Chapter 16

Assembling societal metabolism and social practices: the dynamics of sustainable and unsustainable reproduction

Dario Padovan

(from, PÅL STRANDBAKKEN AND JUKKA GRONOW (Eds), The Consumer in Society. A tribute to Eivind Sto, Abstrakt Forlag AS, Oslo, pp. 335-362).

Introduction

For their reproduction and maintenance, societies draw matter and energy from nature, which they transform, distribute, consume and reject. This process is called societal metabolism. Despite all the work on societal metabolism and its environmental impacts, little has been revealed about the regulation of its two main dynamics: production and consumption. Analysis of regulation implies the identification of agents involved in practices of production and consumption (reproduction). This is clearly a functionalist approach but it is useful as preliminary exercise to identify main social sectors of societal reproduction and their rulers or drivers. The way in which different agents perform certain activities and the *telos* they pursue gives rise to different metabolic regimes. Metabolic regimes have two functions: on one hand, they fulfil social needs for transforming resources into usable and consumable objects; on the other hand they provide the ground for the process of wealth accumulation. This means that societal metabolism is not a clearly delimited, socially disembedded sphere of physical relations, which tend towards general stability. Rather, metabolism is a complex process that tends to accumulate capitals (natural, human, technical and monetary) while it provides socially useful objects, artefacts and services. These functions are apparently not in contrast but are complementary. However, metabolic processes that are too fast and too linear might overrun social stability, generating crisis, like, for instance, the rift between consumption and resource availability.

This chapter aims at linking metabolism and social practices. The practices taken into consideration are those of basic social reproduction like eating, cooking, housing, heating, cleaning, moving and caring. Societal metabolism is made up of bundles of everyday life activities aimed at the stable and recursive reproduction of the social material life of human beings. These bundles are the basic units of metabolism, the triggering activities that start metabolism, while at the same time they are outcomes of metabolism itself. All human activity involves the

consumption, transformation and conservation of matter and energy (Rosa and Machlis, 1983; Foster, 2000). From a material viewpoint, practices always consume matter and energy as input and produce something material as an output. Thus, I employ the concept of 'practice' in order to focus on the ongoing material social reproduction. The material base of social life is constituted by human practices. At the same time, the relevant practices entail relations – between human agents and with technical artefacts, natural resources and services. These relations vary in different historical circumstances and constitute the specific conditions of reproduction: human agency must operate within those specific conditions. The mode of combining social metabolism and social practices brings about the predominant form of life.

Societal metabolism and its connected practices are not only a matter of biophysical accounting; it is also driven by cultural and symbolic horizons. This is the reason why practices of consumption for decades have been studied from a symbolic, cultural, linguistic, identity-making perspective. But metabolism is driven by the necessity of collective reproduction, which gives reproduction back its original, material meaning. The recent interest in 'metabolism' as a category is due to its capability to capture this and to account for the resources that systems consume for their reproduction. The fact that systems are consuming too many resources, is leading to a turn in social ontology, now aiming to cope with the finite biophysical limits. In my view, the 'practice turn' is one of these ontological approaches, which tries to deal with the material basis of social reproduction. Thus, the 'metabolic turn' is a new ontology in the field of studying physical systems like cities, firms and buildings. This implies a reincorporation of the social into the biophysical realm. But this reinsertion of the biophysical into the social appears more difficult than expected, for reasons that I tried to explain in a recent paper (see Padovan, 2014).

In the first section I summarize the current definitions of societal metabolism. In the second, I show how the metabolism concept implies the reassembling of consumption and production and how this task is carried on by different scholars. In the third, I try to make the material side of consumption reappear at the expense of the dominating, culture-based explanations of consumption. In the fourth part I attempt to provide theoretical links between societal metabolism and everyday social practices, as a necessary approach to trigger sustainable transition. In the fifth part I argue that practices are the site of social order and disorder, simultaneously, and the chapter ends with a conclusion.

Understanding societal metabolism

Metabolism is not only a metaphor but also a theoretical category useful for understanding, explaining and accounting for the relations of systems to their environments. We might say that societal metabolism is an input/output mechanism, with the aim of maintaining the turnover connected to the conversion of matter and energy into useful things. This is an intrinsic feature in the reproduction of any organism (Padovan, 2003, 2014) yet it is also a category that is useful for investigating, pinpointing and assessing the regulatory processes that govern this complex interchange between organisms and their environment.

At the heart of a metabolic regime are two relations: the first is the relation between technical progress and nature appropriation, where technical efficiency depends partly on the institutional arrangements and partly on the

resistance of natural actants like soil, animals, plants, climate and geological stratification to increase productivity (Moore, 2012). The second is the relation between the accumulation dynamic and the mode of social reproduction (Burkett, 1999; Foster, 1999, 2000).

People increasingly depend on the market for their reproduction. This insertion of the reproduction of the labour force in the accumulation schema modifies its properties dramatically. Flexible combinations of economic and extra-economic practices help to secure, although only temporarily and in specific economic spaces, societal metabolism stability. Yet, if the role of market forces becomes increasingly crucial for societal reproduction, complementary but declining functions of other agents, such as social assemblages, nonhumans actants, community activities, might undermine its predictability.

The specific ways society's metabolism is synchronized with or desychnronized from its environment are determined by a variety of historically organized constellations of practices. The rising of the metabolic rift is a consequence of a historical mode of regulation imposed on metabolic throughput (Clark and York, 2005; Clausen and Clark, 2005). The current societal metabolism is ontologically oriented to an unstable conditions due to its growth and accumulation. The systematic innovation of socio-technical regimes often implies the expansion of existing consumption, the creation of new needs, the discovery new use and exchange values. The consequence is that societies organize their resource throughput by even changing parameters of natural processes to gain better access to nature's resource supply (Schandl *et al.,* 2002). Our attention might turn to the structural coupling and co-evolution of infrastructural forms, social practices and discursive dispositive in the overall reproduction-regulation of the societal metabolism. These assemblages are the ground on which inefficient societal reproduction processes arise, bringing the system towards dissipation and inequality.

Metabolism entails different interconnected activities carried on by different organized agents (Dickens, 2004). Metabolism corresponds to the whole process of reproduction of the system itself and of its parts, irrespective of the system to which it refers (city, household, firm). This process might be deconstructed into different fields of practice, entailing different agents and sociotechnical systems along all the goods provision chain: appropriation, production and transformation, distribution, consumption and finally disposal. All these interrelated activities are subjected to different organizational regimes, rules, knowledge and capabilities. Consequently they need flexible analytical tools to be reassembled in a new understanding. Practice approaches might help in this effort. Practices can be of all kinds. There are practices implied in the reproduction of largest social systems, as well as practices aimed to reproduce everyday life; practices aimed at the production of means of production, and practices designed to produce stuffs and goods for households, as well as practices for disposing waste. We might say that practices are the basic units of social affairs. Among the metabolic approaches we find Industrial Metabolism, Urban Metabolism, the 'MuSIASEM' approach (Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism), Household Metabolism and so forth. All have their specific methods for analysis of the exchange between social and natural systems.

Industrial metabolism studies the throughput of raw materials and energy sources in productive systems, arguing that societies must actively regulate this process and develop efficient machinery to diminish the rate of material consumption (Ayres and Simonis, 1994). The analysis of the metabolism of a socio-economic system is a

truly interdisciplinary enterprise that uses concepts and methodologies from several social and natural sciences (Fischer-Kowalski, 1998, 2003; Fischer-Kowalski and Hüttler, 1999). The tool used by industrial or socio-economic researchers is Material and Energy Flow Accounting (MEFA). The MEFA framework analyses important aspects of society–nature interaction by tracing socio-economic materials and energy flows, and by assessing changes in relevant patterns and processes in ecosystems related to these flows – in other words, the 'colonization' of terrestrial ecosystems (Haberl *et al.,* 2004).

Urban Metabolism is a multi-disciplinary and integrated platform that examines material and energy flows in cities as complex systems shaped by various social, economic and environmental forces. The biophysical approach to studying and quantifying urban material and energy flows and stocks is the predominant task of urban metabolism today (Gandy, 2004). It generally focuses on quantifying the flows of particular materials or energy in an urban system, in order to identify environmental problems and to design more efficient urban planning policies (Brunner, 2008; Barles, 2010; Rapoport, 2011). Yet, cities are not only physical entities. They are also symbolic, social, cultural machines. A growing cohort of scholars is expanding the conceptions of urban metabolism as not only consisting of material and energy cycles but also of highly politicized physical and social processes. These scholars move away from a society-nature dualism and chose to see the city as a process of metabolically transformed nature, a dynamic intersection between social and bio-physical dimensions to urban space, even a socio-natural hybrid or a cyborg of machine and organism (Heynen *et al.,* 2006; Swyngedouw, 2006).

The multiscale integrated analysis of societal and ecosystem metabolism (MuSIASEM) approach makes it possible to perform a check on the feasibility and desirability of patterns of metabolism of socioeconomic systems by providing a characterization at different levels and scales of: (i) the performance of socio-economic activities (for households, enterprises, economic sectors, national economies, world economy) and (ii) ecological constraints (micro and macro). This is achieved by looking at the interference that the metabolism of matter and energy flows controlled by human activity induces on the expected pattern of metabolism associated with the self-organization of natural ecosystems. (Giampietro *et al.*, 2009).

The household metabolism is an approach that enables an evaluation of the environmental impact of a community/country, based on the linkages between household consumption and the processes of producing and managing goods. It measures the household's final consumption, including all energy that is consumed directly and indirectly in the processes of production of final goods (Moll *et al.,* 2005). Household metabolism makes it possible to identify different types of aggregation and categorization of consumption (Benders *et al.* 2006). In addition, the metabolic model for family units allows one to identify the structure of the everyday practices of consumption, by which the physiology of the socio-economic system itself can be reconstructed. All these approaches address the physical account of metabolic processes, but they rarely study the practices of agents that shape the metabolism dynamics.

Metabolic regimes as assemblages of production and consumption

As mentioned above, the metabolism approach includes both production and consumption. Further, it challenges the idea that there is an unbridgeable gap between producers and consumers. Even though we think we know where consumption starts and ends, from the point of view of 'natural resources', each activity included in societal reproduction (production, distribution, exchange and consumption) consumes energy, matter, ecosystems services, and labour. This means that everybody consumes, thus that everybody is a consumer, even producers (Princen *et al.,* 2002). The fact that the routine enactment of many different activities entails the consumption of energy and matter including body's energy is now being shared by a number of scholars (Warde, 2005; Røpke, 2009).

Despite the somewhat artificial separation of the two sides of social reproduction made by social sciences, consumption is closely linked to production and to achieve an effective understanding of consumption, analysis has to take production into account. As suggested by Barry Smart (2010: 4) 'the very process of production itself involves consumption, it "is immediately consumption" (Marx, 1973: 90), in the sense that, of necessity, materials and resources are used and energy and other capacities are expended in the course of making things and/or providing services.' The relationship between consumption and production is complex and varied and has changed over time. With the globalization and delocalization of manufacturing, consumer services have been increasingly outsourced, moving from wealthier, more developed, 'consumer' societies to emerging 'producer' societies, creating a distance between producers and consumers (Smart, 2010). This resembles the distance created between the social system and its ecological system of resources provision.

The metabolic approach gives consumption some of its original, materialistic meaning, bringing back together production-based and consumption-based processes. Consuming energy and materials means transforming these resources, with the mediation of social labour, into consumable use-value-based commodities. By working to earn money, buying these commodities and then consuming them, their exchange-value is realized. Many approaches are merging production and consumption aspects. The Sustainable Consumption and Production (SCP) approach was developed by Arnold Tukker (Tukker *et al.,* 2008), as a holistic view encompassing business, design, consumption, policy. It has introduced at the global level by UNEP. Yet it is the 'prosumption' approach that is gaining momentum (Humphreys and Grayson, 2008; Ritzer and Jurgenson, 2010). For Ritzer and Jurgenson (2010) the focus has almost always been on production. However, they assert that the capitalist economy (and even pre- and non-capitalist economies) has *always* been dominated by *prosumption*. *Prosumption* involves *both* production and consumption rather than focusing on either one (production) or the other (consumption). More specifically, in prosumer capitalism, unlike other forms of capitalism, there is a trend toward unpaid rather than paid labour and toward offering products at no cost, and the system is marked by a new abundance where scarcity once predominated (Ritzer and Jurgenson, 2010). Another approach is that of Colin Campbell's 'craft consumer' who engages in 'craft consumption', an activity in which the 'product' concerned is essentially both 'made and designed by the same person' and to which the consumer typically brings skill, knowledge, judgement and passion (Campbell, 2005).

At the empirical level, we not only find 'prosumers' but other recombining agents of production-consumption practices as well. Purchasing groups are an example of a social tendency to relink production and consumption. Groups of households cooperate in purchasing food and other products (shoes, clothes, detergents,

etc.) directly from producers, who are selected in accordance with ethical and solidarity principles, the most important of which are respect for the environment and for people. Here attention is devoted to moral values shared by actors, the rebuilding of a lost reciprocal trust, the breakaway from the rising costs of big distribution companies (Kjærnes *et al.,* 2005; Fonte, 2013).

All these approaches are opening up new perspectives in sustainability transition studies. However they still share two limiting aspects: on the one hand they are empirical, whereas we still need theoretical and epistemic frameworks to redefine consumption and production activities; on the other hand, few are aware of consumption/production assemblages being inscribed into both macro systems of societal reproduction and several 'situated activity systems' (Goffman, 1961). The evolution of social practices in these 'situated activity systems', which pinpoint the individual's regular participation in a regular sequence of daily activities that I will explain below, entails new assemblages of production and consumption, fostering new and changing orders, technical supports and constraints, roles, norms and capabilities that seem to go beyond pure market relations. Bourdieu took the point when he explicitly linked goods manufacturing and active consumer engagements: 'consumption of goods always presupposes a labour of appropriation, at different degrees depending on the goods and the consumers or, more precisely, that the consumer helps to produce the product he consumes, by a labour of identification and decoding which, as in the case of daily consumption, requires time, practical sense and dispositions acquired over time' (Bourdieu, 1984: 100).

Practices structure the way in which nature is transformed, accumulated, produced, and colonized, in order to satisfy the needs of economic driving forces, and providing consumers of continuing mutable use-values. It is self-evident that the reproduction and performing of social practices requires increasing material and technical infrastructure considering the increasing amount of events that they make possible. Practices vanish after they have made events or networks of events possible but their loss is the condition of their regeneration and structuration. Thus, irreversibility is built into the bundle of practices not only at the structural level but also at the level of single practices. While social reproduction is based on this fundamental fact of practices, gestures and words disintegration and reintegration, disordering and ordering, often vanishing and/or reappearing as recurring processes, infrastructures, devices, artefacts, stand there. Social metabolism, and the practices it entangles, presuppose the existence of objects that are already framed by funds of consumed raw materials and past labour. It means that there will be an increased flow of resources to maintain material stocks that make practices and events possible.

The material dimension of consumption

In addressing the question 'why do people consume as they do and what are the environmental consequences of escalating demand?' Shove and Warde (2002) note that that the sociology of consumption is not well equipped to deal with the environmentally crucial forms of 'inconspicuous' consumption in areas like demand for energy, water, food and other natural resources or with rough objects. The reason for this inadequacy is probably that consumption is often considered mainly a means of communication or an apparatus of identity-building, omitting many environmentally sensitive practices or conditions of consumption. Social metabolism introduces a new order of

problems regarding the nature of consumption itself, for example its prosaic materiality or its repetitiveness, or again, the fact that it indirectly incorporates the consumption of many others.

Highlighting the materiality of consumption indirectly suggests that the influence of consumer culture over the individual's identity is both overgeneralized and overstated. As such, the culture-based explanations of consumption are of limited value. Most of what is consumed is explained in terms of practical responses to contemporary living conditions, rather than by cultural factors. Consumer choice cannot be equated with individual freedom. The portrayal of consumption as an outcome of free choice ignores the fact that most domestic consumption is an adaptive response to the present-day living conditions and is best seen as obligatory (Lodziak, 2000). In short, consumption is not the realm of freedom; rather it is a realm of necessity, even though it is masked by free choice (Binkley, 2006).

Household metabolism, for instance, focuses on ordinary, inconspicuous, daily and necessary consumption, which is often pushed by bodily habits and inertial social practices. Here, luxury consumption is considered only as a tiny part of the global consumption. In fact, '. . . a great deal of consumption takes place inconspicuously as a part of the ordinary, everyday decision making of millions of individual consumers. Ordinary consumption . . . is not oriented particularly towards individual display. Rather it is about convenience, habit, practice, and individual responses to social norms and institutional contexts' (Jackson and Michaelis, 2003: 31). Therefore the analysis of household consumption is of special interest because there no ultimate reason exists for people to behave in one way or in another (Padovan, 2008). This also means that there is not necessarily a strong relationship between income and expenditure. As exposed by Mary Douglas, consumption in society does not reflect the effects of pure division of income only but has to be viewed in the social embeddedness of consumption (Douglas and Isherwood, 1979; Bögenhold and Fachinger, 2000).

As well as the interlocked biochemical processes (enzymes) there are the activators of an individual organism metabolism; household practices are the activators of a societal metabolism. Shopping, cooking, cleaning, heating, cooling and waste disposal are arrays of activities that trigger the exchange of matter, energy and information between society and nature. These practices are socially determined and influenced by *habitus*. Habitus is a concept of practice, the practical enactment of a set of objective conditions of existence. I don't want to open a debate over Bourdieu's *habitus* here. I only want to point out that households forge the *habitus*, and more generic habits. Bourdieu defines *habitus* as

> the structures characteristic of a determinate type of conditions of existence, through the economic and social necessity which they bring to bear on the relatively autonomous universe of family relationships, or more precisely, through the mediation of the specifically familial manifestations of this external necessity (sexual division of labour, domestic morality, cares, strife, tastes, etc.), produce the structures of the habitus which become in turn the basis of perception and appreciation of all subsequent experience. (Bourdieu, 1977: 78)

Families function as sites in which the competences deemed necessary at a given time are constituted by usage itself and, simultaneously, as sites where the price of these competences is determined. In other words, the family is the place where practices are acquired as cultural competences, inseparable from insensible acquisition of 'sense' for cultural investment (Bourdieu, 1984: 85). One cannot ignore what happens to products in the relationship with the consumers – that is, with the dispositions that define their useful properties and real uses. Objects, often industrial products, are not objective in the ordinary sense of the word – independent of the interest and taste of those who perceive them and they do not impose the self-evidence of a universal, unanimously approved meaning (Bourdieu, 1984: 100). Here, abstract exchange value is surmounted by use value or the subjective, symbolic value attributed to objects. But this is not always the case.

Consumption occurs by a labour of appropriation of goods, consisting of streams of actions deployed inside a household. However, the labour of goods' appropriation seems to be more standardized and more guided by what Bourdieu seeks to deny: producers or expert instructions are increasingly important for making devices work, or to prepare a good meal. This does not mean that there is not a labour of appropriation but that it unpredictably changes its substance and competence depending on which activities are to be deployed to reach a certain goal. In short, while we can inaugurate times of consumer autonomy and creativity, at the same time we notice that consumer subordination to technical and expert rules is running even faster. Here the individual *habitus* surrenders to the strength of technical standardization and expertise.

The fact that goods provisioning does not end at the shop door might open up new possibilities but it can also close them. Resource consumption is deeply embedded in the broader social fabric. As noted by Kjærnes *et al.* (2005), to support end-market exchanges between consumers and retailers, a whole range of socially organized consumer practices is assumed, which cannot be derived directly from supply-side characteristics. The household as an institution for food consumption is not simply an effect of the products bought and consumed within it. Coordinated acts of purchase, food preparation, and eating within households are outcomes of considerations about nutrition, health, quality, economy and ethics, and negotiated daily. But this autonomy is increasingly challenged. A ready-to-eat meal heated in a microwave oven consumes more energy than food bought as raw/fresh ingredients to be conserved and prepared in the household. The models of buying, preparing and consuming food in the end depend on the labour market, mobility, working and free-time structures, in a word on the social fabric in which agents are engaged and ways they tackle it.

The resources throughput reproducing social life is mobilized by instrumental practices of organized 'doing' and is governed by social conventions and rules embedded in activities. The greatest systems of activities are in some way regulated by global market-based agreements. Here the role of practitioners, such as workers, has very little influence. The smaller nets of activity tend to be more self-regulated, if self-regulation means more popular autonomy to manage devices and primary resources. But these are increasingly becoming absorbed by large organizations and colonized by the market. The point is that these processes deserve more attention. Household labour, the socially invisible labour of everyday reproduction, is a crucial part of the subsistence sphere. Sustainable transition should see the engagement of these agents of the *oikos* as relevant societal innovators, as agents able to erode the rules of the game and to foster more sustainable regimes of technologies, routines, forms of knowhow,

conventions, and expectations across all domains of daily life (Shove, 2010). Agents of the *oikos* – women and workers – have pushed to bring into the public sphere what had previously been seen as private (Colatrella, 2013). Recognition of the work of social reproduction, of domestic labour/housework as socially necessary labour, means acknowledging that this work, no less than generic or scientific metabolic work, should be seen as part of the collective social metabolism, an agent enacting new metabolic regimes.

Situated practices of an ordinary metabolism

Societal metabolism brings into focus the largest processes of societal reproduction at the global level. These processes of nature appropriation, implying work, technology, consumption, expertise and various facilities supporting them, must be regulated by laws, money (wages and profits) and organizational regimes. But, as we have seen above, there is another and more situated side of metabolism, the one focusing on the routinized reproduction of the material basis of social life. It is social or/and household metabolism. It entails everyday life, ordinary, repeating and unpaid practices, activities and actions performed by people in the context of stable activity systems. Here, the social metabolism is the result of a particular way to use goods, energy and things as dictated by the way social actors are pushed to act. It responses to real situations, commitments, needs, roles, projects, abilities with the help of specific sociotechnical regimes, within given (actual or perceived) constraints. In other words, social metabolism is the outcome of arrays of bundles of activities needed for its continuity.

In this perspective, we might also differentiate between 'work' and 'labour' as suggested by Agnes Heller (1984). While work might be seen as a generic and species-essential activity, essential for the metabolic exchange of society with nature, labour is an everyday activity aimed to reproduce living agents in their singular bodies and social relationships. All the rational large-scale organized social activity, all the objectivation necessary for the reproduction of a given society, and the manner in which it is performed, corresponding to the norms and timescales of that society, can be regarded as 'work'. All social practices life-activities, such as cooking, cleaning, washing, caring, aimed at the daily reproduction of agents, can be regarded as 'labour'. The latter often consists of out-of-market consumption practices, even if they combine different incomes and both market and non-market activities. To be performed, they imply labour as words *socially necessary unpaid labour*. Paid and unpaid activities are strictly *inter*dependent, in the sense that paid work is conditioned in its efficiency by the already done unpaid labour of reproduction. The existence of unpaid labour – coupled with the appropriation of free nature services – is not an anomaly: it is a basic condition of accumulation (Colatrella, 2013; Moore, 2014).

In my view, *social practices* are both the activators and the outcomes of societal metabolism. Social metabolism is activated, maintained and regulated by infinite constellations of practices bundled with material arrangements. The reproduction of social life process (social metabolism) is 'housed in' and at the same time 'stems from' social practices. Such bundles of practices and material arrangements make possible social metabolism, which makes social reproduction possible. It follows that the sum of such bundles provides the basic ingredients from which all social life processes leak out (Schatzki, 2011). Bundling practices and material arrangements, consequently, is a fundamental social mechanism, marked by the emergence, persistence, and dissolution of bundles.

For Schatzki, 'practices' are spatially-temporally dispersed open sets of doings and sayings organized by common understandings, teleology (ends and tasks), and rules (Schatzki, 2002). 'Material arrangements' are people, organisms, artefacts and natural things. Practices and arrangements bundle in that (i) practices affect, alter, use, and are inseparable from arrangements and (ii) arrangements channel, prefigure, and facilitate practices (Schatzki, 2011). This definition of the 'social' as stemming from and housing in these bundles of nature, artefacts and human activity opens up new perspectives on sustainable transition where new constellations and bundles of activities might prepare a more sustainable *higher stage of social metabolism*.

To be studied, practices have to be organized in enduring and recognizable – across time and space – sets of activities (Schatzki, 2002; Shove *et al.,* 2007; Røpke, 2009). Practices can be divided into a huge number of different and interconnected activities, made up not only of current activities but of blocks of past labour, and raw materials embedded in devices. In short, I consider some practices as *form-giving* activities – activities that produce objects and events using stocks and flows of past and present combinations of labour, instruments and matter. These processes are performed by large groups of people and are fixed as structural forms or entities in which materials, instruments and labour are consumed by being employed and converted from their original form into the form of the event, goal, and telos to be performed. The combination of these three different moments of the process – the material, the instrument, and labour – depending on agents acting for it, gives rise to different objects and events.

Sustainable consumption is studied by many scholars using the 'practices approach'. They started to look at daily practices that are deemed basic components of social reproduction. In the light of the social practices approach, energy (Gram-Hanssen, 2010, 2011), cooling, heating, time (Shove, 2003, 2009), food (Warde, 2005), technology (Røpke *et al.,* 2010; Røpke, 2012), mobility and housing (Bartiaux *et al.,* 2011; Bartiaux and Reátegui Salmón, 2013) have been explored. But these studies do not throw enough light on the natural conditions of everyday life reproduction.

Together with natural resources and artefacts, practices emerge as heterogeneous and disordered fields in which creating, consuming, adapting, transforming, handling, manipulating processes amalgamate in ever changing ways and outcomes. All these everyday reproduction practices are heterogeneous (Heller, 1984). They accumulate and gather, without a clear order, entailing skills and capabilities of different kinds. Agents coping with everyday life and performing heterogeneous practices give rise to a social order that is often unstable and subjected to sudden changes. It casually arises from practices entailing relations such as coordination and cooperation among humans and nonhuman agents that are frequently also conflicting. The fact that social practices entail conflicts and inequalities is a self-evident truth, as in the case of driving practices, which entail conflicts, tensions, quarrels, bad encounters and accidents. These social relations constitute certain specific and irreducible conditions of reproduction in which human agency must operate, but these conditions and relations of power are not chosen by the agent itself. Goffman's notion of 'situated activity systems' seems very useful here both at an empirical and a theoretical level. A situated activity system is an individual's regular participation in a regular sequence of daily activities. Some of these activities will bring him into face-to-face interaction with others for the performance of a single joint activity, a somewhat closed, self-compensating, self-terminating circuit of interdependent actions (Goffman, 1961: 84–85). Such situated systems of activity are composed of interacting people, physical objects, mechanical devices, rules,

accomplishments, administrative purposes and emerging roles and they are to be distinguished from a task performed wholly by a single person, whether alone or in the presence of others. Meal taking in domestic establishments provides a situated activity system. When the actions of a situated system are repeated, situated roles seem to emerge, and action comes to be divided into manageable bundles, each a set of acts that are sufficiently compatible with each other that they can be performed by a single participant. There is also a tendency for role differentiation to occur, so that the package of activity that the members of one class of participants perform is different from, though dependent on, the set performed by members of another category. In short, situated activity systems are bundles of practices and material arrangements from which roles and positions emerge. They connect not named individuals but any persons who come to occupy the positions specified by the activity to be performed. Systems of activities or structures of practices are sets of empty places. In entering the position, the practitioner finds that he/she must take on the whole array of practices encompassed by the corresponding role, so the role implies a social determinism and a doctrine about socialization. It is through roles that tasks in society are allocated, and arrangements are made to enforce their performance. Recruitment for positions is restrictively regulated, assuming that role players will possess certain minimal qualifications and capabilities. This recruitment occurs for structures typically to bind together not named individuals but whosoever happens to perform the role in question. The way in which they recruit agents help to explain why societies and their metabolism persist in time.

Situated activity systems not only recruit people to perform certain tasks but, when needed, they also provide a means for acquiring competences. But in doing that they are also power-conferring systems, which give different people different powers for performing activities. Practices are clearly performed with diverse tools, habits, qualifications, and capabilities. Meal preparing is clearly a practice but it might be performed in a variety of modes and with a variety of foods and skills to make meals very different from each other. Here practice performances and outcomes might follow paths of social disparity and asymmetry, different roles and positions. This problem is linked to the different roles that mark any situated activity system, the access of agents to different kinds of practices and devices. Knowledge, habits, capability, devices and objects employed by agents in the practice of cooking vary greatly, producing very different results in quality and taste of cooked food. There is, here, a problem of failing practices, or of those practices that never succeed in reaching noteworthy goals or are have never been performed in the right ways by practitioners.

Consumption studies have traditionally considered stratification processes to be central to understanding the use, distribution and meanings of goods in society. Class and status inequalities have been central in consumption studies, although during recent years they may have lost significance (Veblen, 1994 1899; Bourdieu, 1984; Lodziak, 2000; Spilerman, 2000; Dwyer, 2009). Stratification and inequalities continue to raise important questions about the relationship between consumption and social position and they pose the same problems for practices: why are some people recruited to certain practices and some not? What is the role of the different agents inside the same practices? Why are some agents good practitioners and some not? Might we speak of positional practices, as well as of positional goods or positional consumption? What is the role of status or class in positional practices? How are people are trained to accomplish certain practices? These aspects seem to be missing the literature on practices and this is a gap that should be filled.

Practices as matter of disorder

Practices are usually considered as harmonious and irenic performances of tasks aimed at clear and shared goals. In reality, however, they are more unstable, as exposed by Heller. When practices produce social order and when they produce disorder might be a sociological question. Situated activity systems, as shown by Goffman, can be sites of disorder where people engaged in them can assume so-called 'role distance'. Or, as Goffman (1982) pointed out when speaking of the concept of 'interaction order' – what is the desirable order from the perspective of some can be sensed as exclusion and dominance from the point of view of others. Questions do arise when we consider the fact that there are large categories of persons who constantly pay a considerable price for their practical existence. These people continue to perform practices and related interactions in costly ways in order to deal with prevailing performing patterns and they might be uncomfortable with some norms while sustaining all the rest. Perhaps, noted Goffman, 'behind a willingness to accept the way things are ordered is the brutal fact of one's place in the social structure and the real or imagined cost of allowing oneself to be singled out as a malcontent' (Goffman, 1982: 6). For Goffman, there is no doubt that categories of individuals in every time and place have exhibited a disheartening capacity for overtly accepting miserable interactional arrangements. One cannot fail to notice the unequal distribution of rights and the unequal distribution of risk in the interaction practice order (as in the case of food access).

Looking at 'eating disorders' we observe that people strongly deviate, in their eating, from the norm embedded in common, general practices. Here 'disorder' is not the opposite of order, but something abnormal, an anomaly not in line with the existing norms and normality. As suggested by Georges Canguilhem in his work on the 'normal', 'every preference for a possible order is accompanied, most often implicitly, by the aversion for the opposite possible order' (Canguilhem, 1991: 240) and this is the case with practices that regard the abnormal as something opposite to the right way of doing things, like eating. Viewed from the point of view of resource consumption, we might claim that eating continuously reproduces disorder. In this perspective we should look into emerging links between societal metabolism, social practices and obesity. Increasing obesity in saturated societies (Sulkunen, 2009) is in recent years increasingly under investigation, but it too often starts from an individualist point of view failing to link individual obesity and urban metabolic circulation (Sui, 2003; Eid *et al.,* 2008). As noted by Simon Marvin and Will Medd (2006), the stock and flows of fat through bodies reveal complex bundles of practices floating from and turning back to urban metabolism by means of infrastructures and socio-technical arrangements.

We know that eating practices are affected by a number of different features, some depending on metabolic infrastructures such as access to good and healthy food, tap water, public spaces and buildings supporting physical activity, active transportation and so on. To these infrastructural aspects we might attach social schemes because obesity has a disproportionate impact on low-income people and minority communities. The toll of obesity and resulting diseases is striking people unequally. This is due to complex bundles of activities that forge food practices: sugary drinks are the leading items associated with excess intake of calories in adults. Sugary drinks, along with

other junk food, are now ubiquitous, calorie dense, cheap, served in large portion sizes and aggressively promoted. Sugary drinks and junk food in particular are everywhere, even in places like newspaper stands, pharmacies, gas stations, bookstores and hardware stores.

Danger, hazards, risks, unhealthiness and environmental impact are increasingly the main features of eating practices. Food metabolic regulations of cities, households, communities, neighbourhoods, are the principal causes of this but we should not forget individual eating choices, even if they are justified by taste, habits, constraints, cheapness and distance. Increasingly, this shadowy side of practices is being highlighted but, previously, we tended to look at them as rather regular, neutral and harmonious, perhaps consuming too much resources, but inherently irenic, malleable and flexible enough to be changed with little effort. Further, they are rarely seen as stratified along social and class positions or as carriers of past and present stocks of injustice. The performance of people engaged in practices such as eating are obviously conditioned by their access to tools, objects and devices needed to perform practices themselves but they are also influenced by their recent or remote past, by their habits, by the situations in which they are entrapped. This selected access to resources for performing practices is conditioned by their social position – continuous social inequality. So, concluding the syllogism, practices are also a matter of social inequality. Also in the case of situated activity systems that can be viewed as a more basic variation on the taxonomy of practices, we notice structured differentiated performative roles. Here eating practices show how they are carriers of disorder and risks.

Conclusions

Societal metabolism is triggered by complex bundles of social practices and technical arrangements that appropriate, transform, distribute, use and dispose of energy and raw materials building up goods and services for the reproduction of social life. Practices can be of all kinds. There are practices implied in the reproduction of markets, politics and civil society. Practices can be situated at all segments or nodes of production/consumption chains and networks (Spaargaren, 2011). Here I have dealt with practices of social reproduction emerging from different metabolic contexts, showing that outcomes of the same practice might be very divergent and that this divergence is shaped by the way in which people are recruited by the practice, the tools they can use, the materials they can access, the social role they play.

One of the reasons why practices, performances and outcomes differ between people is that large organizations are absorbing many activities previously performed by people in their own situated activity systems such as households. Ordinary practices like cooking, cleaning and caring have for a long time been performed mainly out of the market but an increasing part of them are becoming more market based. For example the slogan ‘Don’t cook, just eat’ pinpoints this process. These aspects of ordinary and daily life activities are, even today, not sufficiently highlighted, like the fact that technical systems are increasingly capturing and replacing many practices that used to be performed by people. The shifting from human activity to mechanical activity, from the point of view of social metabolism, implies an increasing use of resources, in addition to including meaning, abilities, capabilities and practical understandings of agents performing metabolic practices. Despite the focus on the environmental

impact of the production-consumption complex (societal metabolism), practices are becoming less regulated politically and more regulated by the market. The metabolic process is now codified by the process of abstraction of the commodity form, the transformation of the material and sensible content of reproduction into 'abstract things'. This is mediated through the mechanisms of the market, which progressively incorporate the whole relation to nature. The overcoming of abstract commodity forms that disconnect people from nature needs much greater, and more collective regulation, which is able to restore the political and deliberative field that is today so narrow and superficial. The abstraction and marketization of daily life activities are not only speeding up ecological crises but they are also fostering tensions between production and consumption, work and labour, societal and social metabolism, while the recomposition of these fields should be at the core of sustainable transition strategies.

References

Ayres, R. U. (1994) Industrial metabolism: Theory and policy (1994) in *Industrial Metabolism: Restructuring for Sustainable Development*, (eds. Ayres, R. U. Simonis, U. E.) United Nations University Press, Tokyo, pp. 3-20.

Barles, S. (2010) Society, energy and materials: the contribution of urban metabolism studies to sustainable urban development issues. *Journal of Environmental Planning and Management* **53**(4), 439–455.

Bartiaux , F., Gram-Hanssen, K., Fonseca , P., Ozolia , L., & Christensen, T. H. (2011). A practice-theory based analysis of energy renovations in four European countries. In *Energy Efficiency First: The Foundation of a Low-Carbon Society.* : Proceedings of ECEEE 2011 Summerstudy, 6-11 June. Chapter Panel 1.Stockholm: European Council for an Energy Efficient Economy, ECEEE, 67-78.

Bartiaux, F. and Reátegui Salmón, L. (2012) Are there domino effects between consumers' ordinary and 'green' practices? An analysis of quantitative data from a sensitisation campaign on personal carbon footprint. *International Review of Sociology: Revue Internationale de Sociologie* **22**(3), 471-491.

Benders, R. M. J., Kok, R., Moll, H. C. *et al.* (2006) New approaches for household energy conservation. In search of personal household energy budgets and energy reduction options. *Energy Policy* **34,** 3612–3622.

Binkley, S. (2006) The perilous freedoms of consumption: toward a theory of the conduct of consumer conduct. *Journal for Cultural Research* **10**(4), 343–362.

Bögenhold, D. and Fachinger, U. (2000) *The Social Embeddedness of Consumption – Towards the Relationship of Income and Expenditures over Time in Germany.* ZES Arbeitspapier Nr. 6/00, Universität Bremen, Zentrum für Sozialpolitik, Bremen.

Bourdieu, P. (1977) *Outline of a Theory of Practice*, Cambridge University Press, Cambridge.

Bourdieu, P. (1984) *Distinction. A Social Critique of the Judgement of Taste*, Harvard University Press, Cambridge, MA.

Brunner, P. H. (2008) Reshaping urban metabolism. *Journal of Industrial Ecology* **11**(2), 11–13.

Burkett, P. (1999) *Marx and Nature*, St John's Press, New York, NY.

Campbell, C. (2005) The craft consumer. Culture, craft and consumption in a postmodern society. *Journal of Consumer Culture* **5**(1), 23–42.

Canguilhem, G. (1991) *The Normal and the Pathological*, Zone Books, New York, NY.

Clark, B. and York, R. (2005) Carbon metabolism: global capitalism, climate change, and the biospheric rift. *Theory and Society* **34**(4), 391–428.

Clausen, R. and Clark, B. (2005) The metabolic rift and marine ecology. *Organization and Environment* **18**(4), 422–444.

Colatrella, S. (2013) Collective housekeeping and the revenge of the Oikos: against Hannah Arendt on democracy, work and the welfare State. *International Critical Thought* **3**(4), 444–467.

Dickens, P. (2004) *Society and Nature*, Polity Press, Cambridge.

Douglas, M. and Isherwood, B. (1979) *The World of Goods*, Routledge, London.

Dwyer, R. E. (2009) Making a habit of it. Positional consumption, conventional action and the standard of living. *Journal of Consumer Culture* **9**(3), 328–347.

Eid, J., Overman, H. G., Puga, D. and Turner, M. A. (2008) Fat city: questioning the relationship between urban sprawl and obesity. Journal of Urban Economics **63**(2), 385–404.

Fischer-Kowalski, M. (1998) Society's metabolism. The intellectual history of material flow analysis, Part I, 1860–1970. *Journal of Industrial Ecology* **2**(1), 61–78.

Fischer-Kowalski, M. (2003) On the history of industrial metabolism, in *Perspectives on Industrial Ecology* (eds D. Bourg and S. Erkman). Greenleaf Publishing, Sheffield.

Fischer-Kowalski, M. and Hüttler, W. (1999) Society's metabolism: the state of the art. The intellectual history of material flow analysis, Part II: 1970–1998. *Journal of Industrial Ecology* **2**(4), 107–137.

Fonte, M. (2013) Food consumption as social practice: solidarity purchasing groups in Rome, Italy. *Journal of Rural Studies* **32,** 230–239.

Foster, J. B. (1999) Marx's theory of metabolic rift: classical foundations for environmental sociology. *American Journal of Sociology* 105(2), 366–405.

Foster, J. B. (2000) *Marx's Ecology*, Monthly Review Press, New York.

Gandy, M. (2004) Rethinking urban metabolism: water, space and the modern city. *City* **8**(3), 363–379.

Giampietro, M., Mayumi, K. and Ramos-Martin, J. (2009) Multi-scale integrated analysis of societal and ecosystem metabolism (MuSIASEM): theoretical concepts and basic rationale. *Energy* **34**(3), 313–322.

Goffman, E. (1961) *Encounters. Two Studies in the Sociology of Interaction*, Penguin, Harmondsworth.

Goffman, E. (1982) The interaction order: American Sociological Association, 1982 Presidential Address. *American Sociological Review* **48**(1), 1–17.

Gram-Hanssen, K. (2010) Standby consumption in households analysed with a practice theory approach. *Journal of Industrial Ecology* **14**(1), 150–165.

Gram-Hanssen, K. (2011) Understanding change and continuity in residential energy consumption. *Journal of Consumer Culture* **11**(1), 61–78.

Haberl, H., Fischer-Kowalski, M., Krausmann, E. *et al.* (2004) Progress towards sustainability? What the conceptual framework of material and energy flow accounting (MEFA) can offer. *Land Use Policy* **21**(3), 199–213.

Heller, A. (1984) *Everyday Life*, Routledge & Kegan Paul, London.

Heynen, N. C., Kaika, M. and Swyngedouw, E. (eds) (2006) *In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism*, Routledge, Abingdon.

Humphreys, A. and Grayson, K. (2008) The intersecting roles of consumer and producer: a critical perspective on co-production, co-creation and prosumption. *Sociology Compass* **2**, 1–18.

Jackson, T. and Michaelis, L. (2003) *Policies for Sustainable Consumption. A Report to the U. K. Sustainable Development Commission,SD Commission, London*.

Kjærnes, U., Warde, A., Lavik, R. and Harvey, M. (2005) *Trust and the Institutionalisation of Food Consumption.* Paper presented at the biannual meeting of the European Sociological Association, working group of the Sociology of Consumption, Torun, Poland, 9–12 September.

Lodziak, C. (2000) On explaining consumption. *Capital and Class* **72,** 111–133.

Marvin, S. and Medd, W. (2006) Metabolisms of obesity: flows of fat through bodies, cities, and sewers. *Environment and Planning A*, **38,** 313–324.

Marx, K. (1973) *Grundrisse. Foundations of the Critique of Political Economy*, Penguin Books/New Left Review, London.

Moll, H. C., Noorman, K. J., Kok, R. *et al.* (2005) Pursuing more sustainable consumption by analyzing household metabolism in European countries and cities. *Journal of Industrial Ecology* **9**(1–2), 259–275.

Moore, J. W. (2012) Cheap food and bad money. *Review* **33**(2–3), 125–161.

Moore, J. W. (2014) The end of cheap nature, or: how I learned to stop worrying about 'the' environment and love the crisis of capitalism, in *Structures of the World Political Economy and the Future of Global Conflict and Cooperation* (eds C. Suter and C. Chase-Dunn). LIT, Berlin, pp. 285–314.

Padovan, D. (2003) The concept of social metabolism in classical sociology. *Revista Theomai/Theomai Journal* **2,** 26–40.

Padovan, D. (2008) Social capital, lifestyles and consumption patterns, in *System Innovation for Sustainability. Perspectives on Radical Changes to Sustainable Consumption and Production* (eds A. Tukker, M. Charter, C. Vezzoli *et al.*), Greenleaf Publishing, Sheffield, pp. 271–287.

Padovan, D. (2014) Metabolic exchanges and practices of regulation. The assemblage of environment and society in early social sciences. *Ecological Informatics* 61–17.2

Princen, T., Maniates, M., and Conca, K. (eds) (2002) *Confronting Consumption,* MIT Press, Cambridge, MA.

Rapoport, E. (2011) *Interdisciplinary Perspectives On Urban Metabolism. A Review of the Literature,* Development Planning Unit, UCL, London.

Ritzer, G. and Jurgenson, N. (2010) Production, consumption, prosumption: the nature of capitalism in the age of the digital 'prosumer'. *Journal of Consumer Culture* **10,** 13–36.

Røpke, I. (2009) Theories of practice. New inspiration for ecological economic studies on consumption. *Ecological Economics* **68,** 2490–2497.

Røpke, I. (2012) The unsustainable directionality of innovation – the example of the broadband transition. *Research Policy* **41,** 1631–1642.

Røpke, I., Christensen, T. H. and Jensen, J. O. (2010) Information and communication technologies. A new round of household electrification. *Energy Policy* **38,** 1764–1773.

Rosa, E. A. and Machlis, G. E. (1983) Energetic theories of society. an evaluative review. *Sociological Inquiry* **53**(2–3), 152–178.

Schandl, H., Grünbühel, C. M., Haberl, H. and Weisz, H. (2002) *Handbook of Physical Accounting Measuring Bio-physical Dimensions of Socio-economic Activities,* Federal Ministry of Agriculture and Forestry, Environment and Water Management, Wien.

Schatzki, T. R. (2002) *The Site of the Social: A Philosophical Account of the Constitution of Social Life and Change*, Pennsylvania State University Press, University Park, PA.

Schatzki, T. R. (2011) *Where the Action Is (On Large Social Phenomena Such as Sociotechnical Regimes).* Sustainable Practices Research Group, Working Paper 1, Lancaster.

Shove, E. (2003) *Comfort, Cleanliness and Convenience. The Social Organization of Normality*, Berg, Oxford.

Shove, E. (2009) Everyday practice and the production and consumption of time, in *Time, Consumption and Everyday Life* (eds E. Shove, F. Trentmann and R. Wilk), Berg, Oxford.

Shove, E. (2010) Beyond the ABC: climate change policy and theories of social change. *Environment and Planning* 42(6), 1273–1285.

Shove, E. and Warde, A. (2002) Inconspicuous consumption: the sociology of consumption, lifestyles and the environment, in *Sociological Theory and the Environment: Classical Foundations, Contemporary Insights* (eds R. Dunlap, F. Buttel, P. Dickens and A. Gijswijt) . Rowman & Littlefield, Lanham, MA.

Shove E., Watson M., Hand, M. and Ingram, J. (2007) *The Design of Everyday Life*, Berg, Oxford.

Smart, B. (2010) *Consumer Society. Critical Issues and Environmental Consequences*, Sage, London.

Spaargaren, G. (2011) Theories of practices: Agency, technology, and culture. Exploring the relevance of practice theories for the governance of sustainable, consumption practices in the new world-order. *Global Environmental Change* 21, 813–822.

Spilerman, S. (2000) Wealth and stratification processes. *Annual Review of Sociology* **26,** 497–524.

Sui, D. Z. (2003) Musing on the fat city: are obesity and urban forms linked? *Urban Geography* **24**(1), 75–84.

Sulkunen, P. (2009) *The Saturated Society. Governing Risk and Lifestyles in Consumer Culture*, Sage, London.

Swyngedouw, E. (2006) Circulations and metabolisms: (Hybrid) natures and (Cyborg) cities. *Science as Culture* **15**(2), 105–121.

Tukker, A., Charter, M., Vezzoli, C. *et al.* (eds) (2008) *System Innovation for Sustainability. Perspectives on Radical Changes to Sustainable Consumption and Production*, Greenleaf Publishing, Sheffield.

Veblen, T. (1994 [1899]) *The Theory of the Leisure Class*, Penguin, New York, NY.

Warde, A. (2005) Consumption and theories of practice. *Journal of Consumer Culture* **5,** 131–153.