Property, Mineral Resources, and "Sustainable Development"*

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1. A new look at property and its implications for development

Hardly anyone ever questions the fact that "property" is the core institution of capitalism. It is, therefore, the more surprising to find in Gunnar Heinsohn and Otto Steiger a team, and in Hernando de Soto an individual researcher, who not only claim but prove from different perspectives that property as the constitutive element of capitalism is not even a concern for mainstream economics: rather, property is a taboo, similar to the foundation myth of a tribal society. Thinking of mainstream economics, not only do classical, neoclassical and Keynesian economics, in particular Monetary Keynesian theory (Heinsohn and Steiger 2006 [1996]), come to our minds, but also new institutional economics (Steiger 2006), development economics (de Soto 1989 [1986] and 2000) and even environmental economics.

Our contribution is subdivided as follows. In the second section, different meanings of the term "property" will be addressed, starting with the core differentiation between possession and property as proposed by Heinsohn and Steiger. "Possession" refers to different levels of use rights, while "property" – beyond these use rights – includes the notion

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of collateral; that is, the possibility of burdening or encumbering such property, which thus serves as a security in credit relations. It is this particular aspect of property in relation to credit that has traditionally been neglected in mainstream economics, despite the fact that it is one of the founding elements of capitalism. Through encumbrance, money is turned into an anonymous title to property. In this fashion, encumbrance maintains the stability of a given currency, provides security in economic transactions, allows capital formation without previous savings, economic growth and development – to which must be added a whole set of further characteristics increasing the developmental thrust of a property regime.

Given the potential for economic growth contained in the rationale of property – but not in that of possession – and given that a great deal of 'economic' activity in developing and transition regimes occurs independently of formalised property systems, the introduction of such systems into the informal sectors of those regimes seems to be an irresistible institutional proposition.[1]

In the third section, the question must therefore be raised whether property is a necessary condition for development: what kind of development, development for whom, and within which timeframe? On this basis, we shall look at how property rights were introduced into the possession-based regime of British India. This example is the more informative as the process in question followed two fundamentally different rationales: one similar to that of privatisation, the other aimed at establishing a formalised property system to the benefit of the peasants themselves. The long-term effects of both models will be considered in this section.

The fourth section discusses property rights and development on the basis of ecological and social considerations. Its first part (section 4a) is devoted to Thorstein Veblen's critical position with regard to the evolu-

[1] In order to emphasise the fundamental difference between property-based and possession-based systems, Heinsohn and Steiger go so far as to call the property-based system the only regime that, with full right, deserves the names of "economy" and "society", while the possession-based systems are characterised as mere production regimes. They are no societies but "communities" (tribal regimes) or "seigniorities" (feudal regimes); for more detail see Heinsohn and Steiger 2006, 26-28, and Steiger 2006, 185-187.

tionary path of a property-based economy. Veblen, the founder of institutional and evolutionary economics, is among the very few who have focused on the issue of encumbering property, notably in his work entitled *Business Enterprise* (1964 [1904]). Defining economic rationality as a process of evaluating and decision-making from a property point of view is an endeavour quite different from that of a reasoned balancing of valued ecological and social conditions that are measured by heterogeneous ecological and social indicators. In this sense, the relationship between property, poverty and future generations is far from being an evident one.

Having come that far, in the second part of section 4 – 4b – we shall focus on property, exponential growth, mineral resources, and ecological sustainability. Property forces exponential growth, time pressure and monetary cost-efficiency. These institutional imperatives can only be met by using mineral resources. The qualitative difference in economic, and not only ecological, terms between non-renewable mineral and renewable, mainly *living* resources cannot be over-emphasised. Nowadays, industry, as well as much of agriculture and most services, involves technologies based on mineral resources – to the extent that we have become super-industrial rather than post-industrial societies.

In the third part of section 4 – 4c – the issue becomes more complex, since we shall have to deal with the fact that the possession aspect of property – that is, everything involving material transformation in economic processes – is subject to the entropy law, as shown by Nicolas Georgescu-Roegen. Economic growth entails not only increased depletion of natural resources, but also means irreversibly worsening the ecological degradation, in spite of all the counterarguments advanced by the exponents of so-called "weak sustainability".

In the fifth section, reference will be made to a helpful distinction elaborated in the research on "property regimes in resource management". This is the distinction between common / private / State possession or property on the one hand and "open access" on the other. Nearly forty years ago, Garret Hardin (1993 [1968]) confused the terms "common property" and "open access". Nonetheless, his work offers a valuable contribution by stressing a point that we have so far never seen discussed in literature, namely the double bind inherent in this type of situation.

Thus, it is with a double bind that we need to summarise the contribution by fourteen theses in the sixth section. Indeed, it is difficult to see

how developing or transition economies can achieve development without a formal property system, above all in the wider context of property-based economies that are in a position to take advantage of the twofold potential of property. And it is even harder to see how property-based economies, as they now rule the global economy, can achieve sustainable development without destroying the ecological foundations on which they are built.

2. Possession and property: the core institutions of non-capitalist and capitalist societies

Possession, understood as the core institution of non-capitalist societies (or of possession-based sectors within capitalist societies), and *property*, understood as the core institution of capitalist societies (or of property-based sectors within non-capitalist societies), are ambiguous concepts, both in empirical and in theoretical terms. Already in the process of their socialisation, members of a given community or society internalise the meaning of possession or property to the point that such meaning becomes self-evident. By the same token, the rights and duties implied by either institution are implemented or complied with as a matter of routine. As social scientists or economists, we often follow the same route, studying possession and property from the vantage point of more or less conscious paradigms guided by internalised value premises, perspectives, methods, and selective questioning. Thus, we tend to focus on certain aspects of reality to the exclusion of others, shedding light on some of them while leaving others in darkness. Whenever we engage in unreflected analysis, we either do not see what is "there", or we project onto reality something that does not exist and, hence, create illusions.

For members of a given community, *possession* defines a more or less inclusive bundle of rights and duties connected with the concrete *material use and return* of resources, production technologies, products, and waste. "More or less" can be defined with precision. For example, Schlager and Ostrom (1992) and Le Roy, *et al.* (1996) differentiate five rights that go hand in hand with increased authority on possession ("property" in their inaccurate terminology): (i) *access*, meaning the authority to make use of a resource; (ii) *withdrawal*, meaning the authority to withdraw units from a resource; (iii) *management*, empowering one to

make decisions about how to use a resource; (iv) *exclusion*, which is protecting the boundaries of the right involved; and (v) *transfer*, meaning the authority to make gifts to others or to transfer rights in case of inheritance.

However helpful this or any other differentiation is for matters of local resource management in possession-based regimes, the focus rests on the material use of resources and their material return. *Possession rights* define who has the right to use, either individually or collectively, a given set of natural or man-made resources, using a given technology, within a given timeframe and under given restrictions, in view of the production of a given set of goods or services, involving the management of a given level of waste and pollution. Rules about these questions exist in all societies, whether they are tribal, feudal, capitalist, socialist, or whatever the future may offer. In this sense, institutions of *possession* respond to a *universal* question: They determine how to actualise a universal potential. It goes without saying that the answers to that question and the chosen forms of actualisation of the material economic potential are *culture-specific* and exhibit considerable diversity and variation.

Property, in contrast, is a very different and historically quite exceptional matter (Heinsohn and Steiger 2006 [1996]). According to Steiger (2006, 186; for more detail see Heinsohn and Steiger 2006, 25-28; and 2007, 493-495),

> "*Property rights* are *de jure* claims. They entitle their holders to intangible (non-physical) capacities which first constitute economic activities:
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> (i) to burden property titles in issuing money against interest; (ii) to encumber these titles as collateral for obtaining money as capital; (iii) to alienate or exchange including sale and lease; and (iv) to enforce. Property rights transform possessory rules into possessory rights regulated by law. Thus, individual rules become private rights.
>
> Property rights transform goods and resources into saleable commodities and rentable assets."

The important point is that the difference between possession and property does not derive from the material aspect of possession. It is the abstract-immaterial economic potential contained in the security of a legal property title (called *property premium* by Heinsohn and Steiger), enabling credit relations, that makes property the constitutive institution of

capitalism – on the condition, of course, that property is titled, registered, protected and enforceable. The relation between possession and property is an asymmetrical one: possession is a bundle of rights contained in property, yet property includes a bundle of rights not contained in possession. It is necessary to distinguish *the two potentials* of property: its possession aspect and its property aspect. Both potentials are conducive to engaging the same object at the *same* time; for example, any proprietor's parcel of land can be simultaneously *tilled* (possession aspect) and *mortgaged* (property aspect).

Focusing on the possibility of burdening property in issuing money against interest and of encumbering property as collateral for obtaining money, Heinsohn and Steiger propose what they call "the property theory of interest and money". Within the legally formalised network of market-based contractual arrangements, including credit (transfer of the property aspect of property only), lease (transfer of the possession aspect of property only), sale (transfer of both the property and possession aspect of property), and employment contracts, the credit contract is of strategic importance because of the qualitative nature of obligations it imposes. Such obligations shape the entire process of evaluating economic activities. Credit contracts doubly involve property, whether they are issued by the central bank as the prime creditor in the modern property-based economy – defining the money of account, the standard in which the contracts are expressed – or whether they involve any other instance of issue.

The bank of issue or any other creditor has to maintain two rules: (i) to secure the loan in order to safeguard its reserves (its "own capital" or "net worth") by claiming property titles from the debtor as collateral (a commercial bank in case of the central bank, a business enterprise or a private individual in case of a commercial bank) and, beyond that, (ii) to burden the debtor's capital to protect itself against defaulting debtors in case the value of their collateral diminishes. Money issued – as Heinsohn and Steiger insist – is an *anonymous title to the property of its creator* (neither a good as in many possession-based regimes nor a title to planned production as in former socialist countries). The relative stability of money in property-based economies is achieved by this engagement of the immaterial yield of security contained in property, the "property premium". It is nevertheless true that even under this protection, the property-based endogenous and self-organised process of money creation remains open to some degree of risk, uncertainty and lack of knowledge.

Engaging has its price. To the question, "What loss must be compensated for by interest?", Heinsohn and Steiger respond that interest compensates the creditor for engaging the "property premium" in credit relations. By burdening and encumbering property, its disposability is temporarily limited and is compensated for by interest. As for the debtor, he can dispose of the liquidity premium of the money borrowed, settle contracts definitely and expand business operations. It must be emphasised that in the case of a credit contract, only the property aspect of property is engaged. The possession aspect of property remains untouched as long as the contractual arrangements are duly fulfilled and lenders as well as borrowers continue enjoying the possible material use of the burdened assets. One of the main implications for development is that "money is a derivate of property [legal titles], and not of goods (possession)"; therefore, "accumulation can start without previous savings" (Steiger 2006, 187).

3. Property: a necessary condition of development

3a. What kind of development, for whom and in which time frame?

The difference between property and possession is of such crucial importance because property has an economic potential that strategically determines economic growth and development. Undoubtedly, the possibility of burdening and encumbering property in credit relations and, as a consequence, the self-organised and autonomous creation of genuine or creditor's money is an important condition for development. By *creditor's money*, we mean "a currency issued according to sound principles of banking, that is, not only against interest but also against good securities and with sufficient capital of the issuing bank" (Steiger 2006, 188). The missing property titles in possession-based regimes are the main reason why it is so difficult to achieve a stable currency. Yet, without such security, "contract partners would not exchange their valuable property titles in exchange for a domestic currency which, like the State, or

debtor's money[2] in most developing and transitional countries, is inferior – that is, nonconvertible to the currencies of developed economies – and, instead, resort to them" (Steiger 2006, 188). The stability of the currency is one of the reasons that has convinced Steiger to consider a formal property system as part of "the core economic principles to be implemented for protected transactions in developing and transitional countries to trigger economic development". Beyond the fundamental role property plays in credit creation – capital formation, economic growth (expansion) and development (innovation) also depend on a set of indirect advantages of formalised property systems, as pointed out by de Soto in his studies of the extralegal sectors of developing and transition economies.

According to de Soto (2000, 41 f.), "the formal property systems of the West produce six effects that allow their citizens to generate capital. The incapacity elsewhere in the world to deploy capital stems from the fact that most of the peoples in the Third World and former communist countries are cut off from these essential effects." These effects are:

> (i) *"Fixing the Economic Potential of Assets"* (42 f.), meaning that "a formal property representation such as a title is not a reproduction *of*" a thing, "like a photograph, but a representation of our concepts *about*" the thing. "Specifically, it represents the non-visible qualities that have potential for producing value." Focusing on the title of a house and not on the house itself means entering an abstract conceptual world; it means focusing "on the economic potential ... by filtering out all the confusing lights and shadows of its physical aspects and its local surroundings".
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> (ii) A formal property system is *"Integrating Dispersed Information into One System"* (44 f.), because when "property information is standardized and universally available, what owners can do with their assets benefits from the collective imagination from a larger network of people".
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> (iii) *"Making People Accountable"* (46 f.), meaning that "by becoming inextricably linked to real estate and business that could be easily identified and located, people forfeited the ability to lose themselves in the masses".

[2] A debtor's money is characterized by the fact that the bank of issue, unlike in the case of creditor's money, accepts titles issued by its debtors as securities, thereby circumventing the lack of good securities.

(iv) *"Making Assets Fungible"* (48), meaning that "by uncoupling the economic features of an asset from its rigid, physical state, a representation makes the asset 'fungible' – able to be fashioned to suit practically any transactions".

(v) *"Networking People"* (50 f.), meaning that property "radically improved the flow of communications about assets and their potential". And finally,

(vi) *"Protecting Transactions"* (53), meaning that the property system works like a network, because "all the property records (titles, deeds, securities and contracts that describe the economically significant aspects of assets) are continually tracked and protected".

On the strength of the arguments advanced both by Steiger and de Soto, one can easily agree that the introduction of property rights is of fundamental importance for development. Many neoclassical economists would not hesitate to confirm this point, arguing that it is in conformity with their standard proposition of privatisation. However, the problems involved with the establishment of a formal property system are very different from those connected with privatisation. Therefore, Steiger and de Soto propose to stabilise the existing possession rights of small producers within the informal sector through formal property rights. Privatisation as it is generally understood in economics is a far cry from this proposal, meaning a shift from supposedly common or State property[3] in favour of the private property rights of the already wealthy minority in the formalised sector.

This can be exemplified by the processes in which, in the 18th and 19th centuries, property rights were introduced into the possession-based regime of India by the English colonial power, as analysed by John Stuart Mill in his *Principles of Political Economy* (1909, 1976 [1848]). The two modalities of introducing property rights long ago are not so different from those prevalent nowadays – namely privatisation and the creation of a formal property system. With regard to the distinction between possession and property, we easily project familiar institutional conditions onto culturally different situations that require independently formed and cul-

[3] The proponents of privatisation in development countries do not know that common or State property does not exist in these nations, only common and State possession because property rights are lacking.

turally appropriate concepts. Furthermore, we must ask how ecological and social conditions are influenced by the introduction of property rights. This specific point will be discussed in the tradition of Veblen, one of the very few economists who gave serious thought to the implications of burdening and encumbering property with regard to the qualitative path-orientation of economic growth.

3b. Learning from the introduction of property rights into the possession-based regime of British India

John Stuart Mill (1909, 1976 [1848], 325 f.) gives the following account of the introduction of property rights into British India. His account clearly shows the fundamental error, namely that feudal lords in India were amalgamated with capitalist English landlords.

> "The English Government ... grossly misunderstood the usages and rights which it found existing. Its mistakes arose from the inability of ordinary minds to imagine a state of social relations fundamentally different from those with which they are practically familiar. England being accustomed to great estates and great landlords, the English rulers took it for granted that India must possess the like; and looking round for some set of people who might be taken for the objects of their search, they pitched upon a sort of tax-gatherers called *zemindars*. … The *zemindars*, … it was inferred without delay, were the proprietors of the soil, the landed nobility and gentry of India. It was not considered that the *zemindars*, though they collected the rents, did not keep them; but paid them all away with a small deduction to the government. It was not considered that if they governed the *ryots* [peasant-farmers], and in many respects exercised over them despotic power, they did not govern them as tenants of theirs, holding their lands either at will or by contract under them" (emphasis added).

Mill (326 f.) deplores the missed opportunity: indeed, one might as well have allocated property rights to the cultivators. Instead, as in the case of Ireland previously, a new class of feudal lords having no interest in economic development was created.

> "'But the legislators were English aristocrats; and aristocratic prejudice prevailed.' ... They flattered themselves that they had created ... English landlords, and it proved that they had only created Irish ones. The

> new landed aristocracy disappointed every expectation built upon them. They did nothing for the improvement of their estates, but everything for their own ruin. ... Nearly the whole land of Bengal had to be sequestrated and sold, for debts or arrears of revenue, and in one generation most of the ancient zemindars had ceased to exist. … The descendants of Calcutta money dealers, or of native officials who had enriched themselves under the British government, now occupy their place; and live as useless drones on the soil which has been given up to them" (emphasis added).

In order to understand this criticism, we must emphasise that in any society, economic core institutions, such as possession and property, are part of a much larger institutional matrix. They express *cultural values*; they are governed by specific *informal and formal rules and regulations*; and they are actualised in corresponding forms of *organisation*. A shift from possession to property on the formal level of rules and regulations introduces a new economic potential that has not been part of the socialisation process: in a possession-based system, there is no way, at this stage, that people have the experience or routine to cope with the new situation or can rely on appropriate cultural values or forms of organisation. A village council can never function like a joint-stock company. The new potential may therefore prove destructive. It allows the newly instituted proprietors to engage property rights beyond possession *via* credit contracts that generate money to be used for ceremonial spending during crucial events of social importance (marriages, funerals, and the like) by using property as collateral, without being aware of the risks involved. Being able to cope with the rules pertaining to possession means that one has considerable knowledge about, say, the principle of sharing, but no knowledge at all about the cumulative effects of having to pay interest. Using different terminology, Georgescu-Roegen (1960 and 1976) highlights the fundamental difference between rational economic principles in a possession-oriented regime based on tithe, and those characteristic of a property-oriented regime based on profit. In the same spirit, Dudley Seers's warnings in his article "The Limitations of the Special Case" (1976 [1963]) are in fact, in Heinsohn and Steiger's terminology, a warning against projecting the economic principles of a property-based economy onto the possession-based regimes of the developing countries.

One is therefore hardly surprised to see that the *zemindars* in British India were unable to retain the newly created property rights. Having

been administrators of the traditional feudal Government neither engaged in farming nor familiar with the monetary rationale of property, the *zemindars* lost their newly created property by default. Mill's discussion clearly shows that property rights are far from able to automatically generate economic development. The absentee owner of landed property, as emphasised by Gunnar Myrdal (1968, 1039), "often managed to enjoy the prerogatives of a capitalist landlord without giving up the privileges of a feudal chief. At the same time, he avoided nearly all the obligations of both". This topic is a well-studied one, starting with the works of the Physiocrats in the eighteenth century and leading up to those of critical institutional economics of today. And it is still highly significant for many developing, transition and even highly developed economies.

According to Mill (1909, 1976 [1848], 327), "in the parts of India into which the British rule has been more recently introduced, the blunder has been avoided of endowing a useless body of great landlords with gifts from the public revenue." This insight allows us to compare the long-term implications of the two ways in which it is possible to introduce property rights. The question is: What happened in those regions where "British rule" created property rights *directly for the peasants,* much in the same way as Steiger and de Soto have proposed the introduction of a formalised property system? In this context as well, the newly created small farmers did not have the necessary experience to handle credit, and many of them lost their land. In fact, they lost it so quickly that the British Government adopted legislation to protect this new category of farmers from their own property rights! The *Land Alienation Act* of 1901 simply banned the transfer of landed property to non-agricultural castes. "Thereafter, members of notified agricultural tribes were forbidden to sell their land to anyone outside their own tribe or community" (Kusum Nair 1979, 82).

This author carefully compares the long-term effects of the two modalities of introducing property rights on comparable State, district and village levels of ecologically similar conditions. In a district in Bihar, an area of permanent settlement where the *zemindars* were made proprietors, the land productivity of wheat stagnated around 1500 kg/ha for ten years following the "Green Revolution" in the 1960s, after having increased by as little as 200 kg/ha within a period of 60 years. In a comparable district in Punjab, however, where peasants obtained property rights, the yields were about 2300 kg/ha. In addition, the farmer-

proprietors increased productivity both before and after the existence of the advantages presented by the Green Revolution, while in Bihar stagnation continued.

The introduction of property rights into a possession-based regime entails a long period of learning of how to handle the newly acquired economic potential of being able to enter into credit relations – a period, during which, in the Punjab case, the colonial power effectively protected the newly created small proprietors from becoming trapped by debt. It should be noted, however, that in both cases an even more important and more general question is connected with the hierarchical structure of the property aspect of property (credit potential) and the possession aspect of property (use rights). Obviously, the acquisition of property rights simply to obtain as much rent as possible, without taking care of the possession-side of property, is an economic strategy quite different from one that consists of using property rights to secure, improve and extend the possession aspect of property. Both are inherent in property-based societies.

4. Property rights and economic rationality: ecological and social considerations

4a. The tradition of Thorstein Veblen and critical institutional economics

It is the property aspect of property – the potential to enter into credit relations as a creditor *and* as a debtor – that defines economic rationality in capitalist societies. As we have seen, it opens up an entire set of opportunities. Yet, once an economic agent has engaged his or her property as collateral in a credit contract – and has survived economically! – the implications are such that they define the entire *hierarchy of economic decision-making* and the *evaluation process* associated with it. It is not only that a property-based economy "allows", "seduces" and "pushes" for growth, it also imposes growth as a result of the conditions of credit.

Money created in a credit contract is expressed as a money of account, a *standard* defined by the creditor. The contract defines the *level of interest* to be paid, the *time period* within which the loan has to be refunded with interest and the *collateral* acceptable as security. The combined effect of these conditions defines the *specific economic pressure* that pre-

vails in property-based economies: the *pressure for exponential growth* imposed by interest, the proverbial *time pressure* imposed by the period for which the credit is granted, the *pressure to improve cost-benefit conditions* in order to be able to refund. It is therefore not surprising that, given this particular economic pressure, the qualitative orientation of economic growth, path orientation, is of an equally particular nature.

Economic rationality in a property-based economy is a rationality defined from the point of view of property or the proprietor. All economic decisions and evaluations are hierarchically differentiated, integrated, balanced and centred according to the impact they are likely to have with regard to the security, quantity, quality and value of property. Their monetary determination is due to the fact that money is an anonymous title to property. The hierarchy of decision-making directly follows from this perspective. Five different levels can be distinguished in this hierarchy:

(i) a general orientation towards the monetary value of the property engaged;

(ii) maintaining solvency as the existential condition of property engaged in credit;

(iii) a cost-benefit evaluation of all economic transactions as a routine procedure;

(iv) institutional considerations based on an evaluation of the impact of changed rules and regulations on monetary costs, benefits, and value of capital; and

(v) considerations of an ecological and social nature, as distinguished from economic rationality.

The first level of evaluation is concerned with the value of the property engaged. Veblen (1964 [1904], 131) focuses on the role of collateral in credit expansion when he defined capital as "capitalised putative earning-capacity, expressed in terms of value" while stating that "this capitalisation comprises the use of all feasible credit extension". The value of capital, as it fluctuates from day to day, is evaluated according to two interdependent factors of a material (technical) and immaterial (institutional) nature, where the

> "nucleus of the capitalisation is not the cost of the plant, but the concern's good-will. ... 'Good will' is a somewhat extensible term ... the items included ... are 'immaterial wealth' [and] 'intangible assets' ... [comprising] such things as established customary business relations, reputation for upright dealing, franchises and privileges, trade-marks, brands, patent rights, copyrights, exclusive use of special processes guarded by law or by secrecy, exclusive control of particular sources of materials. All these items give a differential advantage to their owners, but they are of no aggregate advantage to the community. They are wealth to the individuals concerned – differential wealth; but they make no part of the wealth of nations" (140 f.).

Whether a capitalist society with its property-centred economic rationality is able to maintain globally reasonable social and ecological conditions is a central economic problem that has troubled a number of authors throughout the history of economic thought. The question can obviously not be answered without relying on explicit value premises with regard to the multiple inequalities within and among nations, or without considering a time frame extending beyond several generations. Taking into account the consolidation of economic sectors in his time – and we might add today's global consolidation of markets – Veblen (158) distinguishes several organisational levels of interests in decision-making: (i) the interest of the community, (ii) that of the corporation and (iii) that of the corporation's directorate. While the interest of communities "demands that there should be a favourable difference between the material cost and the material serviceability of the output," the corporation looks for "a favourable pecuniary difference between … cost and sale price of the output," and the directorate is interested in "a discrepancy … between the actual and the putative earning-capacity of the corporation's capital".

As indicated above, in the hierarchy of property-oriented decision-making, solvency is the existential condition, imposing as a routine the necessity to create a "favourable pecuniary difference between … cost and sale price of the output." This implies some obvious characteristics: (i) continuous innovations according to this – and only this – principle; (ii) labour-saving technical progress; (iii) substitution in favour of cheapest natural resources; (iv) all kind of strategies to keep sales prices high; and (v) publicity to influence consumers to project their immaterial needs to the consumption of rapidly expanding consumer goods. Veblen's critical list indicates why the relationship between economic growth accord-

ing to the "vested interests" of property values and substantive satisfaction of the needs of "common man" is highly complex and far from obvious.

The important question in any cost-benefit calculation is obviously: What is a cost, and for whom (Bromley 1989)? In any society, and at any moment, the answer depends on the legal definition and distribution of rights, duties, privileges, and non-rights of the members of such society. The "rules of the game" determine the extent to which economic agents may be held accountable, define the scope of responsibility and therefore specify which ecological and social standards need to be met. Legal standards identify the costs to be taken into consideration, to be 'internalised', and determine which of these costs can be foisted on other sectors of society or future generations in the form of social costs, as first demonstrated by K. William Kapp (1950). This is why business organisations have an interest in following and influencing the political process of lawmaking and why differences in ecological and social standards play a role in investment decisions.

Only after having followed the hierarchy of economic evaluation in the sense of impacts on the value of property, solvency, cost-benefit routine and connected institutional considerations is there room for social and ecological considerations. If we interpret Veblen's "favourable difference between the material cost and the material serviceability" as a kind of ecological and social reasoning (different from economic rationality), it is obvious that a development in the interest of, say, "the poor" or future generations is very different in nature from the economic growth process achieved under the rule of a property-based economy (Steppacher 1976 [1972]). The difference becomes obvious when we look at how a business ordinarily keeps its books and records successful economic activities, or at how national accounting determines what an economically "good" year for the country is.

Nothing informs us about what is happening in the real world of the biosphere, except some remote manifestations in *relative* resource prices and pollution-abatement costs imposed by law. Relative resource prices say nothing about *ecological* scarcity: they only represent actual supply and demand situations of economic agents, with, at best, some short-term anticipation of changing relative scarcities and their *economic* meaning. The same is true for costs involved in politically imposed pollution control. These costs say nothing about the severity of ecological conditions.

They only reflect the economic cost impact of politically determined environmental standards – standards that may be influenced by property interest as well.

Much in the same way as market prices do not reflect the *needs* of people, but only the manifestation of needs *via purchasing power* – that is, distribution of income – market prices in turn do not reflect ecological conditions. They only show the actual economic and political evaluation of such conditions; that is, the *power of present* over future generations. Economic success, evaluated according to economic principles based on property, can easily go hand in hand with the degradation of social and ecological conditions measured by non-monetary social and ecological indicators. In developing and transition economies, where one often finds a combination of widespread poverty and ecological degradation, the question of whether the introduction of a formalised system of property rights – let alone privatisation – is a feasible proposition remains open to debate.

One may even go one step further. While some property-based economies have achieved high growth rates since World War Two, in particular since what historians have called "the syndrome of the 1950s" (Pfister 1996), one must not forget that this material success benefits only a minority of the world population living in property-based economies and yet has caused global ecological degradations of *geological* dimensions. Even for this minority, the economic growth path has proved to be non-sustainable – and this is without considering what the economic pressure of a property-based global economy would mean for the biosphere. The question of the relationship between a property-based economy and ecological degradation is the focus of the next sections, which address three issues: (i) the strategic role of natural resources for exponential growth – of mineral natural resources, to be precise; (ii) the fact that the possession aspect of property is subject to the entropy law; and (iii) some insights from, and limitations of, the discussion of "property" regimes some forty years after Hardin's article on "The Tragedy of the Commons" (1960).

4b. The property aspect of property and its implications for economic growth

The economic pressures imposed by the property aspect of property are exponential growth, time pressure, monetary cost efficiency, and favourable institutional conditions. How can this pressure be actualised materially? As long as property-based economies represented only a small fraction of global economy, gains from asymmetrical *international trade*, *the appropriation of land and natural resources in colonial expansion* at the cost of indigenous possessors, and *concentration of property* in the hands of a few did not pose any particular problem. With the spread of capitalism, exponential growth somehow had to be materialised. What kind of *technology* and what kind of *resources* allow exponential growth, a time organisation of production and cost efficiency in such a way that it satisfies the conditions engaging the property aspect of property? When focusing on technology and resources, we automatically think of the possession aspect of property, the question of the rules guiding the material use and return of resources, production technologies and processes, products and waste.

Not surprisingly, different schools of economic thought have focused on the strategic resources for growth under the technological conditions of their times. Agricultural progress leads Quesnay to focus on *land*; the "division of labour" determines Adam Smith's emphasis on *labour*; and "the machine process" stimulates Karl Marx to address the issue of *capital equipment*. Veblen (1924 [1923], 232 f.; emphasis added), in turn, sees *technological knowledge* as a strategic fund factor and *natural resources* as a strategic flow factor in production.

> "In America, as an outcome of the nineteenth century, the industrial work of the community has fallen into the shape of a three-fold division or stratification of industries which work together in a balanced whole, a moving equilibrium of interlocking processes of production: (a) the primary, initial, or *key industries*, so called, *which command the greater natural resources of the country* and turn out the prime staple necessaries of the mechanical industry in the way of *power, transportation, fuel, and structural material*; (b) the secondary or continuation industries, manufacturers, which turn these crude supplies and services into consumable goods and distribute them; (c) agriculture."

In Veblens's view, the key industries do not have much in common with the division of labour and specialisation as maintained by classical economists. On the contrary: with the spread of the steam engine as the master model of heat engines in general, the industrial revolution already became *thermo-industrial*, as Jacques Grinevald (1990) insisted long ago. Thermo-industrial technologies based on heat engines, machines, and mineral resources are still what our historical situation and technological globalisation are all about.

"Timber lands" and "oil fields" (Veblen 1924 [1923], 186-201) are very different kinds of natural resources. Mineral resources, as the economically most important category of non-renewable resources, compared with living (or biotic) resources, standing for all renewable resources, do have different *economic and ecological characteristics* – an insight which cannot be over-emphasised! According to Georgescu-Roegen (especially 1965), the main differences are the following:

> (i) *Living resources* do *not* allow for exponential growth. They grow to maturity but not beyond. If they do so, we call this deadly cancer. Obviously, productivity has been improved in agriculture by achieving better control over limiting factors, such as irrigation. Yet, there is an upper limit, and today the high productivity of some agricultural systems is due to an exogenous support of mineral resources. *Mineral resources*, in contrast, allow exponential growth as a feasible proposition, but only *within a given historical period*. The reason is simple: one steam engine, one coal field, and one iron deposit allow the production of as many steam machines as needed to exploit all accessible iron and coal deposits. The property imperative of exponential growth requires minerals!
>
> (ii) The 'time is money' imperative requires minerals, too. Living resources, or renewable natural resources in general, are subject to time irregularities inherent in biological and ecological rhythms and seasons, limiting the production potential of the *services* of those *funds*. This is a situation entirely different from the *resource-flows of mineral stocks*. Their utilisation over time can be chosen freely!
>
> (iii) From the difference in *time-structure* flows a further asymmetrical condition: factory processes based on mineral resources can be *arranged in line*, minimising idleness of fund factors such as land, labour and equipment. Production processes based on living resources (like

farms or windmills) can only be *arranged in parallel*, implying non-reducible idleness of funds.

(iv) There are several other asymmetrical relations dependent on the kind of individual mineral or living resources involved and on the purpose they are supposed to serve. Let us just mention some examples: Farm animals, unlike tractors, consume energy even when they do not work. If we neglect the obviously important difference between non-renewable and renewable energy resources, the energy-efficiency of minerals may exceed that of living resources. A chicken kept in battery is cheaper because it is kept like a mineral resource: its consumption of energy for autonomous goals is limited to near zero. To stock minerals is easier than to stock living resources that may decrease in value over time, and so forth.

Table 1: Mineral and living resources in relation to property and possession

	Exhaustible, mineral resources	Renewable, living resources
Property	case 1	case 2
Possession	case 3	case 4

If we combine the differences between mineral and living resources with the differences between property and possession, we arrive at Table 1 above.

The result of the combined asymmetries between mineral and living natural resources is obvious: only minerals, particularly fossil fuels, together with engines and machines (two fundamentally different types of equipment), are today a technically feasible proposition to satisfy the particular institutional economic pressure imposed by the property aspect of property (case 1), while renewable resources are not (case 2). To avoid a misunderstanding: the known technical potential of renewable resources is great; however, it does not fit the imperatives of the property aspect of property. And since this particular aspect is constitutive of capitalism, the incompatibility it entails is equally constitutive of capitalism. Empirically, there can be no doubt: since the thermo-industrial revolution,

nearly all technological development has been based on minerals. Not only industry, but also agriculture and services have to some extent become cumulatively dependent on engines and minerals. Seen from a natural-resource perspective, property-based societies have not become post-industrial but rather super-industrial!

Even agricultural biotechnology with genetically modified seeds has favoured the consumption of mineral resources by favouring herbicide-tolerant corn varieties. Substitution of exhaustible for renewable resources has been the norm for decades, while reverse substitution hardly ever happens. And if it does, it is only under conditions, where the property rule is offset or modified by political efforts in the direction of a possession rule, as in the case of policies encouraging organic agriculture or renewable energy measures (Bieri, Moser and Steppacher 1999). However, it is not surprising that living resources can stand well with the institution of possession: most agrarian regimes have in fact been based on possession rather than property (case 4).

Yet, while there is path-dependency in property-based societies between mineral resources and material exponential growth, agricultural possession-based regimes are today plagued by another path-dependency, namely the problem of exponential population growth that cannot be solved with the help of renewable resources alone. Most interestingly, the combination (3) of institutions of possession with industrial technologies based on mineral resources, as in former socialist economies, did not yield an increase of wealth corresponding to that yielded in property-based economies; rather, natural degradation became even worse.

Veblen (1924 [1923], 165 f.) already sensed that other countries "some day … will presumably outbid America, … both as to the abundance and the availability of their natural resources". He is also correct in foreseeing the strategic role of the key industries. The largest industrial companies today are producers of oil, petrochemicals and cars. U.S. oil production, which peaked among the 48 oil-producing countries in the 1970s, today ranges at the bottom, as correctly predicted as early as 1956 by the Hubbert curve. Based on the same geological evaluation techniques, a growing number of geologists warn "that oil will begin to run out much sooner" than economists assume (*Science*, 21 August 1998). Yet, the exponential growth of non-renewable mineral consumption – especially of fuel – is continuing, because newly industrialising countries like China and India, with a population of more than a billion people

each, are dramatically increasing their consumption of minerals, given that much of the production in these countries *is* under a regime of property.

The empirical fact that most of today's technologies are based on exhaustible mineral resources is profoundly rational according to the property aspect of property. From a sustainable-development point of view, however, it seems to be very unreasonable. We should not forget that a large portion of the world population has nearly no access to mineral resources. Population growth and export obligations to refund loans force them to overuse living resources, thus hindering growth. While *availability* and *accessibility* of mineral resources, particularly fossil fuels, are important questions regarding the imperatives of the property aspect of property, the ecological implications of today's use of mineral resources is still more important.

4c. Why the possession aspect of property is subject to the entropy law: Lessons from ecological economics

The economic evaluation based on the property aspect of property is a growth- and time-pushing *monetary* evaluation, recorded in monetary concepts in the balance sheets of companies. This kind of bookkeeping is in harmony with *mechanistic principles*. However, on this level of abstraction, there is no indication of what is happening in the biosphere – except some remote manifestations in *relative* resource prices and pollution abatement costs imposed by law. It is the *possession aspect of property* that allows to obtain a clearer view of the material side of production processes: quantities and qualities of the natural resources needed, labour and equipment services employed, health standards imposed, pollution levels tolerated, production and product requirements imposed by the imperatives of the technology at hand, defined according to accepted standards and expressed in physical, biological or chemical units, such as temperature and pressure in the most simple cases. This is the world of the engineer, where productivity, efficiency or any other concept acquires a *material* meaning that differs from the corresponding one in property and, therefore, *monetary* terms. Significantly, this material level of production is not guided by mechanistic but by *thermodynamic principles*.

Thermodynamics is a scientific branch that has grown from the historical fact that the industrial revolution was crucially based on thermodynamic conditions. When studying the efficiency of steam engines, Sadi Carnot (1796-1832) became the founder of what was later called *thermodynamics* (Grinevald 1976). And it is Georgescu-Roegen (1971) who, influenced by research that integrated thermodynamics with life sciences (Schrödinger 1944, Bertalanffy 1955, Kapp 1961) into an open system's approach, becomes the founder of *ecological economics*. He describes a paradigm that allows for a new understanding of the qualitative interrelationship between economic activity and global ecological degradation. His approach deals with the ecological and social implications of the material transformation processes in production and consumption in the light of thermodynamic laws. Its basic integrating idea is that living structures are able to maintain themselves for some time and to compensate entropic degradation by sucking low entropy (high-quality energy matter) from the bio-geo-chemical cycles of the ecological environment and, at the same time, rejecting high entropy (low-quality energy matter). Ecological economics demonstrates that prevailing economic ideas about natural resources and pollution contradict thermodynamics laws – ideas that had their origin in the mechanistic epistemology of neoclassical economics and in the historical experience of seemingly superabundant natural resources (Georgescu-Roegen 1976). Many of these myths have survived in the guise of the concept of "weak sustainability" (Neumayer 2003).

The significance of ecological economics for the possession aspect of property can be deduced from the laws of thermodynamics. Accordingly, limitations apply not only to the availability and accessibility of natural resources, but also to the *transformation of energy into work* and to all other material transformations. Furthermore, the laws imply the *irreversibility of the economic process* and of *ecological consequences*, where the possession aspect of property is actualised.

The entropy law not only teaches us about our limitations with respect to resources; it also informs us about the irreversible ecological degradation that goes hand in hand with economic activity: "Given the entropic nature of the economic process, waste is an *output* just as unavoidable as the input of natural resources" (Georgescu-Roegen, 1976, 13). For sure, various forms of waste, pollution, and emissions must be differentiated. Some waste is biodegradable, requiring only space, time and hygienic

conditions to do so. Carbon dioxide resulting from burning fossil fuels is not even pollution. The problem results from the fact that fossil fuels were stocked in the lithosphere as coal or oil for millions of years, so that their release into the atmosphere and their increased concentration contributes to the greenhouse effect and climate change.

Some forms of pollution, such as sulphur dioxide or nitrogen dioxide, have been reduced by technical measures in some highly developed countries, improving *local* health while at the same time increasing *global* entropic degradation. Energy-matter efficiency has increased in many production processes, but economic growth has more than offset the improvements. Some waste can be recycled: yet, energy matter is required for this process to occur. There can be no doubt that property-based economies, with their extremely high per-capita consumption of minerals, bear most of the responsibility for today's global ecological degradation.

However, one notices a fundamental contradiction. It is at the level of material transformation that connects an economy with the ecological cycles – a level evaluated by the possession aspect of property. Measures to be taken to reduce the entropic impact of economic activity need to be defined at that level and expressed on the basis of geological, physical, chemical, and biological indicators. Only a material flow-fund analysis can begin to inform us about what needs to be done to reduce ecological degradation. "Industrial ecology" (Erkman 1998) teaches us how to interconnect industrial processes in such a way that overall entropic degradation is reduced, how to de-materialise production and how to decarbonise energy; organic agriculture has developed high standards of knowledge; housing could be provided with a much lower level of energy consumption, and the same is true for transportation. There is no field in which alternatives are not available at the level of principles guided by the concept of the possession aspect of property.

However, the fundamental contradiction lies in the fact that economic evaluation at the level of the property aspect of property is hardly ever connected to ecological reality. The main strength of property-systems identified by de Soto (2000, 42), namely the focus "on the economic potential ... by filtering out all the confusing lights and shadows of its physical aspects and its local surroundings", is also its main weakness from an ecological viewpoint. Having lost contact with its physical environment, economic evaluation at the level of the property aspect of prop-

erty cannot escape the need to push for growth and increased use of mineral resources. In fact, it pushes for anything that is favourable from the point of view of the monetary evaluation of property – no matter how much it may otherwise be unfavourable to ecological improvement.

5. "Property regimes in resource management": necessary differentiations between common, private, State, and "open access" regimes

The awareness of the importance of "property rights" for natural resource use and ecological degradation has spread, together with the concept of "sustainable development" – to the extent that expressions like "environmental resource management regimes " (Bromley 1991) have become part of our language over the past few decades. Research on how peoples in different cultures use their living resources, and what this entails for the ecological degradation of natural resources, has enhanced the understanding of the very different meanings of "property" (in fact possession) in different ecological and cultural settings (for example, Ostrom and Schlager 1992; or Le Roy, *et al.* 1996). However, these distinctions neglect the implications of the more fundamental differentiation between property and possession that is constitutive of both capitalist and non-capitalist societies.

Garret Hardin has been most influential in shaping this research agenda. In his seminal article addressing the "Tragedy of the Commons" (1993 [1968]), he explains the tragedy of herdsman grazing their cattle in a pasture open to all as follows:

> "Each man is locked into a system that compels him to increase his herd *without limit* – in a world that *is* limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all" (132).

The "Tragedy of the Commons" proposition has been widely accepted, as a case in point – as it seems – against a regime of common property and in favour of private or State property. However, Ciriacy-Wantrup and Bishop (1975) as well as Bromley (1989, 205) have shown that Hardin confused the "common property regime" with the regime of "open ac-

cess"; that is, a system *without* any regulation of rights and duties with regard to resource use. Empirical research rather confirms that the commons always – and often quite ingeniously – define a system of rights, duties, privileges and non-rights for members of societies following a particular *common possession regime* (McCay 1987; Berkes 1989).

There is no need to idealise common possession regimes. However, the real break-down of many of them, particularly in forest areas, was often due to the introduction of "State property" into the forests, depriving the village communities of their authority to protect their boundaries against infiltration of non-members into 'their' forest, while the State forest agencies were unable to protect them. Poffenberger (1990) has shown for many Asian regions that such interference from the outside favoured the problematic transition of commons to "open access" regimes. The corresponding colonial policy, together with logging concessions allocated by State agencies, hardly managed to exercise any control over foreign companies, thus adding to the destruction of vast forest areas.

Yet Hardin's "tragedy" is not only misplaced with regard to the category of the "property regime". Also, the very idea of "growth without limit" is the projection of a capitalist society based on property and using mineral resources onto a non-capitalist society based on possession and using living resources. As we have seen, it is the "property aspect of property", the security aspect engaged in credit and, consequently, the imperatives of a monetary rationale that push for exponential growth rather than maturity. People using living resources whose economies are determined by funds rather than mineral stocks know that "their" resources are finite; they know they must continuously adapt ends and means according to the availability and accessibility of such resources. Abstracting from its fundamental material difference, the monetary evaluation of living and mineral resources puts them into a form of competition that can only be destructive.

The insights gained from the differentiation between private, common and State property on the one hand and "open access" on the other can be increased by connecting them with Heinsohn and Steiger's differentiation between possession and property, as shown in Table 2 below.

Table 2: Different forms of property and "open access" in relation to property and possession

	Common	Private	State	"Open access"
Property	case 1	case 3	case 5	case 7
Possession	case 2	case 4	case 6	case 8

The differentiation between common, private and State is significant for both possession and property, although in the case of possession one should rather speak of individual and not private possession (Steiger 2006). In most cases, *commons are possession* rather than *property* regimes; they cannot be encumbered or sold. The shift to private or State property is more than a shift in authority, it is also a shift in the procedure of evaluation from a kind of ecological-social reasoning to economic rationality, the outcome of which depends on factors such as those discussed by Mill in the case of British India. There are also cases in which formal property systems have been introduced, yet the proprietors have not been able to keep registration adapted to new circumstances, as shown by Ensminger (1997) for Kenya. Privatisation as a shift from State or common possession to private property is anything but the establishment of formalised property rights in favour of those who have already existing possession rights! In this case, it is a shift from individual possession to private property.

Similarly, the common possession knowledge of indigenous people (see Veblen 1961 [1908]) about, say, potential health characteristics for plants is a far cry from intellectual property rights as will most certainly be introduced, once it is demonstrated how this knowledge can be used to produce drugs. Whatever our perspective and research interests, the distinction between possession and property opens up a vast – and complex – array of research possibilities.

6. *Fourteen theses on property, exhaustible resources, and development*

As pointed out in section 1 above, there exists a double bind between the necessity of property rights for economic development on the one side

and the doubt to see how the existing property-based economies are able to achieve sustainable development on the other, without destroying the economy's ecological foundations. The contradictions between property, exhaustible resources, and development are summarised in the following fourteen theses:

(i) The difference between possession and property, established by Heinsohn and Steiger, is of fundamental importance for the understanding of economic development. Property contains economic potentials alien to possession and is therefore constitutive of capitalism.

(ii) What is most important is the potential to burden and to encumber property in credit contracts. A whole set of other characteristics of a formalised property system adds to the development strength of a property regime.

(iii) The property aspect of a property regime not only allows but also imposes exponential growth owing to engaged property, indebtedness, interest, time pressure, and imposed cost efficiency guided by monetary evaluation.

(iv) The empirical fact that in many developing and transition economies, large parts of the population produce under conditions of possession, particularly in the large informal sectors, necessitates the establishment of a formal property system for allowing expansion of production through secured credit relations and also for the control of currency stability.

(v) Adding to the distinction between possession and property the differentiation between State, common, private, and "open access", it becomes possible to identify different meanings of shifting possession and or property regimes. The establishment of a generalised property regime, including small producers in the informal sector, is a far cry from privatisation and thus the transfer of State and/or common possession into private property of an already wealthy minority.

(vi) Possession and property systems are always part of larger institutional structures, including cultural values, other rules, and regulations and organisations. A shift on the legal level is effective only when corresponding shifts of cultural values and forms of organisations occur.

(vii) Shifting from possession to property implies a shift from ecological-social reasoning, based on sharing costs and benefits evaluated on the basis of its own heterogeneous indicators, to economic rationality

as defined from the point of view of the monetarily evaluated property engaged in economic activity. A whole hierarchy of decision-making follows from this perspective.

(viii) Economic rationality from a property point of view does favour economic growth, but it guarantees neither an improvement of social conditions nor the prevention of ecological degradations.

(ix) Between exhaustible mineral natural resources and renewable natural resources in general and living resources in particular, fundamental economical and ecological differences exist that cannot be reduced.

(x) The economic pressures of the property aspect of property for exponential growth, for speeding up time, and for achieving monetary cost-effectiveness can only be transformed into corresponding material economic growth by using up the stocks of exhaustible mineral resources to which renewable resources cannot respond.

(xi) The material production conditions on the level of the possession aspect of property are subject to the entropy law, exposing the limitations of availability and accessibility of natural resources, the problems of transforming energy into work and the ecological degradation that goes with economic production and growth.

(xii) Economic growth guided under the property aspect of property cannot be sustainable, because the global extension of property rights speeds up ecological degradation.

(xiii) Therefore, we are confronted with a paradox: without property rights, it is not possible for possession-based regimes to compete with property-based economies. Yet, the global extension of property rights, by its very economic rationality, destroys the ecological foundation on which it is built.

(xiv) Dominating economic theory has neither established the constitutive importance of the property aspect of property nor the entropic nature of the possession aspect of property. The general confusion between property and possession and the rarely understood differences between mineral and living resources have opened the way for more or less naïve discourses on sustainable development. Therefore, a new theory integrating these multiple differentiations is badly needed.

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