as well as on its speed, the direction and the modalities of the national accumulation of capital. But with the globalisation of the economy and the ever-increasing transnationalisation of societal forces, from telecommunications to culture, the illusion of mastery of the Megamachine is no longer possible. The operating logics are located at levels which go beyond that of social organisations. They have no other choice than to submit or resign, and generally do both.²⁷

One of the consequences of this fact is a certain end of politics, that is to say, the loss of control of their destiny by citizen communities in favour of the hyper growth of a technocratic and bureaucratic administration. The political authorities of the largest industrial nation-states are now in the situation of the sub-prefects of the past: all-powerful against their constituents in the finicky execution of oppressive regulations but totally subject to orders and closely dependent on central and hierarchical power, revocable on command at any time. Quite simply, and not for nothing, this central power of Big Brother has become completely anonymous and faceless.²⁸ For him, this generalised anonymity of the techno-societal Megamachine demoralises the social and political relationships of human communities. The constraints that weigh on the politician, as on the engineer, the producer or the consumer, lead to a renunciation of all ethical considerations. The efficiency of the machine is the only value recognised by everyone. However, this efficiency, which has become an end in itself, is self-destructive and makes the machine an infernal machine.²⁹ This leads us to the next point.

2.2.2 Second thesis: the Megamachine leads to an impasse

For Latouche the race for progress in which we are trapped is truly delusional. The unlimited accumulation of capital, the indefinite growth of techniques, production for production's sake, technology for technology's sake, progress for progress's sake, this always more which constitutes the law of modern societies cannot continue forever. This headlong rush, necessary for the dynamic balance of the system,

comes up against the relative finitude of the world. Natural limits are about to be crossed, as evidenced by the environmental crisis.³⁰

2.2.3 *Third thesis: the Megamachine leads to injustice*

Indeed, Latouche underlines that the dynamics of the planetary social machine are infernal, in that they are seriously unjust. Programmed to achieve the greatest happiness for the greatest number, it is on the verge of bringing unhappiness to most, if not all, after having scandalously favoured the well-being of a few. According to the World Bank itself, the billion richest people on the planet have more than a hundred times more resources than the billion poorest people! Under these conditions, universalism, which the West has put so much emphasis on, is a fraud. Here we touch on one of the most dramatic consequences of the Megamachine for Latouche, the fact that it functions not only at the standardisation but also exclusion: the Megamachine standardises, uproots and ultimately destroys politics. It reduces the modern person to being, following Heidegger's expression, only a "technical functionary."³¹ By becoming a worker, consumer and user, the citizen submits body and soul to the machine. Latouche then quotes Taylor who had the merit of cynical clarity: "[Y]ou are not asked to think; there are people who get paid for that!" By separating the tasks of design from the tasks of execution, Fordism-Taylorism achieves mass production, the condition of mass consumption, at the cost of reducing the worker to the state of blind servant of the machine. In the flexible workshop, the numerically controlled machine tool no longer leaves any freedom of decision to its servant. Thus, in the factory, in the office, on the market, in daily life, the citizen, who has become an agent of production, passive consumer, manipulated voter, user of public services, is a pure cog in the great techno-bureaucratic machine. Even if his sovereignty was not rendered impotent by all the mechanisms that we have analysed, how could they still have the leisure and desire to exercise it? The beautiful project of democracy is thus deprived of all substance for the benefit of an anonymous technocracy.³² Of course, since the shuttles go by themselves, everyone could and should recover the *oikos*, leisure being the condition for democracy for Aristotle. It is to be feared, however, that the Megamachine, knowing only efficiency as its law, will get rid of these idlers and, ultimately, of all of humanity, useless and cumbersome, if we do not pull ourselves together in time.³³ After making this diagnosis Latouche, in a lecture, pays homage to a philosopher who visibly inspired him a lot: Jacques Ellul. He said of him that he was indeed the man who had (almost) everything anticipated, notably that those who are specialists in values (theologians, philosophers, etc.) have no influence on specialists in technology and cannot, for example, ask that we ban a particular research or existing means in the name of a value: it seems obvious that it is the scientist or the technician who decides the type of human being to create.³⁴

In summary, for Latouche, the Megamachine is not fundamentally an ideological construction of the capitalist bourgeoisie: it arises, during the Renaissance, in the 17th century, from the ideas of European scientists, particularly Bacon, who assigned to humanity a mission of limitless progress thanks to technical inventions. However, this idea could not have seen the light of day without the contribution of economists

in the 18th century such as Turgot, Condorcet and especially Smith – the inventor of the invisible hand of the market – who laid the foundations for the concrete quantification of progress and the total rationalization of the social. This is how the Megamachine, a complex concept which combines several scientific, technical, economic and political dimensions and actors (see below), began to develop in the 19th century and then find its full scope in the 20th century, during the third industrial revolution with its global domination thanks to the internationalisation of economic activity within the framework of a global market desired by politicians. As this Megamachine is characterised by the contribution of many actors, scientists, technicians, economists, businesses and politicians, Latouche considers that it is almost anonymous and therefore very difficult to control, which leads to an impasse. We will now be able to compare this very demoralising vision of the Megamachine with that of Scheidler.

Notes

- 1 Latouche (2004), p. 26).
- 2 Latouche (2004, p. 26).
- 3 Latouche (2004, p. 183).
- 4 Latouche (2004, p. 30).
- 5 Latouche (2004, pp. 30–31).
- 6 Latouche (2004, p. 31).
- 7 Latouche (2004, p. 161).
- 8 Latouche (2004, p. 144).
- 9 See the elixir of long life. Latouche (2004, p. 145).
- 10 Latouche (2004, p. 146).
- 11 Latouche (2004, p. 146).
- 12 Latouche (2004, p. 146). Referring to Delvaille (1910, p. 187), he highlights that the original title of Descartes' "Discourse on the Method" was "The project of a universal science which can elevate our nature to its highest perfection."
- 13 Latouche (2004, p. 146).
- 14 Latouche (2004, p. 147).
- 15 Latouche (2004, p. 147).
- 16 Latouche (2004, p. 147).
- 17 Latouche (2004, p. 147).
- 18 Latouche (2004, p. 148).
- 19 Latouche (2004, p. 149).
- 20 Latouche (2004, p. 46).
- 21 Latouche (2004, p. 34).
- 22 Latouche (2004, p. 127).
- 23 Latouche (2004, p. 43).
- 24 Latouche (2004, p. 47).
- 25 Latouche (2004, p. 48).
- 26 Latouche (2004, p. 41).
- 27 Latouche (2004, p. 140).
- 28 Latouche (2004, pp. 48–49).
- 29 Latouche (2004, p. 47).
- 30 Latouche (2004, p. 49).
- 31 Latouche (2004, p. 50).
- 32 Latouche (2004, pp. 53–54).
- 33 Latouche (2004, p. 55).
- 34 Latouche (2004, p. 55); citing Ellul (2004, p. 139).

3 Scheidler's Thesis

“The end of the Megamachine (2020)”

From the introduction to his book we are fixed on a certain number of fundamental points. First, historically, the Megamachine would be a system that appeared in the West “roughly 500 years ago,” which apparently places its origin in the 16th century around 1520. Then it is, at this time at least, “founded on predatory exploitation.”¹ We can already note a striking difference with Latouche's thesis according to which the Megamachine appeared in the West in the 17th century only with scientists like Bacon. But Scheidler, apparently just like Latouche, admits that it would be a “global system” in which “all the elements are interdependent” which would rest on “three major pillars,”² economic, state and ideological, while specifying that it would have believed itself charged with a historical mission to save the world, first with the Christian religion, which is not Latouche's thesis, and then, in the name of reason and civilisation.³ Scheidler explains that he borrowed this name of Megamachine from Lewis Mumford (1895–1990) while emphasising for his part, that this machine “does not mean a technical apparatus, but a form of social organization that seeks to function like a machine and which is actually made up of people.”⁴

In this introduction he presents the structure of his book, of a much greater historical scope than that of Latouche: he apparently needs a much larger perspective than Latouche to be able to explain the formation of the Megamachine. The first part (Chapters 1 to 5) is in fact devoted to the “Four Tyrannies” which will end up dominating the world (see below) and looks at a period of five thousand millennia dating back to the prehistory of the Megamachine in Mesopotamia, while the second part (Chapters 6 to 11) focuses on the past five centuries: the centuries proper of the history of the Megamachine.

One last crucial piece of information is included in the introduction. He tells us that the exit from the Megamachine and thus from the logic of endless capital accumulation is inextricably tied to the question of democratic self-organisation.⁵ We are therefore a priori fixed on the fact that for him, unlike Latouche and in connection with Mumford's theses, capitalism is a key element of the Megamachine, if not its very substance. I will now take the 11 chapters of the book in turn to draw out their “substantive marrow” in order to see things more clearly, starting with the one devoted to power (Chapter 1).

3.1 “Power”⁶

Power concerns the birth of four tyrannies and the roots of domination which, for Scheidler, are physical, economic, ideological constraints and finally linear thinking (notably calculation). He shows that from the period of nomadic hunter-gatherers until the beginning of the Bronze Age, between 4000 and 3000 BC, “archaeological sites revealing predominantly sedentary lifestyles show few traces of major social differentiation or hierarchical organization” but that this situation changed with the beginning of the Copper and, especially, Bronze Ages.⁷ Indeed, according to him, it was in the Mesopotamian agricultural region of Sumer that the first writing systems developed around 3200 BC, from signs which were printed on goods with seals, and that the first cities appeared (notably Uruk with 50,000 inhabitants) as well as the first divisions of labour. Hence, little by little, the formation of an oligarchy of rich families, which would gradually take power in central government structures such as temples and royal palaces.

It was also at this moment that, for the first time in the history of humanity, the State was able to exercise a power of constraint over its nationals. This observation then leads him to wonder how we arrived at this radical social change which has determined history until today. Why have most humans accepted the creation of elites who rule over them? He then states three fundamental reasons: 1) physical power, in particular that of weapons, 2) structural violence, particularly in the form of socio-economic power, 3) ideological power of a religious, moral or expert type which serves to legitimise or even make invisible the first two forms of power. He shows, based on the writings of David Graeber, in particular his book “Debt 5000 years of history,” that these three kinds of domination originated in Sumer with the first forms of private land ownership developed and concentrated in the hands of a few families. This privatisation of land and its products also led to the invention of commercial debt when these rich owners lent to poor peasants, who, because they were unable to repay their debts, could become slaves. He thus believes that “debt is structural violence par excellence,” a violence which, however, at that time, forced the sovereigns of the first empires to regularly decree debt forgiveness to save their system from collapse.⁸ He underlines, regarding these debts, the appearance in Sumer of socio-economic power and ideological power. Indeed, thanks to the discovery of writing, professional scribes in the service of temples and palaces became capable not only of recording property titles but also of recording debt titles on clay tablets. These debts could become objects of commerce, which prefigured paper currencies.⁹ He concludes on this point by emphasising that writing could therefore be used to codify the law in favour of the powerful while admitting that throughout history it could also be at the service of the weakest. To complete this picture of the birth of ideological power, Scheidler, relying on Wunn (2005) and Kramer (the story begins in Sumer), shows that instead of representations of animals and different types of feminine figures which decorated the Palaeolithic caves and which subsequently still inspired traditional agricultural populations, we also see in Sumer of Enlil, the birth of a male God like an earthly sovereign who also has a throne and an empire and the power to inflict punishment: to say it in a nutshell, a sort of state religion in the service of the elites.

To the birth of these three tyrannies of a physical, socio-economic and ideological order, Scheidler adds the appearance of what he calls the tyranny of linear thinking which is based on the assumption that the world functions according to predictable laws of cause, which means that it can be dominated.¹⁰ This while specifying that if these hypotheses have made it possible to successfully dominate inert matter, they are misleading with regard to living beings, whether this concerns humans or ecology. Indeed, we cannot, except in the event of catastrophes, treat humans all their lives as automatons, no more than a river and, more generally, nature,¹¹ which implies recognising that the world is alive and therefore unpredictable. To conclude with the presentation of this first chapter devoted to the birth of power in the first historical manifestation of the Megamachine we will say that Scheidler was largely influenced by the theses and analyses of Mumford but that he had the merit of updating them by taking into account the most recent studies, notably those of Graeber.

3.2 "Métal, mining, armament and power over nature"¹²

In this short chapter Scheidler wants to show how metalworking played a decisive role in the expansion and metamorphoses of the "four tyrannies" over the past five millennia. Indeed, not only did metals serve as currency at the origin of our financial system, but they made it possible to produce increasingly powerful weapons to dominate entire populations. Already in the Bronze Age the alloy of copper and tin allowed harder weapons and, in particular, as shown by Reichel (2005), for the city of Uruk to wage the first organised war in the history of humanity: the one against the city of Hamoukaren in Syria. The second great technological revolution, around 1200 BC in Assyria, was the revolution of the age of steel, made from iron enriched with carbon. This invention will notably first allow Assur to conquer immense territories in terror and especially later allow Rome to provide weapons for its 600,000 soldiers and thus to build its Empire, this at the cost of deforestation of some 25 million hectares of forests. Indeed, at this time, the Romans fuelled their melting furnaces exclusively with charcoal, which involved massive clearing of forests by fire. In this regard, Scheidler makes the link between these early devastations and those of today by emphasising how the systematic hunt for fossil fuels today increases this destructive power in a monstrous way and fuels civil wars.

He cites in particular, referring to Vandana Shiva, the case of mass deportations of hundreds of thousands of people in the Indian state of Orissa due to large private groups in search of minerals: these groups go so far as to create private militias at war against the people who live there. More generally, he attacks the giants of the mining industry; for him this economic sector is by far the most aggressive and destructive on the planet. He ends this chapter by emphasising with the historian Eliade that metallurgy and alchemy are already the matrix of the idea according to which humans could exercise unlimited domination over the material world and that now the engineers took the place of God.¹³ These are the main elements of how mining activity inspires Scheidler. We find in his writings certain ideas expressed by Mumford as early as 1934 in his Chapter 2 devoted to "Agents of mechanization," in particular the link between mining activity and the development of science

and technology as well as the inhuman nature of this activity and also the deforestation linked to it.

Mumford also shows the link between this type of industry and the development of weapons for war, in particular by citing the harmful role of the capitalist Jacob Fugger II, the first example of the new type of financier and investment banker: the domination of this capitalist symbolises the perversion of the economy of life in an economy of money. Once again, it seems that Scheidler's main merit in this chapter is to have brought up to date the problems linked to this type of activity, more than to have brought new ideas. But, Scheidler will now address a power other than that of weapons: economic power.

3.3 “Markets, economic power, money and property”¹⁴

The motto of this chapter is a quote from Goldman Sachs CEO Lloyd Blankfein: “I’m just a banker doing God’s work” – everything is apparently programmed! By evoking this sentence Scheidler wants to attack those who speak of markets as a sort of natural power: markets are anonymous and have no address; they are irrevocable and are not accountable to anyone. In fact, as he rightly explains, behind them are very concrete people who defend very personal interests: their rules were invented by certain particular human beings for specific purposes. He therefore takes issue with Adam Smith who asserted that human beings have a natural inclination to exchange. Apparently, unlike Latouche, he does not make the illustrious economist a major player in the birth of the Megamachine. He emphasises that there have been non-market societies for a long time and situates the appearance and diffusion of the modern capitalism system only from the Renaissance, which confirms his first dating made previously in [Chapter 2](#), about the Fuggers. Thus in Greece, he also rightly asserts that, at the beginning of the 6th century BC, market relations still played a minimal role, peasants producing for their own consumption, and even under the Roman Empire that most peasants preferred to produce to cover their own needs: it was only with the introduction of taxes to be paid in money that these farmers were forced to sell part of their products on the markets. This introduction of taxes paid in money therefore allowed Athens, then Rome, to found a form of market economy which could push traders and the population to organise a sustainable supply: in order to earn the money they had to pay back as taxes to the State, which used it to pay the soldiers.

Scheidler then describes the appalling conditions of the production of silver coins in Greece by slave prisoners of war in the Laurion mines leased by the State to private entrepreneurs and he emphasises that the invention of this triangular system articulating money, slavery and war constituted the heart of the first market economy, the one that the military campaigns of Alexander the Great subsequently distributed throughout the eastern Mediterranean Basin. This monetary economy and these permanent armies will then strengthen the power of the monarchs in an unprecedented way: thus money, military force and the market became a closed circle. He then shows, by citing the work of Graeber, that these phenomena linked to the development of a monetary type economy reached their peak under the Roman

Empire within the framework of a geographical dimension encompassing the entire Mediterranean basin.

He also indicates that the Romans will be at the origin of the first type of joint stock company with an unlimited lifespan: the publican companies responsible for collecting taxes, companies whose management was long leased by the Roman State to private entrepreneurs. The publicans were a good example of public/private synergy.¹⁵ Scheidler emphasises in this regard that the relationship between the market and the State has tended to be reversed: while in antiquity, the State used and created markets to assert its imperial interests, companies today use the State to create their own empires. Scheidler insists that just as states need markets to make war more easily, markets need militarised states, at least the kinds of markets that have historically prevailed to the present day. He shows that this regulation of markets by the State aims in particular at the protection of property rights and then asks the fundamental question: what precisely do we mean by property? Is this the Roman conception of property (*dominium*), a conception which tends to consider that the owner of a thing has total and exclusive power of disposition over this thing, whether it is animals, plants, land, rivers and even human beings like the slaves, the wife, the children of the Roman *paterfamilias*? For Scheidler, the fact that oil and mining companies can transform half the planet into lunar landscapes goes back to Roman legal tradition.¹⁶ He then denounces more broadly the insatiable possessiveness of a minority, a class which, as resources become exhausted and conflicts multiply, is confined in protected gated communities and asks the question: must the pieces of paper stipulating property rights always be recognised as valid whatever their deadly consequences? With this new indictment of a minority which is visibly akin to the capitalist class, we are quite far, it seems, from the anonymity that Latouche speaks of in relation to the Megamachine.

Scheidler ends this chapter by answering the question previously asked to which the biblical prophets had clearly answered: the earth is no one's property, it has only been lent to humans, and this in equal share.¹⁷ This is the first evocation of the position of religions which will be taken up and completed later, notably in [Chapter 4](#).

3.4 "Powerlessness. The trauma of power and the origin of apocalyptic thinking"¹⁸

Scheidler's thesis is that it is Western apocalyptic imaginations, which cross over both religious, notably Christian, and secular, notably communist, systems of thought, which have generated the potential for destruction which today threatens our future. Thus, the reverse of the brave new world that the consumer society offers us is a plundered and charred planet. He specifies that historically these apocalypses are completely desperate visions which appeared at a time of massive economic and physical violence: that which followed the wars of conquest of Alexander the Great and, in particular, the biblical book of Daniel, written in Palestine around the year 164 BC. However, for Scheidler, by far the most influential apocalyptic text will be that of John written around the year 90 AD in a context of total helplessness of Jews and Judeo-Christians to face the power of the Roman empire.

This text announces that the world is irremediably evil and that the only possible outcome is the annihilation of the entire earth and its recreation through divine intervention. But it specifies, a fundamental point, that only the elect recorded in the book of life¹⁹ will benefit from the celestial city: the New Jerusalem.

Scheidler believes that – secularised in various ways – this vision has profoundly marked Western civilisation to the present day and that with the emergence of a capitalist economy since the 16th century²⁰ it has experienced both a renaissance and a reinterpretation, especially in Calvinist and Puritan doctrines. The market is now responsible for carrying out the divine will which divides humanity into the chosen and the damned. He deems that this link between apocalyptic thinking and capitalism is still worryingly relevant today. Indeed, for him, it is certainly no longer a God who is enthroned but the invisible hand of the market which distributes their prizes to the winners and losers. To this diagnosis, which mixes economics and religion concerning the actors in question, is added a precision concerning their temporal vision. For Scheidler, inspired on this point by Walter Benjamin, there is on their part a movement of flight from the present: the inexorable domination of a one-way arrow of time which distances to prevent our own decline through a permanent gesture of self-improvement, of modernisation. From then on, he believes, we are throwing ourselves into a war that we can never win because what we are fighting as an external enemy is in fact only the product of our own movement.²¹

But to this infirmity Scheidler opposes the philosophy of Jesus, who, at the time of Roman domination, sought to heal a traumatised society by acting in the present. He believes that the answers proposed by Jesus were very clearly distinguished from what was presented as being constitutive of the Christian religion as well as apocalyptic thought. Indeed, this specific movement, internal to Judaism, was based, he deems, on egalitarian principles and was not associated with a fantasy of revenge and annihilation, but in favour of a kingdom open to everyone, already begun with concrete acts, in particular actions of liberation with regard to the occupying forces.²² Scheidler, by way of conclusion of this chapter, then considers that between the Jesus movement and the ecclesial dogmas of official churches, it is perhaps the most serious reversal of meaning that a history has ever undergone,²³ a point that he will develop in the following chapter.

3.5 “Mission: the origins of Western universalism”²⁴

Scheidler is interested here in the historical premises on which the concept of “mission” is based – and therefore the entire ideological edifice which will justify European expansion for 2000 years, whether it be Christianity, the Enlightenment, the economy of market or simply “Western values,” the hard core of this thought being constantly to claim that the West embodies progress in the history of humanity and that this mission is considered accomplished only once all look like us. He indicates that the first to put on paper a universal missionary project was Saul of Tarsus, also called Paul. Paul’s mission, unlike the Jesus movement which wanted to act concretely to change things here and now, makes the salvation of all humans dependent on a saving element to come: the Last Judgment and the resurrection. Paul’s four

theses corresponding to this mission are as follows: 1. World history is moving in a specific direction. It advances irresistibly towards salvation. 2. Far from being restricted to certain peoples, this story is universal: there is no alternative. 3. This story admits only one truth, universally valid. 4. The one who knows this truth has the obligation to put on the right path those who do not have it. According to Scheidler, these would also be the four theses of the mission that the West has assigned itself. The problem is that most Christian missions that relied on persuasion through preaching have often had only limited success. This, according to Scheidler, is the reason which led them to request military support from states lacking territorial expansion to "convince" the recalcitrants. Murder, pillage, and destruction of other forms of organisation would then be part of a higher mission to save the souls of these barbaric heretics. Scheidler emphasises that this missionary brutality does not date only from the arrival of Christopher Columbus in America. He shows, in particular, how from 723 a man called Boniface "the benefactor" went to evangelise, on the orders of the pope, the pagans who populated the heart of Europe and persisted in venerating trees and springs, even if it meant massacring them in case of persistence in their errors. This type of practice would continue in this region and reach a peak in the 13th century with the knights of the Teutonic Order, whose standards would later adorn the uniforms of the Kaiser and the Third Reich.

Afterwards, underlines Scheidler, this type of missionary practice will slip into the clothes of the colonialist, then reappear under the figure of the development expert and finally, today, in the skin of the apologists of the free market, these different missions, taken all together, forming no less a coherent story, that of the superiority of Western civilisation and the historical tasks incumbent on it with regard to the world: a story which will become one of the essential ideological pillars of the formation and the expansion of the modern Megamachine. It should be noted in this regard that Scheidler refers on this last fundamental point to Wallerstein, who affirmed that "the belief in universalism constituted the cornerstone of the ideological edifice on which historical capitalism was based."²⁵ We see once again clearly that Scheidler, unlike Latouche, does not hesitate to make capitalism one of the fundamental instruments of this European mission: the capitalists too were indeed driven by an ideology of universal conquest not only of markets but also minds, if not hearts. With this [Chapter 5](#) we have finished with the study of the first part of Scheidler's work devoted to the four tyrannies (political, military, economic and ideological) which were the basis of the origin of the birth of the modern Megamachine. We will now approach the second part of his book, which is devoted to a more precise study of the conditions of the birth of this modern Megamachine.

3.6 "Monsters: the re-formation of power and the emergence of the modern world system: 1348–1648"²⁶

The thesis that Scheidler defends in this chapter is that in the period which goes from the late Middle Ages²⁷ until the end of the Thirty Years' War (1648), the four tyrannies were reformed in Europe to lay the foundations of our system – the current world: a monstrous machinery or Megamachine driven by the logic of

the endless accumulation of money which will cause the accelerated destruction of nature and the disappearance of non-Western cultures. Thus, for him, contrary to the image that permeates our minds, the transition to modern times was, much more than the Middle Ages, a monstrous era because never before had there been such a massive explosion of violence in European history. He shows that this violence culminated in the genocide of the Amerindians (from 1492), which caused millions of deaths, and the massacres of the Thirty Years' War (1618–1648), which exterminated approximately a third of the European population. Indeed, he emphasises, it was not during the Middle Ages but during modern times that these practices reached their peak. If there were between 1320 and 1420 (apparently for him dates still relating to the period of the Middle Ages, the truly modern period only beginning around 1500 as specified several times) only 36 women accused of witchcraft throughout the Europe, tens of thousands of alleged witches were sent to the stake in the 16th and 17th centuries (from 1500 to 1700).

He then begins an analysis of the different phases of the Middle Ages. He emphasises that after the collapse of the Roman Empire, kings and overlords could no longer force their subordinates to obey through physical violence: they had to compromise and negotiate royalties and forced services (*corvées*). In addition, land was largely withdrawn from the market; it was only lent (given in fiefdom) to peasants who were no longer slaves as in the Roman Empire. Furthermore, another sign for Scheidler of a reduction in human beings' power over each other, we are witnessing in particular in Italian cities but also in other countries, the creation and development of a layer of artisans organised into corporations which rigorously regulate prices and working conditions. But, he adds, from this period of growth, we nevertheless see the social divide worsening, due to the slow penetration of the monetary economy. Rich merchants in particular will appear who will monopolise power in the cities. This will trigger criticism from Francis of Assisi, a severe denouncer of social hierarchies, and an avant-garde defender of animals, whom he called his brothers and sisters. But Scheidler shows that the context will change considerably in the first half of the 14th century following two events relating to this period which will have fundamental consequences. Firstly, from 1315 to 1322 the harvests were bad, which caused a catastrophic famine which deeply marked collective memory and affected social cohesion. Secondly, the plague (the Black Death) spread throughout Europe from 1348 and wiped out nearly a third of the population and, according to Delumeau, caused, even for the survivors, profound psychological trauma. However, on the other hand, on the economic level, the surviving peasants approached negotiations with landowners in a much better position.

That explains why, according to Scheidler, a new and much more massive wave of popular uprisings appeared in Europe. He cites in particular the insurgent peasants in France in 1358 (*Grande Jacquerie*), who set fire to hundreds of castles, the textile workers of Florence in 1378 (the famous *Ciampi* revolt), the Peasants Revolt in England with the capture of the Tower of London in 1381, the insurgents of the city of Ghent in 1379 and the Hussites in Bohemia in 1420, events which are mainly located in the late Middle Ages. He then believes that the feudal elites, shocked by the strength and combativeness of the *egalitarian movements*,²⁸ intensely sought

means to maintain their privileged position and that it is this research which explains the birth of the modern world system which operates today under different names ("Western civilisation," "modernity," "capitalism"). In short, apparently, according to him, *de facto*, the seeds of the Megamachine come from these social events of the Middle Ages, themselves explained by economic, social and health factors.

But, as he emphasises, in this research, these elites did not follow a planned strategy: what happened was rather that innumerable steps taken by different actors ended up forming a system that generated the monsters of modernity. He shows how the profits derived from trade with the Orient soon made Venetian and Genoese merchants the richest bourgeois in Europe, who even lent to kings and emperors, merchants who composed the government themselves. In this regard, he cites Mumford who showed that Venice created the largest factory complex before the industrial revolution where people were already working continuously on mechanical assembly lines according to the three-eight system. These businessmen from Genoa and Venice were therefore not, according to him, peaceful merchants who were concerned about non-state interference but great people from ultra-militarised city-states who, from the start, imposed their commercial interests by the force of the sword and cannons, notably during the crusades.²⁹ Indeed, for Scheidler, in the Crusades we already see on a small scale what would later become a world system: the combination of the development of capital, militarism and Western missionary zeal. This system would develop even more with the systematic practice of mercenarism which developed during the Hundred Years' War (1337–1453) and which then culminated in Northern Italy. Almost all flourishing city-states hired entrepreneurs, called *condottieri*, for their wars, who enlisted mercenaries, recruited from all over Europe, into their firms, the companies *di ventura*. Some of them, like Francesco Sforza in Milan, had political careers.

Clearly, although he places, as we have seen previously, the birth of capitalism around 1500 he himself demonstrates that this capitalism or at least, he seems to estimate, a proto-capitalism, existed from the 14th century in certain cities of Northern Italy and that this situation would have very significant consequences later, particularly in the 17th century. Indeed, as he specifies, this economic model reached its peak during the Thirty Years' War (1618–1648) with Wallenstein's private army, financed by the Dutch banker De Witt, an army which numbered up to 100,000 men, and which was at its time the largest company in Europe, particularly in the production of weapons. It ravaged entire sections of central Europe. According to J. Moore, as cited by Scheidler, this type of industry was also one of the driving forces behind the rapid monetisation of the economy and the development of wage labour. Finally, as evidenced in particular already in 1556 by the book *"De Re Metallica"* by the doctor Agricola,³⁰ it was also, due to the consumption of a considerable quantity of wood, particularly for the reduction of ores, the cause of considerable destruction of the nature and living conditions of the inhabitants of mining regions.

On the other hand, it favoured the rise in power of cunning capitalist bankers who, in return for the credits they granted to heads of state, demanded from them monopolies on spices, wool, silk and especially metals. Scheidler cites the cases in Florence of the bankers Bardi and Peruzzi in the 14th century and also, just as

Mumford had done, that of the Augsburger Jacob Fugger who, in the 16th century, in the service of the Habsburgs, became the most powerful banker of the world, to the point of dominating his masters, who were increasingly in debt despite their lucrative conquests in America.

But, as Scheidler emphasises, this character was not the only case of this type nor the oldest. Indeed, in a passage of this chapter devoted to what he calls the “un-leashing of the monster” Scheidler shows how in 1492 the mercenary Cristoforo Colombo, to finance his second trip to America, promised as return on investment to the Spanish Crown and its Italian bankers as much gold and as many slaves as you want and explains that it is the very terms of this financial agreement which will trigger the greatest genocide of humanity until then: of the 50 million inhabitants that Central and South America then had, only three million remained a century and a half after the landing of Columbus. We will not describe here all the scenes of cruelty and sadism that are difficult to bear that Scheidler relates about this conquest of America by the Spanish: they are of incredible atrocity and violence.³¹ But we will relate the three main reasons which led to this civilisational disaster according to Scheidler. First of all, the economic motive animating these Europeans in question caught in the international cogs of the valorisation of capital and indebtedness who, according to the very expression of an Atzec of the time, coveted gold like starving pigs. This is all the more so since the entire Conquista was financed on credit and therefore it was the pressure of creditors which fuelled the infernal furnaces of Potosi,³² the mines with six thousand furnaces, the mouths of hell which swallowed up the Indians by the thousands. Then, the fact that Spain had become a war mongering and violent society during its conquest of the Muslim caliphate and the expulsion of the Jews from Spain. Finally, the third factor, decisive according to Scheidler, of an ideological type – the role that the claim to the universal truth of Christianity could play in the justification of violence: when we believe, and the supreme authorities confirm us, that our actions, however inhumane they may be, are part of a global providential mission, we are able to overcome our last scruples.

Scheidler then shows that this avant-garde monetary-military complex would use its armies of mercenaries to seize property by force, notably in England, land used collectively to graze large flocks of sheep, and put down popular revolts grappling with inflation resulting between 1500 and 1700 from the influx of colossal quantities of silver coming from the mines of Potosi.³³ Among these actions to break popular revolts, which arose well before the so-called first industrial revolution of the 18th century (first steam engine in a coal mine in the north of England), he cites, in support of Silvia Federici, the demonisation of women who protested, notably of peasant women who were going to be accused of being witches to divide the populations.³⁴ He also shows how the feminist movement of the Anabaptist kingdom of Münster which, in 1535, claimed non-violence and the community of goods, was repressed with the greatest violence by the troops of the Confederate sovereigns with the support of the Lutherans: he qualifies Leviathan as such a state monster of modernity.

But he specifies that the authoritarian state was not the only monstrous institution created at this time. Indeed, based on R.S. Lopez’s “The commercial revolution in medieval Europe” he cites a first “decisive” invention created in the 14th century,³⁵ that is to say in the Middle Ages, that of double-entry accounting, as we still know it

today: according to him, thanks to it, revenues, expenses, profits and taxes could be precisely calculated, and not only after the fact but also in a forward-looking manner. He infers that this mathematisation of trade³⁶ constituted a decisive step on the path leading from the spontaneous accumulation of wealth through trade and piracy to a calculated accumulation of money, which also became a goal in itself: the adventurer travelling the seas has become someone who, from his office, directs his clerks sent all over the world. He adds a second fundamental invention, that of the joint stock company, in principle eternal, with interchangeable humans, which appeared around 1600, a sort of machine whose only goal is the endless accumulation of money and whose logic implies that questions about the meaning and purpose of our economic activities are not allowed to be raised. More precisely, it concerns the founding in 1602 of the Dutch East India Company. Scheidler shows that this company had obtained the right to constitute its own army with the help of mercenaries and notably participated in the genocide of the inhabitants of the Indonesian island of Banda Neira in 1621. The golden age of the Netherlands, new centre of the world economy in the 17th century, including in 1612 the founding of the first stock exchange in Amsterdam, centre of the world economy, was therefore founded, according to Scheidler, on an outbreak of barbarism. A barbarity justified by a religious ideology. Indeed, according to the ideology of the Genevan John Calvin, God has divided the human race into the elect on one side and people who will be damned forever on the other, while specifying that, due to lack of certainty on God's choice, the clearest sign that one is part of the elect is economic success. Scheidler emphasises in this regard that the Calvinist doctrine combines the apocalyptic tradition with the capitalist project³⁷ and that this combination is radically opposed to the spirit of the gospels, notably to Saint Matthew: the poor now appear as those whom God has reprobated. He concludes on this point that this doctrine legitimised the social divide and removed it from any discussion, and that the expectation of future salvation was combined with the rigorous calculation of the expected profit: a fusion of apocalyptic fantasies and economic calculation.

He concludes this chapter with two fundamental lessons. Firstly, the period from the outbreak of the plague (in 1348) until the 17th century was traumatic for Europeans, with its wars and carnage. Secondly, he seems to hold the new economic regime that appeared in this period fundamentally responsible for these wars: indeed, a regime in which many actors find themselves in debt and can get out of this situation only through violence. This new economic regime is apparently practically that of capitalism, a management system based on double entry bookkeeping, which he told us had been a decisive invention and which will gradually succeed not only in bringing under its control the small people, in particular by privatising their commons, but also subjugating the States, a situation opposite to that which existed previously when the vast empires of Assur, Rome or China retained control of all their citizens by forcing the rich to make discounts of debts. Indeed, for Scheidler, apparently inspired by the writings of Wallerstein,³⁸ what characterises the modern State which appeared at this time is the fact that it is only with the credits of trade magnates that sovereigns were able to pay for mercenaries and weapons and take control of territories and their inhabitants. For this reason, the relationship of power between the holders of capital and the sovereigns is at that time, and until today, absolutely not the same as in the

ancient world. Indeed, while in vast empires, such as those that Rome and China built, the strengthening of central state power and the consolidation of empire was the supreme goal, in the modern world system state violence is primarily a means to facilitate the path to the unhindered increase of monetary capital. In both cases the market and the State are inseparable, but their relationship has tended to be reversed. Scheidler cites as proof to support his demonstration the case of the Thirty Years' War (1618–1648): according to Huf³⁹ the war that the princes were waging could have ended, but the private army of mercenaries who came from Bohemia wanted to be fed and its general, the war contractor von Mansfeld, threatened his sponsors [the princes] to return his troops against them: in fact he had debts to repay [to capitalist lenders]. The war therefore continued.⁴⁰

Scheidler concludes this chapter, the largest of his book, by estimating that the economic-political system which was once created in violence has since spread across the entire earth and that it is our current system, even if many elements have changed. He adds that it is indeed a system because none of its parts can exist without the others: the history of the beginning of modern times shows very clearly that the economic power of capital could not have developed without the physical violence of the State, nor the latter without the economic power of capital; both were closely linked to the growth of the metallurgical complex and that expansion was constantly legitimised by a universalist ideology which first wore Christian clothing before cloaking itself in the names of “civilisation,” “reason” and “free market.” Thus, according to Scheidler, the fundamental point is the alliance of economic power with State power, while specifying that for him, as it seems to us, this alliance is characterised by three fundamental elements. Firstly, it is economic power which dominates that of politicians and, more broadly, of other actors, notably scientists and technicians, while Mumford seems to put these two influences on an equal footing in the construction of a new Megamachine in the 17th century. Secondly, contrary to Latouche's thesis, this economic power is not at all confused with the use of only the traditional tools of economists of the type that Adam Smith will advocate in particular: priority seems to be given to management tools that capitalists forged in the Middle Ages, in particular, those which result from the invention and use of double-entry accounting. Thirdly, and this point follows from the two previous ones, to the extent that it is the capitalists and their management tools who are fundamentally at issue in this question, we are not dealing, as Latouche maintains, with very numerous anonymous actors. Rather this is a perfectly identifiable caste that is not very numerous on a global scale, even if we add the politicians that support it. Scheidler will now defend the thesis in the following chapter that the effectiveness of this formidable economic-political system will be further increased by the “scientific” idea of considering human beings and nature as machines.

3.7 “Machine. Mechanistic sciences, state appearances and the disciplining of man (1600–1800)”⁴¹

Scheidler first recalls that certain elements which will lead to a mechanisation of the world were introduced in the previous period, in particular double-entry accounting and the diffusion of the mechanical clock in the 14th century. But he believes

that the precursors and pioneers of modern natural sciences, like Galileo and Newton, themselves fascinated by the mechanical clock, will already go a long way by considering nature as an immense mechanism, while the mechanistic philosophers gathered around of Descartes and Hobbes took yet another step: they affirmed that even human beings were nothing other than automatons whose study of functioning will make it possible to make them act in the most effective way. Scheidler then emphasises that these ideas corresponded completely to the political and economic system which was being formed at the time and was spreading throughout the world: the entire social body must also be governed by a central authority. In this regard, visibly inspired on this point by the writings of Mumford, he cites a typical case of a man-machine such as the well-disciplined soldier and indicates that this example will then serve as a prototype for a series of social institutions, from the factory to the school, including the prison, all organised on the model of the machine, this to make the operation of the Megamachine as efficient as possible.

While recognising that the sciences have become a powerful instrument of criticism and development of remarkable technologies he emphasises that they were also from the beginning closely linked to the apparatuses of military and economic power, all the more so since scientists also had personal interests to defend. In this regard he cites the case of Francis Bacon (1561–1621) in whose life we find in a sort of pure state the association between the domination of nature, the logic of profit, apocalyptic thinking and colonialism which so characterises what we call Western civilisation. He shows in particular that Bacon was a member of the board of directors of the Virginia Company, that he observed nature from the perspective of power, that his experimental research owes to the inquisitorial practice of torture and that his language is full of sexual metaphors linked to violence against women. He therefore particularly emphasises the link between capitalists and scientists, which Latouche does not do, but which Mumford also does. For him, the epistemological turning point which began in the 17th century and made measurement, to the detriment of perception, a privileged means of access to reality, was closely linked to the reorganisation of physical and economic power: the rise of monetary economy and merchant capitalism has transformed counting and calculation operations into real obsessions. Predictability and calculability have become, for businesspeople and servants of the State, the central categories of thought and action, a modern spirit that we also find in the work of mechanistic researchers such as Descartes, Mersenne and Gassendi, who radically broke with the idea that the universe is alive and endowed with a soul, this despite the criticisms of certain great scientists like Newton.

Let us emphasise that Scheidler is not against methods of measurement, counting and calculation, because, he believes, remarkably, they are in themselves neutral and can be used for completely different purposes. What transforms these methods into ideologies and an instrument of domination is not the fact of resorting to them but of asserting that they alone can shed all light on the world "as it is" and that the measurement and counting are in principle superior to any other form of knowledge. In this regard, he emphasises that the claim to have exclusive access to knowledge and truth leads to a new variant of Western universalism, which completes the missionary project of Christianity and adds to it the crimes that the expansion European Union has provoked.

But that's not all. Indeed, he explains, this desire to calculate and dominate nature goes hand in hand with another project: the State desire to uncover the secrets of the social world. Scheidler's thesis is that the States, allied with and dependent on capitalists for their financing, did not appear for the good of the populations but as organisations based on physical violence. Under these conditions, to allow their armies to be financed, they established centralised tax systems and ensured the collection of these taxes by making human society mappable, recordable and controllable so that it became transparent. But beyond these financial problems, it is also the very nature of the men who made up their armies that they wanted to modify by making them real machines trained, if necessary, by torture,⁴² to obey and fight well. But, he adds, visibly influenced by Mumford, this mode of disciplinary organisation has served over the centuries as a model for a large number of institutions: the prison, the reformatory, the factory, sport as well as school, while specifying that for the latter the modern school was born from the meeting between Christian asceticism and military training. Inspired by the philosopher Foucault, he describes the training of school children in the classroom and affirms that from the beginning the *raison d'être* of the school was not so much to teach subjects as to inculcate a mode of being which is essential in order to then be able to integrate into the mechanism of the modern economy, which "needs alienated human beings."

He then describes what he calls "the invention of work" (as opposed to the activities of free human beings) with its two historical forms: the work of slaves under physical violence and that of employees under a system of procedures increasingly refined: disciplinary measures whose end result is that workers participate in their own subjugation. He emphasises in this regard that the first capitalists wanted to dissociate work from the house to transfer it to factories, allowing better control, and then, to increase productivity and efficiency, broke up the tasks into various stages. Thus "the complex relational structures on which community life rests have been replaced by the mechanical chains of command,"⁴³ with the sole aim of infinitely increasing production, this well before the industrial revolution. As we see again, almost at each stage of his reasoning Scheidler is keen to show the importance of the role played by capitalists, including in this chapter devoted primarily to the mechanical sciences, where he has already mentioned the exemplary case of Newton, a scientist closely linked to the capitalist system. But, he specifies, to further perfect this society organised on the machine model, something was missing to obtain massive production, if not without limit, which he will treat in his Chapter 8 with the case of coal.

3.8 "Moloch. Coal power, total market and total war (1712–1918)"⁴⁴

In this chapter Scheidler shows that at the beginning of the 18th century the capitalist system faced an increase in the price of charcoal in a context of growing energy needs. Access to local coal fossil energy was considered but encountered technical and financial limits, mainly the cost of pumping water in ever deeper galleries: the expansion of capitalism was therefore called into question. But it would be saved by the invention of Thomas Newcomen in 1712 of the first steam engine, which,

coupled with that of the use of the railway in the mines, made it possible to solve this serious problem: it is the time of the so-called industrial revolution or rather, it seems, more precisely, according to Scheidler, the first phase of the industrial revolution, this beginning in England in 1760 and ending in 1840.⁴⁵

Some geologists, Scheidler points out, believe that this massive use of fossil coal was so important that it inaugurated a new era in the history of the planet: the Anthropocene era characterised by an enormous increase in the production of goods and also one of the greatest mass extinctions of species in the history of the planet. Would the industrial and technical revolution of the 18th century, with the invention of the steam engine as its symbol, therefore be the cause of this economic revolution? This is not Scheidler's opinion. Certainly, he indicates, referring to [Bonneuil and Fressoz \(2015\)](#), how in school textbooks, the history of the industrial revolution often begins with technical inventions, above all that of the steam engine. But for him they were not so much the cause as the effect of the forces pushing for economic expansion. For this reason, he believes, it would be more relevant to call the new era Capitalocene rather than to speak of Anthropocene, because it is not the human being as such who has brought about this evolution but the dynamic of the endless valorisation of capital. He recalls that the monetary economy spread more and more widely during the first modernity (from 1348 to 1648) and that the bourgeois who benefited from it had accumulated gigantic quantities of monetary capital which were waiting to be invested with profitable manner, and that in order for money to be able to produce money in a sustainable manner, the volume of production must grow and even grow exponentially. For him, therefore, the invention of techniques allowing the massive use of coal is a spiral which coupled with the system of endless accumulation of silver to form an explosive mixture which precipitated the earth into the Capitalocene and leads us today to a systemic crisis of planetary dimension, a gear starting a process comparable to the explosion of a nova.

Once again we see that Scheidler links economic development and its industrial choices to the logic of the capitalist system: he constantly returns to the capitalistic origins of the Megamachine which dominates today's world. He will then show the consequences of the implementation of this Megamachine based on coal energy. First, as already well shown by Mumford, the uprooting of a large part of the population having to renounce their family roots, this despite massive resistance like that of the Luddites in England in the 1810s. Then the use of the idea of participation in the construction of powerful and glorious nations, in the context of a revisited economic nationalism, supposed to provide happiness to the working class rescued by welfare States. He will then explain that these social promises will be notably paid for by the colonisation of practically the entire planet in the second half of the 19th century.

He first deals with the devastation of Africa, starting with the case of the military conquest of what would become Rhodesia by the troops of the mining entrepreneur Cecil Rhodes: the latter justified his "civilising mission" by the fact of superiority of the white race, a superiority also recognised, Scheidler points out, by eminent philosophers like Kant, Hegel and Hume. He shows in particular that, thanks to the invention of the machine gun, the army of Rhodes, with less than 2,000 men and less than 500 killed, was able to exterminate 60,000 Ndébélé in rebellion against

the control of the copper resources of their territory: copper which would enable lighting of the houses of European workers.

He then cites the even more horrible cases of the conquest of the Congo by the king of the Belgians from 1884, always for questions of supply of raw materials, notably copper and rubber, resulting in ten million people murdered through summary executions or inhumane forced labour conditions. In this regard, he underlines that the Société Générale de Belgique played a leading role in the plundering and genocide of the Congo and continued its business without hindrance until it was swallowed up in 2003 by the Suez Lyonnaise des Eaux Group.

Scheidler then turns to the case of India. First governed since the middle of the 18th century by the East India Company, India was then, due to an uprising of some 200,000 mercenaries it employed, directly administered by the British State which destined it to be a major supplier to the global agricultural market. To this end, to “convince” traditional peasants to abandon their subsistence economy, this State used the two classic methods of levying taxes and placing them in debt bondage, this in the case of instalments on their harvest which could not be reimbursed. This practice serving the world market will prove catastrophic during the exceptional droughts which regularly strike India due to the El Nino phenomenon: in fact, whereas within the framework of classic forms of community and solidarity of the agricultural economy, these traditional farmers could rely on reserves or aid during these periods, it was no longer like this within the framework of priority to the world market: the available stocks being reserved for export were delivered to the world market, this all the more efficiently because with the taxes paid by small farmers the British had built a vast railway network transporting these stocks quickly and cheaply. The result was waves of famine of unknown magnitude which caused between 12 and 30 million human beings to die in India alone, despite calls for Viceroy Lord Lytton to intervene to reserve supplies: his response was the ban on meddling in self-regulating private commerce, Scheidler ironically specifies.

Scheidler will then deal with the destruction of China by the colonial powers. Based on Arrighi (2009) Scheidler shows that this country had developed for centuries a non-capitalist market economy based on the separation of the State and capital with strict control of the activities of foreign merchants and missionaries, which had not prevented it from becoming the most prosperous country on the planet. However, these limitations particularly hampered the opium export activities of the British East India Company as well as those of Jardine, Matheson & Co. When Chinese authorities arrested British drug traffickers in 1839 and burned more than 12 tons of illegally smuggled narcotics, Jardine and Matheson pushed London to launch a war against China – a war that became known as the first Opium war – and obtained its capitulation in 1842. Due to a similar incident, a second Opium War took place in 1856, culminating in the devastation of the imperial palace, followed by the imposition of the signing of treaties legalising the traffic of opium and obtaining the opening of China to international trade as well as to the activity of Christian missionaries. This would precipitate this prosperous country into the chaos of the civil war in 1851, notably due to the Tai Ping revolt,⁴⁶ which resulted in the deaths of 20 to 30 million people. In 1899 these actions of

the colonial powers provoked a massive rebellion, the famous Boxer Rebellion, which was crushed militarily by the invasion of a coalition of eight Western states, a punishment supplemented by having to pay "reparations" which will complete the ruin of this prosperous country and place it under the control of warlords and mafia organisations: they were responsible for having made 20 million Chinese addicted to drugs. A whole story that Scheidler claims has been largely repressed or minimised until today even in Julia Lowell's book (2011) on this subject.

He concludes this chapter by emphasising that around 1900 the entire planet, or almost all of it, was integrated into the global capitalist economy, which constitutes the first truly global system in the history of humanity, and that competition pushed to the extreme between the colonial powers to conquer the markets, control raw materials and ensure their spheres of influence. It was one of the causes which would ultimately lead to the First World War, Germany, in particular, with its powerful coal industry, wanting with all force to dethrone the British Empire. What was new, according to him, was on the one hand the industrialisation of the massacre, notably thanks to the contributions of the metallurgical complex and the chemical industry,⁴⁷ and on the other hand the scale of the mobilisation (50 million soldiers including 13 million on the German side alone) and destruction: 10 million dead, 20 million injured and an incalculable number of traumatised people. He then wonders: how is it that all these human beings obeyed and left their homes to go kill people who had done nothing to them because somewhere, in the distant cities of Paris, Berlin or Saint Petersburg a bunch of "operetta characters," as Karl Kraus (1974) put it, had decided so? But, in my opinion, he himself gives, at least partially, the answer in his text by emphasising that war is structurally a phenomenon of moral hazard: those who make the decisions risk almost nothing themselves; and those who risk their lives have no decision-making power. Let us recall that in the preceding chapters Scheidler had already pointed out that modern capitalists make their fatal decisions quietly, sheltered in their office, sipping a whiskey, a beer or a sake I might add, while those who work for them are destined to be cannon fodder of struggles for global competition without being able to intervene at the level of these companies. This raises the question of democracy that he will address in the next chapter of his book.

3.9 "Masks: governing the great machine and the fight for democracy (1787–1945)"⁴⁸

Scheidler begins this chapter with the presentation of a fable: in the current narrative, which makes Europe the cradle of freedom, democracy and prosperity, the expansion of the capitalist mode of production in the 18th and 19th centuries is presented as the condition for the progressive advancement of democratic rights. He is then surprised to see how popular this story is even though almost every one of its allegations is false. First, as he already showed,⁴⁹ the principle of human beings' dominion over each other simply did not exist for most of human history: until about 5,000 years ago it was impossible for a minority to impose its will on the majority. A situation which persists, he emphasises, until today in certain

indigenous cultures.⁵⁰ At the height of Attic democracy only a minority (of well-off men) had the right to vote but, he believes, even today in Europe this type of privilege persists in other forms for three main reasons. Firstly, entire sectors of society are largely devoid of any democracy: not only most businesses⁵¹ but also schools, the army and other disciplinary institutions. Secondly, not only did Europe not invent democracy but, under its colonial rule, it everywhere destroyed egalitarian forms of social organisation in Africa, America and Asia. Thirdly, there is no link between democracy and a market economy: on the contrary, the democratic achievements obtained in Europe were achieved thanks to the resistance that this type of economy has generated. He concludes this passage on the myths of European democracy by emphasising the importance of the fundamental conflict: on the one hand different fractions of the economic elites sometimes classified into “conservatives” and “liberals,” who are fighting to obtain political power, and on the other, those who suffer from the system and fight for a completely different social order.

This fundamental point leads him to study what he calls the “filters of democracy.” This is the dilemma facing political and economic elites: making concessions to groups in revolt but concessions that must not go too far. He then believes that States will never accept either a questioning of salaried work or a questioning of the property regime. Indeed, an integral democracy which does not stop at the threshold of the factory, the barracks or the school, would mean nothing less than the total dislocation of the functional structures of the modern world economy: such is his thesis, indeed a fundamental thesis. Therefore, for him, the history of modern democracy must also be written as the history of the restrictions imposed on it. This is how James Madison, the “father of the American Constitution,” clearly distinguished democracy, the ferment of agitation and revolt, from the Republic, which practically allows the richest, like Madison himself, to govern: this is what Scheidler calls the first filter, the one which aims to give the right to vote to a limited social category, that is to say, at the time, to white American men whose fortune exceeded a certain threshold.

The second example of a filter that Scheidler gives is that of the role of money (pure and simple) during the French Revolution. He explains that this revolution involved three types of actors. On the one hand, the wealthy bourgeois who then demanded their systematic participation in political life without any questioning of their affairs. On the other hand the Enragés, with Jacques Roux as spokesperson, who wanted not only to participate in political life but also to call into question the privileges of the bourgeois in their firms. And thirdly, Robespierre and his supporters who, although also calling themselves revolutionaries, in fact wanted to prevent democracy from overflowing, in particular by calling into question the power of the bourgeois in their companies. To reassure merchants and bankers, Robespierre, in September 1793, arrested and sentenced Roux and the other enraged people to death. As part of this second filter, unlike the first, all men of a certain age in France can theoretically participate in the Republic but only financial capital continues to dominate the scene in capitalist companies: thus the revolution did not induce a change of system, all the less so since the constitutional proposal of universal and equal voting rights for men has not been put into practice, as we will see later.

The third type of filter that Scheidler gives is provided by the example of Haiti, a country whose majority black and slave population led a victorious revolution in 1791 against French forces. But the French authorities recognised its independence only on the condition of compensating the former owners of the plantations who had been "expropriated." Hence an interest-bearing debt which squeezed this country until 1947 and prevented it from being able to self-determine correctly.

The fourth type of filter is the one ultimately used by the French "revolutionaries" inspired by Abbot Sieyes to avoid granting the right to vote to all French people. It consisted of establishing a distinction between "active" and "passive" citizens: only those who contributed to public services, in practice wealthy white men, would be considered active and then be able to benefit from the right to vote, this depending on the amount of tax they paid, with women completely left out. In short, the poor, women, despite the protests of Olympe de Gouges (guillotined in 1793), and blacks were not considered capable of acting reasonably. This situation, Scheidler shows, persisted throughout Europe for most of the 19th century: the right to vote remained the privilege of wealthy bourgeois males. But these elites had to install other filters as the demand for universal suffrage tended to become more widespread.

Scheidler then shows that they played on a fifth type of filter: that of controlling public opinion. Indeed, thanks to the concentration of newspaper ownership in their hands, they began to have enormous power over opinion. Scheidler cites in this regard the cases of Julius Reuter and Alfred Harnsworth in England, of William Hearst in the USA and of Hugenberg, chair of the board of directors of the Krupp Group in Germany, a supporter of the Nazis. He concludes on this type of filter that this concentration of the media, however, only had limited effects due to the fact that not all the newspapers belonged to these magnates and that a lively public space remained.

He ends this list of filters by showing that when the five previous types of filters failed, governments could then resort to physical violence: he notably gives the example of the repression of the workers' commune of Paris in 1871, on the orders of Adolphe Thiers. But, ultimately, he emphasises, all these filters could not prevent the universal and free right to vote from being recognised, thanks to the tenacity of worker organisations and civil rights movements and not to the democratisation that the market economy would bring about.

Hence the new question that will arise for the defenders of the Megamachine: how to keep control of the system in this new context? A question all the more difficult since, as Scheidler shows, the Megamachine began to have a weak point: indeed, as fossil coal replaced other various sources of energy, a relatively limited number of workers controlled gigantic quantities of energy: this is evidenced in particular by the major miners' strikes from the 1880s to 1910. Hence a new delicate situation for entrepreneurs and States arose: how to operate to make certain concessions sufficient to stop strikes without leading to the dismantling of the Megamachine; a problem of developing new strategies and methods adapted to the new situation. Scheidler believes that, faced with this new situation, the economic elites had the choice between two main solutions: either strive to abolish the representative system and replace it with a form of totalitarian government, or accept

the formal establishment of a representative democracy and bet on the possibility of channelling it, using various filters.

Scheidler then gives a first case of a typical solution for replacing the representative system with a form of totalitarian government with the example of Russia in 1917. In this country the war led by the Tsar had caused misery and brought the Bolsheviks to power. The population then awaited the realisation of Lenin's promises of a democracy based on workers' and soldiers' councils.⁵² But as soon as the Bolsheviks seized power they buried the dream of self-management, Lenin believing that the proletariat needed the power of the State: an organisation of violence. Scheidler then shows that Lenin did not want to dismantle the Megamachine but simply to use it in another way by building an efficient planned and centralised industrial system in the image of the war economy set up in Germany by Walther Rathenau, the president of the electricity giant AEG. The only difference, he said, with the model of bourgeois industrial society was that Lenin substituted the party bureaucrat for the entrepreneur who commands his employees. Scheidler believes that from a certain point of view this was a colossal step forward since it meant the expropriation of capitalists, but from the point of view of the Megamachine, the goal of the industrial machine remained to accumulate capital to reinvest it in an infinite spiral. As Lenin himself said, "Socialism is only the monopoly of state capitalism put at the service of the interests of the entire people."⁵³ Scheidler concludes that Lenin's communist system did not break with the four tyrannies but simply the structural violence of the market was replaced by the direct domination of the bureaucracy with the addition, later under Stalin, of a system of internment camps. He adds that this Russian scenario, however, constituted the dread of a large part of the Western elites who were then looking for a path between the Scylla of authentic democracy and the Charybdis of Leninism.

This leads Scheidler to the next point, which concerns the invention by the worried defenders of private capitalism of a new type of (formally) representative democracy: managed democracy. This is the name of this new type of miracle democracy which will save capitalism. Managed democracy is a concept first formulated in the 1920s by the American journalist Walter Lippman. The latter, explains Scheidler, believes that a modern democracy is made up of two types of human beings: on the one hand those who are fundamentally overwhelmed by the complexity of modern societies and, on the other hand, experts. For the former, participation in political life should be limited to choosing every four years between two competing fractions of the "specialist class," because this class alone has the knowledge necessary to pilot an ultra-complex Megamachine. Thus, experts will be able to guide the herd by deliberately influencing public opinion through what Lippmann calls the "manufacture of consent," that is to say the manipulation of this opinion. Scheidler, inspired by Orwell (in particular his book *Animal Farm*), specifies about this type of democracy that one of its main functions is to circumscribe the domain of what can be "reasonably" discussed in such a way that the options threatening the system are never seriously part of the debate. This occurs with the help of three subsystems: the university system, the party system and that of the media. But he shows that this strategy is anything but perfect: we cannot prevent

human beings from thinking for themselves. "Managed democracy" is therefore always threatened and this is why, he explains, other more radical methods have been considered by those in power, notably fascism, which is the subject of the last study in this Chapter 9 devoted to the masks used by the defenders of the capitalist economy to prevent their adversaries from seeing clearly.

For this purpose he takes the example of the German revolution of 1918–1919, a revolution which began in October 1918 in Kiel by the refusal of exhausted and disillusioned sailors to once again weigh anchor for an absurd battle and which in five days would spread throughout the country everywhere – without central organisation. Factories and entire municipal administrations were occupied by the revolutionaries. He emphasises that, unlike the October Revolution in Russia, this revolution was not led by a Bolshevik elite but by a predominantly social democratic working class who wanted workers' self-management and who expected to have the support of the leaders of the Social Democratic Party. In fact, as a response, Friedrich Ebert, the first social-democratic president of the Reich and his Minister of Defense Gustav Noske mobilised proto-fascist Free Corps from the extreme right forces to drown in blood in January 1919 revolutionary centres and undo the Republic of Councils proclaimed in Munich. Scheidler, referring to [Haffner \(1973–2011\)](#), ends this episode by insisting on the fact that many soldiers of the Free Corps already wore the swastika as an armband: the germ cells of the Nazi movement were born. He then shows that in northern Italy workers' councils occupied large factories after the war and even proclaimed workers' democracy in certain towns. Faced with this situation, a good number of industrialists financed Mussolini's thugs. Indeed, wherever the filters of managed democracy were no longer sufficient, fascism appeared for industrialists and bankers as a way of maintaining control over the Megamachine, not only in Germany, where Hitler received massive support from German and sometimes even foreign employers,⁵⁴ notably for his electoral campaign, but also in Catalonia during the civil war of 1936–1939⁵⁵ and in Japan with Tenno fascism. The rest is known: with the emergence of fascist states, the Megamachine was transformed for six years (1938–1944) into a gigantic apparatus of industrial extermination, this not following a regression into primitive barbarism but rather due to completely modern 20th century phenomena. This leads him to his 10th chapter.

3.10 "Metamorphoses, resistance movements and the limits of the system (1945...)"⁵⁶

After WWII Scheidler shows that the situation becomes complex and differentiated according to geographical areas. In the West, from 1945 to 1975 we speak of the "Thirty Glorious Years" with a parliamentary system supplemented by the establishment of a welfare state which encourages consumption: thus, he believes, "work and capital are reaching out." Capitalism offers a consumer society based on the automobile industry and the use of goods with planned obsolescence or changing fashions. It is the time of consumerism and systematic growth measured by a new indicator: gross domestic product (GDP), developed in the 1930s–1950s, and considered the best indicator of progress. In China, Mao, much more brutal with his famous

“Great Leap Forward,” wants not only to copy but also to surpass the West on his own ground. As a result, Scheidler emphasises, he draws the peasants into the steel madness, which will cause one of the worst famines in Chinese history, which left millions dead. Likewise, his “Cultural Revolution” will be contaminated by an idea of development against the Four Old Ages (ideas, culture, customs, habit).

On the other hand, in the Global South, there are fewer admirers of the Western model and therefore the recipes proposed by the neo-liberals will be more difficult to pass. Thus in India, which became independent in August 1947, when Gandhi proposed breaking with the division of labour which had made this country a supplier of low-cost raw materials and reviving village self-subsistence, he found strong opposition from missionaries of Western civilisation like Harry Truman. The latter did everything he could to make this country change its strategy and renounce its projects. After the assassination of Gandhi and his replacement by Nehru this was finally achieved.⁵⁷ Likewise, the American secret services would organise coups d’état and/or assassinations of elected presidents to prevent the advent of a true democracy capable of harming the interests of Western capitalists. This in many countries, notably in Iran in 1953 (case of Mossadegh), in Guatemala in 1954 (case of Arbenz), in Congo in 1960 (case of Lumumba), in Indonesia in 1965 (case of Sukarno). With these actions the politicians then thought they had found the solution to stabilise the situation.

But that was without taking into account the “world revolution of 1968,” that of the “struggle for civil rights and student protest” which would defy the global system in a much more fundamental way than the “old left,” a revolution which wanted to “change life,” in particular by calling into question salaried work, and not simply to better distribute wealth, all this by allying itself with other movements, in particular that of Indigenous peoples and women. Faced in this case with previously unknown forms and objectives of resistance, the political and economic establishment was forced to forge a new toolbox. Certainly, it would continue to use old methods such as tear gas and beatings, or even lethal weapons and torture against students, but it would also resort to new methods such as smear campaigns, false reports, and even, in Italy, with Gladio, the organisation of attacks then attributed to left-wing organisations. But Scheidler believes these actions will not be enough, especially since the student movement has been joined by the emergence of a new wave of activism: the modern environmental movement, notably with the founding of Greenpeace in 1970.

Scheidler concludes on this phase that certainly 1968 did not ultimately bring the great political revolution hoped for, but the social changes were no less profound: a global counterculture was interfering ever more deeply in the dominant culture. This was also confirmed by a famous report commissioned in 1973 by the Trilateral Commission, made up of important politicians from three continents and CEOs of large groups: the “Huttington Report.” This diagnosed a crisis of democracy due, in the opinion of its authors, to an excess of democracy (!) while “the effective conduct of a democratic political system usually requires a certain dose of apathy” (!). This is particularly ascribed to a layer of idealistic intellectuals who spend their time denigrating leadership and the lack of agreement in education with our economic and political demands and the rise of partisan journalism.

Statements that Scheidler characterises as evidence of the "liberal" political elites' fear of true democracy and the complete embarrassment into which the establishment had fallen by the mid-1970s.

But this establishment had not yet developed its strategies to carry out the "great leap backward" that Halimi (2004) speaks of and which Scheidler will now evoke under the title of "the great regression." In a context of double challenge posed by the counterculture and the economic recession due to the surge in oil prices and the collapse of the international monetary system, the political and economic elites concocted what was subsequently called the "neoliberal revolution." According to him, it was based on three main strategies. 1. Strive to reduce costs linked to input (salaries, taxes and the cost of natural resources), in particular thanks to the indebtedness of the Global South. (See below.) 2. Increase speculative operations while requiring that the public treasury intervene by ensuring that losses linked to a possible crisis are not assumed by the speculators themselves (although this principle is theoretically incompatible with neoliberal ideology). 3. Privatisate sectors which had until now been removed from the logic of capitalist accumulation, such as health, education and retirement systems, and transport.

All these measures have resulted in a growing debt of citizens and States. The success in imposing such a program of social destruction required a different mix of ideological propaganda, structural power and physical violence. Regarding the latter, Scheidler gives first the example of Chile: the coup d'état in 1973 against Salvador Allende with the support of the United States. He also mentions the case of Iraq in 2003. But such a solution could not be applied in North America and Western Europe. In these regions the recipe that would be adopted, thanks to a colossal propaganda campaign, would be that of selling citizens the destruction of their public infrastructure and their social security as an individual liberation, this in the name of self-optimisation and the freedom to consume. Among these measures was the commodification of universities and the privatisation of television in order to prepare viewers for a world of total competition. Scheidler emphasises in this regard that the social democratic parties became the zealous executors of the neo-liberal program so that during the elections there was almost no real political alternative put to the vote.

Regarding the East after the collapse of the USSR and the failure of Gorbachev to achieve a kind of social democratic welfare state on the model of Sweden, Scheidler shows how foreign investors and local elites got their hands on the choice pieces of the system which was collapsing and favoured, with the support of the IMF and Western governments, Boris Yeltsin's 1993 coup against Parliament. In China he describes a process similar to that of the USSR but internally: Deng Xiao Ping opened his country to external capital from the beginning of the 1980s, which led to the expulsion of 70 million peasants from their land and practically deprived workers of any social protection while party officials appropriated public enterprises, factors which were one of the detonators of the protest in Tiananmen Square in 1989, a resistance broken by Den Xiao Ping with tanks and mass executions.

In the South another strategy was generally adopted: that of proposing, in particular to the governments of the former colonies, major infrastructure projects,

often oversized, and absurd prestige projects, financed with the help of credits granted by the North and carried out by Western firms; the latter, between 1970 and 2000, increased the debt of the 60 poorest countries in the world from 25 billion to 523 billion dollars. When Paul Volker, the director of the Federal Reserve of the United States, radically raised interest rates, the consequences were dramatic for the Global South, especially since the IMF subsequently granted them emergency credits on the condition that they radically oriented their economies towards exports, which would cause a collapse of prices on the world market, to the great benefit of the North.

Finally, in certain cases, to build a united group, a “we” that is to say an imaginary community from a torn group, the liberal political elites opposed an external enemy. Until 1989 this was the role of communism. In the United States, after the September 11 attacks, the leaders managed to find a new enemy of civilisation in the East: the various currents of political Islam all united in the same bag of Islamism.

At the conclusion of this long chapter (nearly 50 pages) Scheidler draws up the limits of the system, those on which the global Megamachine stumbles, limits which, according to him, prove that there is no doubt that the optimistic faith in progress, which characterised Western civilisation for more than two hundred years, is in the process of collapsing. First of all, economic limits due to the fact that liberal regression, if it was very profitable for a thin elite, at the same time considerably weakened demand by reducing wages and precarious work and exponentially indebted all the actors. This system became therefore suffocated by its own productivity: indeed, it is a system in which only 20 per cent of the population operates production⁵⁸ and which refuses Keynesian programs for taxing wealth, while dilapidating infrastructure and focusing on the construction of surveillance systems.

The result, and this is a second type of limit of this system, is an erosion of citizen loyalty that certain nationalist states like those of Bolsonaro in Brazil, Trump in the United States, etc. think they are avoiding through a diversion strategy targeting scapegoats but which further aggravates all the dynamics leading to the global crisis. Finally, Scheidler analyses the link between economic growth and the destruction of the planet with a system that destroys its own conditions of existence while emphasising that neither the magic formula of green or sustainable growth nor that of decoupling will be able to resolve these ecological problems. As long as the Megamachine continues to function it rushes into the wall because the only tools that could now be of any help to us were never planned: a brake and a reverse gear. This statement will be clarified in his last chapter.

3.11 “Possibilities. Exit from the Megamachine”⁵⁹

Scheidler first reminds us that no social system is eternal and that this also applies to the capitalist world system which has spread on earth over the past five centuries⁶⁰ and that even small actions like those of a Rosa Parks or a Greta Thunberg could have had great repercussions. For him, it is about building new social and economic structures that make it possible to live and produce a little more each day

outside of the logic of the machine in order to replace it with new institutions and new rules. In this perspective, he believes, there is no sense in playing defensive strategy against offensive struggle, gradual reform against revolutionary rupture, decentralised development of alternatives against the dismantling of large structures, as has been so often the case and as we continue to do today: the actors must learn to collaborate. He believes that in terms of alternatives we have everything we need but what is missing is *a master plan to build a new system that would replace the previous one*.⁶¹ Thus, instead of a general plan, a patchwork of very different initiatives emerges, which are adapted to local and cultural conditions. He says in this regard that, on the one hand, the absence of a master plan is not a defect and that, on the other, however, such pluralism can also constitute a weak point with fatal consequences if it prevents the convergence of struggles at certain strategic moments. Indeed, he underlines, major structural transformations require political coordination and concentrated forces.

We therefore need, he believes, a common narrative with an integrating effect articulating a certain number of fundamental values in the service of the common good and not profit: this in order to allow authoritarian structures to be replaced by self-organisation and deepening of democracy. He emphasises that all scenarios for exiting the Megamachine must sooner or later confront the power of the large anonymous companies which constitute the engine of the capitalist economy, giants which nevertheless have an Achilles heel: most of them could not survive without the aid of States. He affirms that free and undistorted competition, which economists constantly invoke, has never applied to them and that with the product of taxes we finance with billions the organisations leading us to climate chaos, showing that the "free market" is just a myth and that citizens could reappropriate these funds for socio-ecological transformation. He then calls for putting pressure on those who finance the metallurgical-fossil complex and above all for forging a *legal framework*⁶² which cuts off the financial windfall from destructive sectors with restrictive rules to channel monetary flows towards socio-ecological reconversion. This in the framework of another economic logic which, in particular, would aim to replace traffic in individual cars with public transport networks, cycle paths and pedestrian paths. This rather than manufacturing electric cars which release much more CO₂ than the production of conventional automobiles, above all because of the enormous batteries required.⁶³ He also cites the "Restart Switzerland" initiative aimed at forming "neighbourhoods" of 500 people working nearby, which minimises transport.

With regard to the financial sector and in particular the banks, Scheidler proposes that the granting of credits be subject to strict social and ecological criteria and that these banks be broken up in the event of failure and not systematically bailed out as is the case with these days. He also proposes creating housing cooperatives which will take real estate off the market in the long term. To combat the phenomenon of growing indebtedness of States and citizens, he suggests, in addition to the radical solution of refusing to repay, that of taxing the rich to repay the debts they hold on the poor. More broadly, to modify the current economic system he supports the Austrian proposal⁶⁴ of a citizen economy project which consists of

reversing the legal framework of companies in order to reward not competition, but cooperation in research of the common good.

Testifying to a rather rare accounting concern, he wants from all companies, instead of a simple financial report, a “citizen report” which analyses the social and ecological consequences of their activities. Socially and ecologically destructive companies would then pay much more in taxes and would not obtain credits (or only very expensive ones) and would not benefit from public orders. This citizen economy will also provide for companies beyond a certain size to gradually pass into the hands of employees, this coupled with the introduction of a maximum income at the national level so that differences in income do not exceed 1 to 10. He emphasises that the various scenarios can diverge on the role that should fall to the market and money: some want to go beyond them completely and others give them a different role. Whatever the choice made, he believes that this type of economy based on the common good would mean the disappearance of multinationals, but not the end of the world, especially since the economic vitality of joint enterprises would no longer be drained by exterior shareholders. Furthermore, the application of such a system to agriculture would allow the end of agribusiness and, as a result, the conservation of nature (especially soil) as well as massive hiring of new farmers. More generally, the drop in GDP that would result from this new economy would not be a disaster: producing less and distributing what we have produced more fairly would increase a form of comfort that does not appear (in GDP): abundance of time but also personal development and commitment to society.

While the engine of the Megamachine consists of transforming money into more money, getting out of this logic requires reintroducing the question of meaning into the economic domain. For him, moreover, this construction of a new participatory economy could make it possible to improve the functioning of representative democracy: both building decentralised structures from below and transforming centralised state structures so that they allow democracy to unfold. He is rather optimistic on this point because he believes that the Megamachine is beginning to collapse. Indeed, we do not see any superpower emerging on the horizon that can take over the role of the United States, but rather something like a multipolar world: the centre of gravity of the economy is visibly moving towards China, which will soon be the great economic power. But unlike Western states in the past, he believes that China does not rely on military conquest and domination, but above all on trade: elements are therefore in place for the establishment of a new, multipolar and peaceful world order. He ends his book by insisting that a discussion about what technology we want, and for what purpose, can make sense only once we have discarded the ideology that increasing productivity and efficiency is the only criterion that must be taken into account in the development and use of techniques, and that freeing ourselves from the dictatorship of efficiency nevertheless requires replacing competition with cooperative economic structures. Thus, for him, the question of technology takes us well beyond purely technical questions: it is a question of reculturating our economic practices and our social institutions which, over the past centuries, have been cut off from their cultural dimensions.⁶⁵

With these reform proposals from Scheidler we have just completed the presentation of three major contributions to the study of the Megamachine that drives today's world. It seems to us that on many points Scheidler is in line with Mumford's ideas. On the other hand, we can only be struck by the differences in approaches that separate Serge Latouche and Fabian Scheidler. For the first, what is fundamentally at issue is the problem of the idea of unlimited progress formulated in the 17th century by scientists like Bacon, an idea then concretised in the 18th century by economists like Adam Smith who will insist on the fundamental role that the market and its invisible hand play for economic expansion. On the other hand, for Scheidler the fundamental problem is that of the managerial practice of capitalist firms, a practice which is permitted, as he underlines, by the invention of accounting in the late Middle Ages (around 1340), and which fundamentally develops at the turn of the 16th century (around 1500) with, in particular, the examples of bankers from Genoa, Augsburg and Antwerp who financed the conquest of the Americas and then that of the rise of the Fuggers to the rank of the first bankers and mining entrepreneurs in the world. Scheidler's focus from the beginning to the end of his book is constantly on these large, increasingly powerful accumulating capitalist firms which will gradually dominate politicians and scientists and end up imposing on the whole world their accounting rationality based in particular, as Scheidler underlines it often, on an ideology of effectiveness and efficiency in the service of unlimited accumulation. These two very different visions lead, as we have shown, to very different positions regarding the possibility of acting effectively on this Megamachine. While Latouche essentially sees, with Ellul, multiple and anonymous actors, practically uncontrollable, Scheidler, on the contrary, does not doubt that we can one day curb these clearly identifiable capitalist actors, especially those of the large global groups, who are relatively few in numbers. This difference of view on the Megamachine can be explained by the training and readings of the two authors. Latouche has the great intellectual honesty to admit that as an economist he has little or no exposure to the concrete realities of business management. As for Scheidler, if he does not talk about his experience in his book, he displays a rare knowledge of the importance of accounting. Perhaps it is his taste for history and the fact that in Germany there have been sociologists, and not the least important ones, like Max Weber and Werner Sombart, who were passionate about this discipline, and more broadly the management of capitalist companies, which explains his particular attention to these concrete questions. We can only be impressed by Scheidler's realism and capacity for synthesis and we must congratulate him for having written such a rich and, in my humble opinion, very convincing book on such a vast theme.

However, I would like to show that although I share most of his analyses, I nevertheless think that some of them could be improved and above all that his proposals for reform of the current economic system could be greatly enriched, this in particular because if he has paid attention to the flagship discipline of capitalism, its accounting system, he has not delved enough into its concrete nature and potential for a type of new economy. This will lead me to tackle the second part of this work devoted to a new vision of the Megamachine, its expansion and its death.

Notes

- 1 Scheidler (2020, p. 3).
- 2 In this regard, he pays homage to the sociologist Immanuel Wallerstein who, to designate this functional structure, speaks of a “modern world system.” (p. 15).
- 3 Scheidler (2020, pp. 5–6).
- 4 Scheidler (2020, p. 6).
- 5 Scheidler (2020, p. 10).
- 6 Scheidler (2020, pp. 13–31).
- 7 Scheidler (2020, pp. 13–14).
- 8 Scheidler (2020, p. 24). He specifies that this tradition also includes the biblical jubilee, which provides for the cancellation of all debts every seven years and the restitution of their former properties to landless peasants (p. 43).
- 9 Scheidler (2020, p. 25).
- 10 Scheidler (2020, p. 26).
- 11 Scheidler (2020, pp. 29–30).
- 12 Scheidler (2020, pp. 33–41).
- 13 Scheidler (2020, pp. 40–41).
- 14 Scheidler (2020, pp. 43–57).
- 15 See Richard (2023b) for more details on this point.
- 16 Scheidler (2020, p. 56).
- 17 Scheidler (2020, p. 57).
- 18 Scheidler (2020, pp. 59–74).
- 19 This book is an accounting book that records all our actions throughout our lives. Let us emphasise in this regard that in the Arab religion the same book relating to the last judgment is qualified as *yum El Hisab*, this latter term (*El Hisab*) meaning in Arabic calculation or accounting (from the root *hasaba*). This is obviously perfect accounting since it is kept by God! This shows that accounting is a universal and immortal activity: not only the one used by humans on earth since the Stone Age but also the one favoured by the Gods in heaven. (See for more detail my article online on “les origines du mot comptabilité” [https://www.academia.edu/93086593/Origines_du_mot_comptabilite].)
- 20 This reiterated precision allows us to once again confirm the date of the true birth of capitalism according to Scheidler: after 1500. We can see the care he takes to specify this dating, whereas for Latouche this problem does not seem very important: which is logical since for the latter the Megamachine goes far beyond the framework of capitalism, if only by the fact that, according to him, that socialist and communist type regimes have also adopted it.
- 21 Scheidler (2020, pp. 63–71.)
- 22 Scheidler (2020, pp. 71–73).
- 23 Scheidler (2020, p. 75).
- 24 Scheidler (2020, pp. 75–81).
- 25 Wallerstein, Immanuel (1996, p. 2.) *Le capitalisme historique*. Paris La Découverte.
- 26 Scheidler (2020, pp. 85–133).
- 27 In general, in most dictionaries the end of the Middle Ages is identified either by the capture of Constantinople by the Turks in 1453 or, most often, by the discovery of America by Christopher Columbus in 1492, (i.e. practically 1500, at the beginning of the 16th century).
- 28 I stress this important point.
- 29 Scheidler (2020, pp. 152–154); he cites in particular the massacre and pillage perpetrated by the Genoese in the mosque and the city of Jerusalem in 1099 and the pillage in 1204 by the Venetian fleet of Constantinople, during the fourth crusade.
- 30 This work, as we have seen, had also been cited by Mumford.
- 31 Scheidler (2020, p. 114). To show the reader what this could be about, however, here is an example that Scheidler took from the famous report of Las Cases on the practices of

- the condotieri: "[T]hey placed bets on who could manage to cut a man in two, or cut off her head in a single blow with their ax. They took suckling children at their mother's breast by the foot and threw them against rocks while others, laughing and joking all the time, threw them over their shoulders into a river"!
- 32 These mines were discovered in 1545 in Bolivia.
- 33 Scheidler (2020, pp. 187–188).
- 34 Scheidler (2020, p. 189; he specifies in his chronologies (p. 547) that "the peak of witch hunting in Europe took place from 1550 to 1650."
- 35 He specifies in his chronologies that this invention took place "around 1340 in Venice and Genoa" (p. 546).
- 36 I emphasize this point: for him it is apparently not an industrial activity but only a commercial one, a point which is very questionable as we will show later.
- 37 Scheidler (2020, p. 203).
- 38 See note 106 on page 578 and the reference to the book "Capitalism and World Economy."
- 39 See note 108 on p. 579.
- 40 Scheidler (2020, p. 208).
- 41 Scheidler (2020 pp. 135–171).
- 42 He cites in particular the case of the Prussian army which punished soldiers who dared to contradict a superior by the "torture of the rods": passing bare-chested in front of a platoon of several hundred soldiers each required to strike the back of the soldier with a wand. (p. 250).
- 43 A little later in his work he cites the famous scene from Charlie Chaplin's "Modern Times," where "the worker has become the cog in a global megamachine" (p. 276).
- 44 Scheidler (2020, pp. 173–205).
- 45 Scheidler (2020, p. 407).
- 46 This revolt emanated from dissatisfied minorities led by a peasant's son (Hong Xiuquan) nourished with Christian apocalyptic ideas (p. 310).
- 47 He cites in particular the synthesis of saltpetre by Fritz Haber and Carl Bosch, which allowed the manufacture of explosives and gunpowder in hitherto unimaginable quantities.
- 48 Scheidler (2020, pp. 207–238).
- 49 And as Mumford also demonstrated in "Myth of the Machine."
- 50 He cites the case of the Herero of South-West Africa as a typical example (p. 319).
- 51 He cites the Lowell mill girls who believe that businesses are built in principle on the model of absolute tyranny (p. 320).
- 52 The latter had stated: "[S]ocialism is not created from above, by decree. It can only be the result of the creative and living activity of the masses" (p. 344). See J.C. Scott (1998) for all the quotes from Lenin.
- 53 Lenin (1917) "The imminent catastrophe and the means of averting it," Complete works, Editions du Progrès 1976, Vol. 25 (Text available on the website www.marxistes.org).
- 54 This is the case, among others, of the Comité des forges de France and Henry Ford in the USA.
- 55 Scheidler emphasizes that the self-managing workers of Catalonia "were not only attacked by the fascists but also by the communist party loyal to Moscow." (pp. 360–361).
- 56 Scheidler (2020, pp. 239–285).
- 57 The latter will notably encourage the construction of dams which will lead to the forced displacement of more than 50 million people (according to Arundhati Roy) (p. 385).
- 58 This according to H.P. Martin and H. Schumann (1997) "The Global Trap. Globalization and Assault on Prosperity and Democracy." London, Zed Books.
- 59 Scheidler (2020, pp. 287–316).
- 60 We can infer from this assertion that the capitalist system would have been born around 1500–1520 and could notably correspond to the rise of the Fuggers to the rank of first bankers and mining entrepreneurs in the world, a thesis which, it should be noted, is

also that of Mumford, who particularly insists in his writings on the importance of the Fuggers in the development of capitalism. (p. 547).

61 Author's emphasis.

62 Author's emphasis.

63 He is also very critical of the construction of wind turbines and solar panels, which itself swallows up considerable resources and emits greenhouse gases (p. 463).

64 In this regard, he refers to the work of Christian Felber: *Citizen Economy* (in German: *die Gemeinwohl Ökonomie*). A movement has emerged Actes Sud (2011).

65 He adds, on the feasibility of this point, in an afterword dedicated to recent pandemics, that during this viral crisis, "the holders of capital massively financed a certain type of research and that suddenly "everything became possible [...] Money that was apparently impossible to raise for social and ecological transformation suddenly began to flow freely." (p. 522).

Part II

The True Modern Megamachine

Origins, Expansion and Solutions for Its Death

In the first chapter, I will deal with the reality of the capitalist system and its role in the formation of the Megamachine. In the second chapter, I will present some false solutions advocated by financial capitalists and their allies to save the Megamachine. In the third chapter, I will show how the drastic modification of its accounting system will allow the death of this Megamachine. In the fourth chapter and the last chapter I will show how the reform of constitutional and legislative rights at the state level could accelerate the movement towards a new human and ecological society.

4 The Concrete Reality of the Capitalist System and Its Consequences for the Formation of the Modern Megamachine

I will devote the first section to the study of the origins of modern capitalism and its true nature, then a second one to the consequences of this historical event for the formation of the modern Megamachine.

4.1 The origins of modern capitalism and its true nature

Let us first of all confirm Scheidler's statements about the importance of the invention of modern capitalist double-entry accounting in the 14th century: it was indeed, in the Middle Ages, a revolution in terms of management and economy with a new type of accounting totally unknown to previous civilisations, notably those of Assur, ancient Egypt, ancient Greece, imperial or Republican Rome (although the latter had a great appetite for accounting calculations) and even, more recently, from the China of the Emperors Song. As we have shown elsewhere (see in particular [Richard and Rambaud 2022a](#) and [Rambaud and Richard 2021](#), Chapter 7), on the basis of historical studies, all these rich civilisations did not know double-entry accounting with, in particular, its revolutionary concepts of depreciation and of capital, the latter being understood in the accounting sense of the term and not

in the economic sense (see below for this fundamental nuance): they used at best, in addition to the remains of very diverse ancestral accounting practices,¹ what we can call single-entry accounting, that is to say, accounting in terms of cash flows (simple comparison of cash entries and cash expenditures and not revenues and expenses) which did not allow the results to be calculated periodically. In fact, in the case of activities extending over several years, in the medium or long term, it was generally necessary to wait until the end of these activities to finally know a result: that is to say, practically, the death of these companies. But, as we have demonstrated elsewhere (notably in [Rimbaud and Richard 2021](#)), this infirmity was not very troublesome in the case of civilisations still largely based on agriculture, which were fundamentally ancient Greece and even ancient Rome: their people, mainly small farmers, had a very long-term vision of their agricultural operations, which is much less the case for the new modern capitalists who appeared in the late Middle Ages and invented double-entry accounting.

This invention, as we have also shown in detail elsewhere ([Richard and Rimbaud 2022c](#)) is fundamentally based on a sort of splitting of the personality of the capitalist: the private capitalist who founds a company to make profits within the framework of this commercial or industrial activity will “lend” his personal money to the professional capitalist who manages this activity, and the latter, who, in the historical examples provided may then also be an accountant who plays the role of this professional capitalist, will have a debt of the same amount towards him. In the context of this fiction when the private capitalist takes out of his personal assets a sum of cash of 1,000 this expenditure is no longer considered as a loss since in compensation for this “loss” the private capitalist has a claim of the same amount on the professional capitalist, who must repay to him this sum, which obviously presupposes a certain confidence in the managerial abilities of the latter that should normally not pose a problem. Conversely, the professional capitalist when he receives the sum paid by the private capitalist does not make a profit since the “benefit” of cash that he receives is compensated by the appearance of a debt that he has with regard to the private capitalist, as shown in the following balance sheet.

Balance sheet of the modern professional capitalist (or accountant) when receiving money from the private capitalist

<i>ASSETS</i>	<i>DEBTS (or liabilities)</i>
Money (received from private capitalist) 1,000	Capital: debt to the private capitalist 1,000

It is therefore this type of assessment based on fiction which appeared for the first time in the Middle Ages around 1340 in Northern Italy, as Scheidler very well noted it. Harari in his fresco “A brief history of humanity” (2019) shows that fictions have often played a central role in the history of humanity: this is, indeed, the case of the one we have just mentioned. Indeed, this double entry technique is still in force today: it is undoubtedly one of the very rare techniques, if not the only one,

which has survived almost seven centuries without modification of its fundamental logic and its presentation. The inventors of this technique in the Middle Ages, if they were resurrected, could understand the principles of construction of current balance sheets, in particular the initial balance sheet that I have just presented. This balance sheet is modern in its spirit in a double sense.

It is first of all, of course, due to the fact that it appears for the first time in world history due to the action of Italian Catholic capitalists in the Middle Ages and not, as Max Weber erroneously sought to prove, in his famous book on the “spirit of capitalism,” later, during the time of the reform, due to Protestant capitalists. But it is also and especially modern because, by its very structure, it testifies, well before the writings of Bacon and Descartes, of what we will call modernist ideology, an ideology characterised by the recognition of the existence of an all-powerful actor (or subject) who imposes his views to the detriment of objects, notably nature and humans, as we will prove in the following developments.

We there see the full importance of this capital invention (it is true to say so) for the genesis not only of capitalism but also of modernity, whose effects last until our day. This is all the more so since, as also shown in the works cited above, it is the only technique in the world which is today the subject of international legislation: in fact, practically all States on the globe, including communist China and the “neo-communist” Russia today² impose on their companies the keeping of this type of double-entry accounting, this at the request of all private or public capitalists, whether from Europe, Asia, America or Oceania. Marx had dreamed of an alliance of workers on an international scale to overthrow the capitalists but it was the capitalists who actually achieved this union with the slogan “Capitalists of all countries unite and apply double-entry accounting systematically everywhere.” Despite their differences in skin colour, religious beliefs and political conceptions, whether they are far left, far right, liberal, socialist or communist, they have all united around a common ethic and a sort of religion on a global level: the union of those who advocate the systematic conservation of the financial capital and of it alone. Of course, there are some accounting differences between the two types of capitalism which currently dominate the world within the framework of an increasingly conflicting bipolarity. As shown elsewhere (Richard 2020 and Richard and Rambaud 2022b), countries which, like China or, presumably, North Korea, that give preference to state capitalism mainly have an accounting whose result is not that of private owners but of state owners but this does not change the accounting philosophy described previously: in all cases only the financial capital is strictly preserved to the detriment of the two other types of human and natural capital. Thus China, which has specific accounting for its public companies, has no problem practising a type of accounting similar to International Financial Reporting Standards (IFRS, in fact American standards) for its private companies.

Of course, this accession is not the sign of a rapprochement between the two current capitalist blocs which dominate the world: on the one hand that of the capitalists who admit the possibility of (relatively) free elections and, on the other hand those which, as in the case of China, continue to refuse this type of concession in the name of the priority given to the decision-making model of the Communist

Party. It is clear that we are going to experience a merciless clash between these two types of capitalism which could lead to a world war. This bipolar situation is all the more worrying since relatively democratic countries which live under the leadership of “private” capitalism generally cannot oppose the economic development of countries under the rule of state capitalists. Indeed, their own capitalists have every interest in developing their trade with them whatever happens: they have also opened the doors wide to bring them into international organisations, including commercial ones, notably those which regulate accounting standards. These private capitalists obviously put their personal interests above all else: it is the law of commerce which must prevail and above all international accounting law, even if this leads to war.

Let us now underline another fact concerning this accounting regulation. It has always been fashionable among capitalists, economists and liberal or neoliberal politicians to denounce the unbearable straitjacket of regulations in the field of labour law and ecology, unbearable regulations that they very often qualify as “punitive.” But, curiously, the same capitalists who protest against these attacks on their freedom of action, in particular what they call the famous “punitive ecology,” see no problem in being forced to make the same type of regulations everywhere they apply the accounting standards: on the contrary they love this terrible accounting punishment! What’s more, they even ask States for criminal sanctions against those of their colleagues who do not respect these fundamental accounting standards. (See below.) We can therefore see that, for them, when we impose their system, all laws, even the most Draconian ones, are acceptable. They are then fiercely anti-liberal when it comes to financial accounting and become liberal again only when it comes to social and ecological laws: this is the very basis of their economic and political thinking.

We will return later to this crucial point generally ignored not only by philosophers, who are most often very far from these very down-to-earth calculation problems, but also by most economists, notably, initially, by Adam Smith: the latter, as is well known, saw the invisible hand of the market everywhere. But, due to lack of accounting education and, more broadly, of business management techniques, he never saw the visible hand of the capitalist accountants who organise the market with a view to the domination of their capitalist masters. Even an author like Scheidler, who is also aware of the fundamental role of capitalist accounting in the creation of the Megamachine, says practically nothing about accounting technique and accounting laws and their history, which is problematic for a correct understanding of what the Megamachine really is.

Fortunately, there are recently certain economists who, notably in line with the reflections of Kapp and Veblen, attach particular importance to the reform of capitalist accounting: this is notably the case of [Berger \(2017; 2022; Berger and Richard 2021\)](#), who emphasises the imperative nature of a transformation of business accounting to achieve a drastic redefinition of cost calculation in the context of a new market economy. We can also cite in France the support for this accounting cause, notably the use of its concept of depreciation, of economists like [Perroux \(1952\)](#), [Passet \(1979\)](#), [Godard \(2010\)](#), [Jorion \(2018\)](#), [Aglietta \(2019\)](#), Favereau (notably in

the context of the reflections carried out within the Cercle des Bernardins), [Levrel and Missemmer \(2023\)](#), as well as the reflections led by Cécile Renouard within the Campus of Tradition. This support from these rare economists (for more details see notably [Richard 2023a](#)) is very important because it will perhaps allow us to finally bring to the forefront the fundamental role that capitalist accounting plays in matter of economics and, more largely, in matter of comprehension of the of the nature of the Megamachine that leads the world today.

Indeed, this revolutionary accounting technique, ratified by national and international business laws, has therefore experienced a stunning and devastating success to the point of being, in my opinion, *the* Megatechnique which has led the world from the Middle Ages to the present day and which has enabled the irresistible rise in power of the capitalists, then their domination on a global scale with the ecological and social consequences that we know. The epicentre of the conflagration which will devastate the entire world and give rise to the modern Megamachine is therefore not located in the 17th and/or 18th centuries during the emergence of the concept of political economy with notably [Adam Smith \(1776\)](#) and even (a fortiori) later during the industrial revolution marked in particular by the appearance of the steam engine in 1784 as is very often maintained, particularly in scientific, ecological, economic and even historical circles: it is well located in the Middle Ages.

But how can we support such a thesis when it is apparently only a simple technique accompanied by calculations that may denote only a very materialistic philosophy of action,³ as is often said to characterise this practice, a discipline which, moreover, to the difference of economics, uses rudimentary mathematical equations like two plus two equals four, which demonstrates a crippling computational poverty? To explain this point, it is appropriate to study a little more carefully the founding balance sheet of the firm that we have taken as an example. Indeed, this revolutionary balance sheet has two sides, the term “balance sheet” coming from the Latin word “bi-lanx,” which designated the Romans scales for weighing goods which had two trays (bi-lanx), as are still sometimes found today in certain popular markets. We can clearly see that the same sum of 1,000 is entered on both sides of the balance sheet, most often once on the left side, in money received, in the “assets” section, and another time on the right side in that of debts, or, another equivalent word in many countries, also very often used, in the “passive” side⁴: the word “passive” coming in fact from the Greek verb “patein,” to bear (in particular the weight of debts). This first double-entry registration, characteristic of the founding of all firms, reveals the entire philosophy that drives these modern capitalists. On the one hand, it indicates with the assets their means of action, the word active coming from the Latin verb “agere” which means to act. In this case, when this firm is founded, most often a sum of money in cash (or in the accounts of a bank) is the means of action which will then allow, in the case of our example, to buy an investment property. Let us examine in this regard what the balance sheet will be after the purchase of this real estate for which we will assume that its purchase price is 1,000. It is clear that the asset amount of the cash item will decrease by the same amount to fall to zero⁵ and a new asset item in the amount of 1,000 corresponding

to the purchase cost of the building will appear, the liability side being unchanged to the extent that the debt of capital owed to the private capitalist is still not repaid, which gives the following new balance sheet:

<i>ASSETS</i>	<i>LIABILITIES (PASSIVE)</i>
Building 1,000	Capital 1,000

I have just described in a very schematic manner the basic philosophy of this new type of accounting which appeared in the 14th century in Northern Italy. It will permanently allow new types of capitalists to use their assets while systematically conserving their (financial) capital. To complete this first description of its most striking and original aspects, I can add a second fundamental invention: that of the concept of depreciation⁶ (or amortisation in the case of intangible assets). We saw previously that the building purchased by the capitalist was recorded as an asset on the balance sheet as its purchase cost pending its resale on the real estate market. But these new modern capitalists are already aware that this building, even with the best possible maintenance, is condemned to inevitable wear and tear more or less quickly: what we call the effects of the passage of time. They will soon therefore take an annual wear and tear into account by estimating the approximate lifespan of this building and by recording a fraction of the purchase cost as a reduction in the assets of the property each year: this generally corresponds to the total purchase price (1,000 in our example) divided by the approximate number of years of possible use of the good concerned.⁷ Thus appeared the concept of depreciation, still a living and fundamental concept today, particularly in ecological matters, which we will see later. We already mentioned in this regard that most economists will also subsequently ignore this fundamental management concept for any reform of the capitalist economy. Among the rare exceptions I already cited are the notorious cases of Kapp, Passet and Berger. Regarding Kapp, I showed in 2015 in the introduction to the new French edition of his work “The social costs of private enterprise” that he regretted as soon as 1963 that only machines were the subject of a measurement and systematic and precise accounting of their wear with the aim of systematic renewal of assets, the human being at work and nature not having the chance to benefit from the same treatment. As a fine connoisseur of business management, he therefore placed the accounting concept of depreciation at the heart of his system of social and ecological costs to benefit all three types of capital. Subsequently, as I have also shown ([Richard 2012](#), p. 144) René Passet, this other avant-garde ecological economist, takes up this idea in his book on the “Neoliberal illusion” (2000, p. 31) while emphasising the difficulty in convincing adversaries of any use of capitalist accounting tools: “[T]he person? Let’s be serious, this is not the subject of [economic] science but of philosophy.” Finally, more recently [Berger \(2022\)](#), a specialist of works of Kapp, has demonstrated his support of the works carried out by me and my French colleagues from the CERCES team in favour of the systematic application of the principle of depreciation to human and natural capitals, this notably in the introduction that he kindly made to “Economics,

accounting and the true nature of capitalism” (Richard and Rambaud 2022a) but also in an article (Berger and Richard 2021).

After this passage dedicated to the presentation of the concept of depreciation, let us now finish the presentation of our little example by supposing that the capitalist (the professional one), at the end of his first year of activity, takes advantage of a very favourable situation in the real estate market to resell the building at a price of 1,200. This will allow him to make a profit of 200 compared to the capital investment of 1,000 that he made and therefore to obtain a profitability of 20 percent (in the supposed absence of any tax). In this case, after the completion of this operation, the final balance sheet at the end of the first financial year will be as follows:

<i>ASSETS</i>		<i>LIABILITIES</i>	
Cash on hand	1,200	Capital	1,000
		Profit	200

This balance sheet clearly shows the logic at work for calculating the profit in the previous case: it consists of comparing the total assets, i.e. the 1,200 which is in cash, with the capital initially paid by the private capitalist and due to this same capitalist. However, this initial situation is particular. If the private capitalist continued his activities by purchasing a new building at the start of the second period for 1,200 and reselling it at the end of the second year for 1,320, the calculation of the new profit would have to be made taking into account not of the initial capital of 1,000 but of the sum of this capital and the profit of the first period, it means 1,200, a sum which corresponds in accounting to the book value of what we call “equity,” a concept different from that of capital since it accumulates the capital and the profits registered in retained earnings (here not distributed and retained but distributable in principle). We would then obtain a new profit of 120 (1,320–1,200), the profitability of the operation being obviously also calculated in relation to equity: it would only be 10% (120/1,200).

Obviously, the example we took is very simple: it does not deal in particular with employees. In fact, when this technique was invented in the Middle Ages, capitalists, particularly in Florence, also used at the same time not only slaves but also employees. We will therefore also find in the assets of their balance sheet the cost of purchasing the labour force of these employees on the market for a given period of time, itself incorporated with other production costs in inventories of products in progress or finished products as production progresses. In short, on the assets side of such a balance sheet we will find, in addition to the rest of the money that the capitalist brought into his firm, all the costs of purchasing the means of action (or assets) of the capitalist, incorporated as the case may be at different levels of the production and sales process. Of course, these means of action will be used whether it is the building acquired for rental or speculation, in the case of our particular example, or buildings used for commercial or industrial activities, goods in commercial activity, machines in the case of industrial activity and labour power, whether that of slaves or employees used for these activities. All these usage costs will end up passing into the

assets of the balance sheet first, if necessary, in the costs of products in progress and finished, then in those of products sold, costs into which the capitalist will integrate his profit margin to determine the sales price to be paid by its customers, which sale price once paid by its customers will make it possible to obtain the cash which will allow it to restart its activities while generating a profit.

In this very last analysis of the assets that we have just carried out, the reader will undoubtedly have recognised the famous cycle of capital Initial Money, Commodity, Final Money (MCM') that Marx made famous in his famous work "Capital." In fact, as we will show below, Marx, due to a lack of accounting knowledge, was mistaken in labelling this MCM' rotation as a "cycle of capital," at least from the point of view of the practitioners of capitalism. But let us underline again all the complexity and richness of the concepts of modern accounting, some of which, such as the major concepts of capital and depreciation, were invented in the Middle Ages. In order to give a global view of the functioning of this revolutionary type of modern accounting I will offer to the reader a synthetical scheme representing its logic: In this type of representation without a balance sheet (designed by Alexandre Rambaud) the liabilities are what appears to the right of the frame and the assets are what is in the frame. The cost of production of the products sold (Cost of Sales) is at the bottom on the left and the amount of sales (Sales) on the right (outside the frame to mark the relationship with customers). We clearly see how the company, thanks to this cycle of operations, manages to maintain its capital and make a profit if sales cover profit margin, the cost of production, including raw materials, machine depreciation and labour costs.

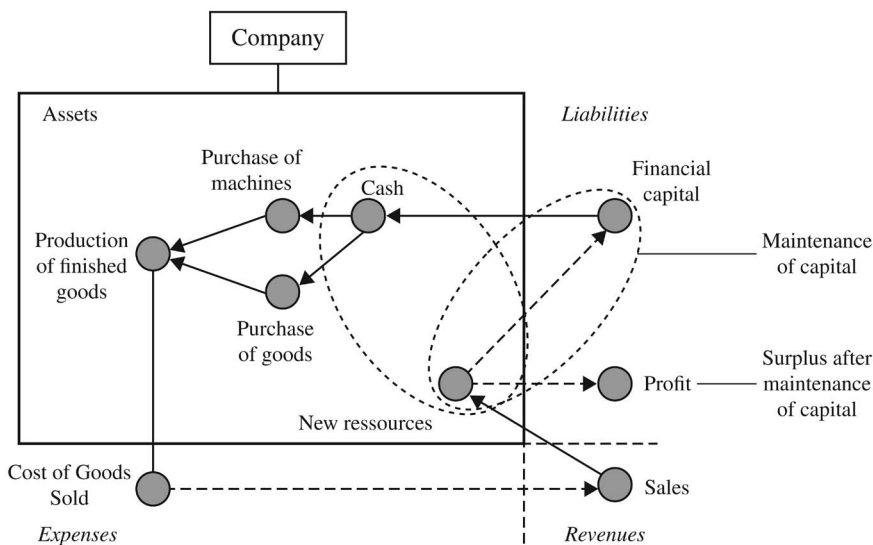


Figure 4.1 The figure shows how only financial capital is conserved, while other factors of production, such as workers and natural resources, are treated as assets. These assets are not paid the full costs of reproduction.

Let us now return to the crucial question: what is capital? According to Marx and the vast majority of economists (though there are a few exceptions who have made the effort to study accounting) it is, as already mentioned, money that generates more money in the context of circulation of the type: Initial money (M) – Commodity (C) – Final money (M'). Translated into accounting language, this generally corresponds in fact to a phenomenon of *asset turnover*. Thus, in the case of our example, first the transformation of money into a commodity building for 1,000 (M – C), then the retransformation of this building into money of a greater amount: 1,200 (C – M'), the final profit, in an optimistic view here, being equal to the difference M' – M (final amount of money minus initial amount).⁸ But this vision of capital has absolutely nothing to do with that of the accountants who invented the double-entry accounting in the Middle Ages and its concept of capital-debt, any more than with that of the vast majority of accountants who continue today to apply the precepts of these founders of modern accounting. As we saw previously in the balance sheet, capital is not at all a circulating asset but a debt appearing among the liabilities, a debt to be repaid in full and systematically, that is to say without possible negotiation, in opposition to a bargain: we cannot imagine that the professional capitalist (often a trusted man or an accountant who managed subsidiaries) could say to the private capitalist "I will try to reimburse you." This capital-debt, which is something to be kept, and not an asset, therefore varies only in very specific, if not exceptional, circumstances: capital increases to meet new investments; incorporations into the capital of profits put in retained earnings to better stabilise the financial structure of the firm (avoiding their distribution), revaluations of capital in the event of inflation, reductions of capital in the event of crises to attract new investors, etc.). Operations which all require the agreement of the capitalist and which have *nothing to do with problems of turnover of goods*.

Let us also emphasise that if the operation of the sale of the building that we have processed had ended in a loss, *the amount of capital would not have been changed*: in fact, in principle and in accounting law this debt remains intangible and can be modified only with the explicit agreement of the capitalist. Thus, if we return to our example, assuming that the building can be sold for only 800, the loss of 200 will be recorded on the liabilities side in a specific negative account: item entitled losses. Under these conditions while the final cash amount (A') is only 800, the accounting capital therefore *remains recorded for the sum of 1,000 which proves that it does not circulate* and is not confused with an asset. On the other hand, obviously, equity will be reduced and will decrease to 800. Here we see all the richness and subtlety of modern accounting analysis as broadly invented in the Middle Ages to ensure the conservation of financial capital, a "sacred" and intangible position, unless decided otherwise by the capitalist.

Let us underline once again that the fact that capital-debts are at the origin of the formation of assets (a decision to lend money was necessary at the outset) has nothing to do with the question of materiality of the circulation of assets, which can take very diverse forms and amounts. Let us also add an authoritative argument. Faced with the vast majority of economists, notably neoclassical and Marxist, accountants are not the only ones to believe that capital is a debt. As we have shown

elsewhere (notably in [Richard and Rambaud 2022a](#) and [Rambaud and Richard 2021](#)) many jurists support this interpretation. This is of course the case for lawyers specialising in accounting law but also, more broadly, for most business law lawyers. On the other hand, as already underlined, for the world of economists, except for a minority of knowledgeable people who are interested in the practice of management, it is a kind of heresy and serious misunderstanding of economics that accountants commit of wanting to consider capital as a debt. To explain this misunderstanding, these economists and their supporters most often cite three types of arguments against the accountants' vision.

The first argument is that accounting is a discipline of pure technical recipes which has no theoretical bases and that only these economists can propose a correct interpretation of the laws of economics in the broad sense, accounting included. This first type of "disciplinary" argument, although it could perhaps have been valid until the 19th century, no longer holds water today: everywhere in the academic world there are courses in accounting theory which make it possible to identify the basic principles of this field of knowledge: accountants today, at least many of them, are even capable of questioning their own ideological bases and it is up to economists to make the effort to read their works to understand the reality of the accounting matter and, in particular, the *exact nature*⁹ of the famous concept of capital, the one that capitalists actually use. I will not go so far as to say, with that provocateur that is [Proudhon \(1846, p. 159\)](#) that "the accountant is the true economist from whom a coterie of false literati have stolen his title," but I nevertheless think that accountants can bring a major contribution to the understanding of the ideological foundations of the concrete capitalist economy.

The second type of argument is based on history: the first "scientific" economists or those judged to be such, such as Turgot and Quesnay in particular, all considered that capital consists essentially of physical means of production or asset values in movement, a position which was subsequently largely taken up by most of their colleagues: this is not subject to doubt and invalidates the accountants' thesis. Unfortunately, such an argument of authority cannot counter the serious study of the accounting discipline: it is the right of capitalist accountants to have designed another concept of capital for the management of the affairs of their bosses, a right that they practiced well before the publication of the first "scientific" economics book.

This second argument leads us further into historical research. Indeed, according to certain opponents of the concept of capital-debt, in order to finally resolve this complicated question, it would be necessary first and foremost to do etymological research relating to the first appearance of the word "capital" or a close word: this would make it possible to reach a conclusion on the validity of the majority position of economists on the concept of capital-assets as opposed to that of capital-debt defended by accountants. The thesis supported here is that of the appearance and diffusion in the Middle Ages of the word "cheptel" (livestock) as an indicator of the wealth of the peasants: this term "cheptel" would quite naturally have given rise to the word "capital" of the economists. It would therefore be a question of a good, with this focus on capital represented by heads of livestock, in other words a question of means of production (notably agricultural ones) and, more broadly, of assets

to be managed and not at all of debts. But accounting historians will retort that their concept of capital-debt has a completely different origin and dates back to the time of the ancient Greeks, notably that of the Athenian bankers. Indeed, if we consult for example the ancient Greek dictionary (Bailly 1936)¹⁰ the adjective “capital” (“kephalaïos”) has three fundamental meanings: 1. what relates to the human head; 2. what is very important; 3. the main part of a debt as opposed to the interest on this debt. Let us remember that Scheidler has clearly shown that, historically, the founders of the double-entry system and its concept of capital-debt were Italian bankers: it is obvious that these bankers used the terminology of their Greek ancestors who granted credits against debt signatures, this through the intervention of the Roman bankers who used the word “capital” in the same sense: as [Rambaud \(2022, p. 37\)](#) underlines “the term capital comes from directly the Latin expression ‘caput pecuniae’ which means principal part of a loan by opposition to its interests.” At this stage of the study the reader may be intrigued, if not tired by this battle over the meaning of the word capital: is it worth it after all? We will now try to show that yes, it is.

Indeed, beyond these first factual explanations, the co-existence of this modern accounting concept of capital, which we called the concept of “capital-debt” (as opposed to the concept of capital-assets or capital as a means of action of most economists) with the accounting concept of assets testifies to both a remarkable intelligence and a formidable ideology on the part of its inventors, in addition to their great capacity to secure the support of the dominant political forces before being able to then dominate them also and, finally, the entire world. Let us take up these two fundamental points successively.

Intelligence is having understood that one cannot manage a business correctly on a permanent basis without having established that we must at the same time have things to use (assets), and take into account things that we systematically want to keep, which implies debts towards these things, debts recorded on the liabilities’ side of the balance sheet. The essence of the double-entry invention lies in this fundamental double provision.

This *formidable ideology* manifests itself in the restrictive, terrible and decisive choice made by the Italian capitalists of the Middle Ages. Indeed, while to create wealth any human enterprise must systematically borrow three types of capital, natural, human and financial, they decided, when creating their management system, that only financial capital would benefit from systematic and permanent protection thanks to the recording of conservation debts towards it, this under the heading of the capital account. They went even further later by having the offense of distributing fictitious dividends included in the accounting laws of most countries to punish possible bad apples who dare not respect the sacred laws of their community, chiefly the systematic conservation of this type of capital. Let us emphasise in this regard that according to [Polanyi \(1944 \[1983\]\)](#), probably influenced by Marx who said that capitalism is the reign of generalised equivalence, capitalism led to a general movement of commodification of all things. But this formula is in fact inaccurate because it is too general. In reality, in capitalist world, there is one thing that is not considered a commodity; it is the financial capital of the capitalists in their modern accounting system: in fact today’s fundamental sentence

(motto) of all commercial codes in the world, accompanied by penalties incentives in the event of non-compliance, is “You will protect and preserve your financial capital and it alone.” On the other hand, although the first manifestations of *systematic* plundering of nature appear in the Middle Ages ([Rambaud and Richard 2021](#), p. 15) the same idea of using the concept of capital-debt for the conservation of nature never came to the minds of capitalists: on the contrary, for them, from the creation of modern capitalism, it was a question of being able to use the most freely possible and at the lowest cost this nature, a situation which is still the rule today in capitalist accounting. As for “human capital,” it has never been the subject of treatment comparable to that of providers of financial capital. Certainly, from 1350–1400, and still today in the balance sheets of current companies, we can find “debts” towards employees, in respect of remuneration which has not yet been paid; but these debts have nothing to do with the capital-debts to capitalist investors, for two main reasons.

First, they are not real debts because they are always the subject of negotiation in the context of the labour market, while a solution worthy of a philosophy of the type that founds the concept of capital-debt would logically lead to drawing up, in agreement with those concerned, the list of material and psychological conditions which, in a concrete context, allow the employees considered to lead a dignified and healthy life and thus to adjust their remuneration according to these constraints. As we will see, this is what many workers have vainly demanded since this period of the Middle Ages, then since the industrial revolution and, subsequently, during the multiple strikes which have marked the history of the working condition.¹¹

Second, there is another major difference between capital-debts and salary-debts: while the former are legally accompanied by the monopoly of power in companies, the latter, at best, give only the right to challenge from time to time the excesses of the capitalists, at least in countries where there is real labour law, which is not yet the case in many countries, notably communist countries. In fact, the so-called wage-debts are not real debts, they are kinds of provisions, amounts to be paid fluctuating according to the balance of power between the masters of the companies and their servants. Note that other types of debts such as debts to suppliers and bankers are generally true kinds of debts but without legal power in the company: they are therefore not capital-debts. Here we see the importance of the distinction between simple assets and the concept of capital-debt which characterises the essence of modern double-entry accounting. Karl Marx claimed that the material infrastructure makes it possible to explain the ideal superstructure and therefore the study of assets and particularly machines could make it possible to study the processes of information and ideological choices. But in fact he was unable to see what fundamentally characterises this ideal structure: its concept of capital-debt at the service of the capitalists and them alone.

More generally most economists and politicians were not interested in understanding the reality of the accounting concept of capital. Thus, as [Berger \(2022, p. viii\)](#) says very well in his preface to one of our works, this concept of capital became “obfuscated through a make-belief monetary calculus instituted by a mathematical, technical, legal, and political complex organized by capitalists, their

accountants, economists, lawyers, lobbyists, and politicians.” This situation is all the more strange and paradoxical given the crucial importance of this concept. Indeed, we can assert that the invention of the concept of capital-debt and its use for the exclusive needs of modern capitalists is the *basis of the formation of the Megamachine* that leads the current world still today. Scheidler’s great merit is to have foreseen this fundamental fact. However, his vision of the major impact of the capitalist double-entry accounting system remains insufficient. Indeed, as we saw previously, he limits himself to emphasising that “thanks to the double-entry invented in the Middle Ages, income, *expenditures*,¹² profits and taxes could be precisely calculated, and this not only after the fact but also in a forecast manner” (emphasis added); this although he already infers that “this mathematization of trade constituted a decisive step on the path leading from the spontaneous accumulation of wealth through trade and piracy to a calculated accumulation of money, which has also become an end in itself.” In fact, not only does he not seek to explain precisely what this double-entry consists of, but he seems to misunderstand its nature since he speaks of accounting in terms of “receipts and expenditures,” which is the old accounting in terms of cash flows and not the new modern capitalist type of accounting based on the recording of assets and liabilities accompanied by the registration of expenses and revenues. As a result, he does not at any time address the key question of the nature and the definition of capital-debt and the monopolisation of this fundamental concept in the exclusive service of capitalists. Consequently, he will miss out on an appreciation of the full importance of the accounting revolution of the Middle Ages, including with regard to the history of the concept of modernity.

This leads us to the following question: *what is the origin of this famous modernity and, more generally of the force that dominates the modern world today?*

We have seen by studying Latouche’s book in particular that it is traditional to date the birth of modernity to the publication of works by “purely” scientific authors of the 17th century, particularly the writings of Bacon and Descartes. According to him, it was at this time that modernity was born. On the other hand, Scheidler is of another opinion. He already underlines, with the case of Bacon, the link which unites capitalists and scientists, which Latouche does not do. But above all he goes back even further in time than Latouche to find the roots of modernity. Let us recall that according to him the businessmen of Genoa and Venice “were not peaceful merchants who were concerned about non-state interference but great people from ultra-militarized city-states who, from the start, imposed their commercial interests with the force of sword and cannon,” notably during the Crusades.

For him, let us also recall, “in the Crusades we already see on a small scale what would subsequently become a world system: the combination of the development of capital, militarism and Western missionary zeal,”¹³ a combination that he considers as a fundamental mark of modernity or at least of the new economic and political system which will reign over the world. He adds that this system would develop even more with the systematic practice of mercenarism which appeared during the Hundred Years’ War (1337–1453) and which then culminated in Northern Italy: indeed, “almost all the flourishing city-states hired for their wars entrepreneurs,

called condottieri, who enlisted mercenaries, recruited throughout Europe, in their firms, the “companies di ventura.” Some of them, like Francesco Sforza in Milan, had even political careers.

Thus, clearly, let us repeat, although he places, as we have seen previously, the birth of capitalism around 1500, he himself demonstrates that this type of capitalism existed from the 14th century in certain cities of Northern Italy. It is not we who will contradict these statements; on the contrary we will go even further than he does by clearly stating that modernity began with the catholic capitalists of the cities of Northern Italy at the end of the Middle Ages. Indeed, in the accounting system which emerged at this time the capital-debt, which appears on the liabilities side of the balance sheet is the symbol and the affirmation of the power of a subject over simple objects: nature, slaves and employees who all work for him. We can note in this regard that for centuries, until around 1930, most accounting books, practically in all countries, qualified this capital as “chief” (a word with the same root as capital!), as if it were a real person ([Richard and Rambaud 2022c](#)); we could thus not better symbolise the presence and domination of the capitalist subject in his enterprise. Descartes, certainly, expressly formulated the radical distinction between subjects and objects as the foundation of modernity, but he was de facto preceded by the capitalists of the Middle Ages who went even further than he did by integrating and institutionalising the concept of modernity in a system of formidable accountancy. As [Balandier \(1991\)](#) rightly points out in “The Object and the Issues”: “[I]t is the couple associating forms of production and forms of power which is the source of the forces which can [...] bring about changes in society.” The capital-debt of the Italian founders of capitalism must therefore be considered as a fundamental operational concept of modernity at the service of a particular group of subjects who are even more modern than others. In other words, to use a well-known formula of the famous French comedian Coluche, in the liberal capitalist society inherited from the Middle Ages through the Enlightenment, everyone is equal but certain subjects are “more equal than others”!

The capitalist balance sheet absolutely confirms this modern divide. It is in fact a major instrument of modern management, and, more broadly, of regulation of the entire economy. It is therefore not a simple technical instrument, as is generally believed, but the reflection of a vision of the world, a cosmology, a philosophy, but unreasonable, unless we consider the reason of capitalists as Reason with a capital R, as some politicians serving this caste readily believe, especially if they find a personal pecuniary interest in it. In short, modern capitalist accounting invented in the Middle Ages, and particularly its balance sheet, is a political institution of the first order, in the sense that it is based on the systematic conservation of a single type of capital, financial capital, to the detriment of the two other types of capital, natural and human. This eminently political character of accounting will then be challenged or at least passed over in silence by the defenders of the capitalist system who will try to pass it off as a neutral technique. Just as neoclassical economists will want to remove the term “politics” from political economy, so the defenders of modern capitalist accounting will want to make it a simple, totally neutral technique: this is notably the emblematic case of the philosopher [Comte-Sponville \(2004\)](#), an uncompromising

defender of capitalism, who will consider that management accounting for capitalists is a neutral discipline insofar as it involves only simple mathematical additions of the type two plus two equals four. This is the “misery of philosophy” as Marx would say!

It must be recognised that these followers of capitalism will be helped in this task by the fact that most economists and philosophers critical of capitalism are not interested in the accounting discipline or will not study it enough to see its true nature and therefore its importance. This is how Marx, although he spent practically his whole life studying capital, did not see, or want to see, despite the relevant observations of his friend Engels ([Richard and Rambaud 2022a](#), pp. 66–69) that the capital of the practitioners of capitalism is not a simple asset (or a simple resource according to the terminology often used by economists) but a debt to be repaid. This omission or negation of the concept of capital-debt will not only deprive him of precise knowledge of capitalism but also prevent him from developing an economic counter-model to replace it, assuming that he had the intention to do so. It is true, however, that Marx thought that the accumulation of wealth by capitalists during the expansion of the productive forces would inevitably lead to the destruction of this economic system, which could explain his lack of motivation with regard to this type of concern. This position on the contradictions of capitalism, very Hegelian, would even lead him to be a free trader. As he says in “*Misère de la Philosophie*” (2002 [1847], pp. 197–212), “[T]he system of commercial freedom hastens the social revolution. It is only in this revolutionary sense [...] that I vote in favor of free trade.”¹⁴

Why then invent an economic counter-model when the dynamics of capitalism are certainly leading to its death? Another fundamental error of Marx was to believe that the capitalist system was really born in England at the end of the 18th century, this in particular because of his ignorance of its previous history, particularly in the accounting field. However, the study of the conditions of its true birth in Northern Italy in the 14th century is completely illuminating on the nature of this new economic regime. We can say that we already find there practically all the ingredients of what will characterise it later.

Take the case of the famous Ciompi revolt¹⁵ of 1378 in Florence, at the time of Datini, described by Ernst [Piper \(1978\)](#). Contrary to what has often been stated, notably by Meiksin Wood,¹⁶ the capitalism of this Northern Italy of the 13th and 14th centuries was not only merchant capitalism, it was also industrial capitalism. The characteristics of the factories of Northern Italy largely anticipated the factories of the English Industrial Revolution. In Florence, in particular, as Piper shows, there were numerous guilds to which access was prohibited for most workers and small artisans: they were therefore subject to their laws without participating in decisions. For this reason the members of the guilds were called the “popolo grasso” (the capitalist bourgeois, practically) and the others, the “popolo minuto”: it was already a clear partition of classes. The largest part of this “popolo minuto” were the Ciompi, a majority of whom were workers in the textile industry. This industry was often organised according to the *Verlag* system (dispersed manufacturing) with a wool merchant (“*Lanaio*”) who remained the owner of the raw material throughout the production process (practically purchase-production-sale).

Therefore the Lanaiole was both a capitalist trader and an entrepreneur directing the entire production process. But there were also several thousand Ciompi wage workers in workshops subject to the jurisdiction of the Arte della Lana (the wool corporation) among the approximately 90,000 inhabitants of Florence. In this city, as in others in Northern Italy, differences in status caused incessant conflicts around 1340. Lowest on the chain were the wool scrapers. One of them, Brandini, wanted to found a Union, but the orders of the Podesta (the first magistrate of the city) prohibited workers from any association while the masters could form their guilds, which were in fact trade unions of employers. The latter even banned all gatherings of workers. For the reasons of band formation and gathering Ciuto was hanged on May 24, 1345. Even if there were minimum wages in certain cases, the working conditions were extremely harsh: supervision provided by the “ufficiale forestieri” (foremen, often foreigners helped by spy workers) accompanied by corporal punishment and torture to guarantee the 16 to 18 hours of daily work. It is therefore not surprising that there were numerous revolts, not only in Florence but also in other Italian cities, for example in Siena. In fact, workers were treated as living possessions, in conditions even worse than those of slaves, who served as servants of the capitalists. Due to their very low wages, in order to survive and pay their taxes, they were often forced to pawn their worktools. To make matters worse, in 1371, a decree of the Arte della Lana stipulated that those who could not pay their debts in money would have to work to repay them, and in fact became wage slaves. (Piper speaks of “Lohnsklaverei.”¹⁷)

These capitalists, who rule their employees with an iron fist, are already supported by the corporate law put in place by political power. In 1298, an act of the Signoria¹⁸ prohibits the Ciompi from selling products to others than their Lanaiole: as in the case already mentioned above of the Podesta, the politician makes an alliance with the big capitalists.¹⁹ These Ciompi workers, in fact, already aspire not only to better working conditions and better wages but also to participate in all decisions that concern them, including in political bodies at the highest level. They are easily organised because they work together in central workshops. They no longer want forestry officials in companies and demand participation in city government. Following a terrible strike in 1378, the Signoria granted them power. But this victorious revolution would be only a flash in the pan because, very quickly, the capitalists of the city banded together to organise a blockade of the wool supply with the support of the former masters of the city and the nobility. Unable to carry out independent work, the revolutionaries surrendered and their leaders were arrested.

This is the social, legal, political and ideological framework in which also other capitalists, like the famous Datini, governed the work of their employees around the same time. This framework shows that, from the birth of modern capitalism in the Middle Ages, laws ratified the power of capitalists and in particular their power to impose their type of accounting or, said in modern language, their “governance by numbers.” These events also show that it is very questionable to trace back to the time of the industrial revolution the time of social struggles which would have the new characteristic of calling into question the modern capitalist regime: from the Middle Ages this type of regime and its power is fundamentally

called into question. Modern capitalism and its economic model were therefore not born within the framework of nice contractual relationships, as claimed by neoclassical theories of the firm and agency theory²⁰ but within the framework of class conflicts “regulated” by politics. Let us also once again underline the fact that these workers who rose up very early against the infernal modern Megamachine of modern capitalism testify to the fact that this machine was already clearly visible: they learned it the hard way.

This is the economic and political situation which characterises the birth of a new type of capitalism in Northern Italy in the 14th century and which can be found in many large European cities, as shown by [Mollat and Wolff \(1970\)](#) in their book devoted to great revolutionary and popular waves, notably those of the famous revolts of the Blue Nails and the Jacques, in addition to that of the Ciompi. Polanyi, with his work “The Great Transformation” (1944 [1983]), had the great merit of highlighting the fundamental concept of embeddedness, that is to say, fundamentally, the embedding of the economy in politics. But, due to lack of knowledge of accounting history, he did not see that this embeddedness begins in the Middle Ages with political support for the accounting and more broadly managerial practices of the new capitalists; therefore, in a very questionable way, he dates it back to the formation of the self-regulating market system by the economic liberalism of the 19th century (Polanyi 1944 [1983] p. 70) while for us it is well located in the Middle Ages.

However, there remains a fundamental point to elucidate that we have not addressed: how Catholic capitalists like Datini could justify their attitude in the context of the time strongly marked by the Catholic religion. If the scene we have described had taken place much later, at the time of the Protestant Reformation of Luther, we could have understood, with the help of Max Weber’s writings on the spirit of capitalism, that their Protestant colleagues did not have had the slightest scruple to act thus, convinced as they were that God sanctified their success in business. But the capitalists of Northern Italy at the time did not know this miraculous recipe proposed by Luther: how can we explain this enigma? In fact, as we have shown elsewhere ([Richard and Rambaud 2022a, c](#)), these Catholic capitalists had already invented other equally effective ideological recipes with the tacit support of the religious authorities of the time. Already a simple reading of the liabilities of their balance sheet provides interesting avenues of explanation. Indeed, as was traditionally the case at that time and would be until the 1800s in Europe, the appearance of their net profit was generally justified in their balance sheets by a “gift from God” with, for example, a mention in the liabilities of their balance sheet of the type: “profit that God was pleased to give me 1000.” Furthermore, some of them would go so far as to give a part (often modest coming from stingy people) of their capital to God, to associate him with their business. Others, such as the famous Datini, resorted to more expensive methods. As shown in Origo,²¹ Datini is in fact somewhat distressed by his activity as a capitalist. He knows very well that he is not in good standing with God, because he lends at interest during his banking activities, which is in principle prohibited by the Catholic Church of which he is one of the most assiduous faithful. Moreover, he does not invest all his profits in his businesses: he owns a large real estate fortune and leads a great lifestyle that

is talked about. So, to exonerate itself, very often, he does what we could call, in modern language, corporate social responsibility (CSR), at least in the Anglo-Saxon sense of the term: not only does he give to the poor and do penance by going barefoot and head bowed in processions, but he also finances charitable works and churches. With the support of the ecclesiastical authorities, he then felt authorised to say that God has sanctified his business and even his profit. Max Weber, as Mumford saw very well, was therefore mistaken in adopting Protestant ethics as the unique basis of the spirit of capitalism.²²

Thus, the Catholic businessmen of Northern Italy did not wait for recipe from the Protestant church to invent a capitalism that was not only revolutionary but also ideologically supportable in the context of their era dominated by the Catholic spirit. We must give back to Caesar what is Caesar's: it is first of all these Catholic businessmen from Northern Italy of the type of Datini who symbolise the birth of modern capitalism and not its English or German successors of the 16th century.

This "good" Catholic Datini had already found a way to reconcile his capitalist activity and his religious convictions and to make his fellow citizens believe that his numbers were sanctified by God. These last details allow us to affirm that this Italian period was decisive for the founding of modern capitalism and more largely for the foundation of the modern Megamachine, the one which dominates the world today. We know in this regard that many specialists have shown the difficulty of giving capitalism a date of birth. Thus [Ravelli \(2019\)](#) questions us in an interesting article: "[C]an we pinpoint the birth of (modern) capitalism knowing that depending on the criterion chosen to define it, its date of birth jumps on a scale of forty centuries: at the top the industrial revolution, at the bottom ancient capitalism?" For him, he rightly emphasises, this date of birth is a fragile information because it depends on the definition of capitalism. But the appearance of double entry accounting in the Middle Ages, a technique combined with an ideology which still allows today the possibility of a permanent measurement of a profit within the framework of a systematic protection of financial capital to the detriment of that of the two other capitals (natural and human capitals), seems to us to be a fundamental criterion for dating the birth of capitalism that we currently know. This while, as we will show, the simple presence of corporate profit, an eminently flexible concept, even usable for a future ecological and social economy, can in no way be a criterion to characterise the current capitalist economic system.

Some may think that my focus on accounting issues is exaggerated. But after all, on this point I am in line with the reasoning of Mumford (notably in his Chapter 7 on myths) and also Scheidler: both of them grant crucial importance to the role of accountants in the history of the formation of the Megamachine, starting with the scribes of the time of Assur and ancient Egypt. The only problem is that despite this predisposition to properly deal with this question they were not willing or able to undertake an in-depth examination of the concrete practice of these accountants, particularly those who founded modern capitalism in the Middle Ages, a gap that I hope to fill with this work.

I have thus finished with this description of the appearance of modern capitalism towards the end of the Middle Ages. This description deserves, in particular, a more

detailed analysis of the situation in other industrial and commercial cities of Europe. Nevertheless, it seems sufficient to draw certain lessons, particularly in relation to the theses defended by Scheidler on the birth and reality of the Megamachine.

4.2 The lessons to be drawn from the historical study of the birth of modern capitalism

Let us recall in this regard that for Scheidler four main tyrannies are at the origin of the current Megamachine: physical, economic, ideological constraints and finally linear thinking, notably calculation. It appears that these four tyrannies are those which marked the appearance of modern capitalism in Northern Italy in the 14th century, particularly in cities like Florence, with new weapons, including and especially accounting.

I began by showing that these Catholic businessmen created the very basis of the current modern economic system with the invention of double-entry accounting: it is the tyranny of a certain calculation that Scheidler speaks of, a tyranny which remains relevant today; and which is also economic tyranny to the extent that this type of calculation governs the bases of the current economy: as previously highlighted, the (economic) laws of the capitalist market are dominated by the constraints imposed by accounting rules, in particular the rule of conservation of financial capital alone and that of the systematic commodification of natural and human capitals.

Regarding ideological constraint, these Italian businessmen were initially able, in the Middle Ages, to secure the support of the dominant religious authorities, most often by not skimping on financial aid for them, then, much later, from the industrial revolution, to resist the rise of socialism and communism due to the errors of direction of these new political currents. In fact, the latter will frighten the popular classes by making, under the notable influence of Marx, private ownership of the means of production the fundamental cause of their misfortunes and the nationalisation of firms the miracle cure for these same misfortunes. All these strategic errors of direction will lead to the collapse of the USSR in the East, and, in the West, to the virtual disappearance of communist parties and, more generally, to a broad discrediting of socialism. As for purely physical constraints, they will prove increasingly difficult to implement in the West and will really remain relevant only in communist countries, notably China and North Korea, a situation that cannot last forever. In my opinion, there remain two determining factors in this development favourable to capitalism. The first factor is the fact that the capitalists, with the help of their political and economic friends, have succeeded in making their accounting Megamachine relatively invisible. This on the one hand thanks to effective propaganda in favour of its achievements and a systematic denigration of the accusations made against it, and above all, on the other hand, in my opinion, due to the inability of most of its adversaries to present and to precisely analyse the ideological bases and practices on which the modern economic model is in fact based: I want to talk here in particular about accounting law and the law of (modern) capitalist companies which remain largely unknown today, even to many jurists,²³ both in terms of their content and their consequences. This ignorance of the deep

reality of capitalism and its misdeeds will lead a number of philosophers, politicians and even economists to attribute responsibility for the ecological crisis to a large number of people, practically all humans on the globe or, in a more restrictive version, the humans who populate Western countries: this is the famous thesis of the Anthropocene or of an European Anthropocene, a thesis widely disseminated in the world of publishing on a global scale.²⁴

Contrary to this conception which places in the “same bag” the ecological responsibility of the poor black people of Harlem and that of the CEOs of large multinationals, my vision of things is clearly that of the Capitalocene thesis, which attributes the main responsibility for the current ecological and human disasters to modern capitalists (and their political allies). I have already pointed out that historically these capitalists have assumed power in companies with the help of politicians, notably liberals, in defiance of the numerous demands of their employees aimed at establishing their participation in the management of companies. Thus, as a result, they were able to build and maintain a management system that was catastrophic in terms of its effects on natural and human capitals. But, supporters of the current economic system who seek to exonerate the capitalists will reply that the latter cannot be held responsible for all anti-ecological acts, in particular those which concern billions of careless consumers who, for example, leave their water tap running for too long or do not repair it in time to avoid leakages: this is the famous thesis of ecological catastrophe due to the numerous bad “small gestures” of small consumers, a thesis which makes it possible to “popularise” ecological responsibility instead of attribute it to the capitalists alone.

But scientists tell us that this view of things is unfounded. Let us cite in particular, in this regard, the enlightening remarks of Michel Magny, emeritus research director at the Centre National de la Recherche Scientifique (CNRS) (2022, pp. 213–214²⁵): “[A]s the report published by the AEE (Agence Européenne pour l’Environnement) highlighted, the ecological and social crisis of the Anthropocene is deeply rooted in the institutional and mental framework that was put in place under the label of capitalist modernity and under the rule of neoliberalism. It is indeed a global and systemic crisis which embraces the entire planet and the multiple fields of daily life, and which makes individual action alone insufficient. A recent study showed that, when it comes to reducing GHG emissions, individual actions represent around 25% of the efforts necessary to achieve the 2°C objective, while States and companies constitute the remaining 75%.”

This scientist also provides other crucial information on the responsibility of large capitalist companies: “[O]ver the interval 1950–2010, 90 major corporations are responsible for 63% of GHG emissions in the world and, in 2017, 25 major corporations were responsible for half of the GHG emissions. Still in 2017, but this time in the field of pollution, 75% of pesticides sold in the world were produced by only 5 companies.” Michel Magny concludes his analysis by saying that “all these figures do not disqualify the necessary individual involvement, but the orders of magnitude that they highlight clearly place the center of gravity of the action at the level of the economic and political structures of the neoliberal world system.”

This fundamental information not only confirms the validity of our choice of the term “Capitalocene” to designate those most responsible for the current ecological and social crisis, but also the great effectiveness of this option which targets a relatively small number of actors, easily identifiable, and therefore also much more controllable than an infinity of little people on a global scale: Magny clearly shows us that Latouche’s thesis according to which the (capitalist) Megamachine will escape all control due to the absence of drivers is very questionable: on the contrary Magny tells us that it is possible to destroy today’s accounting Megamachine because its main drivers are well known. Let us also add that if we targeted small consumers as a priority, the latter would not understand that we could attack them while they are debating to simply live or even survive: the recent revolt of the Yellow Vests in France has clearly shown the aberrant and ineffective nature of the constraint measures exercised on a population of consumers who are often poor or even very poor and who have never been asked their opinion on the nature of the products they consume. It is clear that the only fair and effective ecological solution involves putting producers under social control: it means capitalist companies, first and foremost the largest ones. It is these producers, and not consumers, who must be the priority target of the measures that we propose. This is all the more so since they themselves generally claim their famous responsibility, especially a social one.

The second factor in the persistence of the Megamachine, which partially results from the first, is the incapacity of the adversaries of the capitalist system to propose a concrete model to replace it, particularly a microeconomic and macroeconomic accounting model which could replace the one that currently leads the world. The general idea which will underlie my proposal (and the proposals of all the creators of the CARE/TDL model, notably the members of the CERCES [Centre d’Etude et de Recherche en Comptabilité Ecologique et Sociale]), is to use the favourite weapon of capitalists, that of double-entry accounting, to turn it against them, like what we see in certain martial arts like aikido. More precisely, it will be a question of extending the use of the concept of capital-debt to natural and human capitals. Of course, for some, this idea is very difficult to accept: how, in particular, can we conceive that capital, a concept so decried by Marxists and socialists, can be the very instrument of the salvation of human and natural capitals! How can we also admit, following Graeber’s work which shows the disastrous consequences of people’s indebtedness over 5,000 years of history, that a certain concept of debt can be used to free them from their ills, as well as nature: Isn’t that also a kind of provocation? More generally, how can we admit that I can dare to propose even more accounting calculations when Mumford and Scheidler have shown their harmfulness throughout history and even today! Should we not rather follow the advice of the great German philosophical school of the post-WW II period²⁶ which denounces the dominant influence of technical inventions on a large number of human beings, particularly accounting techniques which lead, as also recalled by the jurist [Supiot \(2015\)](#), much influenced by this trend ([Richard and Rambaud 2022a](#), p. 20), to a so-called “government by numbers”: this is particularly the case for authors like [Adorno and Horkheimer \(1944\)](#) and Heidegger (1954) who will play a driving role in the stigmatisation of

accounting techniques, and, more broadly, of calculating reason: this by explaining that they are at the origin of the crisis of modern civilisation. Should we not therefore admit that the world has suffered enough from the curse of the government by numbers? In fact the thesis that we support within the CERCES is that it is not the techniques and numbers as such that are the problem but rather the techniques and numbers as used by capitalists, which is something entirely different.

Therefore, it seems to us in particular possible to use the revolutionary technique of the capitalist double-entry accounting by modifying its scope to put it at the service of ecological and human causes: at the same time we will be able to note the fact that this technique is sufficiently flexible in its use to be considered a “pharmakon”: a type of thing which, as the ancient Greeks taught us, can be useful or harmful, particularly depending on the conditions of its application. More precisely, it will be essential to use the accounting concept of capital-debt, a concept ignored not only by a large number of economists but also by anthropologists; in particular, as I have shown elsewhere (Richard 2023c), by Graeber: this specific concept of capital-debt correctly understood and applied will no longer be the instrument of enslavement but of a liberation of nature and human beings within the framework of a drastic reconstruction of the international accounting and corporate laws.

It is to this task that I will devote [Chapter 6](#) to a proposal for a new ecological and human accounting model adapted to a new governance of companies and nations: the CARE/TDL model in its microeconomic and macroeconomic versions, a model that I initiated with the help of Alexandre Rambaud but which has since become a collective work of a large number of researchers grouped in the CERCES. But, before that I will present and criticise some other solutions proposed by the defenders of capitalism.

Notes

- 1 Let us emphasise that the history of accounting is very old: it practically dates back to the age of hunter-gatherers. One of the oldest traces of an accounting calculation was indeed found in the form of notches in an animal bone (G. Ifrah: “The universal history of numbers,” New York: John Wiley and Sons 2000). Our hunter ancestor, already driven by a sordid accounting instinct as adversaries of calculation would say, indicated by these notches the number of animals killed. Today the Russian word for accounting “utchet,” which originally means to make a notch, testifies for this old origin. (Richard 2010)
- 2 I must confess that I have no information on the case of North Korea but I would not be surprised if it was shown by a specialist of this country that it applies the accounting rules of the former Soviet Union.
- 3 Very often in the media when criticising an opponent we say, “You have the reasoning of an accountant.” That says it all! We will show that German philosophy, in particular that of the philosophers [Adorno and Horkheimer \(1944\)](#), is not for nothing in this aversion towards accountants and more largely numbers: these philosophers will show that, by wanting to quantify everything, accountants can obviously never take into account the most fundamental values, values which escape these types of petty calculations. But this type of reasoning is simplistic: if we listened to it we should, for example, prevent people from checking their pay and teachers from counting the students for whom they are responsible.

- 4 As usual the English, always original, will do the opposite but it is only a picturesque detail.
- 5 We will not mention it but we could do so by specifying that its value is zero.
- 6 Many economists attribute this invention to Quesnay but this is an error, Quesnay having in mind a completely different concept. More generally, most economists, except those who deal with national accounting, do not know the accounting concept of depreciation ([Richard and Rambaud 2022a](#), pp. 32–34).
- 7 In the case of our example, if we admit that the lifespan in the case of correct maintenance is 50 years, the amount of annual depreciation (of “killing” of the property) would be 20 per year, an amount which should be written off as a reduction in the cost value of the building in the assets side and recorded as a loss (negative liability) in the liabilities side. To simplify our example as much as possible, we will not take this writing into consideration.
- 8 Marx has a simplistic vision of the calculation of profit with his formula $M-C-M'$, suggesting that the simple comparison of the final money M' appearing on the balance sheet at the end of a period of activity with the money which existed at start of this period (M) is sufficient to determine the result of the period ($M'-M$). This is true only if there is, in particular, no change in capital (in the accounting sense of the term) in the meantime, whether it is an increase or a decrease in capital.
- 9 Author's emphasis.
- 10 This dictionary my father, a professor of Latin and Greek, left me, among other things!
- 11 Let us cite only as an example the famous standard list of demands of the workers of the Caudron aviation firm (1909–1936).
- 12 Author's emphasis.
- 13 [Scheidler \(2020, p. 152\)](#).
- 14 This statement also shows that Marx does not see that the commercial freedom he speaks of is entirely relative since even in his time accounting rules regulated the capitalist system.
- 15 The “Ciompi”: in English the “Companions.”
- 16 Ellen [Meiksins Wood \(2000\)](#) “L'origine du capitalisme,” Paris Lux Editeur.
- 17 [Piper \(1978\)](#).
- 18 Government of the Republic of Florence which appeared in 1282. It included nine members, all important members of the guilds.
- 19 Pierre Musso in a recent book on “The time of the State-Enterprise. Berlusconi, Trump, Macron,” Fayard (2019), presents as a novelty the influence if not the domination of capitalist entrepreneurs on policies, but this is a very old story as shown by the example of Florence and many other Italian cities at the beginning of capitalism. *Nihil novi sub sole!*
- 20 Notably, theories of the firm which consider the firm as a simple nexus of contracts concluded between capitalists and employees and not as a legal and political institution.
- 21 Iris Origo, “The merchant of Prato: Francesco di Marco Datini,” Penguin Books, 1957.
- 22 Max Weber, “L'Éthique protestante et l'esprit du capitalisme,” Paris, Plon, 1976 (1920).
- 23 This is also the case for specialists in international law who very rarely speak about international accounting law: see in particular [Richard \(2017\)](#).
- 24 See in particular in France the Anthropocène collection from Editions du Seuil.
- 25 Quote, originally in French, translated by me into English.
- 26 Notably (by alphabetical order) [Adorno and Horkheimer \(1944\)](#), [Anders \(2002\)](#), [Habermas \(1987\)](#), [Heidegger \(1954\)](#), [Husserl \(1936\)](#), [Illich \(1971; 1973a; 1973b; 1975; 1977\)](#), [Jonas \(1979\)](#) and [Schmitt \(1927\)](#).

5 Presentation of Some False Solutions Advocated by Financial Capitalists and Their Allies

The social and environmental crises that marked the beginning of the 21st century are forcing capitalists to react to numerous criticisms from all those who are their victims. It is imperative for them to show that they are making efforts to resolve these crises. We have already made a critical comment on CSR and here we will focus on accounting or tax instruments which apparently aim for objectives similar to those of the CARE/TDL model and which therefore deserve a comparison with it. Among them, we will mainly study the theory of the internalisation of externalities, carbon taxes, the carbon price and what is called integrated reporting (IR).

5.1 The theory of internalisation of externalities

The concept and vocabulary of externalities, promoted by the neoclassical economist Arthur Cecil Pigou,¹ have gained a large audience, with great publicity by economists belonging to the mainstream. The idea, apparently attractive, is that if certain ecological or social damages have not been taken into account by capitalist firms (that is to say have been “outsourced”), States must encourage these firms to take them into account by “internalising” them, possibly with the help of taxes, these taxes themselves being based on the extent of environmental or social damage. In fact, this theory of externalities clearly falls within the framework of neoclassical theory: it is a cost-benefit analysis which consists of firms comparing the costs of any measure taken by them to deal with these environmental or social problems with the value of the damages avoided (these avoided damages being considered as benefits). As these damages (pollution, floods, loss of resources, diseases, etc.) are most often delayed in time, this type of analysis uses so-called financial discounting methods² which aim to make immediate costs (those of ecological measures taken today) and future benefits (future damage avoided) comparable. Clearly, companies will arbitrate between the costs of damage avoidance measures and the payment of taxes based on the economic price of this damage calculated by integrating an anticipated profitability standard.

It can easily be shown that if this type of reasoning is applied to environmental problems, the resolution of these problems depends on the one hand on the height of the rate of return demanded by the capitalists and on the other hand on an estimate of the greatest future damage most often estimated from an anthropocentric

perspective. Thus, mainstream economists who claim to deal with social and environmental problems have achieved the feat of making the solution of these ecological and social problems depend on a subjective standard of financial profitability, which evolves with the balance of power between social classes,³ and attacks on human property, which have nothing to do with measuring concrete degradation and protection of nature from an ecological perspective.

With this reasoning, these “rational” economists manage to demonstrate “scientifically” that plants and animals must be destroyed in the long term if their usefulness does not meet a minimum level of profitability. This is the basis of this terrible theory of externalities for which many people of good faith have the eyes of Chimène, for lack of sufficient analysis of its content. In fact, this theory is totally unsuitable for solving current problems, especially environmental problems, as shown by much critical literature.⁴ It has nothing to do with an approach centred on the study and conservation of the functioning of eco-systems like the CARE/TDL method.

Our position on this point is similar to that of Pope Francis who, in his encyclical “*Laudato Si*” (2015)⁵ argues that if human beings and environmental entities have non-instrumental values, they must be conserved unconditionally, and therefore without recourse to questions of financial profitability. We must therefore clearly reject, in agreement with the Pope, this theory of the internalisation of externalities.

5.2 The cases of carbon taxes and the price of carbon

The solution of environmental taxes is also a pure product of neoclassical economic thought, notably, once again, of the English economist Pigou.⁶ These are taxes that weigh on consumers without ever calling businesses into question. They are totally unsuitable for the nature of the problem posed. Indeed, as shown before, it is the product and marketing policies of companies which are essentially at the origin of the current problems and not the choices of consumers who, most often for lack of sufficient wages, can consume only the least expensive products offered in the ambient context of global ecological and social dumpings. Technologies since the end of the 19th century have been born in capitalist pharmacies, not in the brains of consumers.

To finish on this theme of fallacious solutions, let us compare the cases of natural capital and financial capital. For the latter we have seen that it is subject to systematic conservation thanks to severe and efficient accounting laws. Indeed, what do we do if a company does not respect this obligation? We do not tax its products to penalise the consumers. We are acting at the source of the problem: the courts will sanction the refractory company for the offense of distributing fictitious dividends and its auditors will order it not to do it again. It is a serious and effective method which has nothing to do with the procrastination of environmental taxes which are generally promoted to avoid directly dealing with the problem at its source.

We observe the same deviation from serious solutions regarding global warming. Neoclassical “environmental” thought imagined a kind of market to put a price on carbon. It cannot help but bring everything back to a market to encourage, if

not speculation, at least the bargaining of “carbon capital”⁷ which has nothing to do with effective protection of nature. On the contrary, as we will see, what does the CARE model offer in this area? It suggests that each company calculate its own “carbon cost” (not a carbon price) based on the cost of the measures to reduce its greenhouse gas (GHG) emissions within the limits set by Intergovernmental Panel on Climate Change (IPCC) scientists and enter these costs in its accounts as a diminution of its profits to finance appropriate measures. Thus, in this serious and effective method in line with the principles of traditional capitalist accounting method, there are as many carbon costs as there are companies.⁸ Pottier,⁹ interestingly, showed “how economists are warming the planet.” With CARE ecological accounting we show how accountants will cool it! Indeed, classical accountants have always found very effective ways not based on market prices to ensure the conservation of capital for capitalist entrepreneurs. It is time for their extremely powerful tools to be put to the service of human and natural capitals. All progressive forces should support these new types of accounting and abandon the false solutions of environmental taxes and carbon pricing as well as those promoted by the International Integrated Reporting Council.

5.3 The case of integrated reporting of the international integrated reporting council

Integrated reporting, this new type of reporting, recommended by the International Integrated Reporting Council (IIRC), has been favoured by the financial world because it makes it possible to make uninformed citizens believe that the capitalists have found the solution that allows a fair treatment of all types of capital used by companies. Indeed, the conceptual framework of IR considers six types of capital: financial, man-made, natural, human, social and intellectual. At first glance, it seems therefore a very interesting tool for the conservation of capital. But the form hides a substance which upon analysis turns out to be totally contradictory with the ambition of this reporting, that of treating the six capitals mentioned above on an equal footing.

We justify this criticism by four main arguments.¹⁰ Firstly, integrated reporting does not deserve its name: it is not integrated into ecological accounting as is the reporting resulting from the CARE model. Indeed, while financial capital is indeed registered on the liabilities side of the balance sheet of firms in IFRS, the five other capitals do not appear there and are only the subject of “extra-financial” information. This contradiction in terms does not seem to shock the authors of integrated reporting. Secondly, in connection with the previous point, IR coexists with the IFRS, the famous international accounting standards which promote a capitalist type of accounting: it does not at all call into question these particularly dangerous capitalist accounting standards. Thirdly, of the six capitals of which the IR speaks, only financial capital, which appears as a liability in an accounting balance sheet, is truly protected. Other types of capital, and in particular natural capital, appear as simple means (stocks, assets, or resources) in the service of financial capital and not as debts to be repaid in full and strictly.

It is also very striking that IR feels the need to distinguish “financial capital” from “human made capital.” It is not a question of redundancy: the first is indeed the capital of the capitalists, which is a liability, and the second a simple asset, that is to say, the uses of the financial capital in machines and other objects to be used. In this financial vision, natural and human capitals are simple assets to be used. Fourthly, these capitals are in principle evaluated at their fair value¹¹ with all the consequences described above, whereas in the CARE/TDL method it is the cost of maintaining the capital recorded as liabilities which prevails as the principle of valuation of assets. Finally, fifthly, the concept of limits or limit zones for use of the ecosphere practically does not appear in the IR and is not the subject of any recommendations. This demonstrates the fact that the question of the conservation of natural capital is really not on the agenda of this vision of reporting which remains very financial, like most of the “ecological” reporting proposals. There is nothing serious to expect from all this to save the planet, quite the contrary.

After this criticism of some fake solutions proposed by the defenders of today’s economic system I will now try to demonstrate that the only effective solution to put an end to the catastrophic consequences of the Megamachine consists in applying the principles of a revolutionary new type of ecological and human accounting: the CARE/TDL method, which will now be analysed in detail.

Notes

- 1 *The Economics of Welfare*, Macmillan, 1920.
- 2 Discounting, a basic tool of neoclassical economists, is based on an integration into the reasoning of a minimum financial rate of return: the idea is that a future sum is worth less than an immediately available sum since the latter can, if placed in the financial markets, bring in money at the interest rate imposed by the capitalists.
- 3 Experience proves that the profitability rates of capitalist firms depend on the balance of power between capitalists and workers’ unions. Thus after the Second World War, in a context of weakness of European and American employers, the profitability rate of these firms was significantly reduced until around 1980, only to start rising again in a social context of weakening of the unions.
- 4 See David [Pearce \(1976\)](#) “The Limits of Cost Benefit Analysis as a Guide to Environmental Policy,” *Kyklos*, Vol. 29: 97–112; Alexandre Rambaud/Jacques [Richard \(2015\)](#) “The ‘Triple Depreciation Line’ instead of the ‘Triple Bottom Line’: Towards a genuine integrated reporting,” *Critical Perspectives on Accounting*, Vol. 33: 92–116. And above all the thesis of [Rambaud \(2015\)](#) cited in the bibliography.
- 5 For an analysis of this text see the article by Christophe and Richard in the bibliography.
- 6 “The Economics of Welfare,” op. cit. See also for more systematic analysis Richard (Routledge 2023b).
- 7 The firms which have the most difficulty in restricting their greenhouse gas emissions will be able to purchase on a specific market the excess pollution rights of those which will easily manage to respect the imposed emission quotas.
- 8 Opponents of this solution will say that it does not allow companies that have the most costly measures to purchase on the market the “services” of those for whom these efforts are the least costly. But it is with this type of static reasoning that we have arrived at the current situation because it does not encourage these firms to change their technology. We must force all firms to respect natural capital as they do for financial capital.

- 9 [Pottier A. \(2016\)](#) “Comment les économistes réchauffent la planète,” Paris: Anthropocène Seuil. See also [Richard \(2023b\)](#).
- 10 See for more details Alexandre Rambaud and Jacques Richard, “The ‘Triple Depreciation Line’ instead of the ‘Triple Bottom Line’: Towards a genuine integrated reporting,” op. cit.
- 11 Fair value is practically an assessment in terms of market price. We have seen that Datini refused, for reasons of prudence, to evaluate his firm in resale value. His obsession was to maintain his financial capital. In the same way, CARE seeks to determine the costs of maintaining ecosystems. The latter have too great a value to have a selling price on markets as neoclassical economists generally propose.

6 Towards a New Governance of Companies and Nations to Kill the Megamachine

The CARE/TDL Model

To design and achieve this objective I will list the 12 proposals (or axioms) which form the basis of the CARE/TDL model and the cornerstone of the constitution of a new market economy.

6.1 First proposal: the definition of the concept of capital

By capital we mean a “thing,” material or not, offering potential for use, and recognised as having to be maintained over a certain period of time determined in advance. This definition implies that all the categories which will compose a (real) capital must be considered as debts of conservation of something and not, as is generally the case in economic literature, as assets or resources to be used. Expressed in more philosophical terms, capital is an end in itself and not a mere means.¹

The immediate consequence of this definition is that it is impossible to compensate the different types of capital between them in such a way, for example, as to allow the degradation of certain capitals on the grounds that others will be improved. To use the vocabulary of ecological economics, the CARE/TDL method is fundamentally based on a “strong conception of sustainability” and not on a “weak conception.”²

Thus, in this strong vision of sustainability, we do not allow the compensation of financial, human and natural capitals, as is the case, for example, with the design of the World Bank (2006) to evaluate the wealth of nations: for this organisation the construction of a building can compensate for the loss of biodiversity.³

I would like to point out that this approach to strong sustainability is, in principle, strict. That is to say, except in duly mentioned exceptions, it is also not possible to make compensations within each of the three fundamental types of capital. This is obvious in the case of human capital: we cannot imagine, for example, as is done in traditional national accounts (see below), that the exorbitant remuneration of executives like Carlos Ghosn, former CEO of Renault, can compensate for the miserable salaries of certain yellow vests.⁴

This rule also applies to the different categories of capital that make up natural capital. We cannot destroy fish by invoking, as compensation, the increase in the number of farmed pigs: the problem is that of maintaining the biosphere, more precisely its overall functioning (see below). On the other hand, in the case of financial

capital, it is rather the exception which will constitute the rule: with technological progress, a classic machine can obviously be replaced by a new, more efficient machine if the protection of the two other types of capital is assured, which places strict constraints on this technological progress.

6.2 Second proposal: the choice of capital

It is the task of a democratic society to determine the things that deserve to be treated as true capitals, that is to say, systematically preserved. We have seen how capitalists, thanks in particular to the support of forces favourable to neo-liberalism, have succeeded, until today, in ensuring that only financial capital is promoted to the rank of real capital in accounting. For us there are at least three types of capital that deserve systematic conservation: natural, human (including in the broad sense social, societal, artistic capitals) and financial capital. All three deserve the same fate. We provide more details below on the definition and characteristics of these types of capital. We specify, at this stage of the reasoning, that natural capital must be understood as the things (living or not) without which the possibility of human life on earth would be non-existent or endangered. Certainly, this is an anthropocentric conception but, as the philosopher Norton (1991) has clearly shown, it is perfectly possible to reconcile such a position with the requirement for systematic conservation of natural capital.⁵

We emphasise that our enumeration of the three basic capitals begins with that of natural capital. Indeed, we consider that this type of capital is the basis of the other two and must have priority. We must therefore move away from modern schemes which favour human beings and, among them, capitalists: such human power to act must have limits⁶ except at the risk of bringing us back to the age of the cave! But our list of the three capitals is not exhaustive. It is up to citizens to decide if they consider adding other types of capital. Thus, a tree worshiped by a tribe can be a capital.

6.3 Third proposal: the need for ontological studies

It is impossible to ensure true conservation of human and natural capitals without an ontological study making it possible to observe the nature and functioning of these capitals, independently of the services they can provide to financial capital and consumers. The aim of these ontological studies is to understand what these capitals really are and how they fit into the framework of the global reproduction of the biosphere and the ecosphere. Thus, consider them as such and not, as is most often the case in the context of capitalist-type economic analyses, as simple sources of services and profit. This holistic perspective breaks with the aspects of modernity, which accompany the initial capitalist project and which subjects the nature to the laws of men, as Castoriadis has shown.⁷

In terms of natural capital, the main goal is to study how the permanent renewal of structures and functioning of biological cycles is ensured in such a way as to allow the conservation of biodiversity, which is the basis of life on earth. It

is therefore not a question, at this level of reflection, of knowing whether humans will be able to derive services and profits from this operation. The principle is to conserve natural capital to eventually find uses and not to pose a utilitarian constraint to possibly conserve natural capital: conserve to produce value and not the other way around. In terms of human capital, the goal is to consider human beings as people in themselves who have the possibility of ensuring their preservation to lead a good life, and not as workers intended to provide services and profits to a company. If we accept this type of reasoning which makes human beings and nature capitals to be maintained in themselves, and not simple economic means, the question is then to know in which cases and under what conditions of resilience⁸ these capitals are put at risk.

We can speak of human resilience, particularly when workers' employment conditions threaten the preservation of their health or, more generally, prevent them from leading a dignified life. The complex task of identifying these threats will be accomplished by different people. In the case of humans, it will be carried out in particular with the collaboration of the people concerned, by independent scientists such as ergonomists or company doctors and by union representatives. In the case of natural capital, it will be carried out with ecologists but also other people, such as members of certain non-governmental organisations (NGOs) who have a good knowledge of nature conservation problems and "locals" or "residents" who have proven their ability to take care of them. All these people will be, in a way, "spokespersons" for the three types of capitals concerned.⁹

This approach has nothing to do with that of the analysis of environmental functions as often developed in economic analysis, aiming to assess the capacity of human beings and nature to provide goods and services for the satisfaction of consumers and corporate profits. It also stands out from the ambitious research of philosophy, which wants to discover the essence of humanity: the ontological studies in question here aim more modestly to allow all human beings to live correctly in coexistence with the rest of the biosphere. We emphasise that the CARE method gives priority to actions to conserve existing capital, which already implies for them, very often, actions to rectify payments (in the case of human capital) or new conservation expenditures (in the case of soil, biodiversity, etc.). In the case of missing capital, restoration measures can obviously also be taken if this is still possible; but it would already be good, at the stage we are at, if the conservation of what exists is first ensured. As for the improvement of the "previous" state (which one?) it is an ideal which seems presumptuous currently: before thinking about creating value we must first conserve the capital we have, which is not done these days.

6.4 Fourth proposal: the need for human and ecological scientific norms and standards

Thanks to the ontological analysis of human and natural capitals and their current state, it will be possible to determine the conditions of their resilience and to deduce norms (standards) of their use allowing their conservation. In the case of human beings, we will speak of conservation and the possibility of leading

a dignified life within the frame of the limits of human existence. It will be a question of inducing sufficient payments for all, to ensure this conservation taking into account local conditions and the characteristics of people (in particular certain physical or mental incapacities). This will probably involve calling into question the differences in current “remunerations,” in particular the exorbitant pay of executives. It should be noted that this type of pay for conservation does not, strictly speaking, constitute an income and has notably nothing to do with the concepts of minimum income or universal income that we often talk about, which do not really ensure the conservation of people. Furthermore, in the philosophy of CARE, in the same way that for a shareholder there is a dividend only after conservation of their financial capital, a person’s real income begins only after conservation of their human capital: we will therefore talk only about the “income” of employees at the time of distribution of the new type of profit (see below). Let us specify that in the event of (non-fraudulent) bankruptcy of certain firms, the financing of the budgets for the costs of maintaining the human capital concerned will be systematically ensured by all the firms which will be made collectively responsible for their actions.

In the case of natural capital (soil, water, biodiversity, atmosphere, etc.) it will be the task of scientists independent of firms to define thresholds beyond which there is a risk of loss of resilience. Due to the practical difficulty of defining these thresholds (as they can vary considerably from one place to another), a pragmatic solution will be to prudently decide on limits to be respected for their use, or, even better, to determine zones in which these risks have a high probability of occurring. More precisely, these risk zones must be designed to provide warnings well before resilience limits are reached.¹⁰ Without the definition of these norms, it is impossible to assign a concrete objective to ecological and human management. Unlike a common management perspective which seeks to make efforts without having set the environmental and human limits to be respected, the CARE/TDL method is entirely guided by this type of objective linked to ontological studies of a scientific nature. For us, any management that is not based on these types of objectives is doomed to failure due to its blindness: it results, as is often the case for the famous corporate social responsibility (CSR), so popular with companies, in purely tactical objectives formulated in terms of vague progress of which no one knows where it can and must lead.

We do not deny, as Capron and Quairel show,¹¹ that certain companies can spontaneously pursue a serious policy of conserving their human and natural capitals within the framework of CSR. There are, in this practice, the nature of which is complex to analyse, multiple cases which should be acknowledged. But we think that companies that really play the game must seize the CARE/TDL method label to distinguish themselves from others, in particular to assert that they respect scientific maintenance targets in matter of conservation. The innovative point of the CARE/TDL method by relationship to all this pioneering work in this area is to make it possible to link these “physical” targets to microeconomic and macroeconomic monetary indicators of capital and profit. This “monetisation” is not contradictory with the principles that drive ecological economists such as Gadrey

and Lalucq¹²: the goal is indeed to conserve nature on the basis of a maintenance cost and not to give it a price. CARE has the considerable advantage of offering a serious alternative to the capitalist accounting model which is also based on standards, notably of depreciation, to maintain its financial capital while providing a monetary result.

As part of our bottom-up approach, these limits, or limit zones, will most often have to be defined by the companies themselves¹³ under the control of new independent auditors specialising in the above-mentioned areas. This will involve the creation on the one hand of a new body of “green” auditors who must not be subservient to firms, this within the framework of a new public service of audit. In certain cases, when it comes to global phenomena such as the issue of reducing greenhouse gases, it is obvious that the definition of the scientific targets to be respected will come from international organisations such as the Intergovernmental Panel on Climate Change (IPCC). More generally, cooperation among local, regional, national and international organisations will be necessary to define standards. Through such cooperation, we could define correct conservation pay standards in line with the general requirements set by the International Labor Organization (ILO) and adapted to local situations.

6.5 Fifth proposal: the need for double-entry accounting

We have seen that any correct management of a company involves a dualistic balance sheet, with one side reserved for the conservation of capital and another for its use in form of assets. The same is true in the CARE/TDL model, except that there are three types of capital. We therefore remain within the framework of double-entry accounting. In this regard, we can conclude that this technique is neutral: it can be used for capitalism as well as against it. We thus must not confuse a technique and its use. Classically, in our new balance sheet, the right side will be reserved for recording the amounts of capital to be preserved (the company’s debts towards the three new types of capital providers) and the results (profits or losses), and the left side will concern the corresponding resources,¹⁴ that is to say the assets. These can be defined as material or non-material things, intended to be used to meet certain needs or desires.¹⁵

6.6 Sixth proposal: the imposition of the new model by accounting laws

The establishment of these new balance sheet models with three types of capital on the liabilities side should be made obligatory by accounting laws for all economic players but first of all for large companies, which are in the main responsible for the social situation and the current environmental crisis. This involves applying the same constraints as those that already exist in terms of protecting financial capital, constraints that are currently accepted without problem by all of these companies: we remind you that, contrary to what Latouche believes, the current Megamachine is imposed by international accounting laws and that we know its drivers perfectly to force them to act in compliance with the new accounting laws.

But, as is the case today, simplified regimes may be provided for small and medium-sized businesses.

The generalisation of these accounting obligations will make it possible to progress quickly and efficiently towards the achievement of the ecological and human objectives that more and more citizens around the world are calling for. We will, thus, finally escape from the current dualism which imposes strict laws for the conservation of financial capital and which grants the possibility of “soft laws” for what concerns the conservation of the two other types of capital.

6.7 Seventh proposal: the need to establish conservation (sustainability) gaps

Each economic entity, to establish its new ecological and human balance sheet, will have to make a comparison between the current situation of human capital and natural capital for which it is responsible and the local, regional and national conservation standards which will have been defined according to the ontological studies discussed previously. This comparison will allow them to determine gaps between their actual practices (particularly in terms of pollution, consumption and remuneration) and the human and natural standards that they are supposed to respect. We will therefore be dealing with two main types of gaps (of a monetary or non-monetary nature depending on the case): gaps in human sustainability (or conservation) and gaps in ecological sustainability (or conservation).¹⁶

6.8 Eighth proposal: the need to establish budgets for the costs of maintaining the three capitals

In the case, undoubtedly very frequent, of the occurrence or risk of occurrence of human or natural sustainability (or conservation) gaps, the entities concerned will first have to determine the least costly possible measures to enable these assets to be restored to normal resilience (or conservation) or, even better, to stop the causes of deterioration of these capitals, this in the best possible time frame compatible with the constraints imposed by the risk of non-resilience. They will then have to evaluate, for each capital concerned, separately, the budgets necessary to achieve this sustainability (resilience). These budgets will be called cost budgets for sustainability (or resilience).

If an entity has an activity that already respects the conservation of natural capital (for example with a type of forestry agriculture adapted to soil and water conservation), then this company will not have a budget to plan. In our vision of ecological economics, a perfect company has no natural capital because it has no ecological debt. This situation obviously cannot occur in the case of human capital because, unlike nature, which normally regenerates if we respect its operating rules (within the limits of entropy), human beings must regularly “recharge their batteries” using a budget, most often monthly.¹⁷ In total, three main types of maintenance cost budgets must be established for natural, human and financial

types of capitals when founding a company, even if this budget is zero for nature. These maintenance cost budgets constitute the “existence value” of the capitals concerned.¹⁸

6.9 Ninth proposal: the inclusion of maintenance cost budgets on the liabilities side of the balance sheet as capital

The budgets established for a certain period for the conservation of the different constituent elements of human capital (that is to say, mainly, the sum of the conservation pays allocated to staff members) will constitute the global human capital, that is to say, the global capital-debt of the company concerned with regard to its staff. This human capital (in the accounting sense of course) will be recorded as a debt on the liabilities side of the balance sheet, in the same way as the debt of financial capital usually appears.¹⁹

Similarly, the sum of the budgets possibly planned to ensure the conservation (or preservation) of natural capital for the period concerned will constitute what we will call the overall natural capital of the company, that is to say, the global ecological debt of this company. This overall natural capital will be recorded under the name “natural capital” on the liabilities side of the balance sheet. Let us emphasise that all these recordings concern budgets to modify the present situation through future actions: this type of accounting is therefore not focused on the past.

At the end of these operations, the new CARE/TDL balance sheet, unlike the traditional balance sheet of capitalists, will no longer include a single type of capital, financial capital. We will present three main distinct lines (zones or tranches) of capital inside the liabilities of the firm: the lines relating to natural, human and financial types of capitals. We have seen that we are in the hypothesis of strong sustainability. Consequently, these three large areas will be “impermeable”: a debt registered as global natural capital will not be offset by a debt of financial capital; in the same way, a debt registered in global human capital cannot be cancelled by an increase in financial capital as is the case for example in the writings of the World Bank in 2006.²⁰

Let us point out in this regard that the expression of accounting for three capitals or “tri-capitalism,” which can be attributed to the CARE/TDL model,²¹ obviously does not mean that there are only three capitals. In fact, when it comes to natural capital and human capital, they are made up of a multitude of capitals. We are therefore dealing with an explosion in the number of capitals retained by the company incommensurate with the number of capitals retained by financial capitalists.²²

The same rule of impermeability will apply within the capital zones, except for financial capital, for which compensation is permitted. For example, take advantage of technological innovation to replace old machines knowing that this technological innovation is subject to the systematic conservation of the staff either at the level of the firm or at that of the community: a constraint which will obviously change the pace and the content of technological development.

6.10 Tenth proposal: accounting for a complete ecological and human cost allowing the maintenance of the three types of capital

Simultaneously and symmetrically with the recording of the amounts of the three types of capital-debt to be kept on the liabilities side, their amount will also be recorded on the assets side as the cost of using the assets corresponding to the three types of capitals. The actual progressive use of these assets will give rise to three types of depreciation (wear and tear). Typically, these reductions in assets will result in the recognition of three types of separate depreciation expenses in the income statement which will correspond to potential losses of the three types of capital concerned. These three types of depreciation expenses will form a new true complete ecological, human and financial global cost which has nothing to do with the (truncated) partial capitalist cost that currently governs the formation of the capitalist market. The formation and recording of these depreciations will be illustrated in [Appendix 1](#). The new complete global human and ecological cost will be the basis for establishing new prices allowing complete coverage of human and ecological costs. We will thus move towards the end of the enormous human and ecological dumpings which characterise the current capitalist world.²³

Companies will be obliged to invoice at least this price, in the same way as they already are by the World Trade Organization (WTO) but, unfortunately, on the basis of a price which only ensures the conservation of financial capital. Normally, the company that charges at a price equal to this new complete cost will recover a sum of money from its sales which will allow it to reinvest in the natural, human and financial assets that have been worn out and thus maintain the three types of corresponding capitals, thus in the frame of the inevitable entropy.

6.11 Eleventh proposal: a new type of common profit in the frame of jointly governed enterprises (in common)

We have seen that a new type of full or total cost based on ecological constraints is at the basis of the CARE/TDL model. This cost has nothing to do with a price resulting from a bargaining in the frame of a capitalist type of market: it is constructed in the company and by the company by taking into account the constraint of maintaining three types of capitals, in particular natural capital. As in all classic accounting, this cost of maintaining capital will form the basis of price setting and therefore impose on the market a type of regulation of its formation.

This new accounting situation must be applied by all companies. The constraint of respect for nature therefore does not weigh here on consumers but on producers, to make them quickly change their production model with technological innovations adapted to the current human and ecological crisis: it is time, as proposed K. William [Kapp \(1950\)](#)²⁴ to place technological progress under the constraint of a new economic system. The CARE model therefore makes producers responsible for their actions, which they also seem to claim with their insistent reference to CSR (see below).

If the company manages, thanks to the know-how of its employees and intelligent management, to avoid certain wear and tear on its assets or to reduce the costs of the measures taken for this purpose, it will be able to record a justified profit within the framework of this new ecological and human market economy. This will therefore be a profit that qualifies as ecological and human insofar as it can appear only after conservation of the three types of capital considered in the CARE/TDL method. This new type of profit, which will result from the joint activity of the three types of capital, will be a profit common to those three types.

The CARE/TDL method therefore leads to a common profit (or loss) resulting from a joint action of three types of capitals (see below). In this sense, it constitutes an effective and generalised realisation of the theses formulated by Ostrom,²⁵ this thanks to adequate accounting making it possible to fill the wishes of this avant garde economist. The existence of this common profit will not make the company a community in the sense of the historian Otto Friedrich von Guericke²⁶: there will always be conflicts of interest, as there currently are in any capitalist society between the partners and between the capitalists and the employees, but these conflicts, due to this type of common profit, will probably be much less as far as each type of capital will be systematically conserved.

This new economic situation will be achieved at the global level (and not only in certain sectors of the economy), which will allow the birth of a true social and solidarity economy and the primacy of jointly governed enterprises²⁷: they will finally dominate the economic arena, while they have very low chances of developing in a world where capitalist firms constantly engage in ecological and social dumping. The fate of the new distributable profit will depend on the joint decision of the three types of associated investors. The latter, to the extent that they manage a common profit, will in fact become truly associated for better and worse, which should make them, if not allies, at least possible partners and not, as in the current situation, automatic adversaries. As in any classic limited company (SA), the use of this profit, common to the new partners, can be freely determined by the new annual general meeting which will bring together all the new types of investors (see below).

Logically, the fact that employees and providers of financial capital need to receive a decent pay or pension for their physical and intellectual participation in the life of the firms should encourage them to put part of these profits in retained earnings for self-financing the expansion of their jointly governed enterprise. However, distributions of “dividends” (in the broad and new sense of the term) will be possible for collective or individual investors in human and financial capital, knowing that for the latter there is no longer question of paying a systematic “cost of capital” like this is the case in today’s finance. In the Care/TDL method the concept of income therefore concerns only the remunerations based on the new concept of profit. In this context we could have, in addition to collective remuneration, rewards for particularly deserving staff and for financial investors on behalf of their critical contributions or the maintenance of their capital over a long period, etc.

Ultimately, the association of a very large number of employees with the fate of their firm and its results should make it possible to escape the situation of

alienation in which they live today due to their status of simple employees, while they also contribute with their human capital to the “financing” of companies: workers are thus treated also as investors, in the same way as financial investors despite the fact that the latter, in the history of capitalism, have always been considered as the only ones who deserve this qualification: the traditional capitalist world has the art of capturing flattering words!²⁸ These workers will finally become real partners in the management of their business. This improvement in their situation will be all the greater if measures to fragment large groups into human-sized companies are implemented. They can only be favourable to the revitalisation of businesses. Of course, this progression of co-management could be interpreted as an attempt to revive the old idea of the collaboration of capital and labour. But once again nothing will prevent the unions from criticising its effects. This is what they are already doing today in France by accepting that members of works councils “collaborate” with company managers. In addition, these same unions have generally accepted that there are salaried directors on the boards of directors of large companies. Furthermore, even if employees become partners in companies, this will not prevent the labour code from remaining: employees and workers should not be confused.

This analysis of the common profit managed by the new capitalists completes the descriptive phase of the new type of social and ecological accounting.²⁹

6.12 Twelfth proposal: towards ecological co-management of businesses

The philosopher Georges Canguilhem tells us that “I am doing well, to the extent that I feel capable of bearing responsibility for my actions, of bringing things into existence and of creating relationships between things that would not otherwise arise from them without me, but who would not be what they are without them.”³⁰ The CARE/TDL method is precisely a method whose application will have profound consequences in terms of corporate governance, that is to say, as Perez³¹ shows, in matters of power. First, as each type of capital has its own depreciation expenses, it is no longer the burden of other capital. Thus, the expenses of human capital are no longer expenses of financial capital, as they are in the capitalist accounting system, but expenses which weigh on the common income to the three capitals; it means the sales, also being considered as the fruit of joint use of three types of capitals.

Second, the appearance in liabilities of three types of capitals and no longer just one (financial capital) leads us to consider (finally) that there are three kinds of capital providers in the company and that these capital providers, or their representatives, must be treated on an equal footing. They will have the right to equal power in all decisions concerning the choice of company managers and the distribution of the new concept of profit within the framework of ecological and social co-management of a completely new type which goes much further than the famous German co-determination.³² They will have the same rights at all levels of management decision-making, including in workshops or services. Thus, the providers of labour

capital will no longer be simple employees but rather partners in the management of the company, at the same time as providers of financial capital.

Third, as there are three categories of capital providers, we can speak of an integral theory of capital investors (ITCI, or CARE/TDL capital-holder theory). This new theory will replace the famous American stake-holder theory³³ which currently dominates the world of ideas in terms of reform of corporate governance. This new capital-holder theory is much more precise and brings change in the governance of firms, to the extent that it is based on a new accounting system which makes it possible to clearly identify the capital providers in the firm and measure the results of their joint activities. This will not prevent the provision of ad hoc commissions where, in particular, representatives of the company's clients will be able to express their opinions and wishes on its product policy. These commissions could even be made obligatory and their approval required. But the members of these commissions will not be able to participate in company management decisions which are taken by the capital providers alone.

In the case of this new ecological and social co-management, each type of capital will have a third of the votes, to be distributed among its representatives, it being understood that these representatives will have equal weight regardless of their capital contribution (see below). We will also emphasise that the diversity of size of capital invested is taken into account at the level of their conservation and not of the right of investors to discuss company strategies: at this level, it is the expression of intelligence that counts, and it is not necessarily proportional to the capital investment.

It is not possible within the framework of this brief presentation to analyse in detail the question of the appointment of representatives. Let us simply say that the representatives of financial capital will represent not only traditional shareholders but also creditors, the mass of suppliers, and generally speaking all those who actually make tangible or intangible assets available to companies (including States, regions, tribes).³⁴

Human capital Representatives will be appointed directly by all staff working in the company concerned. Let us specify that the unions will not necessarily be represented in this matter but will retain their traditional task of defending workers: the possibilities on their part of a fundamental challenge to the system proposed by the CARE model and the decisions resulting from it will therefore remain intact. This constitutes a major difference with German co-determination which tends to bring unions into the game of certain management or control bodies such as the supervisory board. The representatives of natural capital will notably be scientists (independent of the company), environmental NGOs and local residents affected by the company's actions on the environment.

Of course, as in any normal society, if things go wrong, the losses will have to be shared. As part of this new type of firm, both human capital and financial capital investors assume the risks within the framework of State social security, which we have spoken about. This actually hardly changes the current situation because, as more and more people recognise, the time is long gone when financial capitalists could claim to be the only ones to take risks. We know that the entire evolution of

joint stock company law has been mainly marked by a progressive reduction in the legal liability of financial capitalists, with a transition from unlimited liability to limited liability for their contributions. We also know that this responsibility limited to financial contributions is often not even assumed in the event of a crisis, at least for very large companies, due to the State aid they receive, as the examples of the 2008 Great Financial Crisis and the recent Covid-19 crisis show. More generally, Mazzucato³⁵ proved that capitalists generally prefer that the State assume the biggest risks in terms of innovations so that they can then make the applications of successful research profitable for themselves.

This truth is particularly relevant in the context of the ecological crisis we are experiencing. The strategy of the capitalists will first be, if possible, to change nothing in their anti-ecological management mode for as long as possible: they have already succeeded in this feat for more than 50 years with the support of the governments, whether they are liberal, socialist or communist. Then, under the pressure of ecological disasters, when they will finally have to take drastic ecological measures which involve financial outlays, they will try to take these measures with public funds resulting from tax levies weighing mainly on poor populations or those of modest wealth, without changing anything in their dividend payment practices. In this regard, they will benefit from the support of dominant economists who compete among themselves to promote the largest possible sums coming from States to finance what they call the ecological transition or, another term which is very fashionable again, the so-called ecological planning, a traditional weapon of State that capitalists brought up to date to save private capitalists.

In addition to these miraculous financial solutions, they have other recipes that allow them to overcome the difficulties to which they are exposed. We know in particular that it is possible for financial capitalists to diversify their risks through an intelligent portfolio management policy and also to use the famous leverage effect to reduce the mass of invested capital and shift the risk of losses to the heads of classical lenders: all finance textbooks list these “good” principles that I myself had to teach during my career in the university! Another macroeconomic type of argument is that one which the stock market press constantly states: we can verify that if they play in the medium, or even better long term, financial capitalists are generally winners; even in case of a crisis, as they were previously able to receive enough dividends they could emerge “victorious” from the affair.

Let us finally underline one last fundamental point in this comparative analysis of the risk of employees and providers of financial capital. It is traditional in debates on this problem to put wages and dividends on an equal footing: workers’ wages would be the remuneration of their human capital just as dividends are the fair remuneration of the financial capital of shareholders. This argument is generally used to promote the massive distributions of dividends that we experienced in the 20th century and especially in the 21st century during the financialisation of the economy.³⁶ The problem is that this argument is biased. As the CARE/TDL model proves, correct pay constitutes only a simple maintenance of human capital and not its remuneration: the true latter begins

only after this conservation. While dividends, which come after the systematic maintenance of financial capital,³⁷ constitute a net remuneration. Wages, in this capitalist world, do not even correspond, for a very large mass of workers, to conservation pay and are therefore not at all representative of remuneration for human capital. It is true that in the event of a company going bankrupt, certain “small” capitalists who do not have the means to properly manage their savings in the long term may lose out, while certain laid-off employees can receive unemployment benefits. But this protection of employees does not exist in most countries around the world and, when it does exist, it is limited to a short period and generally constitutes only subsistence remuneration, while, in many cases, the small capitalists not only could receive real income in the form of dividends during the period of their investment but also could carry out another profitable activity in parallel.

In conclusion, employees should not hesitate to take the same risks that financial capitalists claim to take. They should take literally the slogan of these capitalists who want to be responsible within the framework of the famous CSR: we too want to assume your risks and your responsibilities in the company! Thus, a new risk society will appear shared by the three types of capitals and this new society can be macroeconomically supported by State aid: all these capitals will finally be placed on a strictly equal footing. We will then be part of a new and responsible society which meets both the requirements of sustainable development (due to the constraints of separate conservation of the three types of capital) and which retains the attraction of a potential profit to be shared in the context of a (certain) market economy. Marxist and communist arguments have until now reduced the economic debate to the choice between private capitalist companies on a market regulated by liberals and social democrats, and nationalised companies acting within the framework of planning directed by communist bureaucrats. In this terrifying setting, we just fall from Charybdis to Scylla. The CARE model allows us to escape from this intellectual strait jacket which prevents any evolution.

Let us finally emphasise that this proposal is not about advising any way of life, whether, notably, atheistic or religious, stoic, epicurean, platonic or socratic, and even less a way of seeking happiness, but quite simply to preserve life on earth and allow a good life for all humans and their systematic participation in the activities to which they contribute: it is then up to them to choose the objectives of their lives. There will be therefore a common basis which allows true pluralism with dignity.

We have finished with these general principles of the CARE/TDL method. Readers interested in delving deeper into the issue and taking a more concrete approach will find in [Appendix 1](#) an example of application of this method to the case of a company. They will also find in [Appendix 2](#) an application in terms of national accounts. It will be demonstrated that the CARE/TDL method leads to a total questioning of the concepts of national product and domestic product, in particular the famous gross domestic product (GDP). This macroeconomic focus leads us to the following point of the CARE/TDL revolution: its appliance in the field of constitutional and legislative rights.

6.13 The reform of constitutional and legislative rights at the State level

I will first deal with the question of the principles of the reform, then of the concrete conditions of its application.

6.13.1 *The principles of reform*

In their Communist Manifesto, Marx and Engels formulated their main solutions for the implementation of a new socialist economy by the communist movement. They essentially boil down to three actions: revolution and takeover of power by the proletariat by force, “despotic” attack on property rights followed by expropriation of land ownership, and development of national factories according to common planning. We know what the applications of these precepts produced in communist countries, notably under Lenin, Stalin and Mao Tse Tung.

Our manifesto aims to carry a totally different approach which trusts in the democracy resulting from the Enlightenment movement, continues to give to a certain market a very important role and maintains a certain private property. Let us emphasise, regarding this last question of private property, that, as Ripert showed in 1946 and as Robé recently recalled,³⁸ the shareholders of public limited companies, the largest capitalist type companies, are no longer owners of the assets of these companies or of the companies themselves but the creditors of these companies, which, unlike in the famous (erroneous) thesis of Berle and Means,³⁹ did not prevent them from retaining power and even increasing it during the 1980s. In this regard, the Marxists’ focus on private property and not on power alone is a fundamental error which led them to a terrible delay in examining concrete solutions to eradicate capitalism: Engels, in one of his latest works, does not speak at all of the possibility of workers’ cooperatives but still emphasises the need to transform the means of production into State property.⁴⁰ In CARE, this property, whether private, public, social (as in the case of the former Yugoslavia) or common, must be managed under the constraints of the management rules of the three types of capital that we have set out as part of the presentation of our new accounting model. Indeed, we believe, as the catastrophic examples of the Soviet Union and communist China have shown, that any type of property, even public or common, may be ill-managed depending on the philosophy of management which prevails. (For more details on this question see [Richard \[2023a\]](#).) This problem of the type of ownership having been resolved, it is now important to consider the conditions for the establishment of CARE/TDL model in a democratic manner in the current political context. Indeed, the protests against parliaments and parliamentarians which are emerging today, in particular, for example of the type of those of the famous yellow vests in France, show that an increasingly large number of citizens are calling into question the very foundations of traditional legislative power: they no longer feel represented and protected by their representatives.

There are many reasons for this, but it is fundamentally due to four main causes. The first is that voting methods are generally hostile to the proportional

representation of citizens. The second is that, even if the first difficulty were overcome, nothing guarantees that the persons who present themselves and will be chosen by the voters are representative of the diversity of the social components of a nation: the very cost of electoral campaigns is such that it is obvious that a simple citizen without financial support cannot compete with political forces which have significant financial and advertising support. The third is that the constitutional rules in which the actions of parliaments are enshrined are not protective enough of certain categories of interests: let us cite in this regard the fact that in most countries the preparation of accounting laws is done under the leadership of the large firms and international auditing firms. The fourth is that the functioning of these parliaments is carried out under the pressure of economic forces, mainly large companies, which have considerable means to assert their interests, in particular media under their control: this is particularly what Passet demonstrates.⁴¹ Indeed, the politicians in power, until now, have refused to openly discuss before the people the economic constitution which governs the nations which concerns economic questions, which deal with the conservation of nature and human beings, that is to say capital questions which concern their very existence. They have always sought to prevent people from deciding on fundamental economic structures. In a country like France, a political constitution ensures citizens equal rights to participate in elections from time to time while an economic constitution,⁴² not explicitly ratified by the people, and supported by precise accounting laws accompanied by sanctions, confirms the permanent inequality of capital in companies and a gigantic distribution of fictitious dividends for the benefit of a small minority.⁴³ This is a point that Scheidler had the merit of perceiving although he was not able, due to lack of accounting knowledge, to evoke it in its full extent.

It is time then to put an end to this situation which is leading to ecological and human disasters. We need a completely new social contract, including economics. This is why we propose to include in the constitutions of countries and in the future global constitution of the UN the following two basic principles aimed expressly at all business accounting. First, company accounts and national accounts must ratify equal protection of the three types of natural, human and financial capital: this is the essential basis for achieving true societal justice leading to a reasonable economy. This is also what makes it possible to refound the current system on moral foundations acceptable to all. Second, equal rights of participation in deliberations on business management decisions will be granted to representatives of the three types of capital. We must put an end to the privileges of financial capital and impose the same rules of the game: thus a “tri-capitalism” which will cause a drastic mutation of capitalism. Finally, parliaments must ratify these universalisable positive principles through appropriate laws accompanied by severe sanctions in the event of failure to respect these rules.

Let us emphasise that it is not a question, as in the Marxist approach, of wanting to plan or govern all economic activity, but rather of laying down the basic principles of a new economy in which private and public initiatives remain free to develop but subject to respecting these principles. If this approach is accepted, it is clear that the entire action of parliamentarians will be completely modified.

They will exercise their mandate within a pre-constrained framework which will guarantee the fundamental rights of the three types of capital providers who found a company and a nation. Humans and nature will escape from the clutches of capitalism and its organised struggle against each other. Furthermore, citizens will then be able to develop their “communicative action,” dear to Habermas.⁴⁴ Indeed, this philosopher defends a dualist thesis. On the one hand, according to him, we cannot avoid the presence of an economic rationality in the private sphere (practically that of the capitalist market economy for lack of an alternative proposal on its part). But on the other hand, this problematic influence of capitalist rationality could be counterbalanced by the effects of the extension of a “communicational rationality” leading to a sort of public planning which would aim to correct the problems generated by the economic rationality. We believe, on the contrary, that we cannot envisage a transformation in depth of the current system without a total questioning of the rationality of the capitalist mode of management, which leads us to the next point: the question of power relations in the economy.

Indeed, the equal protection of the three capitals is not enough to break the monopoly of economic power that financial capital currently has: it only limits its power to destroy human capital and natural capital. To ensure equal representation of these three capitals, we must move towards ecological, social and economic co-management at the company level: we presented the principles of this new kind of management previously. But, to have even more effective action in this area, we must also apply this type of co-management on a national and international scale in the political institutions which decide the fate of peoples. We therefore propose that in each country there be systematic bicameralism. There will obviously be, as usual, a chamber of representatives of elected citizens with a very significant dose of proportionality. But it will be systematically coupled with a chamber of representatives of the three capitals (natural, human and financial), in which the three groups will have an equal number of votes. This second chamber must be consulted on all questions of an economic, social and environmental nature and its approval will be necessary so that the laws proposed by the parliamentarians of the first assembly can be applied. In France, the current Economic, Social and Environmental Council (EESC) should not only be maintained but strengthened in this sense. This last point finalises the presentation of the principles of the proposed reform. Its concrete application remains to be seen.

6.13.2 *The concrete establishment of the new economy*

Experience proves that there is unfortunately little to be expected from the traditional political game to move towards the ecological, social and economic co-management that we propose. It should be noted in this regard that in France, for example, the “Pacte” law results in a minimal improvement in staff representation in corporate governance bodies and refuses to take into account recommendation number 10 of the Notat-Senard report, tending to a reform of accounting in a more social and ecological sense.⁴⁵ As Coriat says, “[T]he mountain gave birth to a mouse.”⁴⁶

It is therefore appropriate to try to get out of this blocked situation and to resort to other solutions which allow rapid progress towards essential reforms, this within a democratic framework. Among the instruments which appear more and more in the social and ecological movements that are flourishing on the planet today is the referendum promoted by citizen initiative. We believe that the basic principles of the CARE/TDL method for a new economic constitution could be established, at least for large companies in the form of SA, in all nations of the globe, within the framework of these types of referenda and imposed by powerful popular movements. This obviously presupposes a vast debate in the different components of the social movement and appropriate training.

A true democracy must offer a peaceful choice between different economic alternatives. The Marxist tradition, at least that which follows the precepts of the Communist Manifesto, dictates that any transformation can take place only within the framework of violence. But this axiom is contradicted by the facts: in Europe, 1989 and 1990 saw the Czech, East German and then Romanian communist regimes being overthrown by powerful popular and peaceful movements. In this spirit, we can and must change the terrible domination of capitalist accounting.

As we have repeatedly emphasised, the essential question underlying all accounting is knowing what must be preserved: CARE's concern ("cura" in Latin) is indeed conservation. This major and vital question, which has always arisen in the history of humanity, is currently being resolved by a very small minority, which is a scandal. It is time to pose it clearly in the form of a referendum, of the type that the Swiss like and find normal in a democracy. This would be an opportunity for the people to re-appropriate the economic policy which totally escapes them in the context of current political practices. Of course, this type of referendum should be able to oppose economic models, including the current capitalist model, and should be preceded by a very large information campaign and numerous debates: it is absolutely necessary to offer a real economic choice to the people. We live, it is often said, including in management circles, in a society where human capital is the essential capital: it is time to take this statement literally and give the floor to the representatives of this capital so that they can finally take control of their destiny. Obviously, all defenders of the capitalist system will say that all this is impossible, in the name of realism. But the past is littered with things deemed impossible: impossible to do without kings, to abolish slavery, to abolish census suffrage, to give women the right to vote, to institute ecological, social and economic co-management. A variation of this argument is to say that this is all too complicated. But the same people who use this reason are those who defend the IFRS, a monument of complexity! That said, it must be recognised that all these global solutions are not easy to implement and take time.

A more modest, preliminary and rapid variant would consist of imposing the CARE/TDL model in all *large groups* in parallel accounting,⁴⁷ parallel to that of IFRS: for this there would be no need to wait for an international reform of IFRS. Such a measure would make it possible to immediately see the efforts accomplished or not accomplished by the groups in question for the ecological and human cause. It could be a decisive instrument of the State, particularly for its tax policy towards firms and the agreement of grants. It would also help unions and other

stakeholders to better adjust their demands. A truly ecological government could quickly take such an initiative with the support of a duly informed and consulted population. Other companies could voluntarily opt for this solution, particularly “sustainable” agricultural companies that would like to highlight their ecological efforts and the additional costs that result from them. France, whose revolutionary vocation is well known, could set an example for other countries to follow. Of course, the major beneficiaries of the current system will say that all this is utopian. But, as [Servigne and Stevens \(2015\)](#) say, utopia has changed sides: today a utopian is one who believes that everything can continue as before! Thus, come on, let’s be realistic and dare the impossible to save the planet from the clutches of capitalism. This economic regime has lasted too long!

Notes

- 1 In this all-encompassing vision, the financial capital “lent” to the company is itself a capital-debt to be repaid. As for Datini, it is important that financial capital be preserved. Note that since 1860, legally, in a limited company the shares are debts of the SA to be repaid to financial investors and do not give any ownership rights over the assets. CARE maintains these good principles: but, in an ecumenical vision, it brings together all type of capital and treats them all as debts to be “repaid”.
- 2 [Neumayer \(1999\)](#), “Weak versus Strong Sustainability. Exploring the limits of two opposing paradigms,” Edward Elgar, USA.
- 3 See [WORLD BANK \(2006\)](#), “Where is the Wealth of Nations? Measuring the Capital for the 21st century” and “Critical commentary” [Richard \(2012\)](#).
- 4 We will see later what the pay in question becomes in the CARE model: it is not remuneration dictated by the labour market but an instrument of conservation
- 5 Bryan G. Norton, “Towards unity among environmentalists,” Oxford University Press, 1991.
- 6 The limits to be respected by humans are precisely those imposed by the conservation of natural capital: we do not saw the branch (or better the tree of life) on which we are sitting
- 7 [Castoriadis C.](#) “Modern science and philosophical questions.” *Encyclopaedia Universalis*. Flight 17.
- 8 About this concept of resilience see notably [Holling \(1973\)](#) “Resilience and stability of ecological systems.” *Annual Review of Ecology and Systematics*, Vol. 4: 1–23. See also [Johnson, C.J. \(2013\)](#) “Identifying ecological thresholds for regulating human activity: effective conservation or wishful thinking?” *Biological Conservation*, Vol. 168: 57–65.
- 9 This concept of spokesperson should not be confused with that of the representatives of this capital who will have to make management decisions at all levels of the company. (See below the principles of a new type of co-management.)
- 10 Opponents of taking nature conservation into account in accounting will obviously argue that the existence of such zones implies an incompatibility with the rigour and accuracy which characterises capitalist accounting, which reasons to the nearest cent. Those who know the subject well and who are honest admit that it is in fact marked by terrible approximations, particularly in taking into account depreciation in periods and inflation, not to mention the evaluation of the actuarial discounted values of financial securities which require extrapolations of minimum 10 or 15 years, which only demi-gods would make reliably. In fact, in general, this argument is most often invoked by capitalists themselves who, understandably, do not want to change things.
- 11 [Capron M., Quairel F. \(2016\)](#). “La responsabilité sociale de l’entreprise.” Collection Repères. La Découverte.

- 12 Gadrey J., Lalucq A. (2015). "Faut-il donner un prix à la nature." Les petits matins/ Institut Veblen. Paris.
- 13 We again emphasise the important role that unions must play in defining and monitoring compliance with pay, which ensures the preservation of people affected. The same goes in the matter of ecological preservation for local residents' associations affected by these problems.
- 14 In this case we have taken up the concept and the vocabulary of resources as assets from economists, although in the case of traditional accounting a resource corresponds to a liability: it is a source of assets.
- 15 The reader will find application examples in [Appendix 1](#).
- 16 For example, a monetary gap between a conservation pay and a minimum pay (case of human capital) and a gap between the actual volumes of greenhouse gases emitted and the volumes desired by the IPCC, with regard to natural capital. (See [Appendix 1](#) for more details.)
- 17 We are at this stage of reasoning at the fundamental level of the conservation of human beings which is the sine qua non condition for everything else, in particular the participation of these people in the life of the company and more broadly life in society. This last point, which concerns the governance of firms and nations, will be seen later.
- 18 Alexandre Rambaud, "*La valeur d'existence en comptabilité: pourquoi et comment l'entreprise peut (p)rendre en compte des entités environnementales pour elles-mêmes,*" thèse de doctorat en sciences de gestion, Université Paris-Dauphine, 2015.
- 19 When a company makes a capital increase that has not yet been paid up, a capital debt (budget) appears on the liabilities side of the balance sheet.
- 20 See notably [WORLD BANK \(2006\)](#), "Where is the Wealth of Nations? Measuring the Capital for the 21st Century," The World Bank, Washington DC.
- 21 Jacques Richard, "Comptabilité et développement durable," Paris, Economica, 2012.
- 22 Strictly speaking, CARE/TDL accounting should therefore not be called triple capital accounting but multiple capital accounting or, strictly speaking, triple type capital accounting.
- 23 K. William Kapp (1950), as seen previously, already characterised the capitalist system as an economic system which does not pay all its costs. See also the works of [Berger \(2017\)](#) on this point.
- 24 "Les Coûts sociaux de l'entreprise privée," Paris, Les Petits Matins, 2015.
- 25 Elinor Ostrom, op. cit.
- 26 Deutsches Privatrecht, Vol. 1, Leipzig, Dunckerund Humblot, 1895.
- 27 The jointly governed enterprise could be defined as that which aims to maintain the three types of capitals (natural, human and financial) and the satisfaction of social needs within the framework of a management which systematically associates the investors of the three capitals in the decisions. (See for more details Jourdain's books, 2012, "Quelles norms comptables pour une société du commun?" Charles Léopold Mayer Edition; and [Bommier S. and Renouard C. \(2018\)](#) "L'entreprise comme commun. Au-delà de la RSE." Charles Léopold Mayer Edition.)
- 28 See notably on this important point Olivier [Favereau et Baudoin Roger \(2015\)](#) "Penser l'entreprise. Nouvel horizon politique," Paris, Parole et Silence.
- 29 This has been summarised in the figure proposed by Alexandre Rambaud, which describes the new accounting scheme of the jointly governed enterprise. The figure shows how financial capital, human and natural capitals are conserved through paying full costs of reproduction from sales. Profits are depicted as surplus after costs. Initially this model was conceived by Jacques Richard in 2008 and published in a book in 2012 ("Comptabilité et Développement," Durable Ed Economica Paris) then largely improved with the help of Alexandre Rambaud. It can be now considered as a common work. (Richard, Jacques/Rambaud, Alexandre. "Humanitarian Ecological Economics and Accounting," 2021.)
- 30 [Canguilhem \(2002, p. 68\)](#).

- 31 [Perez \(2003\)](#). “La gouvernance de l’entreprise.” Paris, La Découverte. Repères.
- 32 Current German co-determination does not provide for a specific accounting model: it remains “clinging” to the traditional capitalist accounting model, which is a big problem. Furthermore, it does not provide for representatives of natural capital or spokespersons. Finally, it grants employee representation only on supervisory boards (not management boards) and, even within this limited framework, gives preponderance to representatives of financial investors through a double voting right granted to the appointed CEO of the firm by the shareholders. CARE’s ecological and human co-management is therefore different.
- 33 See notably [Freeman R. E. \(2010 \[1984\]\)](#) “Strategic management. A stakeholder approach,” New Delhi, Cambridge University Paris.
- 34 These tribes, for example Amazonian, must be part of the representatives of capital either as owners of land exploited by companies, or as local residents affected by the degradation of natural capital.
- 35 [Mazzucato \(2014\)](#) “The entrepreneurial state. Debunking public vs. private sector myths.” Anthem Press.
- 36 Conversely, still in the 19th century, in the context of family-type capitalism, the norm was to restrict dividend distributions and to promote self-financing by reinvesting profits: see [Richard \(2015\)](#).
- 37 I emphasise that this principle of systematic maintenance of the financial capital is not trivial. Every homeowner knows how expensive it is to simply maintain that home in good state. Every money holder knows the risks of losing his or her financial capital in the event of inflation. The CARE/TDL method recognises the principle of this conservation. But it refuses the payment of any systematic interest to providers of financial capital. This is not as outlandish as it seems as it is already the case today in capitalist systems when interest rates are very low.
- 38 [Robé \(1999\)](#) “L’entreprise et le droit (Que Sais-Je?),” PUF.
- 39 [Berle A. A., Means G. C. \(1932\)](#). “The modern corporation and private property,” The Macmillan Company. These authors support the famous “managerialist” thesis according to which shareholders lost power to the benefit of house managers and retained ownership of the SA’s assets. Exactly the opposite is true. This thesis, however, continues to have a strong influence on many political scientists and even managers today.
- 40 [Engels \(1880\)](#) “Socialisme utopique et socialisme scientifique (Anti-Dühring),” Editions Sociales (1948, p. 71)
- 41 [Passet \(1979\)](#) “L’Économique et le Vivant,” Paris, Payot. See also [Passet \(2000\)](#) “L’Illusion néo-libérale,” Paris, Fayard.
- 42 We can consider that the conceptual framework of IFRS, which appears in the preamble to this financial code, plays the role of such a constitution on an international scale (since validated by practically all States).
- 43 The French constitution guarantees the right to work, but it is rather a right to work if you find work. The systematic conservation of human beings and nature is in no way obligatory, whereas that of financial capital is, as is the repayment of financial debts.
- 44 Jürgen Habermas, *Théorie de l’agir communicationnel*, vol. 2, Paris, Fayard, 1987.
- 45 Jean-Dominique Senard et Nicole Notat, “L’entreprise, objet d’intérêt collectif,” rapport aux ministres de la Transition écologique et solidaire, de la Justice, de l’Économie et des Finances, et du Travail, mars 2018, p. 78.
- 46 Coriat “Changer l’entreprise? Quand la montagne accouche d’une souris,” *Les Économistes atterrés*, 2 Juillet 2018.
- 47 We could use the management accounting framework. This type of secret accounting, which is not at all regulated, exists in practically all large groups and is used for management.

Partial Conclusion (as Seven Questions and Answers)

- 1 What is the only super technique that is still prevalent virtually unchanged since the Middle Ages?

Response: Capitalist double-entry accounting.

- 2 What is the only technique that allows us to ratify the conservation of the heritage of a privileged caste to the exclusion of that of other capitals?

Response: The accounting of capitalists, which exclusively protects their financial capital.

- 3 What is the only technique that makes it possible to concretely calculate the costs underlying the entire market economy and the famous GDP?

Response: Capitalist accounting.

- 4 What is the only technique that is the subject of systematic international application today?

Response: Capitalist accounting, thanks to internationally harmonized corporate and business laws.

- 5 What is the law that ratifies the exclusive power of capitalists in companies and, more broadly, organizations?

Response: This same corporate and business law.

- 6 Who allowed this international and unfair legal protection of only financial capital?

Response: Most political leaders, whether liberals, socialists, or communists.

- 7 What is the one technique that is practically not studied in the majority of writing on economics and ecology?

Response: Capitalist accounting, which is the basis of the organisation of businesses and administrations all over the world.

These seven questions and answers allow us, in our opinion, to show that the real Megamachine which runs the current world is indeed the double-entry capitalist accounting inherited from the Middle Ages and ratified by an iniquitous legal system with the support of politicians: as we have shown, accounting appears as a super-device which dominates all other techniques. Furthermore, these seven questions reveal that this Megamachine, which is perfectly visible, unfortunately remains invisible, or at least barely visible, due to the incapacity and/or lack of will of most critics of the current economic system to take the study of the concrete management of capitalist enterprises seriously. To allow the reader to know this Megamachine and its replacement even better, we will, in the two Appendices which follow, explain with the help of examples, the concrete transformation of this Megamachine from both a microeconomic and macroeconomic point of view.

Appendix 1: Towards a New Model of Microeconomic Ecological Accounting

Let us take a capitalist who founds a commercial company by providing capital of 100¹ in the form of money on 1/1/ of year N and who buys a merchandise M the following day for 100. Suppose they resell this merchandise for 300 at the end of January but has to pay at that time a salary of 50 to an employee hired on January 2 to take care of the purchase and delivery of the merchandise in question, this salary being that of the local labour market. To simplify this example as much as possible, let's assume that they have no premises to pay for because they store their goods on unused land that belongs to them.

The opening balance sheet and then the balance sheet after each operation will be as follows:

Opening balance sheet as of 1/1/N			
<i>Assets (debtors)</i>		<i>Debts (creditors)</i>	
Money in cash (to use)	100	My capital	100
Balance sheet after purchase of the merchandise			
<i>Assets (debtors)</i>		<i>Debts (creditors)</i>	
Merchandise	100	My capital	100
Balance sheet after the sale of the merchandise			
<i>Assets (debtors)</i>		<i>Debts (creditors)</i>	
Money in cash	300	My capital	100
		Gross profit	200
Balance sheet after payment of the wage earners			
<i>Assets</i>		<i>Debts</i>	
Money in cash	250	My capital	100
		Net profit	150

The movements which led to a genesis of the net profit can be analysed in terms of revenues (positive movements which allow to increase capital) and expenses (negative movements): this is what we call an income statement. Here it is for this first period of activity of the capitalist:

Income statement (first period)	
Revenue (selling price of the merchandise sold)	+ 300
Expense (purchase cost of the merchandise sold)	– 100
Expense for wages	– 50
Net operating profit	150

The usefulness of this type of information is obvious: the capitalist can immediately know the operating margin rate of 150% (150: net profit divided by 100, cost of the goods sold). That said, let us observe the profit of 150 recorded on the liabilities side of the balance sheet: the capitalist, from the Middle Ages, can use it all for himself and their family, which would allow them, for example, to buy a new second home or to make donations to the Church or, on the contrary, to “trickle down” (as we say today) the corresponding sum into his businesses to develop it. In any case, with this accounting device and this calculation of a net profit, the capitalist is sure that even after having completely consumed this profit, they can keep a sum of 100 to restart the operations on the same basis of capital and thus ensure the sustainability of the firm and the future life of their family. The capital to be conserved, from this perspective, is therefore not a means but an end in itself. As for employees, we see that, in the classic treatment given to them in capitalist accounting, they appear neither as capital to be kept on the liabilities side of the balance sheet nor as an asset to be gradually used up. They are simply expenses, evaluated like commodities because they are negotiated on a labour market. These expenses reduce the profits of the capitalist at the time of pay: this obviously will encourage them to reduce expenses as much as possible.

We can say that in this “Hobbesian” accounting construction, the employee is a systematic enemy for the capitalist: they are indeed a “burden” in the literal sense of the term. In this type of traditional accounting, which appeared in the Middle Ages in Italy and which is still in use today, particularly in commercial firms, including the largest, it is therefore completely impossible to see the slightest trace of the employees’ contribution to the balance sheet before the pay at the end of the month. This while the financial capital appears on the liabilities side in the form of capital-debt to be kept with the counterpart of assets to be used. It is said that Ford, the great American industrial magnate of the 1920s, once summoned his accountant and expressed his astonishment that his employees, the main wealth of his company (according to him) were not included in the balance sheet of his automobile firm: there is no doubt that this clerk, trembling, replied that this is how all accountants, or almost all, have always proceeded. In fact, if he had been somewhat of a theoretician, he could have explained to him that he could very well access his desire from a slight complexity of classical writings,

which we are going to explain, because it is of great interest to better understand the capitalist accounting logic at work in terms of “human capital,” a term which, we will see, can have a completely different meaning in the context of a truly human economy.

Indeed, the entire American current of the so-called human resources (HR) school, with very famous economists like Becker and Kendrick at the head,² is extremely fond of a type of accounting that allows human capital to finally appear as an asset or investment of the capitalist enterprise, thus treating the wage-earner, apparently on an equal footing with financial capital. This capitalist treatment of human capital consists, as soon as employees are hired, of registering the debt of wage due at the end of the period (or for several periods in the case of a long-term contract) as liabilities on the initial balance sheet, with for counterpart an asset corresponding to the user cost of employees for this or these period(s). In this way we see (finally) appear on the assets side of the balance sheet not the purchase cost of the employee, who would then be treated like a slave, but rather the investment of the capitalist in the labour force of this employee, this in return for a commitment to pay a salary debt.

At the time of the following balance sheet, after purchasing the goods, it will be enough to substitute the purchased goods for money without changing the rest of the balance sheet. Thus, at this stage of the reasoning, we can say that the overall cost of the goods will be 150 if we add up the salary cost recorded as assets (50) and the cost of the goods purchased (100). Then, when selling, it will be enough to recognize a total expense of 150 and a revenue of 300 to find a profit of 150. Furthermore, when salaries are paid, the salary-debt will be eliminated from the balance sheet in return for the corresponding deduction from the cash fund.

But ultimately, all this complication that we have introduced changes absolutely nothing in the final results, neither from the point of view of form nor from that of magnitudes. These operations which make it possible to treat the hiring of an employee as an investment on the assets side and as a debt to be paid on the liabilities side change absolutely nothing in the fate of the employee who, moreover, is hardly concerned with this “accounting sauce”; they do not improve working conditions and her salary in anyway. We will now show that with the CARE/TDL model it is possible to really put an end to this perverse Hobbesian accounting system.

Simplified example of application of the CARE/TDL method to a company

We take up the previous case which has just served as a basis for explaining the capitalist management model, but we modify it to transform it into ecological and human accounting. To this end, we introduce two additional data from ontological analyses of the human and natural capital used by the person who would take over the company from this perspective. First, for their “human capital” to be effectively preserved, employees should receive remuneration of 120 instead of 50. Second, the new manager should budget costs of 40 to rent a special device to no longer pollute

the river that flows near the goods warehouse. On the basis of these two data, we can reconstruct the initial balance sheet of this firm to make a CARE/TDL type balance sheet.

Initial balance sheet of the firm X (CARE/TDL model)

<i>Assets</i>		<i>Debts</i>	
Cash	100	Financial capital	100
Employees (CU)	120	Human capital	120
Natural asset (CU)	40	Natural capital	40
Total of assets	260	Total of capitals	260

CU = cost of use

In accordance with the propositions stated previously, three types of capital now appear at the foundation of the firm under three different lines of capital-debts. They correspond to three separate lines of assets or, more precisely, three lines of user cost (CU) of these assets concerning respectively, in addition to that of the merchandise, the user cost of the hired personnel. In this simplistic example which concerns only a single period of activity, all types of capital represent cost budgets which must, in principle, be the subject of an expense in this single period, this to preserve the three capitals considered, financial, human and natural.

During the next phase of the purchase of goods, this balance sheet will not be fundamentally changed except that the cost of purchasing the goods will replace the money in the assets:

<i>Assets</i>		<i>Debts</i>	
Merchandise (CU)	100	Financial capital	100
Employees (CU)	120	Human capital	120
Natural asset (CU)	40	Natural capital	40
Total of assets	260	Total of capitals	260

After the sale of the merchandise and receipt of the change but before any repurchase of new merchandise and any payment from employees and the company that rents ecological protection equipment, the new balance sheet will look like this:

Balance sheet of the firm X (CARE/TDL) after the sale of the merchandise

<i>Assets</i>		<i>Debts</i>	
Merchandise	$100 - 100 = 0$	Financial capital	100
Employees (CU)	$120 - 120 = 0$	Human capital	120
Natural Asset (CU)	$40 - 40 = 0$	Natural capital	40
Common cash	300	Net common Profit	40

As we can see, within the framework of this ecological and human accounting, the net profit, which is now a profit common to the three types of capital, has been

greatly reduced: it has gone from 150 to 40. This is obviously due to the fact that the firm, to preserve its human and natural capitals, must plan additional expenses: 70 for human capital and 40 for natural capital, or 110 in total.

We can also immediately see from the balance sheet that despite a sufficient amount of common money (due to sales of goods), the firm has not yet taken measures to ensure the conservation of the three capitals concerned. It results, as we can see on the left of the balance sheet, that the corresponding assets have been worn out without being reconstituted. Thus, the stock of goods (the financial asset) appears as zero on the balance sheet; similarly, the employees were worn out without receiving compensation for this wear and tear. Finally, as the firm has not yet paid for the service to ensure the non-pollution of the river, we must consider that for the moment the obligation of preservation is not completely respected. All the assets corresponding to the three capitals have therefore been depreciated (i.e. reduced) by the accountant, which shows them for a net amount equal to zero. Classically, these depreciations of the three types of assets give rise to an entry as depreciation expenses in the income statement which is presented below.

Income statement for the period (CARE/TDL)

Revenues (sales)	+ 300
Depreciation expense of financial assets	– 100
Depreciation expense of humans (cost of use of employees)	– 120
Depreciation expense of natural asset (cost of use of the river)	– 40
Net common profit	40

We therefore see a triple line of depreciation appear, which allows us to have an estimate of the total cost of the period, including ecological and human costs, corresponding to the maintenance of the three types of capitals. René Passet, a rare visionary economist who was interested in accounting, rightly regretted that only (financial) capital was subject to depreciation intended to allow its renewal: the CARE method grants his wish. Of course, each of these depreciation expenses can be made up of a large number of components, as is the case here for human capital.

As we note, each type of capital has its own depreciation expense and, as a result, in particular, employees are no longer a charge on financial capital. The balance of the income statement therefore indicates, if not a real profit, at least a profit closer to reality after this systematic maintenance of the three types of capital. And this profit is no longer that of financial capital alone but a profit common to the three types of capitals, a profit resulting from the common action of the three “commoners” that are the three types of capital providers. Elinor Ostrom dreamed of a generalization of the governance of commons but was unable to design an accounting model that matches this ambition. The CARE/TDL model provides the basis for this generalization, at the global level, with an accounting system comparable to that of the IFRS in scope but now at service of the three types of capital and no longer at the one of only the financial capital.

But let's return to this new ecological and human profit. We can clearly see, in comparison with the profit resulting from capitalist accounting, how much the latter was a fictitious profit. Generally speaking, most of the profits currently distributed by firms today, more specifically the large firms which dominate the world and which play on the competition between people on a planetary scale, are fictitious profits. This is already the case for Datini at the beginning of modern capitalism. CARE/TDL accounting can therefore provide extremely useful information on the existence of these "surplus profits" of financial capitalists which have allowed them to acquire incredible power at the expense of their employees and nature. As such, it can be the basis of a taxation policy by a State in the service of the ecological and human cause. These super profits would be taxed heavily and the product of this taxation could go to subsidize those who have additional costs due to of their commitment to the ecological and human cause, additional costs that the CARE method also makes it possible to identify. This would be particularly useful in the case of agriculture and would encourage those who go into organic farming while taxing those who make profits to the detriment of nature and their employees, particularly in the case of monocultures with a lot of pesticides. The excess profits of supermarkets which destroy life in small town centres and which do not pay farmers their fair cost of production could also be easily identified and taxed.

But let us now return to our example, supposing that the firm carries out the last normal step of the process which leads it to the effective conservation of the three capitals. We admit that it uses the amount available in common currency to renew its three capitals. Here is the final assessment after this final operation.

Final Balance sheet of the firm X (CARE/TDL)

<i>Assets</i>		<i>Debts</i>	
Financial asset	$100 - 100 + 100 = 100$	Financial capital	100
Human assets (CU)	$120 - 120 + 120 = 120$	Human capital	120
Natural asset (CU)	$40 - 40 + 40 = 40$	Natural Capital	40
Common cash	40	Common net profit	40

What happened? It is clear that the common money has fallen from 300 to 40, which implies an overall expenditure of 260. We can easily see the use of this sum by looking at the evolution of the different lines of the other assets. We first see that the financial assets have increased by 100. This corresponds to the purchase of a new commodity, which makes it possible to renew the financial capital. We then see that the human assets have increased by 120: this corresponds to the conservation pay that the employees received. Finally, natural capital has also increased by 40: this is the consequence of the payment for the rental of the river protection system. We can then see that all the capitals have been preserved, with effects close to the inevitable entropy.³

This conservation can be seen immediately by comparing the level of the "value" (a maintenance cost value, as it means) of the capital to be kept as liabilities and the "value" of the assets. Normally, three types of auditors, respectively

specialists in the conservation of the three types of capital, should certify the reality of these conservations.

All these new calculations will lead to new concepts of profitability, efficiency, effectiveness, competitiveness, etc., which it is not possible to study within the restricted framework of this text. Let us content ourselves with saying once again that it is wrong to distinguish technical from economic rationality in general: rationalities are always conditioned by subjective choices which can be very diverse. With these observations we have concluded our reflections on the implementation of the CARE/TDL model at the microeconomic level. We will now discuss its application at the macroeconomic level.

Notes

- 1 It could be thousands, millions of currency units; it doesn't matter.
- 2 Gary Stanley [Becker \(1964\)](#) "Human capital: A Theoretical and Empirical Analysis with Special Reference to Education," University of Chicago Press; John W. [Kendrick \(1976\)](#) "The formation and stocks of total capital," New York, Columbia University Press.
- 3 Unfortunately, the conservation of human beings and nature is not total. Nothing prevents the degradation of human beings and even the earth, but in the longer term.

Appendix 2: Towards a New Ecological National Accounting

National accounts generally aim to give an idea of the creation of wealth in a given country during a given period. The most famous of its indicators is the gross domestic product (GDP), although we should favour the net domestic product (NDP) after taking into account the depreciation of machinery and, more generally, of all the assets that serve to production (in the broad sense) for several periods, which we will do here.

Basically, in all countries, the NDP is an aggregation of microeconomic data provided by companies in the country concerned, more precisely an aggregation of company income statements: as underlined by [Berger and Richard \(2021\)](#) “no change of national accounting can be expected unless both systems are changed at the same time”. To understand the production of this type of account, we will take a very simple example inspired by our previous reflections on the case of capitalist accounting transformed into human and ecological accounting that we used in [Appendix 1](#). We first recall the income statement of the capitalist as we drew it up at the very beginning of [Appendix 1](#).

Profit and loss statement of the capitalist (period x)	
Revenue (selling price of the merchandise sold)	+ 300
Expense(purchase price of the merchandise sold)	– 100
Expense (wage costs)	– 50
Net operating profit	150

Let us now imagine, at the cost of an outrageous simplification, that the firm of this capitalist is the sole firm of a very small country, which would live solely from the import-export of goods and which would have purchased goods from abroad for 100 to resell them in the country concerned and in other countries for 300. What would then be its NDP for the period considered according to the classic accounting rules of national accounting? Two different methods can be used.

The first method, called the deductive approach, consists of taking the revenue (i.e. the sales) of the period and deducting from it the cost of consumption or production of objects necessary to accomplish these sales, which makes it possible to obtain what is called the “added value” produced by the activity of the nation. In the case of

our example, the revenues are confused with the sales of goods, and the consumption of goods, called intermediate consumption or depreciation, is confused with the cost of goods sold. The NDP of this nation is therefore $300 - 100 = 200$.

The second method, called additive, consists of adding up all the types of income that have been distributed in the country. In our case, there are only two social classes, which correspond to two types of income: on the one hand that of the capitalist, that is to say the profit, on the other hand that of the employees, that is their wages. The additive calculation therefore consists of adding the employee salaries (50) and the profit (150) to again obtain a NDP of the nation equal to 200.

We thus clearly see that we cannot distribute more wealth than the value produced, that is to say, added value. But this is incidental to our investigation. What is more interesting is to compare the microeconomic perspective of the private accounting of the capitalist with the macroeconomic perspective of national accounting. We note that while the private accounting of the capitalist focuses, at the level of the balance of the income statement, on his profit of 150, the national accounting is interested in the overall income of all of the two classes of employees and capitalists, which gives a result of 200 ($150 + 50$). In other words, the profit of a nation is the sum of the “profits” of the employees and their boss(es).

This macroeconomic reasoning can be represented by an income statement of the following type established from the previous figures.

National income statement (period x)

Revenue (selling price of the merchandise sold)	+ 300
Expense (purchase cost of the merchandise sold)	– 100
Sum: net domestic product (NDP)	200

Let us emphasize that, nowadays, this type of macroeconomic measurement is published in all countries of the world and that economists generally take it as a basis for judging the evolution of the performance of nations and even of the globe: it is the indicator which dominates all current macroeconomic thinking, even if this indicator is very questionable from an ecological and social point of view.¹

In view of this account, the reader could say that to the extent that he is interested in a macroeconomic quantity, namely the value added by the “work” of capitalists and employees, this type of national income statement testifies to a conception of the result of the performance of companies that is more neutral than that of capitalists who see in their result only that of their financial capital. This is not the case, as we will show. Thanks to the previous developments devoted to the CARE/TDL model, the reader knows that the figures for wages, profits and consumption do not give a faithful image of the results of capitalist enterprises. Indeed, they take into account neither the true cost of human (labour) capital nor the cost of maintaining natural capital. Now what is true for the accounts of capitalist entrepreneurs is also true for the national accounts which are based on the accounts of companies. All current national accounts are therefore incapable of giving a correct image of the

reality of the performance of nations. We will confirm this by showing what would be, in the case of the subsidiary of company X, the correct national accounts. To do this, we will start from the correct accounts of this company established following the rules of the CARE/TDL method. Here they are again:

CARE/TDL Ecological and human income statement of X

Revenues (sales)	+ 300
Financial depreciation (cost of goods sold)	– 100
Human depreciation (cost of conservation of the employees)	– 120
Natural depreciation (cost of conservation of the river)	– 40
Net common profit	40

We can now repeat our NDP calculations based on these figures corrected to take into account the true depreciation of all assets and obtain a correct NDP. Again, we will distinguish between the deductive method and the additive method. According to the deductive method, we deduct all capital consumption expenses from the sales proceeds (300–260) and we obtain a NDP of 40. Why this huge difference with the “official” NDP, which is 200? Because, contrary to the capitalist vision, to obtain true added value, we no longer consider that there is only one depreciation of a single capital to take into account (that which corresponds to the use of goods) but indeed three depreciations of three types of capital. The overall depreciation expense for the period is therefore absolutely not 100 but indeed 260.

With this type of reasoning, the NDP of 40 merges with the common profit of the CARE/TDL method, that is to say, a true profit both of the capitalist’s company and of the country where this company is located. This is the true measure of the creation of wealth of a nation calculated at the macroeconomic level from “healthy” micro-economic data. It corresponds to a “macro” version of the CARE/TDL model leading to a GDP or, better, an ecological and human NDP: the “NDP CARE/TDL”.

The reader who would like more information on this macroeconomic CARE/TDL model can consult the article that I published in the BRICS economic journal ([Richard 2020](#)).

Note

- 1 See notably Paul [Ekins \(2000\)](#), “Estimating sustainability gaps for the UK,” Forum for the future, London; K. William Kapp, op. cit.; Roefie [Hueting \(1980\)](#) “New Scarcity and Economic Growth. More Welfare Through Less Production?,” Amsterdam, North-Holland; William D. [Nordhaus/James Tobin \(1972\)](#) “Is Growth Obsolete?”, *Economic Research: Retrospect and Prospect*, vol. 5, National Bureau of Economic Research; Jean Gadrey/ Florence Jany-Catrice (2005) “Les Nouveaux Indicateurs de richesse,” Paris, La Découverte; Harold [Levrel \(2007\)](#) “Selecting indicators for the management of biodiversity,” Institut français de la biodiversité; Dominique [Meda \(1999\)](#) “Qu’est-ce que la richesse?”, Paris, Aubier.

Final Conclusion

We began our presentation of the CARE/TDL model starting from axioms which are based on an accounting conception of what must be preserved, that is to say, what is important. We hope that the reader of this text will agree to admit that natural capital, the basis of our existence, and human capital, the basis of all economic activity, deserve just as much as financial capital to be systematically preserved and associated with business management.

These axioms, and their accounting consequences, can be accepted, it seems to us, by those who have a secular as well as a religious conception of life.

If these axioms are admitted, the rest of our reasoning then falls into the economic sphere. The CARE model is nothing less than the transposition of the accounting model of traditional capitalism to natural and human capital: it is first and foremost an economic tool in a new market economy “at the service of man,” as demanded by the lawyer René Savatier.¹

This model is based on the observation shared by almost all economists that the three types of capital are essential to the functioning of any firm. But we know that Aristotle already distinguished two types of economy: a true economy which meets the fundamental needs of men and a false economy, *chrematistics* (from the Greek “*chrēmatistikos*”), which concerns the management of money affairs, based on egoistic accumulation. We are currently in a hyper-chrematistic type of economy driven by an aberrant and dangerous accounting system for humanity: the true Megamachine indeed. The new accounting model presented in this book aims to open a door to get out of this impasse while maintaining an innovative market economy, but under a constraint of sustainability of three of capitals and no longer just one. It can be considered as the bearer of a “real” capitalism replacing a false capitalism which has usurped and disfigured the name of capital for centuries. In fact, in a certain sense, to paraphrase a formula that has become famous,² we were never really capitalists! In these times of ecological and human danger, it is essential to become one for good, so that everyone on the planet can benefit from decent living conditions.

But for that, it would be better, as another big philosopher, the French humourist Francis Blanche, said, “Rather think the change than to change thinking” (in French: “*plutôt penser le changement que changer le pansement*”)! No economic

system will free human beings from the anguish of death and magically bring happiness to all on a silver platter. But we can build a system that will allow everyone to escape the daily anxieties that the ecological and social precariousness of the current capitalist system generates in billions of human beings.

It is accountants who made it possible to found modern capitalism. It will perhaps be other accountants who will have made it possible to radically change it to escape “the icy waters of selfish calculation.”³ I have just cited a famous quote from Marx, an author whom I have criticized a lot. But for all that, intellectual honesty makes me recognize that he was one of the rare economists to have had the foreknowledge of the extreme importance of accounting. Indeed he has declared that “accounting as a means of control and ideal synthesis of the reproduction process becomes all the more necessary as the process takes place on a more social scale and loses its purely individual character; thus the keeping of accounts is more necessary under the regime of capitalist production than it is under that of the fragmented production of artisans and peasants and it is much more necessary under the regime of community production than it is under the regime of capitalist production.”⁴ This statement is indeed a clear encouragement to accounting innovations to resolve the current problems. But, obviously, these accounting innovations can take place only in a context of development of democracy that future ecological, social and economic co-management could strengthen. It is up to those who suffer from the capitalist system to dare to take the step, hopefully in a peaceful context, while there is still time, before violent revolutions arise in a context of ecological and social disasters.

Notes

- 1 René Savatier, “Le Droit comptable au service de l’homme,” Paris, Dalloz, 1969.
- 2 This formula is that of Bruno Latour’s (1991) book “We Have Never Been Modern.”
- 3 Karl Marx et Friedrich Engels, “Manifeste du parti communiste,” op. cit.
- 4 Personal translation of K. Marx “Das Kapital, Zweiter Band,” in “Marx Engels Werke,” Band 24, Dietz Verlag, Berlin, 1973, p. 137.

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