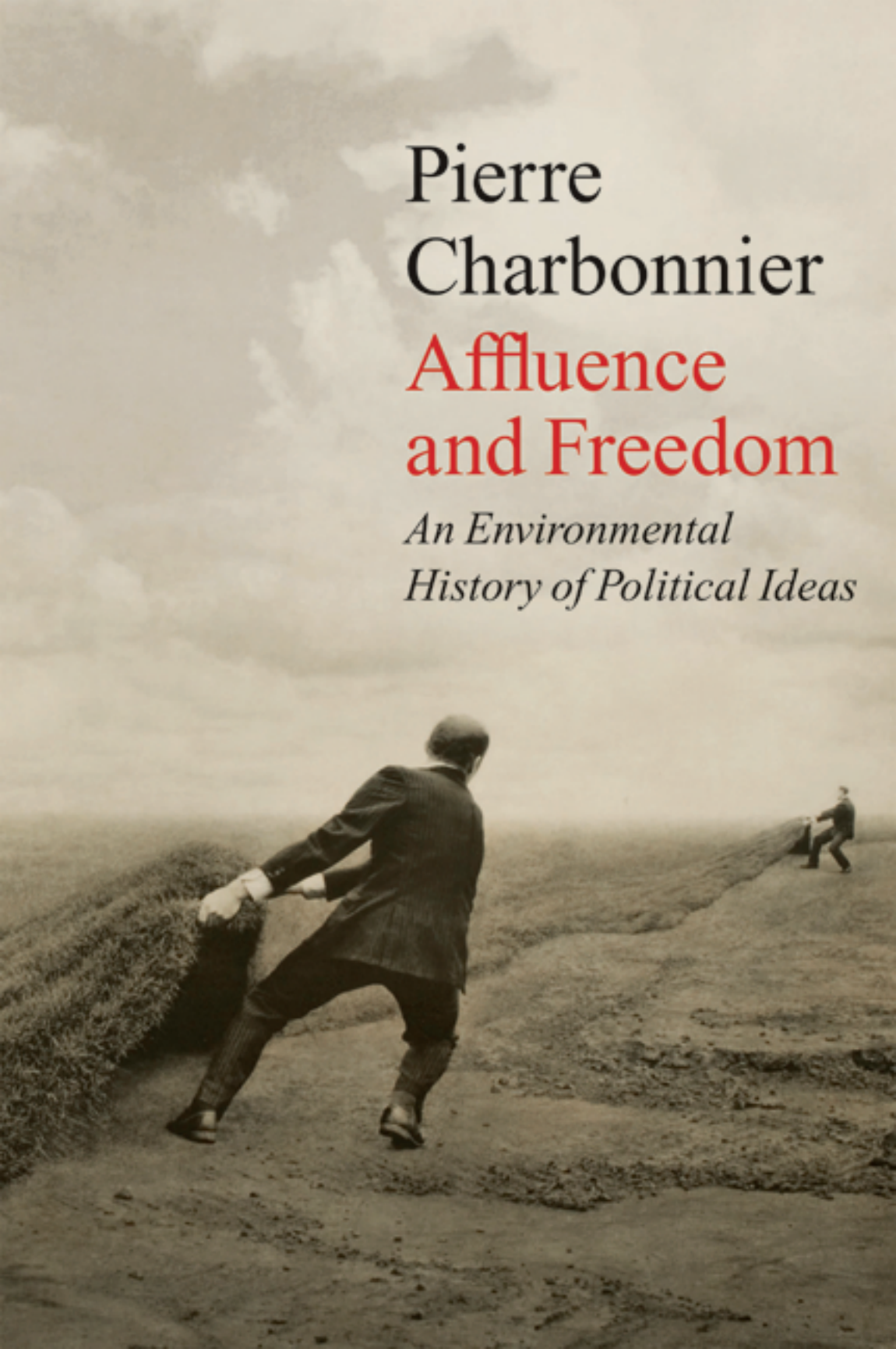
Pierre
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Affluence
and Freedom
An Environmental
History of Political Ideas

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An Environmental History of Political Ideas

Pierre Charbonnier

Translated by Andrew Brown

polity

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Risks and Limits: The End of Certainties

Alarms and controversies

At the end of the Second World War, defenders of the liberal pact and also its apparently harshest critics were both subjugated by the power of affluence. The spectacular increase in material possibilities then provided the conceptualization of liberty with its most solid basis, regardless of which side people took. The modernizing project experienced a prosperous period during which the industrialist faith assured a very powerful structuring role, one that also had the effect of limiting intellectual and political horizons. But that period did not last – or at least it quickly led to serious questioning.

Very quickly, certainties with regard to the future forged in the combination of affluence and freedom faced critiques that then took the form of research programmes, and which thus found their real place in the history of knowledge. On the one hand, there was a new concern for the finite, limited nature of natural resources and a series of alarms targeting the dogma of unlimited growth. Along with Malthusian fears about the world's population, the ecological limits of the spaceship Earth seemed closer than ever and the dream of prosperity compromised. On the other hand, there was also some very deep probing of the regulation of risks and catastrophes and the political dimension of the technosciences. Nuclear accidents, notably Chernobyl, and major episodes of chemical contamination, then fuelled the uncertainties of late modernity. This chapter intends to explore in turn the issues raised in each of these paradigms – the paradigm of limits and of risk – in order to identify the general characteristics of the questioning of affluence and autonomy during this period.

For the proponents of the paradigm of limits, whose most famous expression was the 1972 Club of Rome report *The Limits to Growth*,[1] it was a question of showing to what extent the project of political autonomy understood as emancipation from nature was paradoxically

dependent on material conditions that lead to an impasse. By collecting data relating to metabolic exchanges and the energy dependencies that were formed between the social world and nature from the industrial revolution onwards, a very large body of work helped to shape a counternarrative. The general idea was quite simple: it is possible to contrast the cornucopian ideal born in the eighteenth century with all the ecosystemic disturbances that this ideal ended up triggering, consciously or not. The culmination of these disturbances, the prospect of a demographic and political collapse caused by the return of scarcity and the degradation of the environments that support us, acted as the keystone to the system of thought organized around limits. Thus, thinking in terms of limits to grasp the embedding of society in pre-existing geo-ecological balances requires the adoption of a systemic and holistic scale of analysis, one that sees human societies as material realities engaged in physical, chemical and biological exchanges with their environment.

The other great paradigm on the basis of which nature made its return in modernity revolved around the concept of risk, which emerged in the social sciences around the same time. This was not simply a matter of pointing to the accumulation of catastrophes induced by new technologies, but rather to give meaning to the transformation of the relationship to the future that these catastrophes triggered. While the modernist creed par excellence consisted in granting itself the possibility of controlling this future and of orienting it according to reasonable principles, the irruption of risk blurred this confidence and turned uncertainty into a central component of our social existence. Initially conceived as factors that stabilized humans' relationship to the future, in the age of Chernobyl the technosciences assumed a completely different guise, as a factor of uncertainty and conflict linked to a slowdown and a crisis – by now a structural crisis – of the mechanisms of social protection put in place after the Second World War in market economies. In the words of Ulrich Beck, one of the main representatives of this paradigm, we must speak of a 'risk society', i.e., of a stage of development of modernity where collective exposure to these risks becomes the central criterion that defines the present.[2]

According to Beck, what collapsed from the 1980s was not only the model of linear progress inherited from the first wave of industrial modernity, but also the set of categories of thought attached to it and which formed the conceptual apparatus of the traditional social sciences: national sovereignty, class, merit, nature, reality, science and above all the commodity. The prospect sketched in his work *Risk Society* (originally published in German in 1986) is striking: according to Beck, there would soon be no more borders (as Chernobyl showed),

no more classes (because exposure to risk does not follow income inequalities), no more external nature (because the ideal of mastery had been simultaneously realized and annulled) and no more science (it was the end of the age of certainties, and access to the world was political right from the start). Regardless of the validity of this thesis as a forecast, its ability to capture an ongoing social transformation has been decisive.

Contrary to what the whole of political economy and its critics had established, the commodity would, in a regime of generalized risk, no longer be the sole and irreplaceable object of trade, since the lateral effects of productive activities now involved heavier costs and preventive measures, more able to impose constraints on the economic world in general. Yet it was precisely because nature had been thought of as a reality prior to and external to the economy, as a simple reservoir from which to draw wealth, raw materials and other factors of production, that its return produced such devastating effects. According to Beck, the need for postmodern societies to incorporate these externalities into their economic and intellectual systems amounted to crossing a threshold of reflexivity previously unknown, or deliberately rendered invisible. Integrating risk into the social model inherited from the industrial era thus made modernity 'reflexive', insofar as it would now have to conceive as its own what it had previously located outside of itself. While the belief in the domination of nature had projected society out of the world, the surge of risks and the need to regulate them put an end to this separation, and reconnected, in a more uncertain but also more peaceful form, the natural and the social.

The deep affinity between the paradigm of risks and that of limits lies in the relation to time. To transcend limits, or geo-ecological thresholds, is inevitably to leave the calm and predictable framework that modern technological and political structures had imagined they had built forever. Soils, atmosphere, environments in general began to respond in an unpredictable way to activity; material support for a development deemed to be continuous and indefinite began to fail, bringing down with them forms of life and institutional models. This new relationship to time, as we have said, was also central in the perspective of risk, since this time it was a question of forging a new rationality intended to incorporate this uncertainty and make it ideally calculable. We might say that, from this point of view, the two paradigms involved helped to reveal how modernity was a *chrono-politics*. The pre-emption of the future constituted by the creed of improvement and the myth of progress is perhaps the most striking component of our world. It is at the same time the most robust component, that which captures individual and collective aspirations

in the most powerful and lasting way and makes them enter into vast ideal and material structures, and the most vulnerable, susceptible to the most serious dysfunctions and the bitterest disappointments. The regularity of conduct guaranteed by the administrative and material structures of modernity, and thus the chronopolitics inherited from the age of revolutions, seems to come up against risk and limits.

The critique of development and political naturalism

In the early 1970s, only a few months apart, several texts laying the ground for a new critical approach to growth appeared: Nicholas Georgescu-Roegen's *The Entropy Law and the Economic Process*, the Club of Rome report, *The Limits to Growth*, by Donella Meadows and others and, to a lesser extent, *Steady-State Economics*, by Herman Daly. While the first operates from within economic science by incorporating the contributions of Odum's scientific ecology, thermodynamics and systems theory, the second was the work of an interdisciplinary collective of researchers who were aiming more directly at a reorientation of industrial (and demographic) policies on an international scale, using avant-garde computer modelling. In addition to these publications, a literature warning of the abuses of industrial civilization and the ecological cost of economic growth started to develop. Books by Paul Ehrlich, Barry Commoner and Ernst Friedrich Schumacher[3] were all part of the specific moment of the 1970s: whether in terms of demographic danger for the first of these authors, of the saturation of ecosystems by the residues of industrial activity for the second, or of a more general critique of consumer society for the third, all provided material for an indictment against pathological affluence, in phase with numerous counter-cultural movements then in vogue. Then there was the work of Howard Odum, who, after having developed the principles of contemporary functional ecology with his brother Eugene, in 1971 published *Environment, Power and Society*, a work that highlights certain links between the idea of limits and the technocratic thinking of Veblen and his heirs.

As studies on the intellectual origins of degrowth have shown, the emergence of a critical attitude to the limitlessness of the industrial productive system has its roots quite far back in history.[4] From a sociopolitical point of view, the 1972 Club of Rome report was nevertheless a turning point. This text was the result of a meeting between a group of industrial reformers from different disciplines, first brought together in 1968 in Rome by Aurelio Peccei – hence its name – and the systems theorist and computer scientist from the Massachusetts Institute of Technology, Jay Forrester. It was actually the latter

who developed the modelling techniques necessary to represent in quantified and graphical form the different predictive scenarios on which the critique of growth was based.[5] The report was presented as the result of a thought experiment which retained the following five factors as elementary components: population, resource stocks, the level of agricultural and industrial production (or, in more technical terms, the rate of return of the capital invested in each of these two sectors) and the pollution rate. Each of these variables incorporated into Forrester's algorithm was itself the result of the aggregation of numerous demographic, economic, biological and technological data, detailed at the beginning of the text. Each component had relations of positive or negative reinforcing with the others, which were formalized in a humble diagram called 'The World Model'.[6] For example, population growth leads to increased pressure on resource stocks, which increases pollution, and vice versa. It should also be noted that a significant part of the prestige garnered by *The Limits to Growth* (but also of the criticism it has attracted) is due to the techno-scientific prowess behind this heterogeneous assembly of data into a synthetic and heuristic, if not representative, model. The ecological sciences were then taking their first steps in the world of big science, with intricate and powerful modelling devices.

The 'standard run' of the model designed by Forrester is obtained by conjecturing the perpetuation of the growth rates of the five components maintained at the same rate as that observed over the period from 1900 to 1970. This scenario, which foreshadows a world without deliberate changes, leads to a major demographic and ecological catastrophe by 2000: demographic growth has a positive feedback on the growth of productive activities, so the overall pressure on resources and the accumulation of pollution follow an exponential curve which soon comes up against the limits of the load capacity of the planetary system. It is the result of a mutual reinforcement of the causes behind the depletion of resources and the damage to the regenerative capacities of the environment. The report then multiplies the alternative 'runs' by playing with the variables – deliberately overestimating the stocks available to cover possible future geological discoveries, playing on the ability to intensify agricultural and industrial efficiency, envisaging a partial control of demographic growth, imagining the emergence of alternative technologies, etc. But each of these virtual scenarios reveals either a failure of the rescue attempt, as the exponential dynamic is too strong, or the unrealistic nature of the hypothesis being tested.

The Limits to Growth is an intellectual project that strikes the reader with its ambiguities and the different facets it presents to analysis. In a sense, it is a prototype of Cold War sciences:[7] the product of a strong technological and intellectual commitment to solve in a

top-to-bottom way global challenges perceived in an undifferentiated fashion by policymakers without any precise ideological orientation, as well as being the product of technoscientific structures that largely result from military research. We can also see it as a reactivation of classical Malthusian rationality, since in the end it is still a question of confronting population growth with limited natural resources, bounded by an uncontrolled rise in the mortality rate. More seriously, it is legitimate to see the alert launched in 1972 as an effect of the fear aroused by the access to development of regions of the world hitherto left 'behind', Africa and Asia in particular – and therefore of a Malthusianism understood as an exacerbation of the struggle for resources between competing social and geographic groups. What distinguishes the Club of Rome from Malthusianism is that it is no longer a question of highlighting the dramatic outcome of an encounter between two incompatible growth rates, since it is the accumulation of pollution which this time constitutes a pathological excess. The human and economic system deviates from the norm – the baseline state in which it can grow innocently – by adding to the environment organic and chemical compounds that do not degrade harmoniously, and not only by taking from that environment what it needs.

If the name of Malthus is referred to incessantly in such works as these, based on the paradigm of limits, the two underlying intellectual operations were completely different. Malthus and his school, while emphasizing the dismal horizon of an economy confined to an organic regime, in Wrigley's sense,[8] stimulated a liberation of productive forces that was aimed entirely at making this prospect less daunting. The finite nature of land was to be met by the development of commerce and manufacture, that is, in a certain way, by replacing a limited land-based capital with other forms of capital – a replacement inseparable from drawing directly or indirectly on foreign lands by importing grain and other raw materials. Here, the process was reversed: far from wanting to accelerate production, the point was to slow down the economic machinery. If the fight against population explosion is a premise shared by Malthus and the Club of Rome in their desire to evade ecological limits, Meadows and her colleagues explicitly target the very idea that economic art consists in increasing the gross quantity of wealth produced and traded. Neither Malthus nor Ricardo is an advocate of 'global balance', simply because they never faced the negative consequences of economic growth, but rather the consequences of the glut of human beings. Once the organic ceiling has been broken through, and above all once the analysis of limits has been raised to the global level, the problem arises in a completely new form.

While the Club of Rome mainly pursues political objectives by alerting us to the depletion of resources and the regenerative capacities

of the natural environment, the metabolic perspective has served as the basis for another scientific endeavour, of much greater intellectual scale. The project of a naturalist critique of political economy has been carried out in different ways, but its most successful developments stem from the work of Nicholas Georgescu-Roegen. Bioeconomics, whose current heritage is to be sought in ecological economics and certain branches of degrowth,[9] does indeed become, in *The Entropy Law and the Economic Process* as well as in a series of peripheral texts, a complete overhaul of economic reason.[10] But the whole question is whether this overhaul can respond to the challenge inherited from Polanyi, re-socializing economic thought while making it sensitive to attachments to land.

Georgescu-Roegen does not merely point out that the economy has a substantial meaning, that it consists in circulating a set of materials and energy through the channels of production and consumption and that the gross volume manipulated in modern economies is greater than the carrying capacity of the global environment. He also shows that, if the neoclassical economy in particular has become incapable of taking this dimension into account, it is because of the presence of a physical metaphor at the heart of its epistemological ideal: the system of exchange becomes analogous to a large mechanism in which movement (here, the circulation of the exchange value via prices) is always reversible. This Newtonian economy, where action and reaction are harmoniously balanced, is not viewed as the ideological product of social relations, but as an epistemic idealization of abstract value flows, which has the effect of making invisible, or more exactly extra-economic, the connection between these exchanges and the ecological metabolism. It is therefore necessary to reconstruct economic reason on a theoretical basis that recognizes the second law of thermodynamics, in other words the principle of entropy: to maintain the order of a given system, and to fight against the entropy that ensues by dissipation (whether this involves living beings or a large-scale network of subsistence), there must be an external input of energy. The social organization of subsistence is above all a struggle against the decay of order, a struggle for the preservation of life, and the economy is therefore subject to the irreversible temporality of organic processes.[11]

There can be no compromise between the neoclassical mechanism and the harsh lesson of thermodynamics: economics is not a closed system where order and heat are miraculously preserved, one that can grow indefinitely without an external input of energy; furthermore, the processes by which the fight against entropy is waged are inevitably imperfect. In other words, the energy balance of our economic systems cannot be zero. To maintain order and life, energy must be consumed, and part of this effort is lost in the form of heat, pollution, untreated

residues. Contrary to what a cyclical conception of the economy might suggest, one that sees it as a deliberate tendency to restore to the environment all that is first borrowed from it, Georgescu-Roegen claims that 'recycling cannot be complete'.[12] If the rigorous control of productive externalities is part of the implicit programme of this bioeconomics, the idea of perfect circularity contradicts the lessons of thermodynamics. Whether there is growth or not, the decay of the system is inevitable.

Georgescu-Roegen's work introduces a certain tension into the dominant concept of growth, especially in a context where indicators such as GDP have been developed. The measurement of monetary flows and the aggregation of economic transactions thus have the twofold drawback of setting growth thus understood as a norm for public action (and therefore of confusing the prospects for social development with the continuous increase of this abstract indicator),[13] but also of concealing the very thing it claims to identify. Limitless growth is indeed perceived as desirable and possible only because it is the product of a form of accounting based, if we take Georgescu-Roegen seriously, on a fictitious reference point. Compared to the work of the Club of Rome, bioeconomics grasps the myth of growth at its roots and redefines the central objective of economics as a maintenance of collective life whose thermodynamic outcome is optimized.

Georgescu-Roegen's viewpoint is fundamentally pessimistic, since death is inevitable at the end of organic temporality; nevertheless, it is of capital importance. This is particularly because he himself anticipated and circumvented the critiques addressed to the whistleblowers of the Club of Rome. The idea that the economic order will meet the limits of the ecological system on which it is dependent very quickly spread panic among proponents of the orthodox viewpoint. So as to prevent this point of view, so deleterious for the business world, from becoming rooted in the collective consciousness, three main arguments have been used. First, it is claimed that the stocks of raw materials have been underestimated in the report; second, future technological improvements (mainly in the nuclear field) give credibility to a new abundance of energy and better treatment of waste; and third, the substitution of new materials and energies for the old ones will relieve the pressure on resources that become scarce.[14] It must be recognized that catastrophic forecasts have a particular weakness: by basing their arguments on the persistence of present trends, they are vulnerable to any argument that wagers on the creativity of the future – i.e., any fundamentally modernist argument. And to the extent that economics is the most vigorous heir to this progressive ideal, the critical riposte was fatal to the Club of Rome, and the controversy it stirred died out as quickly as it had been ignited.

However, if properly conceived, bioeconomics does not consist simply in slowing down the economic rhythm to avoid the next Malthusian shock, but in eliminating the economic conceptualization of our relationship to the world from modern self-consciousness. This radicalization of critique obviously does not guarantee success, but at least it has the merit of being based on the right issues. While the Club of Rome sought to be politically provocative, at the same time remaining epistemologically conservative, Georgescu-Roegen's work leads to an incomparably more demanding position. Whereas the dominant critique of political economy, stemming from Marxism, rests on a projected resocialization of the 'dismal science' through the denunciation of the power of capital, the new bioeconomics draws attention to the relationship between the different sectors of economic activity and entropy. Extractive activities, for example, appear from Georgescu-Roegen's point of view as areas where the increase in entropy is found in an almost pure state – as accelerators of dissipation of order. In other words, the monetary value 'created' in these sectors appears as a negative quantity for an economics rethought in terms of thermodynamics.

Georgescu-Roegen himself insists on the affinity between orthodox economics and Marxist-inspired critique, since there is no real difference between them from this point of view. If justice is not obtained except in the context of affluence, then the problem of social equality makes sense only if the economy is limited. It is precisely this reasoning that Georgescu-Roegen attacks head-on. By giving the postulate of limitlessness a radical meaning that defines the whole of modern economic rationality, and by bringing the limits within the deployment of the economy itself, in even its most innocent aspects, Georgescu-Roegen takes a risky wager on the ability of modern reflexivity to align with this demanding programme. And in fact, it is no exaggeration to say that this wager was lost despite the important legacy he has left behind.

As we have just noted, there are external factors behind this failure, which are to be found in the efforts of orthodox political economics to maintain its authority. But it must be recognized that these efforts are not based on anything: one of the main weaknesses of the paradigm of limits is its substantialist character, which gives stocks, and flows of matter and energy, a quasi-sovereign reality, so that modern political economy is interested solely in the organizational and technological capacity of human beings to evaluate these things in terms of market relations. Political economy is much more constructivist than its metabolic critique, and that is why it can always relativize ecological limits presented as absolute – we need simply recall that value has meaning only in the context of a process of positive assessment. The plea for an active recognition of natural processes as factors that rule

out the postulate of limitlessness thus runs up against a modernist coalition which rests on two powerful claims: nature has economic value only through the effective construction of this value; and we do not know what the potential is for these processes of construction. Bioeconomics, in other words, runs the risk of dislodging economics, cutting its links with social reflexivity by forcing it over towards natural history. Very simply, the question arises as to whether we can initiate a critical approach to the idea of submission to nature – as the radical critique of the productive order unfolds in a compromising political vacuum.

* * *

Postponement of the metabolic alert is therefore due to the way in which it exposes itself to a critique that reactivates the modernist ideals that are part and parcel of economics. We can take stock of these specifically political difficulties in bioeconomics if we take a quick look at the work produced by Howard Odum at the same time. *Environment, Power and Society*, published in 1971, sets out much more directly to follow the path of a political theory of bioeconomic inspiration. Odum develops a programme of ecological engineering focused on optimizing the use of energy and the rational management of material flows, which recalls the attempts made by the technocratic movement before the war.

Like Georgescu-Roegen, Odum gives a central place to thermodynamics by showing that the human quest for useful energy (i.e., energy that is available for use and relatively concentrated) necessarily has a cost for the overall system. The technocratic heritage of this approach is clearly felt when Odum introduces the concept of 'emergy'. This term designates a unit of natural value that refers to the quantity of primary energy contained, converted and concentrated in a given commodity.[15] Emergy is conceived as an alternative metric to money, which is clearly not only incapable of accounting for the metabolic dependencies of the economy, but actively obscures any shared ecological reflexivity by imposing fictitious quantities. Thus oil extraction generates money, while causing a gigantic loss of available energy. For Odum, the ability to concentrate large amounts of energy in technological systems must be compared with the loss of corresponding ecological functions: a hydroelectric dam,[16] for example, channels electricity flows at the cost of a deterioration in watercourses and the services they render to a wide range of living species and more broadly to the maintenance of an ecosystem on which, ultimately, humans are dependent. The disruption of these regulations by the energy system (and the same would apply here to the relationship between the motor function of a fossil fuel and the deterioration of the climate regulations that it

entails) is reflected in the form of an ecological debt contracted by the electrical operator to all of the beings affected by the hydroelectric installation.

The way these energy and ecological transfers are rendered invisible, a phenomenon made possible by monetary symbolization, then becomes manifest. Odum draws some quite radical conclusions from this theoretical mechanism, since he envisages reconsidering North–South relationships on the basis of the massive ecological debt that the North, as investor-consumer, contracts with regard to the extractive South.[17] But this brief foray into geopolitics is quickly obscured by the description of a plan for an 'energy organization of society',[18] which recalls the earlier work of Wilhelm Ostwald. The ferociously functionalist nature of this programme, whose watchword is adaptation, gives it a very vertical appearance. What disappears from the theoretical horizon is nothing less than the politico-legal structure of the protections granted to individuals and groups, their autonomy as actors engaged in the co-construction of social liberty. The programme that he calls 'prosperous descent', by which he means a braking of the overaccumulating tendencies of advanced civilizations, seems intent on settling the tensions between affluence and freedom without having to enter the political and institutional field, the field of social conflict.

The drastic limitation of waste and obsolescence, and also the incentive to ensure the ecological restoration of territories damaged by overexploitation, coexist in this programme with measures in which functionalism borders on naturalistic utopia – such as eugenic tendencies.[19] Odum's silence on the way the sense of liberty overlaps with the material economy cannot be interpreted as a lack of interest in the legal and institutional issues raised by the construction of a democratic space disconnected from the regime of affluence. Rather, it reflects the inability of the paradigm of limits, in this version as in the others, to deal politically with the problem of affluence. The Malthusian spectre rises once more when we understand that the promoters of bioeconomics, or at least its main representatives in the effervescent 1970s, are renewing the old idea of a political art taking as its object not society, but the population. The possibility opened up by Veblen, and before him Saint-Simon, which consisted in reconstructing the social order on the basis of the socializing skills induced by technology and science, is here closed. Veblen's critique of money is repeated, but merely gives way to an equally hegemonic alternative measure. The social relations of property, the independence of the industrial classes with regard to the market, the search for political equality as the division of labour becomes deeper – all these themes disappear from the literature on limits. The properly socialist component of technocracy seems to have been lost in this historical and epistemological trajectory, as if the

introduction of the ecological sciences into political thought had the effect of neutralizing the aspiration to autonomy underlying political modernity.

The inability of the paradigm of limits to be formulated within socio-political coordinates is in itself instructive. At the start of the last quarter of the twentieth century, when environmental pathologies become unavoidable, there was such a degree of co-optation of the emancipatory imaginary through material abundance that any thought of limits took the form of a crash landing. This brutal ecological rebalancing of modernity, this reminder of the pre-social norms that supposedly preside over the destiny of humans, was akin to the reactivation of an ideal of integral sovereignty exercised indifferently over space and humans. This fetishization of energy matters was obviously no response to the fundamental problem posed by Polanyi twenty-five years earlier. Indeed, nobody knows what collective subject is seeking its autonomy in the form of a reintegration of territory into political thought: regulation here takes on an essentially biological and energy-based meaning, it is an engineer's dream in which nothing is said of our social capacities to reinvent autonomy without the economy being viewed as limitless.

What was at stake in the attempts of the Club of Rome and of the various authors who put forward the paradigm of limits was the first real attempt to *fit industrial societies within a finite world*, a world whose geo-ecological properties would not clash with their persistence, their durability over time. And it is no coincidence that the concept of limit was the vector of this first incomplete rediscovery of the world as a vulnerable partner in the historical deployment of modernity: after the geopolitical and moral catastrophe of the two world wars, which brought its ideals up against one first form of collapse, this modernity would need to prepare for a test of a new genre, a test due to its very ecological contradictions. How indeed would it be possible to maintain the antitotalitarian requirement, which concentrated its forces on the fight against the reconstitution of predatory arbitrary power while accommodating an ecological requirement whose clumsy formulation awakened, whether consciously or not, the old demon of heteronomy? In the absence (or almost) of a political ecology making credible the increase of autonomy *by* a response to the challenge of limits, space was abandoned to a farcical opposition between a utopian techno-fix and the maintenance of the ecological and economical status quo.

Risk and the reinvention of autonomy

While for proponents of limits the threat was essentially linked to the depletion of resources and the disruption of fundamental

geo-ecological balances, the risk lay mainly in events that disturbed spontaneous confidence in science and technology. The Chernobyl accident in April 1986 quickly became the emblem of this epistemo-political movement, but beyond that, it also became necessary to think about the problem of nuclear waste management, the accumulation of health and environmental scandals such as asbestos, mad cow disease and contaminated blood, and the emergence of the figure of the victim in the political controversies of late modernity. Thus, in the context of risk, it was not the technosciences as a *material force* but as a *political authority* that were indicted. It was their ability to produce a trustworthy discourse on the world, a discourse on which we can rely when it comes to our material aspirations, which was the target of critique, and with it the exclusion of laymen from the exercise of this authority. What was at stake in the studies on uncertainty, responsibility and precaution that marked the 1980s was the idea that the technosciences would create the world into which societies would settle comfortably and sustainably. It was also the idea that the formation of a well-identified scientific authority can be entrusted with the care of the material fate of men and women, negatively delimiting the specific space of the political realm.[20]

Thus, the emergence of risk tells us that the advent of extraction-autonomy is incompatible with the incessant ebb of doubt and uncertainty. What is the benefit of being modern and free if you have to constantly manage the consequences of progress, if you have to constantly debate its harmful effects and set behind each scientist and each engineer a moral conscience that reminds them of their responsibility, their fallibility and, ultimately, their faults? What is the benefit if the remoteness of want and disease implies a constant surveillance of the institutions in which we had placed our trust, and if the very means by which autonomy has been won entail new dependencies? What societies with a high level of innovation have gradually discovered is that the sciences, far from making it possible to abolish natural constraints, cause new ones to emerge in which it is impossible to discern what stems from Providence and what stems from the faulty design of the machines. As soon as the risk is induced by the very thing that was to exorcise it, it is therefore the entire ideological and ontological arrangement of modernity that falters.

To realize this, we need simply recall the structure of modern chronopolitics that was discussed above. The possibility of looking to a certain future, as we have seen, fostered support for the liberal pact at the time of its rebirth, after the Second World War. Capitalism consolidated under the leadership of welfare and the maintenance of high levels of growth went hand in hand in a precarious balance that was soon to be weakened, but which helped to root in people's

minds the idea of a progressive continuity of time. The accumulation of industrial, environmental and health accidents and risks, by introducing threat and chance into the existence of the greatest number and by casting suspicion on the almost sacred authority that the representatives of science had assumed, reaches into the very heart of this chronopolitical system. Risk has the constitutive ambiguity that we do not know when the accident, or at least the disruptive event, will strike; nor do we know exactly where it will come from (otherwise it would be possible to anticipate it) – but we do to some extent know that it will inevitably happen.[21] It is both contingent and inevitable, and the essential thing is not knowing whether it will happen, but where and when. It is this paradoxical fatedness that makes the time of risk a relation to the future totally different from the smooth continuity sought by the modernism that emerged from the Enlightenment.

From this angle, the emergence of a 'risk society' is inseparable from the more general transformations of political economy that took place at the same time, from the end of the 1970s onwards and a little later in France. While the compromise of 'democratic capitalism' had somehow ensured, not without upheavals, the integration and rise of the salaried masses through the development of a social insurance system, the crises of this model and the first attempts at adjustment severely attacked confidence in this system for stabilizing biographical and professional trajectories. Without exaggerating the stability of the social and fiscal pact established between capital and labour in the aftermath of the war, we can agree with Robert Castel,[22] for example, on the emergence of a new historic phase with the spread of deregulation and precariousness of the job market, which itself accompanied deindustrialization and the refocusing of the economy on the maintenance of 'human capital' or knowledge. The 'principle of deferred satisfaction',[23] which enabled the lower classes to envisage the future in the guise of improvement and social advancement despite the ongoing difficulties of the present, gradually gave way to a great uncertainty, which did not present itself only in the guise of mass unemployment, the individualization of career paths, the dismemberment of the wage earners' condition and the gradual replacement of the model of protection by the model of welfare.[24] In fact, insofar as this uncertainty affected the relationship with the future, it was part of a larger social transformation, which included the intensification of environmental risks.

This comparison of two crises, that of social protection and that of scientific authority, was fundamental. The concomitant erosion of society as seen by classical sociology and the erosion of the technoscientific certainties on which it was based must be taken seriously: it is a question in both cases of describing the blows inflicted on the integrity

of the central political subject of modernity. What is at stake here is the conception of society as an organism that is perfected and protected only if it can exteriorize nature, delegate to science the regulation of relationships with the world, and find in material abundance the energy necessary to maintain its autonomy and give itself a future. Once the technosciences can no longer by themselves ensure this regulation (assuming that this has ever been the case) and the social compromise of redistributive growth begins to take effect, the modalities of this social achievement are endangered, and it is actually the very subject of this process that is rendered more fragile. What happens to society if the structures responsible for guaranteeing its future, i.e., scientific authority and the social state, are faulty?

Behind the accumulation of environmental risks and the studies that analyse them, we must therefore see a process of socioeconomic transformation much broader than the simple emergence of an ecological awareness. The relation to time, the division of tasks between science and politics, the forms of scientific authority, the protective apparatuses, are simultaneously put in crisis, and even if the factors of this crisis can be considered as heterogeneous, the emergence of the concept of risk as a central operator capable of organizing knowledge of these transformations must be taken seriously.

There are, however, several ways of connecting the crisis in the welfare state and the crisis of modern scientific authority. A first option is to make the extra reflexivity of late modern or postindustrial societies an unavoidable opportunity to take back the rudder of history after the convulsions of the 1970s and 1980s. Indeed, if we accept that the providential framework of the state and technoscientific promises are two sides of the same sin of pride, two twin versions of a discreet but overwhelming power, then the flexibilization of wage conditions (and the labour market), on the one hand, and the advent of negotiated rather than imposed progress, on the other, can be jointly celebrated as a new step in the long history of emancipation. As the expression 'risk society' itself suggests rather well, it is less a question of eliminating or minimizing the manufacture of risks than of accepting it as an inevitable dimension of the industrial condition, in the same way as the risks of unemployment or accident. Probably no one has been so explicit in the assumption of this argument than Anthony Giddens.[25]

He starts out from the general characteristics of reflexive modernity, which, according to him, rests on the abolition of nature as an entity external to society and taken over by science, and the abolition of tradition as a schema for the reproduction of existing social authorities. Wishing to give a positive meaning to the idea of risk, he associates it with an increase in the room for manoeuvre of individuals who are now freed from the shackles of a closed society, which determines limited

professional and biographical destinies, but also from the incontestable nature of the scientific authorities. Individuals in the reflective age, fully mobilized by risk-taking as a positive component of their social commitment and by their response to environmental threats, can be given greater responsibility, but also greater liberty.[26] In other words, they are given a new form of autonomy, which no longer consists in avoiding threats by all means, but in admitting the risk-taking inherent in a free existence. Giddens writes, in a decisive formula: 'The welfare state is linked to the basic presuppositions of modernity – to the idea that security is guaranteed by more and more effective control by human beings of their social and material environment.'[27] Thus, the overcoming of modernity in its first version must consist in limiting the powers vested in the institutions that inhibited conscious risk-taking. Identified with 'tradition', the welfare state is portrayed as a premodern survival, or at least as a modernity that does not fully accept its individualist commitment. And in this context, the accumulation of critiques levelled against sovereign science gives a certain consistency to this celebration of risk-taking. For risk, understood as a potential threat apprehended through a statistical rationality, can be controlled like any social reality, and even at a lower cost for public finances as for individual liberties.

The question is not so much about how to limit accidents with potentially harmful consequences as to know how to take an opportune risk. The ideal of security, both social and environmental, betrays a political and existential reluctance which reforms of the welfare state and of the great bodies of public engineering aim to get rid of. Once it has been accepted that risks are inherent in the industrial condition, social responsibility does not consist in eliminating them, but in managing them. The political consequence of this idea is huge: 'The idea of unconditional rights seems appropriate when individuals assume no responsibility for the risks they face, but this is no longer the case when risks are manufactured.' The rights in question here are of course social rights, those associated with the protection of the welfare state. Giddens thus makes a twofold conceptual move that captures a good part of the spirit of the 1990s: starting out from the same observation and the same theoretical instruments, he succeeds in politicizing the environmental question in the form of a new dimension of the art of governing (one consisting in governing risks), and in reconfiguring the welfare state, seen by a large part of the political elites as the enemy of liberties and balanced budgets.

The reconstruction of the labour question after the crises of democratic capitalism in the Thirty Glorious Years therefore took place largely at the intersection with the question of nature, or more exactly of the end of nature. Once the linear time of progress has been

desacralized, once the idea of a complete exteriorization of nature and a material confinement of society in its political-legal autonomy has been abandoned, risk regulation can appear as a way of meeting the minimum agenda of modernity (it is, all the same, a matter of being responsible for our future) without entering into an overly blatant contradiction with the material consequences and the 'human cost' of development.

In France, pragmatic sociology and the sociology of science and technology have resulted in a second option, notably in two important works: *Politics of Nature*, by Bruno Latour, and *Agir dans un monde incertain*, by Michel Callon, Pierre Lascoumes and Yannick Barthe. If we see the renegotiation of the pact between science and society as the main horizon of Latour's critique, we realize that the assertion 'science is political' never meant 'science is merely an ideological manipulation', but that the social authority entrusted in the spokespersons of nonhumans is one form of power like others. This authority is therefore not denied or denounced as illegitimate, but redefined as an organizing responsibility which can hold fast and endure only if it fully assumes this function.[28] The sciences, like any authority in a modern context, must respond to the examination of their legitimacy – which is not to be confused with challenging their very principle. However, the scientific authority of experts is not ready to assume this function by itself, because of the sacralization of which it was, in spite of itself, the object, and so it will gradually be constrained to do so when the publics concerned impose their tests on it – publics that include victims, local residents, lay investigators, etc.

The risk here is no longer at all presented as a factor of increase and re-enchantment of responsibility, but as an event that upsets the ordinary adequacy between science as the regulated description of a certain number of phenomena, and science as authority. Indeed, when an uncertainty arises, it is less the scientist's empirical claims that are questioned than his or her social or political claims: asbestos, radioactivity and prions, inter alia, do not suddenly become objects of ignorance when their harmfulness appears, but introduce a gap between what we know about these things and what we intend to do with them. With this link broken, or at least compromised, the confusion between the two dimensions of 'science' that had prevailed since the advent of modernity may appear as what it had been from the start: a fragile arrangement. However, the reconstruction of a true legitimacy for science and technology will not be able to take the form of a return to this modernist compromise which swept uncertainty under the carpet at the expense of its victims. Once the politicization of sciences has been triggered, one cannot backtrack and hope that science can speak again from its Olympian point of view. To persist as

an authority, the sciences must finally pass the test they had called for from the beginning, from the moment when they were announced as the instrument of collective liberation, i.e., as a constitutive dimension of the democratic project.

'Technological democracy' therefore maintains, despite appearances, a deep affinity with what we called (above) 'industrial democracy'. While the technological mediations peculiar to the industrial age had raised the serious problem of the inequality and disorganization of society, the traditional 'labour question' was reactivated at the end of the twentieth century in a new form. This time, it was uncertainty about the future that made it necessary to go beyond the classical liberal and modernist schema. While the ideal of equality and property was immediately problematized by the oligopolistic tendency of the processes of industrial production, this time it was the crisis of confidence in scientific expertise that crystallized a democratic remobilization. Technological democracy, or to use Latour's terms the 'parliament of things', is what one could call a *socialism of proof*: what needed to be socialized, in the crisis of the 1990s, was less wealth (or property) than epistemic responsibility – that is, the ability to engage in a demonstrative exchange with regard to the future. What needs to be re-socialized is the ability to say with which people we can engage in lasting relationships, and in what ways we may do so.

On the one hand, with the re-enchantment of risk in Giddens, we are witnessing the reinvention of the liberal pact in a postmodern regime. On the other, people count on the mobilization of citizens in technopolitical controversies, affairs and scandals to reconstitute a critical public space adapted to the developments of industry and its consequences. This second option has sometimes been considered naive:[29] the formation of 'hybrid forums' supposed to embody the delegation of scientific authority to the people assembled in new informal assemblies and once again assuming their epistemic task seems to underestimate the inevitable balance of power with industrial players. In other words: technological democracy inevitably turns into the democracy of lobbies – who assume without scruples or anxieties the political scope of the sciences.

The impasse: between collapse and resilience

The question that must be asked now, before we embark on the last part of our reflection, is simple: why can the paradigm of risk and/or that of limits not be considered as satisfactory answers to the ecological crisis of modernity? Why can we not be content to combine bioeconomic warnings with postmodern reflexivity to reconstruct the

ideal of autonomy in the form of, say, *a responsible self-restraint of society*? This option is unfortunately not possible, in particular because the escalation of the climate problem in the twenty-first century raises new challenges that these two paradigms cannot face. More precisely, the repoliticization of the collectives resulting from the project of autonomy and abundance on a new base constituted by the response to the ecological crisis could not be achieved through risks and limits.

Climate change is obviously not, strictly speaking, a discovery of the 2000s. On a strictly geochemical level, the basic mechanisms that link the concentration of atmospheric CO_2 with the greenhouse effect have been familiar since the nineteenth century, and the first serious political alarms were sounded in the 1980s – the statements of climatologist James Hansen to the US Congress and the creation of the Intergovernmental Panel on Climate Change (IPCC) in 1988 were key landmarks in this story. After a long period of procrastination, fuelled by the constitution of a 'climatosceptic' front financed at great cost by the fossil fuel industry and exploiting the exacerbation of uncertainties inherent in climate modelling, the climate once again become a central subject of political and diplomatic controversy in the mid-2000s.[30] Two events can help us pinpoint the moments history accelerated: the publication in 2007 of the fourth report of the IPCC and, two years later, the Copenhagen Conference which was to lead to a global agreement defining the planned reduction of the emission of greenhouse gases able to contain the rise in average temperatures to 2°C above the pre-industrial era. With the Kyoto Protocol soon coming to an end – it had in any case been an obsolete commitment right from the start, due to the defection of the United States – the need for such an agreement was seen as a moment of truth in the formation of a demanding global climate policy.

The failure of these negotiations and the signing of a *trompe-l'oeil* treaty, which, since it could not be binding, enshrined an 'incantatory governance', gave a boost to militant approaches that hoped to make the climate the focus of geopolitical struggles and the heart of critique of the economic system. But this failure also exerted a significant pressure on the scientific community, understood in a very broad sense including the so-called natural sciences and the social sciences. The sciences of climate and biodiversity reoriented their demonstrative strategy by reformulating some of their conclusions in more striking language, intended to capture the general characteristics of the new planetary metabolism taking shape. 'Tipping points', 'safe operating space', more recently 'hothouse earth' and, of course, the concept, both obscure and symptomatic, of the Anthropocene[31] all played a central role in the emergence of an interdisciplinary science of the Earth system, one capable of assuming its role as a political whistleblower.

For their part, the social sciences and the humanities also experienced a fairly far-reaching phase of reorganization. This was linked to the properly political consideration of what geologists and, after them, the social sciences community called 'the Anthropocene', which caused the collapse of the paradigms of risk and limits in their capacity to organize the conception of the relationships between nature and modernity.

However, if we keep in mind the main empirical and normative aspects of these two theoretical and empirical regimes, there is reason to believe that the phenomenon of climate change is a boon for both. Indeed, metabolic rationality seems well prepared to welcome the biochemical and social upheaval that an increase in average temperatures on the planet would represent, if only because it is involved in its discovery, and the concept of risk is also a serious potential aid when it comes to thinking about catastrophes and the new forms of responsibility contemporary with this crisis. If this is so, it is because global climate change appears to be the perfect meeting and amalgamation of approaches in terms of limits and risks: it is a *global risk*, a risk caused by exceeding certain key biophysical thresholds, and there is apparently no reason why this encounter within things should not be repeated epistemologically. The rise in average global temperatures affects the physical and biological basis of social life as a whole, to the point that nothing can in principle be considered external to these disturbances. It is no longer a question here of pollution or contamination, those phenomena that provided the main material for thinking about risk, since it is now the global deployment of nature which functions as a pollution, in a pathological way. However, the emergence of this global risk, by blurring the empirical benchmarks of previous decades, has in reality caused a collapse of the pre-existing theoretical paradigms: their synthesis has proved to be unsuccessful and their individual extensions uncertain.

The worsening of the ecological and climatic crisis has caused what might be understood as a radicalization of the positions held by people on both sides of the polarization between risk and limits. When it comes to limits, each minute spent in a productive and demographic regime which intensifies the pressure on resources thereby increases the radical nature of the response required. Almost half a century after the first warnings, the march towards catastrophe has only accelerated, and with it the opportunities for a rationality of collapse. The success of 'collapsology' in France, and of various apocalyptic strategies there and elsewhere, must be understood in this context as a way of going beyond the phase of prevention to conceptualize and directly prepare for life in the ruins, in an environment definitively marked by precariousness and lack. Whether in the form of a reactivation of

religious millennialism or of a set of practical recipes for survival and adaptation (or even a mixture of the two), this social phenomenon which has been unleashed in recent years to some extent emphasizes the failure of the paradigm of limits to create a new bioeconomic foundation, and recycles the prophecy of the catastrophe in the form of a description of life *afterwards*.[32] And when it comes to risk, we can clearly see the creation of an industry of responsibility, one that both capitalizes on the worsening of uncertainties through increasingly complex insurance systems[33] and more or less directly propounds an ethics of resilience. The discourse of adaptation is essential as a market response to the ecological crisis, within a controversy in which the scenarios of 'mitigation' were appearing more and more fragile and less and less able to support the deployment of a promising economic sector.[34]

* * *

Collapse and *resilience*, those two polarized versions of the reaction to the crisis, come across as a couple of concepts that reveal the dashed hopes of the political ecology of the previous generation. The Dionysian attitude of the collapsologists, celebrating collapse and destruction, sometimes with a certain zest, acts in counterpoint to the Apollonian market in insurance, which aims to channel in a peaceful and stable way the most serious events. But behind these desperate strategies, can we discern a new political and critical form of knowledge adjusted to the new climate regime? We had set off, under the inspiration of Polanyi's interpretation of socialism, in search of an assemblage between political theory and ecological knowledge which would guarantee the re-founding of a critical political subject on the basis of a response to the new affordances of the land. We would like to know what will, today and tomorrow, play the role that 'society' has been able to play when it comes to responding to the aggressions of the market and industry. Now, it must be recognized that an answer does not emerge from either side: if the world has radically changed under the effect of the cornucopian dream, and if the aspiration to autonomy has been torn away from its material base, the more or less abstract invocation of responsibility and the new cults of the end of the world only translate the abandonment of such an intellectual and political programme. The assumption of global risk, whether depressive or triumphalist, largely fails to address the problem of restoring the democratic promise in the age of climate change.

To some degree, it consecrates the foreseeable decomposition of the social sphere as a central historical subject, but by allowing two well-known (and very melancholy) figures of the human collective to ebb away: on the one hand, naturalism, and even the Darwinism revitalized

by the prophets of apocalypse, a Darwinism that depicts a population struggling with its survival; on the other, the mechanisms of individual responsibility integrated into a market which, far from being contained, extends its hold on new spheres. Population and individual, i.e., the coordinates of classical political economy, are plunged into adventures of a new kind without their substance being truly questioned. However, if the end of society as a conceptual and political landmark is in some way dictated by the need to take into account nonhuman beings, their future and the mediations that associate us with them in a political reflection, the whole problem lies in knowing how to do away with that end, and with the confiscation of emancipation by growth, without doing away with the demand for self-protection.

11

Self-Protection of the Earth

Changing expectations of justice

Climate change is exploding one by one all the strata of modern political reflexivity. This is true of the juxtaposition of national and territorial sovereignties – already questioned by the nuclear risk – and which looks like a curious vestige of the past when it comes to regulating global productive and market structures in the hope of achieving the targets set by the IPCC in terms of greenhouse gas emissions. The political base map resulting from decolonization is also of little help when it comes to hearing the demands of nonstate political communities: islands or cities threatened with submersion, landless peasants – either indigenous peoples or bearers of alternatives to the agro-industrial system – defenders of the oceans and ice caps, territories exposed to fracking and other fossil experiments, and many others: these are all political entities that raise new problems for the political affordances of the Earth that are completely incompatible with the regime of classical sovereignty, just like the frameworks of international law. It is even, paradoxically, the political dimension of these movements that depends on their situation of bias in relation to the geography of recognized sovereignties and their systems of representation.

This redistribution of attachments and alliances also brings with it the modern imaginary of emancipation as extraction, as a negation of the natural burdens that hinder the free expression of the will. The image dear to Locke of the farmer improving his land, leaving to conquer new spaces available for appropriation, i.e., the liberal arrangement that, since the eighteenth century, has promoted autonomy by coding nature as an external constraint to be lifted – all of this is rendered obsolete by the need to regulate our relations with a vulnerable Earth and environment that are sensitive to our actions.[1] It is therefore the conceptual and political construction of liberty, of autonomy, that is at

stake in climate change – as it had been with the industrial revolution. Not, as is sometimes said, because infinite liberty is impossible in a finite world, but because what we free ourselves from when we claim autonomy no longer has the same shape: today, it is rather a question of incorporating into the collective subject, intent on defending itself, nonhuman beings, territories, ecological processes and regulations. The current transformations of the concept of property,[2] the reactivation of the language of the 'commons'[3] and, above all, the emergence of a gradual degrowth[4] – which is no longer thought of as the abandonment of modernity but as the revival of the labour question – all signal a profound transformation in the benchmarks of political thought.

If climate change is upsetting our theoretical benchmarks, this is also because it brings to the surface elements hitherto present but barely visible from our common past – or in any case carefully left on the periphery of political thought. This is of course the case with affluence, which, while not being an explicit problem for modern political thought, is the horizon against which it is developed. If we bear in mind the theoretical debates and controversies covered in the preceding pages, we can see that much of the process of democratization of modern societies is dependent on a mode of relation to the world constructed as unequivocal: the nonhuman environment is to a huge extent conceived as a stock of available resources (whether renewable, like soil productivity, or not, like coal and oil reserves) and from which it is possible to draw the conditions of emancipation. We are now realizing, as this very possibility comes to an end, that living in affluence consists in developing a system that is both technological and economic and which tends to inhibit the attention paid to the maintenance and replenishment of stocks or ecological dynamics that govern the reproduction of the collective. The capture and improvement of land, followed by its submission to techniques for increasing yields, the mobilization of fossil resources and also the organization of a supply system that keeps these so-called 'raw' materials at a very low price, are all – when environmental reflexivity is taken seriously – akin to a forcing of the geo-ecological capacities of the Earth. Attention to the ecological regulations that make this Earth habitable and the development of a suitable way of life are therefore at the heart of our political history. And this for two reasons: first, because they are part of the history of the emancipation and democratization of society; and second, because the preservation of the project of autonomy now rests on the fastest possible elimination of these mechanisms of affluence.

Sovereignty and property, abundance and scarcity, autonomy and extraction, market and production – these dimensions of modern political reflexivity are all undergoing profound changes. The world in which this repertoire of categories and institutions now has to function

has changed so fundamentally since their establishment, and what is more under their direct or indirect influence, that it is imperative to take note of this transformation. However, curiously, and probably for the first time since humanity posed the question of the principles of its organization, our epistemo-political base has changed less quickly than the world it helped to build: the right to property, the productive schema, these cardinal elements in the arrangement between humans and nonhumans now prevalent in the world are all older than the geo-ecological reality that we inhabit. The latter emerged with industrialization and was consolidated with the great acceleration of the twentieth century, when this set of categories and standards was itself already several centuries old.

This discrepancy calls for corrections, the magnitude of which clearly emerges if we compare it with the long history of historical development that led to their stabilization. It is true that the mismatch between the liberal pact (with its own promises) and the material reality of the world is not new: universalism stemming from the Enlightenment accommodated itself to the slave system right from the start, and then pretended not to see the industrial, and capitalist, inequalities within it, and it is logical enough that the climate issue will still largely elude the heirs of this pact today. The ecological issue is thus part of the history of the demands for justice which aim to correct this discrepancy: antislavery, workers' and feminist struggles have focused on these flaws, have helped to redesign the modern political subject by integrating new beings and new relationships into it, and there is no reason why this process should stop today.

But the climate crisis does not allow us just to stick to the classic objections against liberalism, since it also sets the repertoire of critical thought at odds with ecology. Indeed, the self-protection of society against the market and the new forms of domination it has brought about has itself absorbed the productionist idiom and the decoupling of the social and the natural domains. One could even say that the socialist and sociological counter-movement has endorsed the social as a critical subject at the cost of maintaining the exteriority of nature. In this sense, the reaction triggered by the economic and political development of modernity, in particular among the categories of population hardest hit by its modalities, was formulated in terms largely subservient to the alliance between autonomy and affluence. The demand for a fair distribution of the fruits of progress has paradoxically consolidated the purpose of growth, so much so that the project of an emancipation decoupled from development, which is now spreading in the old poles of industrialization, often appears to be a contradiction. And unless we follow the suggestion made by Polanyi in *The Great Transformation*, where he notes that the self-protection of society

includes its links to conditions of subsistence and territories, links that are not exclusively of an economic nature, this contradiction is insurmountable. In other words, among the political categories brought into play by climate change, there are also and ultimately the notions of nature and society, since behind these terms lies hidden a particular way of politicizing oneself and politicizing the world. It is in this sense that the question of the critical collective subject must be raised again: who is it? How should we name it? Whom is it mobilizing?

Fortunately, in the history of political thought, the socialist tradition has also imposed a concept of autonomy as integration. Thanks to it, the demand to take into account the material characteristics of the world and how we access them has become sedimented in our history. The project of autonomy, while being fundamentally subordinated to the schema of productive conquest, has thus been alerted to the close links being formed between the exercise of political liberty and the conditions in which the conscious transformation of the world is taking place. The critique of exclusive individual property, the attention paid to the links between the division of labour and social solidarity, but also (in the technocratic tradition) the quest for an economic norm outside the logic of prices – all these aspects of the tradition have had the effect of consigning any specific consideration for the materiality of autonomy to the past memory of social struggles. By trying to curb the liberal tendency of delegating to the market the responsibility for organizing relations to resources and territory, socialism has made collective relations to the world a political issue. And this is its main legacy at a time marked by major ecological changes. Beyond its failures, and in particular its environmental failures, socialism has left a legacy that has absolutely no equivalent in the memory of political thought. And it is in this sense that the counter-movement now being triggered by climate change is situated in this tradition: it re-stages, in different terms and in an entirely new context, the collective capacity to identify a threat, to define the collective subject that rises against it, and make this ordeal into an opportunity for reformulating the ideal of the liberty of equals.

Thanks to the historical precedent constituted by socialism, understood as a deepening of the sense of liberty in a technological world, then in a world affected by climate change, and negatively affected by the project of autonomy itself, the development of a political response to climate change is not entirely without pointers. And these pointers are necessary in a context where the feeling of abandonment, loss and disorientation hovers over political ecology, especially once we begin to measure to what extent mainstream political concepts are found wanting by the challenge of climate change. It is on this feeling of loss that the prophets of the apocalypse, millennialism and other ideologies

of the end of the world thrive, since they all in their own way wager on the incommensurability between ecology and politics by passing straight on to the register of salvation or survival. But while bearing in mind the radical singularity that climate change constitutes as a historical and psychological experience, and while accepting that this change is no longer a distant prospect but a fait accompli, the reference to socialism tells us that the formation of a new critical subject is always possible. It is in this sense that political ecology remains an avatar of modernity: it presupposes a self-critique and a correction of political reflexivity, a deliberate transformation of the means by which the collective takes responsibility for itself – and not, especially not, any submission to external standards, whether 'natural' or theological.

So that is what we mean when we say that climate change is exploding all strata of modern political reflexivity. Beyond the disruption of geo-ecological balances, this transformation forces us to redefine the repertoire of our categories of thought. Climate change – i.e., every particle of greenhouse gas that is added to the Earth's atmosphere and that takes us out of our ecological 'safe operating space'[5] – is an entirely political reality, in two ways. First, because CO_2 emissions are the product of a technological and political past that had nothing necessary or inevitable about it; and second, because these emissions impose on us the task of unravelling the political arrangement that was established with the liberal pact and in its various modern reincarnations. Climate change is the name of the historic present because it is both a fact, established by geosciences, a heritage to bear, whether we like it or not, and an ordeal to be overcome – in other words, a political condition. And if this ordeal is so difficult to face up to, it is because the current deterioration of planetary ecological conditions is more than just the result of an error committed in the past and needing to be corrected later, or a figure of evil of which we have become aware in retrospect.

It is possible to make our task easier by affirming that the 'capitalist mode of production' and the 'technoscientific objectification of the world' are the ideal culprits behind this error, and thus need to be arraigned before the court of critique. These concepts stemming from modernity and sometimes set up as absolute categories of domination by theory are obviously connected to contemporary issues. But one of the conclusions of our investigation is also that neither of them captures historical reality correctly, for three reasons. First, both stem in part from very real collective desires for the improvement of the material conditions of life and security, which must be treated symmetrically and cannot be abandoned as a whole; second, because the critiques to which they have led have long been compromised by their own premises, in particular productionism; and finally, more

radically, because an environmental history of political ideas reveals other instances of domination, another way of looking at the pathologies of modernity, than those we inherit from the past. The critique of capitalism and the technosciences is thus to be understood as a critique of these categories themselves, which there is no reason to regard as more timeless or more absolute than the categories of property or sovereignty.

* * *

The scale of the current upheavals is measured by the strength of the new counter-movements, but especially, alas, by the radicalization of the economic elites who are determined to continue full steam ahead to growth. Faced with the evidence now unanimously accepted, including and perhaps even especially by those whose plans it most disrupts, that the planet is no longer large enough or flexible enough to accommodate a limitless economy, the persistence of liberalism is becoming more obvious than ever. While the pact forged between affluence and freedom, between growth and democracy, had worked as a global project until quite late into the twentieth century (whatever one thinks of the value of this project), in the sense that it formed the basis for the discourse of progress, the search for growth is now turning against its old political ally and causing an extraordinary corruption of the democratic ideal. Naomi Klein and Bruno Latour,[6] even though they come from very different intellectual traditions, have drawn from it a common observation and working hypothesis: the exacerbation of political conservatisms, the consolidation of alliances between market forces and identitarian nativism and the electoral outlet that they find among populations seeking protection against offences, which, however, stem in large part from the logic of the markets, must all be understood in the context of the climate crisis. As Bruno Latour would put it, faced with the observation that there is no longer a world able to host the project of infinite economic growth, its defenders have preferred to liquidate the idea of a common world and to build illusory ideological lifeboats.[7]

This still risky hypothesis, which awaits further empirical investigation by the political sciences, nevertheless fits perfectly into the history that we have just reconstructed. The sense of political liberty, first boosted then trapped by its alliance with the mechanisms of growth and extraction, is today at a clearly identifiable historic turning point. Either it remains subservient to the old structures of the liberal pact, and is condemned to shrink, to surround itself with barriers to protect itself against the new contenders for development and affluence, or it is assumed that the history of this alliance must end. The systematization of the links between climate denial and the programme of aggressive

liberalization of the markets,[8] this worldless globalism that is spreading at an astounding speed, should in this respect indicate the path *not* to follow. This is because it represents an economic project based not only on the defence of established interests, but also and at the same time on the reactivation of the conservative spectre already described by Polanyi: when laissez-faire dissociates itself from multilateralism and takes refuge in little islands of prosperity, it again becomes the objective ally of the defence of the traditional soil and the exclusion of the foreigner, the vehicle of the identitarian and localist reduction of the political affordances of the Earth. Some try to draw reassurance by listening to those who promote the inclusion of ecological demands within the neoliberal framework, but the lack of ecological support for this project immediately makes such a framework seem empty and invalid. Either, therefore, the project of autonomy remains rooted in the dream of affluence, in which case it will sink with it in the great reactionary and authoritarian movement that we are already witnessing, or it frees itself from it by taking the form of a post-growth autonomy, i.e., of a new kind of integration-autonomy.

The assumption on which we are working here is fortunately corroborated by other studies of the exhaustion of global economic structures. Indeed, their inability to support peaceful and lasting political projects is at present remarkably well documented by the social sciences. It is essentially from the angle of debt, inequality and crises that this methodical process is carried out, and the historical logic of a certain destabilization emerges, the critical threshold of which has undoubtedly not yet quite been reached, but which certainly cannot be postponed indefinitely.[9] The reinvention of capitalism at stake in the spread of austerity, in the erasure of the mechanisms of redistribution, in the absolving of financial institutions from any responsibility, to some degree prolongs the death agony of this old paradigm, but every death agony comes to an end. And although equivalent work from a climatic point of view still needs to be carried out, political philosophy can already manage on the basis of this necessary decoupling between autonomy and affluence. In a context characterized by certain economists as 'permanent stagnation',[10] the objectives of growth can be obtained only by a series of accounting, fiscal, monetary and, of course, legislative forcings (one thinks here of the reforms of the labour market, or of the new enclosures),[11] which are inevitably envisaged as having to do with the more general forcing of the planet's ecological carrying capacities. Each time, these are mechanisms designed to overcome resistance to the reproduction and accumulation of private wealth. As regards the old poles of industrialization, all growth is thus pathological, since it is obtained only by means that irreversibly consume the human and nonhuman substance.

In *Où atterrir?* [*Where to Land?*], Latour presents these issues by asserting that the alliance between climate-scepticism and the return to localist, Barrès-type conservatism[12] reveals the definitive collapse of the 'common world' previously guaranteed, in his view, by the liberal project. Universalism breaks down when it appears that Gaia cannot provide shelter for the economic liberty of the wealthy and the aspirations of all the others. However, our analyses lead us to view the relationships between the liberal paradigm and the composition of a common world in a different way. Following in this respect the elements provided by the imperial and environmental historiography of liberalism, the least that can be said is that this tradition has always had conflicting relationships with the very idea of a shared world, since its implication in colonial adventures and the more general construction of modern ubiquity raise a big question mark over this promise. In other words, the current inability of the heirs of liberalism (whether or not they have crossed the sceptical and reactionary Rubicon) to meet the climate challenge is partly explained by this very long history and these many missed encounters between the ideal of emancipation, in its typical eighteenth-century formulation, and its geo-ecological conditions. In reality, and more broadly, honesty obliges us to say that no classic theoretical or political idiom is immediately up to the challenge of climate change, simply because this latter represents an event that, as Naomi Klein says, 'changes everything'.

Autonomy without affluence

Fortunately, the epistemo-political terrain has already been prepared by the series of symmetrizations described in the previous chapter. Even if the challenges to the twofold exception – i.e., the scientific and political authority of the moderns over nature and the non-moderns – have not been explicitly developed as a response to the climate challenge, they provide the only consistent and available theoretical framework for understanding contemporary transformations without lazily recycling a political grammar developed in and for another world. We must therefore take seriously the idea that the modernist gravitational system, which projected into its margins the sociohistorical otherness of non-Europeans as well as nonhumans, no longer exercises a monopoly on truth-telling. And with it a more positive corollary: the exhaustion of its authority goes hand in hand with the composition of new non-productionist political partnerships that remain to be developed. This new space opening up to the politicization of collective experience cannot therefore be reduced either to an end of history or to a situation of epistemological and social

anomie, since the answer to the ordeal of climate change must find a place within it.

When, according to the indications of climatologists, it is stated that the Earth is not large enough or flexible enough to host the autonomy conceived on the basis of affluence, this obviously sounds like the end of something, of something to which many of us are still attached. And this is indeed the case, in one sense: there are certain ordinary connotations of the idea of emancipation that cannot any longer be preserved – those linked to modes of consumption in particular, i.e., to the world of commodities. There are certain future projects that can no longer be realized – notably the 'large projects' linked to fossil extraction and the capture of agricultural land and forests. But if the ideal of autonomy is likely to be reformulated in terms less dependent on the mechanisms of extraction and accumulation, i.e., of affluence, then this transformation will not assume a merely negative meaning. The acceptance of liberty that must prevail in the twenty-first century, and which is already taking shape, will rearticulate itself in geographic, ecological and epistemological coordinates emancipated from the schemas produced by the modernist tradition. This new form of autonomy, and the political collective that enacts it, as its subject, will simply respond to territorial and ecological affordances hitherto silenced in our agricultural, colonial and industrial history, which for a very long time have imposed a certain vision of what a legitimate use of the Earth involves. And it is in this sense that symmetrization, even if it has for now an essentially theoretical meaning, is essential: by denaturalizing the 'obviousness' of certain aspects of the modern collective experience, by bringing out its singularity and its provincial character, as well as the asymmetries it dictated, it shows that it is possible to explode from the inside the association – long viewed as necessary – between autonomy and modernity, between the sense of freedom and the uses of the Earth which have led to the exhaustion of the latter.

For it is not enough to pay heed to climatological data to gain a foothold in the new political regime imposed by the ecological and climate crisis. It is not only a question of curbing, slowing down the pace of the economic machine, or of reminding men and women of the limits of the land-based system, so that the answer will be given as if by miracle. In political matters, as in biology, the change of scale of a system necessarily causes a transformation of its internal structure: one cannot have the same thing but smaller, a downsized industrial modernity, miniaturized to meet ecological demands, as the meaning of our sociopolitical benchmarks has been so greatly affected by the increase of our power to act in the world. It is in this respect that the 'eco-modernist' programme falls below the necessary level

of requirements, since it is content to offer techniques of ecological resilience (techniques that are essentially nuclear and robotic) capable of prolonging liberal intoxication without suffering from the hangover of climate change.[13] More generally, the political controversy raised by the climate issue becomes evident once one focuses on nuclear energy: the false comparison between atomic and carbon-based power tends to suggest that we could, thanks to the former, preserve techno-policies (and lifestyles) typical of the age of affluence, while lowering our level of CO_2 emissions. Even supposing that this is possible, it means that the climate issue is merely a question of technological choice, or, as people sometimes say, of 'energy transition'. Now, if we admit, as we have just said, that the very content of the ideal of emancipation is called into question by the new ecological regime in which we find ourselves, then we must not seek new sources of affluence likely to revive extraction-autonomy, but rather ask what becomes of this ideal when it has to fit into a world that has been turned upside down.

Economic curbs and the critique of the limitless economy cannot be conceived without a reform of our political concepts. To put it more radically: any energy transition not based on a socialist movement reimagined outside the confiscations that have been prevalent in modernity is irrelevant, and would bring no real benefit. By defining, at the very beginning of this book, what I meant by the 'environmental history of ideas', I was already to some extent raising this issue. If political notions that are apparently indifferent to our modes of relation with the world turn out in fact to bear the mark of the institutional, technological, scientific mechanisms that organize these relations, this reciprocally means that the transformation of these mechanisms will leave its mark on future political awareness. Political thought therefore has no choice but to explore this field of possibilities, if only to prevent it being abandoned to new forms of domination based on the control and monopolization of means of subsistence that are increasingly difficult to access. By asserting from the start that the field of the political and the field of the ecological are, if not completely coextensive, at least impossible to separate, the methodological proposition of the environmental history of ideas therefore already contained a thesis: the transformation of our political ideas must be of a magnitude at least equal to that of the geo-ecological transformation that climate change constitutes.

Theoreticians of symmetry, who since the 1970s have developed subaltern and postcolonial historiography, the sociology of science, the anthropology of nature and the theory of unequal ecological exchange, were perhaps not fully aware that, by ending the reign of the modern twofold exception, they were not merely doing justice to the forgotten people and aspects of history or establishing an intellectual legitimacy

emancipated from the colonial and modernist schema. Indeed, the instruments necessary for devising an environmental and intergenerational justice adequate to the shock of climate change come to us from this movement, since it was the first to clearly envisage that the self-protection of future political collectives would not fall within the sociocentric dualist schema prevalent within the European experience of the world. What had long been understood as the universal basis for collective emancipation, namely the heritage of the Enlightenment, of industrial social critique, of historical rationality centred on the nation-state, now presents itself not in reverse form as a pure form of alienation, but as a singular schema, bound up with a historical moment, and as such hampered by the dead ends and blind spots of that moment. As soon as the forms of political reflexivity assume new guises on the basis of this symmetrization, the desire for emancipation can overcome the limits imposed by a modernizing narrative which, very literally, is the narrative of another world. If the labour question must today be redefined to give solidarity between humans and nonhumans the centrality it deserves in the present crisis, this can only be done at the cost of a transformation of our political compass. In other words, we cannot simply become 'societies that protect nature', since each of these terms – 'society', 'protect', 'nature' – carries with it a way of organizing beings that is out of kilter with the demands of the present; we have to follow the path of symmetrization to envisage our responsibility for our future in new terms.

* * *

This means that we need first to grasp at the root questions about (1) the type of space that is circumscribed by our political, historical, material affiliations, (2) the meaning that we give to the technological and legal control that we exercise over the world, and (3) the type of authority that we give to scientific discourse, i.e., what guarantees the synthesis between the knowledge we have of ourselves and the knowledge we have of the world – a synthesis more necessary than ever in the age of climate change. These three points correspond to what was defined in the first chapter as the empirical space to be surveyed if we are to understand the ecological question: dwelling, subsisting, knowing.

If we take the first thread, that of dwelling, and pull it out of the spatial dimension of the ecological problem, what unfolds is the history of the relationships between sovereignty and property, i.e., the formation of a political thought of an exclusive domain (individual or collective), then the question of what has been called modern ubiquity, namely the tendency not to take the ecological territory that we consume as such, but also the problem, central to the nineteenth century, of a

mobile society whose symbol is the railway, and where attachments to the land are viewed as throwbacks to an alienating premodernity. In the context of climate change, where territorial discontinuity and the imposition of borders and national jurisdictions are evidence of a striking discrepancy with the emergence of new forms of political mobilization of territories, habitat thus defined becomes a fundamental issue. What we learn from the history of peasant social struggles (in the South as well as in the North) and from an awareness of the ecological interdependencies which underlie the globalized market order is that capitalism is not simply a mode of production, but also a mode of residence. In other words, it is a way of distributing social groups and functions, security and risk factors, across space, but also affluence and lack. This of course causes territorial inequalities, but with them a differentiation from what it means to live on a soil with its geographic, agricultural, historical and memorial characteristics. The territory of the urban middle classes is not that of the agents of global extractivism or of agro-ecological experiments, and these in turn are different, for example, from a town aiming for carbon neutrality or a community determined to create rights for a river.[14] The re-politicization of territories outside the polarity of the local and the global, set apart from the administrative and political regime of sovereignty, is therefore the first axis of theorization for a symmetrized political ecology: what is at stake with it is the fate of assemblies that are no longer understood as 'a society in its environment', but, precisely, as political territories.

In terms of subsistence, and obviously very related to the previous issue, it is essentially a matter of economic rationality and the sense of value. The historical background now reminds us of the constitutive tension of the market societies set up in the wake of the technological and energy revolutions of the nineteenth century. In this context, which is still partly our own, economic and political domination was exercised both through the privatization of the means of subsistence and effective control over the ever more massive flows of matter and energy on which the collective depends, and through complementary mechanisms that ensure the recoding in monetary terms of privatization, i.e., its invisibility as a metabolic phenomenon – thus preventing it from being explicitly subject to democratic exchange. What we learn from Saint-Simon, Veblen, bioeconomics and, more recently, Timothy Mitchell, each in their own way, is that the logic of the market (or the price system) always tends to obscure its connections to a singular technological and productive regime, and that one of the tasks of the social counter-movement consists in highlighting and attacking this very connection by weakening it and exploiting its weak points. The suboptimal nature of modern supply systems, the centrality of waste and wastage in the formation of prices and profits

– i.e., the extraordinary gap that has arisen between the regulation of the 'economy' and the regulation of ecology, or of the living planet that bears us – must provide the basis for a second axis of political theorization. Today, this already longstanding gap has become crucial, since the economic rationality that governs our understanding of the future, and of externalities, entails nothing less than climate inaction.[15] The integration of an ecological reflexivity into the critique of the market as a form of domination is therefore linked to the expulsion of our intellectual coordinates from the productionist schema, i.e., from the belief in a demiurgic mastery of ecological and evolutionary processes that ensure our integration with the Earth. Admitting that we do not produce our means of subsistence, and even less the general conditions of terrestrial coexistence, but accepting that we are part of a geo-ecological regulation made up of cycles that need to be maintained and preserved, is the first step in developing a political economy that finally responds to the good affordances of the earth.

Finally, in terms of knowledge, we must make ourselves the heirs of the symmetrization of scientific authority in order to lucidly conceive the right politics of knowledge for the ecological issue. For what is at stake is neither the subordination of modern voluntarist political consciousness to 'natural' norms, nor the empowerment of an enlightened scientific elite capable of imposing its decisions, but rather the reconnection of the process of democratization to the production of scientific statements – especially when they concern the state of the planet. The development of an environmental reflexivity has given rise to the most significant of recent epistemo-political struggles – and the interminable controversy about climate science is the most striking example: the collapse of the liberal pact has entailed the fanaticization of its most virulent defenders, ready to invent alternative truths to safeguard its meaning.[16] More generally, the competition of contradictory statements in an increasingly vast and open public sphere – and the emergence of what is now called 'post-truth' – has increased the need to tend to the chains of mediations that ensure the proper representation of facts in the political community. The apparent epistemic anomie in which we find ourselves today, far from being a consequence of the critique of the metaphysical authority of science, confirms its central postulate that our relation to the facts and to our capacity to establish them must be tended as carefully as our political values.[17] Indeed, climate change denial itself does not hesitate to exploit the political nature of science. Climate change therefore calls for a redefinition of the knowledge that structures the democratic space and a deepening of ecological literacy – now as essential to agreement between minds as is language, or reference to common history.

The symmetrization and overcoming of the modern twofold exception therefore lead to the identification of three major projects for a political ecology that can be formulated as an extension of the labour question of the nineteenth and twentieth centuries. The self-protection of collectives is first conceived in terms of space, as a critique of modern territoriality, i.e., of the logic of sovereignty and the vestiges of the split between modern people and nonmodern people; second, in terms of value, as a critique of economic rationality, a critique aimed at re-embedding the acquisitive and market processes not in society but in both local and planetary ecology; and third, in terms of knowledge, as an incorporation of ecological knowledge into social and political reflexivity.

* * *

We often realize the value of what we owed to an ideological or cultural structure just as we are losing it, or can feel it slipping through our fingers. This is entirely true of modernity, understood as a structure that conceives autonomy as the removal of natural constraints – or rather as the transfer of these constraints to others than oneself, human or nonhuman. Indeed, the consolidation over the course of history of the equivalence between democratization and enrichment, or the acceleration of the productive machinery, is not viewed as a vulnerability by a significant proportion of the population until this equivalence becomes a mere memory – or in any case ceases to constitute a credible path for the future. The cornucopian schema inherited from the Enlightenment and classical political economy, which promises to open up our political horizons once the frugality of nature is forced to yield, is increasingly perceived as a myth of the past, as the object of a feeling of nostalgia. Yet the Thirty Glorious Years are not that far back in time, and with them the idea that social justice requires a redistribution of the fruits of growth that is now impossible. The type of individual produced during that period in industrial democracies by the last avatar of the liberal pact, namely the productivist welfare state, is now brutally plunged into a new world, with all the strange psychological and social consequences that this can have. One of the most striking examples of this discrepancy is the very frequent attachment to individual mobility, and its main technological realization, namely the automobile. The abundance of energy and the policies of urban sprawl associated with it have given shape to infrastructures and anthropological profiles, to forms of desire, whose inertia over time is at present coming into violent collision with the reality principle of the climate: the psychosocial attachments to automobile autonomy and to the sense of self that it cultivates are being called into question by the rise in energy costs, and urban

infrastructures, however recent, appear to be unsuited to the new ecological regime.[18]

This world, so close to us and yet already so old, is dissipating under the combined effect of attacks on the democratic compromise by austerity policies, the increase in inequalities, and the disappearance of material support for indefinite growth. However, this disappearance is producing all kinds of social reactions which, for some people, echo the problem of historical orientation often mentioned in this book. In other words: how can we envisage in progressive terms social transformations that are breaking away from the form that this progress took in the past? Indeed, if we only half deconstruct the equivalence of affluence and liberty, the idea that the democratization of society has been definitively halted in its tracks can easily impose itself. One need merely admit that, having broken the only material machinery that set this process in motion, this machinery itself simply has no future. This idea has already imposed itself, as we have seen, among the economic elites who have made the destruction of the human habitat the condition of the perpetuation of their power, but it is also found in certain trends in environmentalism which wager on the outright abolition of modern living conditions so as to propose a programme for a post-apocalyptic renaissance.[19] The polarization between the climate denial of the fossil elites and the millennialism of collapse rests on a false alternative: either one preserves the 'progress' of the past, based on abundance, and the Earth is abolished, or one puts an end to all political ambition by ensuring that after abundance comes only survival, adaptation or redemption.

The loss of what, just a generation ago, seemed as an irreversible pact between a way of living in the world and a way of looking towards the future has been so brutal – although the processes leading to this loss have long been familiar – that the transformation of our political compass, as it were, has hardly had time to take effect. Panic-stricken, some have started to assert that the project of autonomy as such has run out of breath and that ecology is inseparable from authoritarianism. But there is a world of difference between the claim that this project relied for two centuries on the removal of 'natural constraints', and the idea that all forms of political autonomy can be identified with this partnership. The space that appears between the two is absolutely decisive, because this is where the resumption of the democratic ambition can begin: collective control over our historic destiny is now conditioned by the integration of a certain number of ecological norms and thresholds, by the reality test imposed on us by the new climate regime. Maintaining the democratic ambition in the Anthropocene requires the reversal of the ecological partnership based on the production that supported it in the nineteenth and twentieth centuries, and a subversion

of the material support traditionally accepted by the expectations of justice. In other words, although a feeling of loss is taking an increasing grip on social groups affected by the collapse of the liberal pact, the self-protection of the new political collective can be viewed as more than just an accompaniment to the endgame: democratic reinvention is not a simple curbing of productive tendencies, not just a series of measures intended to avoid catastrophe, and it is generally not seen as something negative (as a series of things that we can no longer do, that are forbidden). The withdrawal of certain ways of doing and seeing, far from being an abstention, frees up space for action.

The autonomy of the twenty-first century contains, it is true, a component of restraint and self-restraint, notably against certain extractive and acquisitive forces which it is a question of controlling, but certainly not of renouncing. Our political unconscious, by associating action with an increase in the means of acting on oneself and on the world, and these means of acting with their technological implementation, blocks this idea. That is why we often retain just the negative dimension of the policies meant to produce a new form of autonomy – like Bartleby, ecology limits itself to asserting 'I would prefer not to.' The alternative proposed by the Enlightenment between primitive destitution and headlong technological advance (whether conceived as beneficial or as pathological), can therefore no longer serve as a meaningful historical structure. Not because it means having to stick to a compromise, to a middle path (the one we generally call 'sustainable'), but more simply because the technological environment that needs to be built in response to current geo-ecological transformations is heterogeneous to the environment with which we are familiar. In the twenty-first century, the instituting desire that takes shape in law must be dissociated from the logic of technological innovation, because technological evolution can no longer act as a metaphor for social evolution as it has done since the eighteenth century. It is therefore impossible to conceive of this new form of autonomy (even if we do so sometimes) as a leap back over the modern parenthesis to a more distant past: the new democratic demand is not a neo-medieval or neo-primitive resurgence, it is not a return to the lost past of the commons, the tempering of desires, or the non-appropriation of the world, but the recovery of a classic ideal freed from its modernist gangue.

Towards a new critical subject

In order for this decoupling of freedom from affluence to be seen positively, one of the main tasks consists in identifying the collective subject capable of rising up and going in search of its autonomy under

the new conditions defined by climate change. This phrase needs to be emphasized: *under the new conditions*, and not in any random set of circumstances, for it is now evident that the genesis of a political subject is correlative to a mode of relation to space, to resources, to knowledge (about oneself and the world).

The great transformation described by Karl Polanyi, with the additions made by Timothy Mitchell and several others on the form of social conflicts in the age of fossil fuels, has taught us this fundamental lesson. A political subject is discovered in the ordeal of a threat, of something that undermines the integrity and sustainability of a collective that, paradoxically, does not pre-exist for all eternity. Only the industrial world, constructed by the political and technological (i.e., ecological) forms proper to the nineteenth century, could bring about the socialist counter-movement, and with it the political subject called 'society'. This political actor is very complex, since it is both enshrined in other contemporary collectives such as the people, the nation, the class, or even humanity, and out of step with these latter groups insofar as it does not designate either a unique identity or a universal. We do not belong to the social as we belong to a people or a class, because it does not shape the same inclusions and the same exclusions. Social belonging is, to use Durkheim's terms, not mechanical, because it is not based on the resemblance of the terms it assembles but on their difference – and this is precisely what gives it its political character: neither identity nor abstract. It is caught up – like the notion of class – in conflicts, but irreducible to either of the parties to this conflict. And yet these dissimilarities which comprise the social sphere do indeed have an external limit. This is what we learn from the symmetrization of the great divisions, which underlines how much the nonmodern domain – which has not yet found its own sociality – and the nonhuman domain – which is there only as an assertion of the autonomous collective – have suffered from the social paradigm. After decolonization, after the transformation of our relationships to science and technology, the social domain seems to have exhausted its capacity to form a proper collection of political actors mobilized in the struggle.

On the new base map where the geo-ecological privilege of modern ubiquity no longer exists, where territories enter politics based on their experience of climate change and where the productionist mode of relationship has lost its hegemony, the process isolated by Polanyi's historical sociology can then be transposed, with deep analogies and urgent new questions. The sequence in which a metabolic shock is followed by the identification of a disorder, the development of critical thinking and the implementation of its means of action can be retained as a good guide to current political issues. But it no longer connects the industrial revolution (shock I) with the labour question

(unrest I), the socialism of growth (critique I) and workers' sabotage (means of action I). It gives way, term by term, to climate change (shock II), the question of the Earth (unrest II), anti-productionist socialism (critique II), and the mobilization of a new collective subject whose name and methods of action are being developed in ecological conflicts (means of action II). Once everything has changed, and the political sequence of self-protection has undergone a second great transformation structurally analogous to the first, albeit substantially reversed, there remains almost nothing of the sociopolitical landmarks bequeathed by the labour question, except the requirement for self-protection which is its true nature. This appears as an incorruptible principle which animates complex collectives – those who live with technological and institutional apparatuses that are too vast and too autonomous for them to govern themselves mechanically. And it is a persistent principle, even when the economic and ecological structures which had long, albeit imperfectly, provided security and protection to the greatest number now expose them to the most serious threats. Self-protection is in this sense more central than its usual historical subject (society), since it is this concept that makes it possible to closely link a politicized collective (that which protects itself), a power of aggression (what it protects itself from) and the mechanisms of self-defence (the knowledge and practices mobilized to protect itself).

The resistances to the advent of this political subject are unfortunately numerous and powerful – but fairly well known.[20] Several recent studies show that, at the time of the first major ecological alarms, and subsequently at the major scientific and diplomatic meetings convened to respond to the climate challenge from the late 1990s and the Kyoto Protocol onwards, the refocusing of the modern project on the protection of the Earth has been considered several times. The environment has thus become an object for global governance under the effect of the politicization of the ecological and climatological knowledge that has fed into the supranational bodies for regulation both economic (World Bank, IMF) and diplomatic (United Nations Framework Convention on Climate Change) when the paradigms of risk and limit predominated. But the political imaginary of these institutions has always left what we can call, following Amy Dahan and Stefan Aykut, a 'reality schism' between those for whom the reproduction of human society is at stake, and those for whom the issue is essentially the reproduction of capital (i.e., risk, in the economic sense of the term). According to the same authors, the incorporation of environmental issues into the international agenda has gradually taken the form of 'incantatory governance', i.e., a form of paradoxically depoliticizing support that, while affirming the imperative and urgent character of techno-political transformation, demonstrates

in its concrete inaction the failure of existing institutional forms to operate in accordance with this purpose – which thus becomes purely ideal. In a process eloquently described by Dominique Pestre, the attempt to subordinate globalized markets to environmental norms has undergone a shift, at the end of which market rationality has been paradoxically consolidated and relegitimized by the incorporation of watered-down and not very restrictive norms.

It is in a sense thanks to this cunning of history that what has prevailed is not the ecological critique of the economy and the politicization of territories, but the recoding in economic terms of ecological alarms, in a series of marginal modifications of market rules. The question could thus be considered as settled, while being projected onto the fringes of the process of recomposition and extension of the liberal logic which prevailed after the Keynesian parenthesis. It is still this logic that is at work, for example, in the Millennium Ecosystems Assessment[21] commissioned in 2000 by the UN and initially intended to provide the foundation for a global ecological transition. This document borrows its argumentative structure from bioeconomics via the concept of 'ecosystem services' – i.e., the set of underlying ecological functions essential for the economic and social reproduction of humanity. As we have seen, these concepts were developed to challenge the hegemony of the monetary expression of value in economic reasoning, and to replace it with a materialist conception, in which primacy is given to flows of energy, resource stocks and systemic eco-evolutionary functions. In this document, however, the original intention of bioeconomics has been subverted, to the extent that ecological services tend to be interpreted as natural capital to be maintained rather than as a qualitative set of evolutionary dynamics dictating classic economic metrics. Thus, these services, assimilated to capital, can be compensated for, exchanged and negotiated in the same way as goods (as is the case with the rights to pollute), while the fundamental message of the critics of growth consisted in bringing situated, irreversible, qualitative processes into the sphere of value. Thus, the instruments developed to create global environmental regulations once again reveal their inability to change paradigm, but above all demonstrate how the appropriation and deflection of ecological critiques slow down the emergence of a non-naturalistic political subject.

Thus, after several decades during which environmental governance has paradoxically functioned – within the framework of what can be called a neoliberal ecology – as an obstacle to the self-transformation of modernity, the assessment has to be very negative: the sense that the market paradigm is infinitely adaptable often ends up predominating, and with it the mechanisms already described by Polanyi three-quarters of a century ago are rendered fatefully inevitable. However,

these defeats result in a clarification of the issues, as will be even more clearly the case with the subsequent emergence of the authoritarian fossil liberalism discussed above: if an ecological and post-socialist counter-movement can see the light of day, it will be outside these institutional spheres, in a critical relationship to their current agendas – at least as something that overflows and shatters the pre-elaboration of what an 'ecological question' actually is. This counter-movement, in other words, results from a critique of the idealist environmentalism of the first generations focused on the defence of 'wilderness' and its alleged intrinsic value, but also and above all from turning away from the existing mechanisms that had set out to ensure ecological transformation.

These elements are essential to properly situate the type of politicization required for the development of a post-growth democracy. The betrayal of the 'official' environmental authorities in fact leads to a pushback: it provides evidence for the idea that this movement is again taking root in an ordinary class dynamic, where the antagonism between the interests of a majority but dominated collective and the interests of a minority ruling class ready for anything occupies the political centre stage. The problem, of course, is that the collective in which the new labour question, that is, self-protection in the context of climate change, is being developed, looks nothing, or almost nothing, like a class understood in its classic socioeconomic sense. People living near dangerous installations, victims of extractive devices, alternative land users, commoners, scientists and educators, and many others whose experiences are still diffracted by gender and race, compose, with the Earth, a collective hardly comparable to a dominated class, quite simply because they are united neither by the experience of exploitation nor by collective identification with a common condition or identity, or even simply by the fact of being victims. The spatial dimension of the stakes is the main differentiating factor compared to the classical framework of the labour question:[22] in a conjuncture where relationships with the Earth as a source of subsistence, as a habitat and as an object of knowledge become (again) an ideological marker and the object of cardinal struggles – since the whole problem is ultimately one of knowing on what land and what Earth we intend to live – the sociological profile of the emerging collective is necessarily unstable. And, above all, it does not easily acquire a self-consciousness similar to what we talk about when it comes to 'class consciousness' (and even less about 'national consciousness').

What remains of class conflict is the experience of an injustice to be corrected, which gives rise to certain forms of enquiry and knowledge; what remains of national identification is the local and territorial dimension; and what remains of the social movement is the ambition

to create an organic synthesis of different points of view. But none of these collective names from the past satisfactorily captures the process under way – all are reformulated from top to bottom. Many contemporary theorists of socialism have faced this problem by trying to rename the critical subject that matches the economic and political conjuncture of the end of the twentieth century, but none has, to date, proposed to define this critical subject by the links that it forges with the material and spatial conditions of the counter-movement.[23] It is this, moreover, that always gives conservative movements a head start, as they can be content to take from the pre-existing political lexicon the name of the collective to which they are addressed – people, nation, class (although the latter is not very fashionable) when they do not even more simply use the language of individualism. In other words: alongside the active resistances that oppose the emergence of a collective capable of responding to the good affordances of the Earth, there is the objective ambiguity of this entity in search of its internal integrity: neither class, nor people, nor nation, nor society, it differs from all these collective names by locating its centre of gravity at the crossroads of the human and the nonhuman.[24] Baptiste Morizot has shown that ecology is often reduced to the search for multispecies 'alliances' in which coexistence involves the exchange of different points of view on what it means to coexist.[25] But this paradigm of alliance also helps to conceive the composition of this political collective, whose sociological heterogeneity (and no longer just its specific heterogeneity) must be converted into a reason for questioning the nature of the convergence that drives it.

* * *

It is probably not philosophy's task to affirm by speculative means what will be the name and the exact form of this collective capable of establishing itself as the subject of the ecological counter-movement. In this respect, the gap between official social theory and the genesis of a working class in the nineteenth century,[26] formerly highlighted by E. P. Thompson, calls for caution: it may well be that once again the real trajectory of a collective political body and the conceptual expression of its mission diverge. And if we keep in mind the uncertain contours of activisms with a protective aim, as well as the diversity of actors and attachments that they mobilize, the crystallization of these struggles in a common cause undoubtedly holds great surprises in store for us. However, one thing is perfectly clear: a historical and political task is, without the slightest doubt, emerging – the task of the reinvention of the democratic ambition independent of affluence. What unites, perhaps in spite of themselves, the various mobilizations that we listed at the beginning of this book is the development of a

partnership that renders obsolete the old cornucopian dream and, on the basis of spaces and flows of materials, shapes a new kind of partnership.

The self-protection of the Earth (and the land), which is the real movement hidden behind what is generally called political ecology, must gain self-confidence. It is not a peripheral, subordinate mobilization, which questions the future of modernity only at its margins. Rather, it is this self-protection that embodies the pursuit of a political ideal as old as the previous complex forms of coexistence, while the advocates of the liberal pact and the limitless economy cling to a necessarily transitory mechanism, one that has already lasted much longer than the planet allowed. Between this movement and the rest of the political options available, whether predominantly liberal, sovereignist, authoritarian or palaeosocialist, the relationship is reversed: it is this movement that now embodies the centre of gravity and drives the transformations in progress; it is this movement that projects to its periphery the various avatars of political naturalism, those vestiges of another time. The self-protection of the Earth, therefore, is not an ideological curiosity symptomatic of the erasure of politics, but the only arrangement of concrete struggles and aspirations that can meet the challenges of the present.

31 On these arrangements, see Andrew Barry, 'Technological Zones', *European Journal of Social Theory*, 9, 2 (2006), pp. 239–253; see also the concept of 'technoscape' developed by Arjun Appadurai, *Modernity at Large. Cultural Dimensions of Globalization* (Minneapolis, MN: University of Minnesota Press, 1996).
32 Mitchell, *Carbon Democracy*. On the social construction of growth on the basis of economic indicators, see Matthias Schmelzer, 'The Growth Paradigm: History, Hegemony, and the Contested Making of Economic Growthmanship', *Ecological Economics*, 118 (2015), pp. 262–271; *The Hegemony of Growth. The OECD and the Making of the Economic Growth Paradigm* (Cambridge: Cambridge University Press, 2016).
33 Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II* (Cambridge, MA: MIT Press, 2009); and 'Invisible Production and the Production of Invisibility', in Daniel Lee Kleinman (ed.), *Routledge Handbook of Science, Technology and Society* (London: Routledge, 2014).
34 Yannick Barthe, *Le Pouvoir d'indécision. La mise en politique des déchets nucléaires* (Paris: Economica, 2006).
35 One might add that the atomic industry also proceeds by spatial externalisation: uranium mines are mainly located in former colonized regions, which entails an indirect but quite real monitoring of economic and health matters. On these matters, see Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge, MA: MIT Press, 2012).

Chapter 9 Risks and Limits: The End of Certainties

1 Donella H. Meadows, Dennis Meadows, Jørgen Randers, William Behrens III, *The Limits to Growth* (New York: Universe Books, 1972).
2 Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage, 1992).
3 Paul Ehrlich, *The Population Bomb* (New York: Ballantine Books, 1968); Barry Commoner, *The Closing Circle* (New York: Random House, 1971); Ernst Friedrich Schumacher, *Small is Beautiful* (London: Blond & Briggs, 1973).
4 Joan Martinez-Alier, *Ecological Economics: Energy, Environment and Society* (London: Blackwell, 1987).
5 These models are described by Jay Forrester in *World Dynamics* (Cambridge: Wright-Allen Press, 1971).
6 Meadows et al., *The Limits to Growth*, pp. 102–103.
7 Naomi Oreskes and John Krige (eds), *Science and Technology in the Global Cold War* (Cambridge: MIT Press, 2014).
8 See chapter 3 (above).
9 For a succinct explanation of the connections between degrowth and bieconomics, see Giorgios Kallis, Christopher Kerschner and Joan Martinez-Alier, 'The Economics of Degrowth', *Ecological Economics*, 84 (2012), pp. 172–180. See also the work of Antoine Missemer, especially *Nicholas Georgescu-Roegen. Pour une révolution bioéconomique* (Lyon: ENS

Éditions), and 'Nicholas Georgescu-Roegen and Degrowth', *European Journal of the History of Economic Thought*, 24, 3 (2017), pp. 493–506.

10 I am here drawing on this book and 'Energy and Economic Myths', *Southern Economic Journal*, 41, 3 (1975), pp. 347–381.

11 See Philip Mirowski, *More Heat Than Light: Economics as Social Physics, Physics as Nature's Economics* (Cambridge: Cambridge University Press, 1989).

12 'Energy and Economic Myths', p. 356.

13 Nicholas Georgescu-Roegen, *The Entropy Law and the Economic Process* (Cambridge, MA: Harvard University Press, 1971), p. 19.

14 On the form taken by economic debates after 1972, see in particular Francis Sandbach, 'The Rise and Fall of the *Limits to Growth* Debate', *Social Studies of Science*, 8 (1978), pp. 495–520.

15 Howard Odum, *Environment, Power and Society* (New York: Columbia University Press, 1971), p. 90.

16 Odum, *Environment, Power and Society*, p. 199.

17 Odum, *Environment, Power and Society*, ch. 9 and p. 303.

18 Odum, *Environment, Power and Society*, ch. 10.

19 For example, Odum suggests 'redefining the principles of medical ethics that interfere with genetic selection'; see *Environment, Power and Society*, p. 391.

20 Bruno Latour's work is a wide-ranging reflection on the consequences of the formation and disintegration of the authority of the sciences. See in particular his *We Have Never Been Modern*, trans. Catherine Porter (Cambridge, MA: Harvard University Press, 2012), and *Politics of Nature. How to Bring the Sciences into Democracy*, trans. Catherine Porter (Cambridge, MA: Harvard University Press, 2004).

21 Langdon Winner, *The Whale and the Reactor: A Search for Limits in an Age of High Technology* (Chicago, IL: University of Chicago Press, 1986).

22 Robert Castel, *La Montée des incertitudes* (Paris: Seuil, 2009).

23 Castel, *La Montée des incertitudes*, p. 18.

24 See Paul Pierson, *Dismantling the Welfare State? Reagan, Thatcher, and the Politics of Retrenchment* (Cambridge: Cambridge University Press, 1994); and Paul Hacker, *The Great Risk Shift: The Assault on American Jobs, Families, Health Care, and Retirement* (Oxford: Oxford University Press, 2006).

25 Anthony Giddens, 'Risk and Responsibility', *The Modern Law Review*, 69, 1 (1999), pp. 1–11. See also Ulrich Beck, Anthony Giddens and Scott Lasch, *Reflexive Modernization. Politics, Tradition and Aesthetics in Modern Social Order* (Cambridge: Polity, 1994).

26 See Giddens, 'Risk and Responsibility', p. 5, where he states that risk society, viewed positively, is the society in which there are ever more choices. Indeed, risk society is industrial society when it has transcended its limitations, which assume the form of manufactured risk.

27 Giddens, 'Risk and Responsibility', p. 7.

28 See Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge, MA: Harvard University Press, 1987).

29 See Dominique Pestre, 'L'analyse de controverses dans l'étude des sciences

depuis trente ans. Entre outil méthodologique, garantie de neutralité axiologique et politique', *Mil neuf cent*, 25 (2007), pp. 29–43.

30 Stefan Aykut and Amy Dahan, *Gouverner le climat? Vingt ans de négociations internationales* (Paris: Presses de Sciences Po, 2015).

31 See, respectively, Timothy M. Lenton, 'Early Warning of Climate Tipping Points', *Nature Climate Change*, 1, 4 (2011), pp. 201–209; Johan Rockstrøm et al., 'A Safe Operating Space for Humanity', *Nature*, 461 (2009), pp. 472–475; and Will Steffen et al., 'Trajectories of the Earth System in the Anthropocene, *PNAS*, 115, 33 (2018), pp. 8252–8259.

32 See Roy Scranton, *Learning to Die in the Anthropocene* (San Francisco, CA: City Lights Books, 2015); and Pablo Servigne et Raphaël Stevens, *How Everything Can Collapse: A Manual for Our Times*, trans. Andrew Brown (Cambridge: Polity, 2020).

33 A critical analysis of these phenomena can be found in Razmig Keucheyan, *La Nature est un champ de bataille* (Paris: La Découverte, 2014), and Sara Aguiton, 'Fortune de l'infortune. Financiarisation des catastrophes naturelles par l'assurance', *Zilsel*, 4 (2018), pp. 21–57.

34 Romain Felli, *La Grande Adaptation* (Paris: Seuil, 2016).

Chapter 10 The End of the Modern Exception and Political Ecology

1 It is impossible to do justice to the diversity and breadth of this literature. A panoramic view would include Aimé Césaire, *Discourse on Colonialism*, trans. Joan Pinkham: http://abahlali.org/files/_Discourse_on_Colonialism.pdf; Frantz Fanon, *Black Skin, White Masks*, trans. Charles Lam Markmann (New York: Grove Press, 1967); Edward Said, *Orientalism* (New York: Pantheon Books, 1978); Gayatri Spivak, 'Can the Subaltern Speak?' in Cary Nelson and Lawrence Grossberg (eds), *Marxism and the Interpretation of Culture* (Basingstoke: Macmillan, 1988), pp. 271–313; Dipesh Chakrabarty, *Provincializing Europe: Postcolonial Thought and Historical Difference*, rev. edn (Princeton, NJ: Princeton University Press, 2009).

2 In other words, I will omit a study of the symmetrization of sex and gender relations, as this would involve issues that go beyond the framework of this book. The feminist critique of political economy, however, has already led to certain convergences with ecology. See Silvia Federici, *Caliban et la Sorcière. Femmes, corps et accumulation primitive* (Genève: Entremonde, 2017 [2004]); Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (New York: Harper Collins, 1990); Maria Mies and Vandana Shiva, *Ecofeminism* (London: Zed Books, 1993); and Ariel Salleh, *Ecofeminism as Politics: Nature, Marx, and the Postmodern* (London: Zed Books, 1997).

3 Timothy Mitchell, 'The Stage of Modernity', in Timothy Mitchell (ed.), *Questions of Modernity* (Minneapolis: University of Minnesota Press, 2000), p. 3.

4 Tania Murray Li, 'Qu'est-ce que la terre? Assemblage d'une ressource et investissement mondial', *Tracés*, 33 (2017), pp. 19–48.

5 See Andre Gunder Frank, *ReORIENT: Global Economy in the Asian Age* (Berkeley: University of California Press, 1998); Jack Goody, *The Theft of History* (Cambridge: Cambridge University Press, 2012); Kenneth Pomeranz, *The Great Divergence: China, Europe, and the Making of the Modern World Economy* (Princeton, NJ: Princeton University Press, 2001).
6 For one example, see Gildas Salmon, 'Les paradoxes de la supervision. Le "règne du droit" à l'épreuve de la situation coloniale dans l'Inde britannique, 1772–1782', *Politix*, 123 (2019), pp. 35–62.
7 George W. Stocking Jr., *Victorian Anthropology* (New York: Free Press, 1987).
8 Johannes Fabian, *Time and the Other: How Anthropology Makes its Object* (New York: Columbia University Press, 2014).
9 This equivocation was clearly described and assumed by Bronisław Malinowski, 'The Rationalization of Anthropology and Administration', *Africa*, 3, 4 (1930), pp. 405–430.
10 I discuss this in my earlier work, *La Fin d'un grand partage* (Paris: Éditions du CNRS, 2015).
11 See Claude Lévi-Strauss, *The Savage Mind* (Chicago, IL: University of Chicago Press, 1966); and *Race et histoire* (Paris: UNESCO, 1952).
12 Silyane Larcher, *L'Autre Citoyen. L'idéal républicain et les Antilles après l'esclavage* (Paris: Armand Colin, 2014).
13 Bruno Latour, *Où atterrir? Comment s'orienter en politique* (Paris: La Découverte, 2017).
14 David Bloor, *Knowledge and Social Imagery* (Chicago, IL: University of Chicago Press, 1991 [1976]); Bruno Latour and Steve Woolgar, *Laboratory Life: The Construction of Scientific Facts* (Princeton, NJ: Princeton University Press, 1986). See also Harry M. Collins, *Changing Order: Replication and Induction in Scientific Practice* (London: Sage, 1985); Martin J. S. Rudwick, *The Great Devonian Controversy* (Chicago, IL: University of Chicago Press, 1985);
15 See Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge, MA: Harvard University Press, 1987).
16 The expression is used in this sense by Achille Mbembe in *Critique of Black Reason*, trans. Laurent Dubois (Durham, NC: Duke University Press, 2017).
17 Bruno Latour, 'Technology is Society made Durable', *Sociological Review*, 38, 1 (1990), pp. 103–131.
18 This movement, sometimes identified as an 'ontological turn', can be understood as a way of revitalizing the discipline's theoretical ambitions after the postmodernist critique of ethnological authority. See Gildas Salmon, 'On Ontological Delegation. The Birth of Neoclassical Anthropology', in Pierre Charbonnier, Gildas Salmon, and Peter Skafish (eds.), *Comparative Metaphysics. Ontology after Anthropology* (London: Rowman and Littlefield, 2017), pp. 41–60.
19 See Tim Ingold, *The Perception of the Environment. Essays in Livelihood, Dwelling and Skill* (London: Routledge, 2000); Philippe Descola, *La Nature domestique. Symbolisme et praxis dans l'écologie des Achuar* (Paris:

Éditions de la MSH, 1986); Eduardo Viveiros de Castro, *From the Enemy's Point of View. Humanity and Divinity in an Amazonian Society* (Chicago, IL: University of Chicago Press, 1986); and Nurit Bird David, '"Animism" Revisited. Personhood, Environment and Relational Epistemology', *Current Anthropology*, 40 suppl. (1999), pp. 67–91.

20 Pierre Clastres, *La Société contre l'État* (Paris: Minuit, 1974).

21 Eduardo Viveiros de Castro, *Métaphysiques cannibales* (Paris: PUF, 2009), p. 4.

22 The political stakes of Amazonian animism have been explored on the basis of indigenous reports in Davi Kopenawa and Bruce Albert, *La Chute du ciel. Parole d'un chaman yanomami* (Paris: Plon, 2010).

23 See David Abram, *Comment la terre s'est tue. Pour une écologie des sens* (Paris: La Découverte, 2013); and Jane Bennett, *Vibrant Matter. A Political Ecology of Things* (Durham, NC: Duke University Press, 2010).

24 See Philippe Descola, *Beyond Nature and Culture*, trans. Janet Lloyd (Chicago, IL: University of Chicago Press, 2013), ch. 13.

25 Descola, *Beyond Nature and Culture*.

26 André-Georges Haudricourt, 'Domestication des animaux, culture des plantes et traitement d'autrui', *L'Homme*, 2, 1 (1962), pp. 40–50.

27 Giorgios Kallis and Erik Swyngedouw, 'Do Bees Produce Value? A Conversation Between an Ecological Economist and a Marxist Geographer', *Capitalism, Nature, Socialism*, 29, 3 (2018), pp. 36–50.

28 In particular in a presentation at the conference on 'The Right Use of the Earth' in June 2018: 'Prédation et production. Quel bon usage de la terre?'

29 V. Gordon Childe, *Man Makes Himself* (London: Watts, 1936).

30 Baptiste Morizot, 'Nouvelles alliances avec la terre. Une cohabitation diplomatique avec le vivant', *Tracés*, 33 (2017), pp. 73–96.

31 See the three volumes of *The Modern World System*, published between 1974 and 1989.

32 Samir Amin, *Le Développement inégal. Essai sur les formations sociales du capitalisme périphérique* (Paris: Minuit, 1973).

33 *The Columbian Exchange. Biological and Cultural Consequences of 1492* (Westport, CN: Greenwood Publishing Group, 1972).

34 Joan Martinez-Alier, *The Environmentalism of the Poor. A Study of Ecological Conflicts and Valuation* (Cheltenham: Elgar, 2002).

35 Robert Costanza (ed.), *Ecological Economics. The Science and Management of Sustainability* (New York: Columbia University Press, 1991).

36 Roldan Muradian, Martin O'Connor and Joan Martinez-Alier, 'Embodied Pollution in Trade. Estimating the "Environmental Load Displacement" of Industrialised Countries', *Ecological Economics*, 41, 1 (2002), pp. 51–67.

37 On the convergence between environmental history and the theory of unequal ecological exchange, see Stephen Bunker, *Underdeveloping the Amazon: Extraction, Unequal Exchange and the Failure of the Modern State* (Chicago, IL: University of Chicago Press, 1990); and Alf Hornborg, in particular, *The Power of the Machine: Global Inequalities of Economy, Technology, and Environment* (Lanham, MA: AltaMira Press, 2001); and Alf Hornborg, John McNeill and Joan Martinez-Alier, *Rethinking*

Environmental History. World-system History and Global Environmental Change (Lanham, MA: AltaMira Press, 2007).
38 Jason Moore and Raj Patel, *A History of the World in Seven Cheap Things* (London: Verso, 2017).
39 Murray Li, 'Qu'est-ce que la terre?'
40 For an overview of studies on these issues, see Saturnino M. Borras Jr., Ruth Hall, Ian Scoones, Ben White and Wendy Wolford, 'Towards a Better Understanding of Global Land Grabbing: An Editorial Introduction', *Journal of Peasant Studies*, 38, 2 (2011), pp. 209–216.
41 I am here drawing on Ranajit Guha, 'Quelques questions concernant l'historiographie de l'Inde coloniale', *Tracés*, 30 (2016): http://journals.openedition.org/traces/6478. This text originally appeared in the first volume of *Subaltern Studies* in 1982.
42 *Elementary Aspects of Peasant Insurgency in Colonial India* (Delhi: Oxford University Press, 1983).
43 *Provincializing Europe*, p. 13.
44 See *Elementary Aspects*, especially pp. 329–332. These analyses have led to the development of a literature that occupies the ground between the history of subaltern populations and environmental history. See Madhav Gadgil and Ramachandra Guha, *This Fissured Land: An Ecological History of India* (Oxford: Oxford University Press, 1992).
45 See *The Environmentalism of the Poor*.
46 For one example, see Marisol de la Cadena, 'Indigenous Cosmopolitics in the Andes: Conceptual Reflections Beyond "Politics"', *Cultural Anthropology*, 25, 2 (2012), pp. 334–370; and *Earth Beings. Ecologies of Practice across Andean Worlds* (Durham, NC: Duke University Press, 2015).
47 The mass relocalization of productive activities in China is probably the most striking example of this dynamic. See Andreas Malm, 'China as Chimney of the World: The Fossil Capital Hypothesis', *Organization & Environment*, 25, 2 (2012), pp. 146–177, which contains an extensive bibliography on the subject.

Chapter 11 Self-Protection of the Earth

1 On the idea of nature coded as a constraint, see Baptiste Morizot, 'Ce que le vivant fait au politique', in Emanuele Coccia and Frédérique Aït-Touati (eds.), *Le Cri de Gaïa* (Paris: La Découverte, 2021).
2 Sara Vanuxem, *La Propriété de la terre* (Marseilles: Wildproject, 2018).
3 See Pierre Dardot and Christian Laval, *Commun. Essai sur la révolution au XXIe siècle* (Paris: La Découverte, 2014).
4 Giorgios Kallis, *Degrowth* (Newcastle: Agenda Publishing, 2017).
5 Johan Rockström et al., 'A Safe Operating Space for Humanity', *Nature*, 461, 7263 (2009), pp. 472–475.
6 Naomi Klein, *This Changes Everything: Capitalism vs. the Climate* (London: Penguin, 2014); Bruno Latour, *Où atterrir? Comment s'orienter en politique* (Paris: La Découverte, 2017).

7 In this respect, climate denial in Trump's administration has functioned as the centre of gravity of an international policy that was summarized by one of his senior officials after a visit to the Middle East and Europe in May 2017 as encapsulating the idea that the world is not a 'global community' but an arena of competition involving nations, NGOs and businesses in which the United States presents an unequalled military, political, economic and cultural force. See www.wsj.com/articles/america-first-doesnt-mean-america-alone-1496187426.

8 Dieter Plehwe, 'Think Tank Networks and the Knowledge-Interest Nexus: The Case of Climate Change', *Critical Policy Studies*, 8, 1 (2014), pp. 101–115. For a perfectly explicit example of an anti-ecological liberal doctrine, see the work of the economist Deepak Lal, who introduced the idea of 'eco-imperialism'; see in particular 'Eco-Fundamentalism', *International Affairs*, vol. 71, 1995.

9 See respectively Wolfgang Streeck in *Du temps acheté. La crise sans cesse ajournée du capitalisme démocratique* (Paris: Gallimard, 2014); Thomas Piketty*, Capital in the Twenty-First Century*, trans. Arthur Goldhammer (Cambridge, MA: Harvard University Press, 2014); Adam Tooze, *Crashed: How a Decade of Financial Crises Changed the World* (London: Penguin, 2018).

10 See Paul Krugman, 'On the Political Economy of Permanent Stagnation', *New York Times*, 5 July 2013.

11 The expression 'new enclosures' is used to refer both to the seizure of land and to the political economy of intellectual property, especially in the digital domain. See Ben White, Saturnino M. Borras Jr., Ruth Hall, Ian Scoones, and Wendy Wolford, 'The New Enclosures. Critical Perspectives on Corporate Land Deals', *Journal of Peasant Studies*, 39, 3–4 (2012), p. 619–647; and Christopher May, *The Global Political Economy of Property Rights. The New Enclosures* (London: Routledge, 2009).

12 Maurice Barrès (1862–1923) was a conservative French writer who advocated a nationalist mystique of France's organic unity. (Translator's note.)

13 The text is available online: www.ecomodernism.org/francais.

14 See Erin L. O'Donnell and Julia Talbot-Jones, 'Creating Legal Rights for Rivers. Lessons from Australia, New Zealand and India', *Ecology and Society*, 23, 1 (2018); Ferhat Taylan, 'Droits des peuples autochtones et communs environnementaux: le cas du fleuve Whanganui en Nouvelle-Zélande', *Annales des Mines*, 92, 4 (2018), pp. 21–25.

15 See the column by Antonin Pottier, 'Climat: William Nordhaus est-il bien sérieux?': www.alternatives-economiques.fr/climat-william-nordhaus-bien-serieux/00086544.

16 See Naomi Oreskes and Erik W. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (London: Bloomsbury, 2012); and Edwin Zaccai, François Gemenne and Jean-Michel Decroly (eds), *Controverses climatiques, sciences et politique* (Paris: Presses de Sciences Po, 2012).

17 See the portrait and the interview with Ava Kofman published in the *New York Times*, 25 October 2018, 'Bruno Latour, the Post-Truth Philosopher,

Mounts a Defense of Science': www.nytimes.com/2018/10/25/magazine/bruno-latour-post-truth-philosopher-science.html.

18 The work of Ivan Illich is entirely focused on these issues. See in particular *Energy and Equity* (New York: Harper & Row, 1974).

19 See Pablo Servigne, Raphaël Stevens and Gauthier Chapelle, *Another End of the World Is Possible*, trans. Geoffrey Samuel (Cambridge: Polity Press, forthcoming).

20 These resistance movements are documented by studies that underline the institutional blocks to the advent of a complete politicization of the question of ecology and climate change. See Stefan Aykut and Amy Dahan, *Gouverner le climat? Vingt ans de négociations internationales* (Paris: Presses de Sciences Po, 2015); and Dominique Pestre, 'La mise en économie de l'environnement comme règle. Entre théologie économique, pragmatisme et hégémonie politique', *Écologie et Politique*, 52 (2016), pp. 19–44.

21 The document is available online: www.millenniumassessment.org/fr.

22 This leads Bruno Latour to propose a map of geosocial struggles (*Où atterrir*, p. 83), but without explicitly setting this new concept in the context of a critique of the collective names that stem from our history.

23 I mainly have in mind Ernesto Laclau and Chantal Mouffe, *Hegemony and Socialist Strategy: Towards a Radical Democratic Politics*, 2nd edn (London: Verso, 1985); Michael Hardt and Antonio Negri, *Multitude. War and Democracy in the Age of Empire* (London: Penguin, 2004); and, more recently, Nancy Fraser and Rahel Jaeggi, *Capitalism. A Conversation in Critical Theory* (Cambridge: Polity, 2018).

24 In this respect, the slogan 'Nous sommes la nature qui se défend' ['We are nature defending itself'], often brandished by activists settled on the ZAD of Notre-Dame-des-Landes, sounds (apart from the fact that it still uses the idea of nature) like a possible formulation for this critical collective.

25 Baptiste Morizot, 'Nouvelles alliances avec la terre. Une cohabitation diplomatique avec le vivant', *Tracés*, 33 (2017), pp. 73–96.

26 Edward P. Thompson, *The Making of the English Working Class* (London: Victor Gollancz, 1963).

Conclusion: Reinventing Liberty

1 Jedediah Purdy, *This Land Is Our Land* (Princeton, NJ: Princeton University Press, 2019), p. 87.

2 Dipesh Chakrabarty, 'The Climate of History: Four Theses', *Critical Inquiry*, 35, 2 (2009), p. 208.

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