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Chapter 11

Peer-commonist produced livelihoods

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Introduction

The class struggle fails because it only addresses the question of how wealth is distributed and fundamentally fails to consider how it is produced. Essentially, production is treated as neutral, and commodities are more or less understood as objects, material or immaterial, that circulate through an economy; capitalism thus becomes an external system of power vis-à-vis the individual, visited only for the sale of our labour power or to buy commodities for our reproduction. Crucially, according to this rendition of socioeconomic and thus political meta-structure, we – the masses, the multitude – and capital – the hegemonic, power – are ontologically distinguished, quite separate entities. This basic analysis and the consequent call to solidarity demands a radical review.

As humans, we increasingly determine the conditions under which we live. Fundamental to this are the requirements of human existence, the production of what people need for their livelihoods, broadly understood (so including, as well as food and shelter and other physical and also intangible goods, things like symbolic order and social relations). The idea of our livelihoods themselves as being produced helps to avoid too narrow a view on current issues as simply questions about the distribution of resources, exploitation of privilege and the like. Such reductions only give the impression of a safe shore, but there is

no position 'outside', to which we can aspire and from where we can judge. On the contrary, we are doing capitalism every day; it is not an external system of power, but an internalised and objectified system of how we produce our daily livelihood. It is an important part of who we are and what we do. Since we need something to eat tomorrow, we cannot simply 'stop making capitalism' today (Holloway, 2010). The task at hand is much more difficult than that.

First, we need to start from basics, by deconstructing and reconstructing the notion of a commodity. A commodity is not only the stuff of surplus value, something to sell and make money from. Rather, it is an objectified social form of how we produce our livelihoods in capitalism. This is what Marx ([1887] 2010) meant by his notion of fetishism: social relationships between people are expressed as objectified relations between things. People do not communicate about their needs and efforts in order to satisfy them; rather, distinct products 'communicate' on the market through exchange, resulting in an objective measure of their relation, called 'value'. With the value financially quantified through price, these relationships determine what people have to do in order to make a living.

The commodity form that products take when privately produced and then exchanged was one of the central discoveries of Karl Marx. Indeed, this was so essential for him that it determined the analytical starting point of *Capital*. Subsequent notions, like value, money, capital, labour and class, are thus based on an understanding of the elementary social form in capitalism: the commodity.¹ Aiming to avoid the mistakes of traditional approaches in trying to find ways out of capitalism using its own categories – to produce, that is, our livelihood in

a way that does not fall back into the practices of commodity production – an alternative approach would be to start by asking, ‘What can be an elementary social form of a new society analogous to the commodity for capitalism?’ This then becomes an inquiry into a new mode of production, the search for a new elementary social form of livelihood – and the solution is surprisingly simple: it is the *commons* that is evolving right in front of our eyes.² This demands an analysis of the commons, specifically in respect of how it may characterise an embryonic form of a new society.

Like the commodity, I argue, the commons is not simply a thing, and it is not only or primarily even a managed resource (Ostrom, 1990) – rather, or beyond these, it is a social form producing livelihood. Unlike the commodity, however, which is privately produced by distinct entities, commons are created through association and maintained beyond the logics of market and state. This leads to completely different dynamics of mediation between needs and the means to satisfy them, as is highlighted by a listing of problems with the material assumptions and operation of the commodities system and comparison of this with those of a commons-based system.

First, a commodity is produced in the hope that it will meet a stable demand, because otherwise it will not be sold, in which case the resources used to produce the commodity are wasted. Second, even if goods are potentially available to satisfy needs, they cannot be given away for free, because scarcity is a precondition for the existence of commodities.³ Third, as implied by the second issue, goods are destroyed, not, unusually, as an exception, but as a major feature of the structure through which scarcity is maintained.⁴ Thus, the commodities system of capitalism and its requirement

of scarcity cannot satisfy the needs and desires of all and yet also leads to waste and destruction. Capitalism is only able to meet demands in a way that is clearly disproportional (with uneven distribution to the extent of meeting and failing to meet people's needs at almost unimaginably disparate rates) and arguably unsustainable (for internal economic and ultimately ecological reasons). Market mediation is not able to allocate resources proportionally, since the only measure expressing the value of commodities is that of money; if a need does not come with money (is not solvent), it does not count in terms of market mediation. The results of this include global hunger, mental degradation, environmental destruction and climate change, among other things.

In the case of commons, on the other hand, production takes place on the basis of the clear needs and desires of people. Clarifying these needs and desires is not an easy task because they are seldom uniform and sometimes contradictory; ways in which they can be fulfilled first have to be discussed and decided on. Commons production is not a blind (inefficient, indirectly wasteful) or manipulative (intentionally wasteful, through market distortion and built-in obsolescence) form, but a conscious, directly needs-driven process. Instead of artificial scarcity through property-based exclusion and intended or systemic waste, inclusion, abundance and diversity become key drivers. Finally, commons production does not rest upon environmental degradation or iniquitous socioeconomic inequalities (these are not implied by the logic of its operation, i.e. among peers associated by common needs).

At the present level of development, in which networking across different commons is rarely realised, we cannot compare the commodity and the commons as elementary forms of different

modes of production at the same level of unfolding. Nevertheless, some conclusions can be drawn by analysing their core logics.

Firstly, commodities are produced first and mediated on the market afterwards.⁵ This subsequent (*ex post*) mediation *separates* different needs from each other, with every need transformed into a solvent demand that is met only if and insofar as the product exchange for money is realised. At its most basic, a single act of sale/purchase comprises the meeting of a specific need, which thus excludes all other needs (thus, economists dub other needs that are met ‘externalities’). This separation and externalisation of needs tends to have bad consequences. For example, if we buy a shirt, then our clothing need is satisfied, but since the shirt is produced in a sweatshop in Bangladesh by women under horrible working conditions, the needs of these women are harmed. Or, insofar as we want streets for our cars but not the traffic in front of our doors, we want to consume goods but not the pollution that goes with them.⁶ No specific conflicts of needs or contradictory desires are impelled by the logic of commodities, but the general tendency is clearly a major negative feature of the system.

In the structure and operation of commons, on the other hand, mediation comes first and production follows. Such prior (*ex ante*) mediation is regularly observed in the institution and operation of commons. In the ‘classic’ case of local, material commons, for example, the work of the Ostroms and the Indiana workshop⁷ shows how negotiation between members actually avoids ‘tragedy’; in the case of immaterial (virtual), unbound commons, like free software, developers and users first come together and discuss the product features and behaviour they desire (tellingly, perhaps, economists do not employ the term ‘internality’ for forms of *ex ante* mediations).⁸ Since,

manifestly, people cannot synchronise their differing needs in ways that avoid externalities, an investigation of the potential of the commons in this respect becomes crucial.

Secondly, commodities are mediated by an abstract means – money. Due to the need to exchange privately produced goods, the commodity disintegrates into two opposing aspects. While it is the concrete properties of the product that are relevant during production and then usage, during the exchange, only the aspect of value representation is important (because the goal is to make money from selling the commodity). Economics praises money for its ability to give price signals, but these signals are purely quantitative expressions of supply and demand. It is impossible to signal needs directly, which must thus be first transformed into a demand. If we want a clean environment then we have to put a price tag on pollution (e.g. for carbon emissions) – which then creates new markets, quickly decoupling from the original aim and transforming into the development of new opportunities for profit.

Commons mediation is mediation via commons. Since the commons is both a common resource and, as commoning, the social process producing and maintaining that resource, the mediation is not separated from itself. Doing commons – commoning – is an all-in-one. There is no third means like money in the case of the commodity, but only the qualitative meanings people combine with the commons. These people are defined as peers, people on an essentially equal footing, with different meanings expressing the different needs of peers mediated by a process called *stigmergy* (see below; briefly, ‘*stigmergy*’ here refers to a form of task distribution).

Thirdly, the commodity needs an outside sphere in order to exist; it cannot reproduce solely on its own ground. Marx ([1887]

2010) analysed the so-called 'primitive' accumulation as a violent process of separating the people from their means of subsistence (*enclosure of the commons*). Rosa Luxemburg (1913) showed that this was not only an initial process followed by an expansion of capitalism in its own logic, but rather that capitalism can only evolve by including non-commodified areas into its own commodity logic. During Luxemburg's time, this was achieved by *land acquisition* through colonisation. Capitalism always needs an 'outside', which is incorporated through enclosure and commodification and divested by the release of unprofitable parts. Crucially, while non-commodified areas – maintained or otherwise, so including (although not limited to) commons⁹ – are required for capitalism to exist, commons can do very well without commodities; they reproduce on their own ground. This implies the hypothesis that commons can be the elementary social form of a whole new society beyond capitalism.

Commons as an elementary social form

Although the commodity form seems to be so dominant, even now, in advanced, (post)industrial countries, less than a half of societal reproduction in a broad sense is realised through paid work. This only appears not to be the case because most of the activities necessary for the continuation of society are made invisible by capital and the system of commodification (e.g. see the time budget studies of the statistical offices in Germany and Austria), especially those traditionally called 'reproduction' work done by women (Federici, 2004). Thus, the material establishment of commons as an elementary social form is clearly not something that needs to begin *ex nihilo*; on the contrary, it would rather seem to involve the reclamation and extension of a certain social

organisation for livelihood production that remains quantitatively dominant. Commons are, nevertheless, hegemonically marginalised by power and the operation of capital, so a new society does have to be created (even though this involves a materially less revolutionary adjustment than appearances may suggest). In order to set about this, to escape the traps of oppositional approaches that fail to go beyond the normatively defined counter-narrative, it is necessary to apply a categorical reframing. In the following, therefore, I want firstly to develop a new framework of categories, and then, secondly, to outline a transformation scheme describing how it is possible to move from the old, given framework to a new one.¹⁰

Categorical reframing

From the perspective of capitalism as a way of producing livelihood, the main categories are those that are directly linked to the social forms of production and reproduction, the *commodity* for capitalism and the *commons* as a potential alternative. The commodity represents the elementary social form of the capitalist mode of production and enables analysis to be driven forward to nearly every aspect of the whole system, including incorporation of the commons. This is not the case with commons, which are at an embryonic stage within the ocean of commodities and as yet unmeshed and integrated up to the scale of a fully fledged society. Thus, for a categorical reframing, we need to develop a scenario of an integrated network of commons reproduced from commons, where all required circuits (systems) are closed and do not depend on outside sources of input, as is the case today for the commons within capitalism.

Closing all the loops of inputs and outputs of the commons at the level of an entire society refers to the question of societal

mediation. How can the goods that are the output of one entity in one place be related to the required input in another, and how can this be achieved on a societal level for all entities in a proportional way (fairly distributed) without resources being wasted (e.g. due to local overproduction) so that all needs are satisfied? The development of a systemic integration of the commons as an elementary social form assumes the commons as a fundamental alternative and embryonic form of a new society beyond the capitalist categories of exchange, value, money, capital, state and others. This huge task can be approached by taking a closer look at the key aspects of individual and collective motivation and social organisational principles in commodity and commons production and reproduction. First, we need to understand the differences between commodities and commons in more depth.

Exclusion logics vs. inclusion logics

Capitalism is based on personal freedom, which is essentially a freedom of contract of isolated ('free') individuals.¹¹ This ideology of freedom separates two genuine aspects of human existence from each other. On one hand, there is freedom of choice, the freedom to realise one's personal goals; on the other hand, there is individual accountability for humanity, since everyone is a social being, depending on others.¹² This personal responsibility only operates (or is assumed to operate) with respect to immediate (or direct) reciprocal relations to trusted persons (family, friends etc.). Mediated (or indirect) relationships are delegated to alien structures, like the market. Commodity production creates not only externalities but also commodity consumption, since an individual consumptive choice is indirectly linked to the conditions under which the

commodity is produced elsewhere (environmental pollution, resource depletion, slave work, etc.). Thus, in capitalism, individual behaviour is structurally irresponsible (Meretz, 2012a). Irresponsibility does not occur due to personal defect, but by the ways mediation works, in what I call the *logics of exclusion*, which can be condensed to the phrase ‘One only gains at the expense of others’. This principle does not mean that there is no cooperation – on the contrary, cooperation is one way to increase one’s strength in order to out-compete others – so, more precisely, the logics of exclusion are a permanently changing relation of inclusions and exclusions that are fundamentally based on exclusion. The consequence of exclusion cannot be overcome: the only consideration is that of the details of who will be on whose side at what level and in which field.¹³

The commons, by contrast, represent *logics of inclusion*, at least in its embryonic form. Individual goals can only be reached if the needs of others are not harmed. Karl Marx and Friedrich Engels ([1848] 1969) described a society based on the logics of inclusion as an ‘association, in which the free development of each is the condition for the free development of all’. This description of the basic dynamics of a free society can be misunderstood in two ways. Either, it is assumed, there must be an external force (the state) that guarantees a framework, where positive reciprocal relationships between people can unfold; or else ‘association’ is understood as local, as a small-scale, intimate type of organisation driven by personal goodwill and faith. In fact, both of these have proved to be unhelpful, insofar as (i) the state, as a historical development out of and thus categorical production of capital, does not, in fact, act as guarantor of positive reciprocal relations – on the contrary, it institutionalises

capital, e.g. authorising the use of force and providing judicial systems to maintain the iniquities that the capitalist system (re)produce; and (ii) association cannot properly operate at the local level within a system of exclusions, which is the material reality today – the assumption of locality is, in fact, a marginalisation of the embryonic within (by) the existing framework. Instead, the idea of association in which the free development of each is the condition for the free development of all can be understood as a concise definition of the elementary social form of a peer-commonist society, where the commons is the required basic element of a new form of societal mediation.¹⁴ This has to be shown; first, we have to distinguish between three types of commons we face today.

Commons and peer-commonist society

Division of commons

The common may be divided into *traditional commons* – the survivors of the ongoing process of enclosure, understood as the separation of the people from their resources and transformation of these and also human activities into commodities, as outlined (see also Holloway, 2010) – and new or *emerging commons* – often related but not limited to digital or cultural resources, where these resources are the results of peer production as defined by three aspects: contribution (as opposed to exchange), free cooperation (instead of command and control) and possession (rather than property) (see Siefkes, 2007). While traditional commons discourse and action focus on the preservation of existing resources, emerging commons create new ones. Therefore, emerging commons may create (new) cycles of production in which the results of one commons become a

resource for (subsequent) others. The distinction between traditional and emerging commons does not mean that traditional commons are unable to relate to other commons, but due to the preservation focus their capacity in this regard tends to be very limited. The rapid propagation of new commons, however, does allow for traditional commons to become part of larger networks. All commons need other commons in order to survive and flourish.

This leads to another, third type of commons, which is often made invisible. *Care commons* has to do with caring for people, especially children, as well as the elderly, ill and handicapped. Care commons are very old, since most care work was traditionally done within families, whereas in capitalism the roots of care work are in the patriarchal societal decomposition of spheres (Federici, 2004). Roswitha Scholz (2000) calls the phenomenon expressed in the invisibility of care work 'value-separation', where there is a sphere dominated by valuation (making money from commodity production) and a separated, opposing sphere containing all activities that are not subject to valuation but have to be performed (usually called 'reproduction'). While the first value sphere is male structured, the latter, 'residual' sphere is female (attributed to women, who provide most of its human labour input).

It is important to be clear that this division of commons into different fields and dynamics is not due to its own specifics, but reflects rather the deformations, separations and unequal developments of capitalism. Thus defined, therefore, these commons all have their limitations constructed from and as specific views and confrontations with capitalist logics. Together, however, they represent all that is needed to build a new society. Before

discussing transitional paths, we have to further develop the new categorical framework of a peer-commonist society.

Societal mediation

A society is an intangible entity, but one that can be conceptually reconstructed. More than the sum of individual or collective actions, a society is a system of its own logic reproducing itself. This does not mean that the imperatives of a society immediately determine individual or collective actions, since societal living conditions are only *possibilities* to act. People are genuinely free in the sense that we have 'good reasons' (Dray, 1994) to do what we do. These good reasons relate to our daily living conditions as we perceive them and which are the premises of our actions, and these conditions and premises relate to the societal matrix representing the historical, specific way to produce daily livelihood. The relationship between individuals and society is that of *mediation*, which has to be understood from two perspectives, the psychological, which focuses on the societal mediation of individual existence, and the sociological, which focuses on the societal mediation of the society itself. Both are part of a single process.

Now, we can reconsider the proposal of an elementary social form of creating our daily livelihood, since the double perspective is clearly also valid for this in addressing both the individual production and reproduction of individual daily life as well as representing the basic logic reproducing society as a whole. Thus, saying 'We are doing capitalism every day' is not simply a smart slogan to bridge the gap between the individual and society. On the contrary, it is meant quite literally: we are producing our livelihood by reproducing capitalism and vice versa, and we

have good reasons to do it this way, because it is the way that society functions for us. It follows, therefore, that we need good reasons to do commons as the elementary social form of a new society.¹⁵ And thus it is necessary to show that the commons are potentially able to constitute a new form of societal mediation. As explained, this can only be done categorically.

Polycentric self-organisation

Commons are mainly perceived as a local phenomenon. Although this is not applicable in the virtual realm of Wikipedia and the like, commons do not reach the level of societal integration achieved by the commodity, which raises the question of whether they are able to develop, integrate and scale-up to the level of a full societal mediation and thus enable the replacement of the old commodity-based forms. One approach to this is structural: capitalism involves a range of entities, like money, markets, state and law, that perform/facilitate the societal mediation. We may, therefore, set about identifying how these can be replaced, in principle – here, through a sketch of a new society based on peer commons.

In this new society, commons are the basic elements and social entities of societal production and reproduction. However, they are not only horizontally hugely diverse, they are also vertically structured according to the material requirements of societal necessities. The combination of both dimensions leads to a structured network with polycentric self-organisation and governance (Ostrom, 2010). This network does not consist of uniform nodes, but has clusters of commons in order to better organise any given societal task. Let us assume the following commons types: project commons, meta-commons, infrastructure commons

and commons institutions.¹⁶ All commons are responsible for the planning of efforts and resources, providing information on their activities, implementing them and networking with other commons as necessary.

- The mission of project commons is *doing*: implementing the self-determined tasks of production and reproduction. These include the production of goods (food, shelter, transport infrastructure, etc.), resource reproduction (atmosphere, land, raw materials, etc.), social services (health, education, culture, etc.), science and research, and so on. The analogy for the current situation is obviously the private enterprise and public service sectors.
- The mission of meta-commons is *coordination*. These create the preconditions for project commons and coordinate their activities, but are only required for fields where the number of commons is too large for them to coordinate themselves. Meta-commons are a kind of outsourced commons for special tasks of coordination, much as we have today in management or planning units in companies or public administrations. This type of organisation can be useful for distinct productive societal sectors (energy, water/sewage, food, etc.) or global commons (atmosphere, oceans, raw materials, etc.).
- The mission of infrastructure commons is *networking*. These provide network services for project and meta-commons. They are infrastructures for data as well as for material flows. Today's analogy is network management (utilities, the Internet, frequency spectrum, etc.). This might also include distribution pools for some common goods that are no longer sold but simply provided.

- Commons institutions focus on the *durability* of services. They provide ongoing social services mainly, but not only for local communities (like local governments today). Following a proposal by Christian Siefkes (2007), this type of ‘association’ can scale up from the local to the global.

Obviously, these commons are highly meshed, according to their specific requirements. Project commons of a societal area may need coordination by meta-commons; meta-commons and project commons may be highly based on the availability of infrastructures; infrastructure commons themselves may need coordination on a higher level; while commons institutions need all of the above. This sketch of a polycentric arrangement of commons, it should be emphasised, is only illustrative of the contention that commons can very well be developed as the elementary form of a society beyond capitalism. Nevertheless, there are some hidden preconditions that are required for a peer-commons society to function. These can be condensed to *voluntariness* and *openness*.

Voluntariness is a matter of freedom and motivation. Only those people who can voluntarily choose what and how they want to contribute are truly motivated. Despite its ideology, capitalism does not engender a society that is free or allow people to choose how they operate with respect to it; contributions only count societally if they lead to a commodity that can be successfully sold. Thus all activities are subordinated to the dominant and alien logic of valuation,¹⁷ which people have to accept in order to make their living. In contrast, the free development of one’s potentials requires unrestricted voluntary decisions about contributing, including whether to. Voluntariness can

only unfold within the logics of inclusion, which generate positive reciprocal relations between people, the precondition for responsible actions. This type of reciprocal free development of the personality of each is also called ‘*Selbstentfaltung*’ (Meretz, 2012b) – in contrast to the individual development at the expense of others that we have in capitalism.

Openness means complete transparency of all information, in order to gain insights into the processes required to perform a given task. In contrast to the commodity logic, where information and data are kept secret in order to allow only limited and licensed access after payment of an amount of money (a restricted and controlled ‘push mode’), in a free society information concerning the production of livelihood is generally available to all (an open, ‘pull-mode’).¹⁸ This is not only essential for the organisation of social task sharing, but also for the progress of humanity: any discovery at any place on the planet can immediately improve the performance of any commons. This is the reason why, today, open-sourcing is such a powerful and future-oriented strategy – even if embedded in the narrow mind-sets of ‘business models’.

Focus-shift of actions

Assuming a free society based on commons with voluntariness and openness already enables the drawing of some conclusions. In capitalism, societal goals are predetermined by the alien logic of the endless valuation cycle. Marx ([1887] 2010) wrote about value and capital as being an ‘automatic subject’ (*automatisches Subjekt*),¹⁹ indicating that the people are only ‘objects’ of the logic of capital, which is the true subject in this process – thus the paradoxical consequence of producing livelihood in

the commodity form, that the overall process determines the imperatives that people have to follow while (re)creating exactly this process. Under these premises, the purposes of societal (re) production are rarely questionable, because everything must pay off. The focus becomes limited to the *means* (technical and organisational) to profit. This is entirely reversed in a free society, where the main focus is on the *purposes* of (re)production, and the means to do so only play a serving role to the satisfaction of needs. Since needs are hugely diverse, purposes are continuously under debate. Additionally, externalisation is not an option to solve conflicts; internalisation means mediating needs differences prior to production.

Following Ute H.-Osterkamp (1976), needs can be grouped into two spheres, *productive needs*, which refer to participation in the societal process of the provisional production of livelihood, and *sensual-vital* needs, referring to human subsistence and sexuality (food, shelter, health, etc.). These need types depend on each other. Satisfying productive needs is a precondition for the satisfaction of sensual-vital needs, as in the case of hunger, where people not only suffer from not having enough to eat, but also from the fact that they do not have the productive means at their disposal to prevent a situation of hunger. It is important to note that the concrete realisation of productive and sensual-vital needs depend on historical-specific developments. Thus, 'the quality of satisfaction', as Charles W. Tolman (1992: 99) writes, is also a historical product, because it relates to the 'socially produced satisfaction possibilities', which include the fact that satisfaction can 'no longer be measured against the bare fulfilment of basic biological needs'. Concrete needs and their forms of satisfaction are not particularly predictable.²⁰

The challenge for any society, then, is to bring productive and sensual-vital needs into a dynamic relationship. Capitalism solves this by attributing the need circles to separated societal spheres, with productive needs linked to 'male attributed public' commodity production and sensual-vital needs linked to reproduction within 'female attributed private' households (to the patriarchal decomposition of societal spheres – see above). Moreover, due to the alien imperative of valuation, productive needs cannot really be satisfied, which is obvious for unqualified or precarious work. Even in creative, highly qualified work, the free development of individual potential is always under the supervision of market requirements and competition. Production is not the place to fulfil one's productive needs, but only to earn the money for the satisfaction of consumerist wishes hoping they will satisfy sensual-vital needs. However, this relegation to consumption as the main way to reach a fulfilled life always leaves a bad taste, since we do not have our living conditions at our full disposal.

A free society based on commons, voluntariness and openness will end the separation between production and reproduction. Actually, this trend is already clearly visible, but in a negative way, since everything is to be subsumed under the commodity logic dominating production. Without societal separation of spheres, everything is production and reproduction at the same time. Then, fulfilling productive needs is not a painful means for another purpose (consumption) but an end in itself. And it can be an end in itself if and only if productive activities are voluntary, which means only choosing to do them if we really want to do them. Realisation of sensual-vital needs, meanwhile, is more satisfying if, at the same time, we collectively control the satisfaction possibilities. All aspects together result

in a higher motivation, since all activities lead to a more secure and fulfilled life. Under provisionally secured living conditions, it is far easier to deal with limitations of resources in the broadest sense and with conflicts between people. Thus, a free society is not a society without limits and conflicts but one in which dealing with limitations or conflicts does not occur under the threat of personal well-being. Conflicts can be solved far better if no one can use power or domination in order to enforce individual views and goals at the expense of others.

More pointedly, the main focus of a free society is the reflection on purposes instead of optimisation of the means to fulfil alien purposes (as an end in itself). This leads us to the final and most important brick of the new categorical framework. How does internalisation work, how will different needs be mediated, how can voluntary actions lead to a coherent society? Here, stigmergy comes into play.

Stigmergy

Stigmergy is a type of self-coordination in large, decentralised systems through local information:

Stigmergy is a mechanism of indirect coordination between agents or actions. The principle is that the trace left in the environment by an action stimulates the performance of a next action, by the same or a different agent. In that way, subsequent actions tend to reinforce and build on each other, leading to the spontaneous emergence of coherent, apparently systematic activity. Stigmergy is a form of self-organisation. It produces complex, seemingly intelligent structures, without need for any planning, control, or even direct communication between the agents.²¹

A combination of the Greek words 'stigma' (sign) and 'ergon' (action), the term 'stigmergy' was originally introduced by Pierre-Paul Grassé (1959) in his behavioural studies of termites (where pheromones are the signs). The applications of this concept of complex self-organisation are limitless, and it has already found its way from biology to, for example, computing.²² It has obvious potentials too for conscious humans and for commons. Francis Heylighen (2006) applied stigmergy to peer-production, and Christian Siefkes (2013) coined the phrase 'hint-based task distribution'. Heather Marsh (2012) describes stigmergy as being 'neither competitive nor traditionally collaborative'.

The goal of stigmergic task coordination is to transform micro-actions into a coherent macro-dynamics, which is equivalent to capitalist market mediation or central planning. Usually, direct and indirect stigmergy are distinguished. Direct stigmergy involves an action creating a sign that indicates another action. For example, when a Wikipedia contributor creates a hyperlink to another article that does not yet exist, then this link is highlighted in red, inviting other contributors to write the missing article. The process directly generates a sign that others can continue the work. Indirect stigmergy occurs if a sign is separately noted referring to the process (e.g. the Wikipedia list of requested articles),²³ or if a procedural sign is marked with additional information (e.g. the Wikipedia rank list of most wanted articles automatically generated from the red links).²⁴

From the perspective of the individual, stigmergy means voluntarily self-selecting a task and self-assigning to work with people already working on it. This mode is clearly different not only from hierarchical command and control systems, but also from flat consensus approaches, which tend to be assumed as the

cooperative alternative to competitive hierarchical structures. Consensus, of course, has its own drawbacks: it does not scale up very well, tends towards expanded (sometimes jamming) discussions and is vulnerable to provocateurs. Consensus does not necessarily mean that all participants have to agree to a decision, but rather that there should at least be no reasons left to object and finally veto it; this may result in ambiguous individual motivations to follow the decision, depending on the personal agreement with the group consensus. Self-selection, on the other hand, means that decision and implementation of that decision²⁵ are not separated from each other, as in hierarchical and even in consensus-based systems.

Stigmergy assumes very high levels of efficacy (successfully reaching the goal) and efficiency (reaching the goal with minimum effort), first, due to the needs-driven basis of action, and second, due to the minimised transaction overheads, since stigmergy does not need (additional) mediation via money. A huge amount of societal effort today is money-related (i.e. accounting, taxing, auditing and other operations on finances) without any immediate useful outcome. These useless efforts bind people's energy, which can be better employed in the creation of useful results through satisfying 'productive' needs. From this perspective, the view that a free society without individual coercion cannot secure the performance of necessary societal tasks appears rather groundless.

Compared to hierarchical or consensus-based task coordination, the motivational position in stigmergy is obvious: I only choose tasks I really want to do. The power of the group I work with is limited to the acceptance or rejection of my contributions. Stigmergical task selection does not mean that all

activities are immediately and directly emotionally rewarding; on the contrary, since we desire to reach self-selected goals, we are highly motivated to apply effort and overcome difficulties – which, in fact, is the main reason that stigmergy is a perfect way of satisfying productive needs. Therefore, although motivation should not be confused with immediate reward, motivated actions are far more fulfilling (satisfying, enjoyable) than personally or structurally enforced alien jobs.²⁶ Voluntary and thus motivated tasks are usually performed with responsibility. This generates trust among the commons and strengthens the logics of inclusion.

Stigmergy follows the network effect. The more people or commons are attracted to a task, the greater the resources and opportunities to reach the goal. This positive feedback loop reinforces itself, as can be observed in the exponential growth of many open source projects. The flipside to this is that the network effect requires a critical mass to take off; a huge number of open source projects do not attract a critical mass. However, this may only be a problem if attaining the critical mass is combined with economic success and personal existence. In an ‘anti-economic’ (Kurz, 1997) logic, a huge number of experiments constitutes the innovative humus from which successful projects emerge.²⁷

Finally, stigmergy scales up very well for large systems. Stigmergy requires diversity to scale successfully, and both the tasks and the people in a society are as diverse as one can imagine. In Free Software, there is a phrase coined by Eric Raymond (1999): ‘Given enough eyeballs, all bugs are shallow’ (referring to ‘Linus’ Law’, which honours the first Linux kernel developer, Linus Torvalds). Modelled thus, the ‘Stigmergic Law’ could be phrased as ‘Given enough people, you will find a nerd for every

task which has to be done'.²⁸ The term 'nerd' (or 'geek') refers to an individual who does not only bind himself to a task, but enthusiastically digs into the challenge until the task is finished in the best way possible. This type of motivation is not surpassed.

Some doubts considered

Various concerns may be raised questioning whether stigmergy is really capable of replacing capitalist categories of mediation (money etc.) as outlined. One is that some societal needs might not be covered and thus go unaddressed. Here, by way of analogy, we can use the Smithian 'invisible hand' of the market, in which micro-activities are synthesised to a macro-coherence by means of exchange, value, money and suchlike. With stigmergy, these objectified means are replaced by needs-driven voluntariness and openness. While in capitalism we have to subordinate under an alien mediation we do not control, in a free society we *are* the mediation, which we fully control. There is no third 'mechanism'. It may be thought that being the mediation ourselves implies an automatism that acts beyond our free will, but this is not the case. Every society can only continue given a minimum level of coherence. The idea of controlling the coherence of society as whole is absurd. Thus, the question is how the coherence is generated – by religious dogma, by an invisible hand, or by ourselves? Insofar as the commons constitute the elementary form of social life, the answer is us, we are doing it. It may also be thought that society requires planning, directed by government and/or the invisible hand of markets. Of course, planning is necessary, but not in the sense of a top-down, central planning. On the contrary, because needs are hugely diverse and dynamic, planning should mainly be a task of the commons itself.

Assuming a local-to-global distribution of production and reproduction according to needs, then self-planning is the perfect means to satisfy nearly every need (including the self-planning of those commons self-designed as responsible for infrastructure). This simply results from the fact of a huge diversity of people. With high probability, there will be a good match between the results of the realisation of productive needs on one side, and the satisfaction of sensual-vital needs on the other. It may be argued that planning an infrastructure is an alien planning from the perspective of the other commons, so the idea of self-planning collapses at this point. Of course, an infrastructure commons is planning the infrastructure for others, but that is not really any different from other tasks, since most of those are done for others also; production is mainly production for others. Importantly, here, the fact of the planning and maintaining of an infrastructure does not imply that people need permission to use it. It is there and can be freely used; the only issue is a matter of capacity, which may be adjusted by the responsible commons.

Another concern involves the global division of labour. In respect to this, first, if we do not want to say that everything is 'labour', then there will no longer be 'labour' in the sense of a special activity in a separate sphere of life ('economy'). There will no separation between production and reproduction, because all activities are recognised as worthwhile. Second, stigmergy does not mean that a global division of activities will vanish. Rather, some absurd divisions will be re-localised (probably the production of food), while others will remain, due to geographical dependencies (extraction of raw materials) and yet others will decrease (e.g. through avoiding parallel developments due to the sharing of ideas). If a global system of production led by valuation

and money is transformed into a system led by needs, voluntariness and openness, then it can be assumed that the whole society will rearrange all activities according to the new paradigms.

Other issues to be raised include injustice and democracy. Regarding the former, we certainly cannot assume that all injustices and divisions along diverse lines (gender, ethnicity, age, etc.) will automatically vanish. However, in contrast to capitalism with its logics of exclusion, in a peer-commons society they may become superfluous, since exclusionist behaviour loses its function; we will have that opportunity. Regarding the latter, a peer-commonist society based on stigmergic polycentric self-organisation is simply beyond what we know as formal democracy in the sense of, for example, representative politics. It is a do-ocracy, in which dealing with our affairs is performed – or, if we wish to stick with the term, a truly inclusive democracy.

Transformation

After developing a categorical skeleton of a peer-commonist society, the logical next step is to discuss how to get there. Manifestly, this is not a trivial question. It concerns how a new mode of production can establish itself while the current mode is dominant and powerful individuals and institutions in particular are interested in keeping the situation as it is. In order to understand the challenges of the coming historical transition we can use the five-step model (Holzkamp, 1983; Meretz, 2012b), often also referred to as the germ form model.

Generally, this is a model employed to understand the concurrent existence and development of phenomena with different qualities. The challenge is to think of the peer-commons production as being a modernisation of capitalist

production methods and the embryonic form of a new mode of production beyond capitalism at the same time. The five-step model avoids an either-or thinking and accomplishes this by viewing the emergence and development of peer-commons production as a process of its own contradictory unfolding in time. Normally, applying the five-step-model is a retrospective procedure where the result of the analysed development is well known. By assuming (imagining) the result of a transition towards a free peer-commons society, the emergence of this result can be reconstructed using the model. Here is a rough sketch of the five steps, first listed and then applied to the case of peer-commons production.

1. *Embryonic form.* A new function appears. In this phase the new function must not be understood as a rich seed encapsulating all the properties of the final entity and which only has to grow. Rather, in this phase, the embryonic form shows only principles of the new, but it is not the new itself. Thus, commons-based peer production is not the new itself, but the qualitatively new aspect it shows is the needs-oriented mediation between peers based on voluntariness and openness. During the initial phase, this is visible only at a local level and a few fields at the global level.
2. *Crisis.* This occurs only if the old system falls into a crisis as a whole and is no longer able to maintain the system functions; only then can the embryonic form leave its niche. The capitalist way of societal production and mediation via commodities, markets, capital and state has brought mankind into a deep crisis. It has entered a phase of successive degradation and exhaustion of historically accumulated system resources. The

recurring financial crises and developing ecological danger make this apparent.

3. *Function shift.* The new function grows, leaves its niche, and gains relevance for the reproduction of the old system. The former embryonic form is now double-faced: on the one hand, it can be used for the sake of the old system, while on the other its own logic remains incompatible with the logic of the dominant old system. Peer-commons production may be utilised for the purposes of cost savings and the creation of new environments for commercial activities, but it rests upon non-commodity development within its own activities. Co-optation and absorption into normal commodity-producing cycles become possible (De Angelis, 2007), therefore; so only if peer production is able to defend its own commons-based principles and abilities to create networks on this ground will the next step be reached. Free Software is one example of peer-commons production that is quite clearly at this stage; Open Hardware is currently at the point where it is just about to leave its niches.
4. *Dominance shift.* The new function becomes prevalent. The old function does not disappear immediately, but steps back as the previously dominant function to marginal domains. Peer-commons production reaches a network density on a global level, so that input–output links are closed to self-contained loops. Separated private production with subsequent market mediation using money is no longer required. Needs-based stigmergic mediation organises production and distribution. The entire system has now qualitatively changed its character.
5. *Restructuring.* The direction of development, the backbone structures and the basic functional logics have changed. This

process embraces more and more societal fields, which refocus towards the new needs-based mode of societal mediation. The state is stripped down and new institutions emerge that no longer have the uniform state character, but are means of collective *Selbstentfaltung*. New contradictions may emerge, and a new cycle of development may begin.

This is only an epistemological model, a dialectical conceptualisation of historical transition, not a scheme for immediate action. The main advantage is the possibility it offers to escape from unfruitful either-or debates. It allows for thinking of the emergence of a new mode of production as useful for the old system while maintaining its transcending function towards a free society as a concurrent phenomenon. This double-faced development can be observed when analysing peer-commons projects today.

Practical application

Having developed a categorical framework of a free peer-commons society, a peer-commons modelling (stigmergy) and now the five-step analysis of a transitional path, we need to conclude with concrete examples of peer-commons production today. We ought to look not only at peer-commons projects in a narrow sense, but also at the influence of a global trend towards these new practices more generally. Insofar as the theory of a functional shift of the embryonic form of a new mode of production is valid, then this shift must be observed in its double-faced character in conventional business practices as well as in new emerging practices outside of normal capitalist logics. Therefore, two examples are considered here, the first an open hardware project and the second a conventional stock corporation.

Open Source Ecology (OSE)²⁹

Founded by Marcin Jakubowski in 2003, OSE is legally defined as a 'non-profit corporation'. The mission is 'to create an open source economy – an economy that optimises both production and distribution, while providing environmental regeneration and social justice'.³⁰ The goal of the project is to develop the fifty most important machines – called the Global Village Construction Set (GVCS) – providing a village with the necessary means of production for modern comfort. These machines range from tractors, brick presses, computer numerical controlled (CNC) machines, bakery ovens and dairy milkers to automobiles and trucks. OSE is a distributed project. The Factor e Farm in Missouri (USA) owned by Jakubowski functions as its 'head-quarters', where machines are prototyped and tested. Permanent contributors at Factor e Farm are paid for their work. Finance comes from donations and institutional grants.

Key design features are the following:

- *Open source* means that plans, designs, descriptions and educational materials of/for the constructed and prototyped machines are released online under a Free Copyleft License;³¹
- *Modularity* and *flexibility* allow for interchanging and recombining of generalised parts (like motors, power units, electronics etc.) from machine to machine;
- *User accessibility* enables users to create or maintain the machines themselves;
- *Cradle-to-cradle* manufacturing cycles reduce environmental impact;
- *High performance* of the products and *industrial efficiency* of the production at *low costs* is the guiding line;

- A '*distributive economics*' is encouraged by OSE, whereby other enterprises replicate the open technology as well as the business models.

In a broad sense, OSE is a reaction to the crisis of the capitalist civilisation model. Jakubowski was 'frustrated with the lack of relevance to pressing world issues',³² and creating a distributed and re-localised 'open source economy' was assumed to be a way out of multiple crises. Local communities would not destroy their own environment, and externalisation as in traditional industrial production could be avoided. This, however, was a quite unrealistic assumption. As shown (above), externalities do not occur due to the remoteness of production, but due to its form and purpose: commodity production occurs in order to make money. In OSE, 'economy' seems to be a neutral apparatus of production to satisfy needs, but satisfying needs is only a side effect in commodity production. In fact, economy is the self-feeding system of the endless growth of abstract wealth controlling people's behaviour, since it is the way to make a living. In that sense, the OSE approach is far too short-sighted and inherently contradictory – in a way, that is, which well represents the issues and ambiguous nature of the embryonic form of the five-stage model outlined.

This contradictory character becomes visible in the licence issue. On the one hand, OSE is fully convinced of and obliged to the paradigm of openness and, albeit less emphasised, also to voluntariness. It is definitely a peer-commons project. On the other hand, OSE wants to finance the project by selling its machines. This creates a contrast between beating scarcity by freely sharing all production knowledge and the necessity of

offering a unique commodity on the market that depends on a tendency towards scarcity. Thus, a competitor can use the free knowledge and produce the same machines for the same or less money. OSE tries to solve this problem pragmatically by combining the Copyleft License with an appeal to serve the distributive economics: 'We publish our business models openly so that others can replicate any enterprise. Everything we know, you know.' This is intended to generate truly free enterprise and life-giving competition, as opposed to monopoly capitalism or militarism. In a word, distributive economics are called 'sharing'. In the political sense, this phenomenon may be described as 'decentralisation engineering'.³³

According to this logic, the problem of capitalism seems to be the creation of monopolies, but not the fact that it dictates how we make a living. Thus, selling its machines seems to be the 'natural' way for OSE to keep its project running, although this has not, in fact, played an important role until now.³⁴ However, the project begins to subordinate its practices to rather questionable goals, like 'single-day-builds' (build one machine a day) as a step to large-scale production. This makes sense if it wants to sell machines on the market, but it detracts a lot of energy away from the original goal of developing the GVCS, and in the long run it may lead to a market dependency.³⁵

Open Source Ecology is a remarkable peer-commons project. It shows that openness and voluntariness can successfully be transferred from the digital into the physical realm. The possibility of realising one's own productive needs combined with an inspiring vision – providing the world with a set of machines to produce locally on the given level of productive forces – drives the project forward. The project leader has organised

a very successful communication campaign, which leads to a respectable amount of donations by 'true friends' or institutions guaranteeing their budget for the next few years. However, the most remarkable result is the machines itself. They are not simply copies of their proprietary counterparts, but rather realisations of a completely different set of design and creation criteria. Modularity is not a marketing slogan but reality.³⁶ The machines are designed to be user accessible and not to hide nifty features from users and competitors as is usually the case with commodities. They are designed to be easily built and repaired using simple and low-cost methods, while at the same time not waiving performance and efficiency. The machines physically represent a new mode of production, at least in an embryonic form. They give an idea of what is possible in a free society when the means of production are not produced to make money but to serve needs. This project, however, appears to be neither aware of its enormous potential nor of its inherent contradictions, which could yet be its downfall – although not before it will have contributed not only, one hopes, materially, to needs in a direct sense (through its machines), but also indirectly, through its role in the positioning and development of peer-commons more generally (as, at least, an instantiation of the currently contradictory process of peer-commons production).

Open Source Ecology, I would argue, is doing the right thing while having some rather short-sighted ideas about business. Inevitably, contradictions will surface challenging the peer-commons character of the project. Historically, many projects (mostly on a low-tech basis) have started out ambitiously, but then either disappeared or transformed into ordinary companies. To be clear, the contradictions do not

occur solely or even primarily due to any individual (human or organisational) shortcomings, but rather because of objective constraints in a society that is dominated by monetary logic and the commodity form. This can be clearly understood using the five-step model. A peer-commons project cannot be anything other than a double-faced entity navigating through the shoals of openness and voluntariness as key motivators on one hand and alien requirements from markets and logics of valuation on the other.

Synaxon AG

A mid-sized stock corporation in the IT sector in Germany, Synaxon AG³⁷ follows a concept of radical self-organisation. The CEO is Frank Roebers, co-author of a book on the use of Web 2.0 techniques in companies (Roebers & Leisenberg, 2010). In Synaxon, he internally launched a Wiki in 2006 and the communication tool Liquid Feedback in 2012. All company information (operational data, job descriptions, projects, quarter-end accounts, etc.) is published in the Wiki, and every employee can access it. Everyone sees what others are working on, and everyone can change anything, including their own job description – without moderation. To begin with, employees were somewhat reticent about this transparency, since not everyone wanted to share their knowledge and some were anxious that posting the wrong words might cost them their jobs. The first to dare to make changes was a young worker still in his probation period: he deleted the company's mission statement, because he did not like it! After digesting the shock, the management decided to let it go and not use its veto power. 'It was like someone has released the handbrake', Roebers said.³⁸ Since then,

more than 400,000 changes have been made, and Roebbers has never felt it necessary to use his veto power. There have been many proposals that saved a lot of money for the company.

Since all employees contribute to the Wiki using their real names, however, truly fundamental changes did not occur. Thus, Roebbers decided to additionally implement Liquid Feedback, a communication and voting tool previously developed and used in the German Pirate Party. Every employee uses a pseudonym and can anonymously post proposals. If a proposal gains 10% of staff votes, it enters the discussion phase. After the debate, the topic is frozen for a time-out period of reflection. If, during the final voting, the proposal obtains 50% voter turnout and the majority of the votes, then the proposal is implemented. Rather small but also crucial decisions (related to things like salary payments and career opportunities) have been made in this way, all of which have been realised, even if the management was not in favour.

Wikis and Liquid Feedback can be a problem for weak managers, since openness challenges their monopoly on knowledge and low performing positions may become visible. On the positive side, they can facilitate utilisation of the collective wisdom of the employees, and the success of this strategy is measurable. In fact, Synaxon doubled its revenue while increasing the number of employees by (only) 10%; efficiency and innovation capacity both grew enormously. This was enabled by providing ways for employees to unfold their individual potentials, bring in their ideas and creativity and satisfy their productive needs – even though within the framework of creating products to be sold on markets according to the motto: ‘Do what you want, but be profitable’.

Openness and voluntariness are exploited under the imperative of being competitive on the market. It is no longer necessary for 'evil bosses' to dictate what 'good workers' have to do. Instead, the logic of valuation does the job. However, the limitations are obvious. Openness is only allowed within the confines of the company: outside of the company, internal information is treated as business secrets. Voluntariness means voluntarily subordinating under the market imperative. It is not the management's veto power that produces good behaviour, but rather the internalisation of the logic of valuation that leads to an identification with the company's goals. Inclusion of the employees and 'radical self-organisation' is a means to compete with others on (for) the market. This, of course, is exactly what the logics of exclusion are all about: freedom is the freedom to cooperate with your peer group in order to facilitate the exclusion of others and externalise all consequences that are not part of the commodity sold.

The example of Synaxon indicates how peer production is growing everywhere in society. Indeed, the new mode of production emerges within the old framework, just as aspects of the new and the old are engaged with struggles within each individual. It is better to decide freely what job to do than to work under command, even though, of course, it is repellent that the ultimate goals are still alien ones. Manifestly, if we have to use personal freedom in alien ways, it is not freedom. The freedom of self-exploitation is self-exploitation and not freedom. Nevertheless, and even under the premise of valuation, people who have learned to follow their personal abilities are able to do peer-commons. We already know how to self-organise tasks. Next, we need to imagine what could be possible if free stigmergic self-

selection of societal tasks were the foundation of society and not caught up in endless cycles of making more money from money.

Comparing Open Source Ecology and Synaxon, we see that they are not as different as they might appear at first glance. The most important difference is the openness of OSE. Open-sourcing all results provides an enormous potential for other commons to copy products and processes. However, this is precisely the main problem of openness within the context of a capitalist environment: the competitor in the market can use them as well. Unilaterally open-sourcing one's own knowledge and being successful on the market is contradictory. Synaxon handles this contradiction by keeping the openness internal. Other companies, however, show that opening up to other producers and customers can generate competitive advantages, due to reduction of transaction costs. There is a clear, if presently limited, trend towards openness.

With respect to voluntariness, Synaxon seems to be more flexible. The management trusts that its employees under the conditions of market demands will choose to do the right thing. In OSE, the founder wants to control the project and people. OSE members have chosen to work in the project, but they are less free to shape the project since the founder wants to have the final say. While the dependency of Synaxon employees is impersonal and indirect (fulfilling market requirements), the dependency of OSE co-workers is rather the opposite (coherence with the founder's ideas). Although the overall goals of OSE are highly motivating, the concrete organisational forms are too restrictive when compared to the overall aim of the project (as well-being for all). This reduces motivation and causes conflicts. At first glance, these problems seem to be rooted just in personal

disagreements, but underneath the surface lurk the same alien requirements of profitability, as with Synaxon. Although OSE is a peer-commons project rather than an ordinary enterprise like Synaxon, the latter is more successful in releasing the productive power of voluntariness – within the limits of alien market requirements. Both the project and the company indicate the broad direction in which future developments will go. Capitalism cannot be out-competed on the field of valuation, it can only be out-cooperated beyond that field. The challenge is to deal with the emerging contradictions.

Conclusions

In this chapter, I have tried to argue for a categorical shift away from an emancipatory approach within the framework of the categories of a commodity-producing society and towards an approach that transcends these categories by creating a new mode of producing our livelihood. This new mode of production is not just an idea, since embryonic forms are appearing right in front of our eyes. A key question is whether the elementary social form of the peer-commons is able to constitute an overall societal mediation. It has been shown that polycentric self-organisation combined with stigmergic societal mediation *can* constitute a coherent society. Openness and voluntariness are the preconditions for a new mode of production – which is no longer separated from reproduction – to emerge. In combination with the five-step model of historical transition, these may be used as analytical criteria when looking at our current situation.

It is, perhaps, not disheartening to appreciate that a new mode of production can only emerge through contradictions. Compromise with capital should not be assumed as collaboration with

the enemy, since it is inevitable, indeed necessary, at this stage of development of peer-commons production. Certainly, there is no cure-all and no one right thing to do. This has been indicated here through the two concrete examples, one peer-commonist project and one stock company. From these, we can see that highly worthwhile project goals do not guarantee successful developments, while capitalist firms are able to adapt aspects of peer production within their predefined purpose of being competitive market players. So, peer-commons is not an idealistic utopia, but an objective trend in society as a whole. Capitalism is beginning to produce its own gravediggers. But the digging has to be done; it does not evolve independently of people's actions.

Acknowledgements

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Notes

1 The notion 'elementary form' is a term used by Marx ([1887] 2010) in the very first sentence of *Capital*, Vol. 1. There, the commodity is a 'unit' or an 'elementary form' (German, '*Elementarform*', see Dragstedt, 1976) of the capitalist mode of production. In the original (1867) publication of *Capital*, Marx emphasised this word.

2 Cf. Dyer-Witheford's (2007) rather similar approach proposing the 'common' as the 'cellular form of a society beyond capital', with 'the movement' as the social force behind it.

3 The usual ideological scheme, where economic activity is treated as transaction given scarcity, is inverted. (There, scarcity is naturalised and mistaken for limitation; limitations are socially managed by artificially excluding people from access to goods as private property; thus, in capitalism, scarcity is always artificial.)

4 This may occur indirectly, through systemic inefficiencies – e.g. up to 50% of the world's food is wasted (Mechanical Engineers, 2013) – or quite intentionally, as a direct function of the profit motive (through market distortion and planned obsolescence, notoriously originating with the Phoebus cartel in the 1920s and 1930s).

5 Of course, businesses may 'create' markets (just as does capital in general, through the 'production' of scarcity); this does not materially affect the current argument, however.

6 From the perspective of the individual, critical psychologists describe this situation as structural self-hostility (Holzkamp, 1983).

7 See <https://ostromworkshop.indiana.edu/research/>

8 A negative notion of internality is used in behavioural economics, this being, roughly, the externality of harming oneself (cf. 'self-hostility' above).

9 Commons are only those resources which people make to be commons, through commoning.

10 Methodologically, this can be expressed as rejecting Adorno's (1966) abolition-of-images dogma at the meta-level of categories while accepting the impossibility of giving concrete descriptions of how these categories can be filled.

11 While the level of the individual is assumed, the ideas expressed here generally apply similarly to population groups, institutions and organisations, countries, etc.

12 Usually, limitation of personal freedom is only presumed where the freedom of others is touched. In this individualistic approach people are not conceptualised as societal humans but rather isolated 'commodity monads'.

13 Obviously, the logics of exclusion are performed along a huge diversity of sections and intersectional combinations of sex/gender, ethnicity, religion, age, health, qualification, etc., in forms of division and discrimination that are, actually, central to capitalist (re)production.

14 Alternative terms for peer-commonist society include 'commonism' (Dyer-Witheford, 2007), 'ecommony' (Habermann, 2011) and, more or less, 'peercommony' (Siefkes, 2013).

15 The question of whether, at present, the commons only helps to absorb the heaviest damages or even offer a renovation of capitalism must be left open here.

16 It is not important to predict the types of commons that may emerge, although it is highly plausible to assume that they will be structured but not uniform.

17 In liberal theories, alienation is played down as an 'invisible hand', while Marx called it 'fetishism'.

18 Personal information may be kept secret according to personal preferences.

19 The German version (Marx, 1867) is more pointed than the English translation; whereas in the English version the value in its endless cycle 'assumes an automatically active character', in the German original the value is 'transformed into an automatic subject processing in itself' (author's translation).

20 This also includes the idea that 'wrong needs' (and wrong routes for their satisfaction) do not exist, since over-historical 'true needs' cannot be assumed.

21 <https://en.wikipedia.org/wiki/Stigmergy>

22 <http://www.evolutionofcomputing.org/Multicellular/Stigmergy.html>

23 http://www.en.wikipedia.org/wiki/Wikipedia:Requested_articles

24 http://www.en.wikipedia.org/wiki/Wikipedia:Most-wanted_articles

25 Karl Marx ([1875] 1970) criticised this 'antithesis between mental and physical labor' as 'enslaving subordination of the individual to the division of labor'.

26 In capitalism, immediate reward, mostly through commercial events (the entertainment industry), generally has to 'compensate' for missing collective possibilities to dispose of the means of securing livelihoods.

27 In capitalism, there are different forms of the relationship between 'anti-economic' commons and the exploitation of their

outcomes, including some constructive ones (e.g. feeding the commons humus to build business models on).

28 In technical terminology, this is the 'Law of Large Numbers' from probability theory.

29 See <http://www.opensourceecology.org/>

30 http://www.opensourceecology.org/wiki/Open_Source_Ecology_Paradigm

31 OSE uses the Create Commons Attribution-ShareAlike License, according to which anyone can access and use the material on the proviso that any redistribution is covered by the same licence.

32 http://www.opensourceecology.org/wiki/Marcin_Bio/CV

33 http://www.opensourceecology.org/wiki/OSE_Specifications

34 The position 'GVCS Preorders', last listed under '2012 – Income & Expenditures', shows zero (http://www.opensourceecology.org/wiki/OSE_Financial_Transparency). Two machines were sold, which directly provokes differences on the usage of that income; the following years did not show any sales.

35 There has been an intense debate on whether OSE should be regarded as capitalist. See <http://www.forum.opensourceecology.org/discussion/876/is-ose-a-capitalistic-system>

36 One example is the 'power cube'. See http://www.opensourceecology.org/wiki/Power_Cube

37 <http://www.synaxon.de/>

38 Interview with Frank Roebbers, *Berliner Zeitung*, 21 September 2012 (author's translation); at <http://www.berliner-zeitung.de/wirtschaft/unternehmen-im-wandel-kreative-koepfe-fuehrt-man-nicht-wie-eine-spargelstecherkolonne-5176782>

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