History of Thought on Nature and Economy

Faber, M., Frick, M., Zahrnt, D. (2019) MINE Website, History of Thought, accessed on 20 January 2019, www.nature-economy.com

Abstract

Aristotle (384/3 – 322/1 B.C.) was the first to develop a proper doctrine of the economy and is considered the founder of economics as a science – apart from Xenophon (430 – 354 B.C.) and his treatise *Oeconomicus*. Aristotle regards the economy and politics as separate entities. Politics is the sphere of freedom, while the econom*y* is the sphere of bondage, meaning a master oversees the household while slaves carry out the work.

Aristotle's view dominated discourse until the end of the Middle Ages. The English statesman and philosopher Francis Bacon (1561 – 1626) criticised Aristotle's views, attempting to use science to create constant progress for the welfare of people. Nature had no value in itself but was a means to his end. Similarly, Thomas Hobbes (1588 – 1679) dismissed Aristotle´s view of regarding human beings not as a community orientated by nature but as a community orientated only towards itself. Instead of emphasising natural harmony, he saw conflict. Hobbes viewed human beings as individualistic, rationally maximizing their choices in their own self-interest.

In the 18th century, Adam Smith founded modern economics, emphasising that economic activity leads to dynamic development, innovation, growth in the national product and improved welfare. Friedrich Wilhelm Hegel (1770 – 1831) and Karl Marx (1818 – 1883) viewed the economy as a system. While Hegel based his considerations on the wants of consumers, Marx saw the economy as dominated by production.

Mainstream Economics started to develop during the second half of the 19th century. Its methodological perspective is based on the concept of the rational utility maximiser. At its core the theory shows how household demand and supply by firms lead prices to strike a balance in the markets. Mainstream Economics views the environment as a subsystem of the economy, providing resources while receiving emissions, waste water and waste.

Ecological Economics emerged out varying strands of historical thought; we shall outline two of their major representatives. First, we examine the classical economist Thomas Robert Malthus (1766 – 1834) before considering the romantic poet William Wordsworth (1770 – 1850). We then draw conclusions for modern Ecological Economics by comparing their views.

Then we turn to the founding of Ecological Economics in the 1980s and its development. In contrast to Mainstream Economics, Ecological Economics sees the economy as subsystem of the environment. This change of perspective broadens the range of questions to be asked.

Finally, we outline the influence of Malthus on Ecological Economics. He emphasizes nature's limitations for proving food, while Wordsworth interprets nature as a source of inner orientation for Ecological Economics.

Related concepts: INDIVIDUAL, COMMUNITY & ENTIRETY; HOMO ECONOMICS & HOMO POLITICUS; EVOLUTION; SUSTAINABILITY & JUSTICE; ENVIRONMENTAL POLITICS; BASICS OF TIME

1. Ancient Philosophy: Aristotle

Aristotle (384/3 – 322/1 B.C.) was the first to develop a proper doctrine of the economy and is considered the founder of economics as a science - apart from Xenophon (430 – 354 B.C.) and his treatise *Oeconomicus* (Petersen/Faber 2018: 162 ff.). Aristotle (1984, 2000) deals with the economy in the context of his teachings on ethics and politics. The Aristotelian ethics asks what the highest good is for humans and finds the answer in living well. To have a good life means to practice certain virtues such as justice [see concept SUSTAINABILITY &JUSTICE], prudence [POWER OF JUDGEMENT], fortitude and deliberateness [HOMO OECONOMICUS & HOMO POLITICUS]. By distinguishing themselves by virtues, humans find their *eudemonia* i.e. their felicity. Aristotle believes that humans can only exert their virtues in the sphere of politics [HOMO OECONOMICUS AND & POLITICUS; INDIVIDUAL, COMMUNITY & ENTIRETY], that is the Greek *polis*, the Greek city state.

To be able to participate in politics presupposes that certain conditions are granted. It demands that freedom, health, marriage and children, and, in particular, a certain wealth are given. Except for freedom and health, the Greek city state, the *oikos* or the house, provides these conditions. In addition to the family, the household also embraces slaves and a farm with animals. Aristotle calls the activity of managing the household *oikonomike.* The word *oikonomike* contains the words *oikos*, house, and *nomos*, law or rule.

The sphere of the *oikos* is strictly separate from the sphere of politics. The latter is public while the *oikos* is private. Politics is the sphere of freedom, while the *oikos* is the sphere of bondage. Production is left to slaves – if possible (for an extensive discussion, see Petersen and Faber 2018: 164 ff.). The main realm of man is politics, hence Aristotle considered man to be a *zoon politicon,* i.e. a political being.

"So, what does *oiko-nomia* mean? Here we must turn our attention to the expression *'nomos'* from which the second syllable '-*nomy'* in 'economy' is derived. *Nomos* is also an Ancient Greek expression meaning law: an established or implemented order, be it of human or divine origin. Thus, *nomos* is an order which does not simply exist of its own accord but must be implemented at some point in time by a law-giving authority or through a contractual agreement.

The expression *nomos* has a relationship to nature, for it is derived from the verb '*nemein'* which means to pasture or graze. How are law and the pasturing or grazing of domestic animals correlated? Among the oldest orders which humans had to establish among themselves was the division of pasture areas and the allotment of fertile lands by a higher authority – for example, a lord or a council assembly. *Nomos* is therefore the law in the sense of the establishment of principles for the concrete ordering of the division and allotment of rights and goods within a human society. The ordering of division and allotment is always associated with the questions: Who has claim to what? Who deserves this, who deserves that? Who is to receive more, who less? In other words, when is a partition just and when is it not? Reflections on *nomos* lead to questions of a just legislation – *nomos* belongs in the sphere of justice [SUSTAINABILITY & JUSTICE].

Regarding the *oikos*, the term *nomos* is limited to the community of those who belong to the household. When speaking of *oikonomia* – as noted above, the expression first turned up roughly five hundred BC – we are therefore dealing with the order of the household. The ancient Greek household was patriarchal: the lord was the head of the household, and running the house was in his hands. It was his right and duty to apportion the household tasks and allocate them to family members, servants and maids. He had to regulate the deployment of animals and tools and decide how money was to be earned and spent. It was furthermore his duty to distribute the acquired goods (insofar as he did not decide to save them) among the people and animals in his charge. Regarding the allotment of work and goods in the house, *oikonomia* meant the just and economically wise running of the household. The measure for the justice and economic wisdom in this sense was the needs and performances of those living in it. It was toward them that the *nomos*, the established order, had to be fair. Throughout ancient times as well as in the Middle Ages, the expression *oikonomia* or its Latin form *economia* retained this meaning" (Faber and Manstetten 2010: 17).

Note that Aristotle differentiates three spheres within economic activity (Petersen/Faber 2018: 261-262; see also 164-172):

- Self-sufficiency of the single households of agrarian and skilled manual work, *oikos.*
- A peripheral exchange economy in which shortage and abundance of single goods between single household's exchange on markets; although Aristotle does not speak of markets in our modern terms.
- An artificial profit-seeking economy based on exchanges, which does not actually seek the production of goods but the indefinite acquisition of money and riches. The attitude which leads to the latter behaviour is called *pleonexia,* i.e. avarice. Aristotle considers it the greatest injustice. For the relationship between pleonexia and non-satiation of the homo oeconomicus [HOMO OECONOMICUS & HOMO POLITICUS].

While Aristotle sees the first sphere as the essential element of the economy, the second only contributes to its supply to a small extent, and he judges the third to be artificial and derogatory. In modern times, the second sphere has widened enormously and gained in importance, while the first has shrunk and lost in importance. The third sphere, on the other hand, is the realm we can call capitalism, as the French social historian Fernand Braudel (1902 – 1885) does (Petersen/Faber 2018: Chapter 20).

2. Individualism and Classical Economics

2.1 Francis Bacon's renewal of science and Thomas Hobbes' individualism

Until the sixteenth century, Aristotle's economic thoughts dominated. It was the English politician, statesman and philosopher Francis Bacon (1561 – 1626) who vigorously criticised the conception of world and human being based on the Aristotelian view. For him, "traditional science, in the form it took at the end of the sixteenth century, was merely convention, no longer the search for truth. … Bacon strove for a 'renewal of the sciences, i.e. that they may be raised up in a sure order from experience and founded anew'" (Faber/Manstetten 2010: 69). Bacon wanted to use science for constant progress for the welfare of people. Nature had no value in itself but was a means to his end. "The true goals of science are for 'the use of human life'. What Bacon seeks is the 'improvement of the state and community of mankind'" (Faber/Manstetten 2010: 69). Science and technology were the keys to exploit nature. "What Bacon has outlined here is the attempt, through arts

and science, to, if at all possible, lead humanity back to Paradise" (Faber/Manstetten 2010: 71).

Similarly, Thomas Hobbes (1588 – 1679) dismissed Aristotle´s view to see human beings as a *zoon politicon*, a community orientated toward nature, but as a self-orientated one. Instead of emphasising natural harmony as Aristotle did, Hobbes – living his life during civil wars, having lost the 'nature' of the Greek polis (city) and the will for good order of the medieval empires – mainly saw conflict and man as *homo hominis lupus*, i.e. a man is a wolf to another man. But how could that "wolf's nature" be tamed? Civil war could only be avoided by giving all force to the state. This would enable men to follow their individualistic aims and wants, as long as they do not endanger the peace and law of the state. In contrast to Aristotle, Hobbes' approach allows human beings to follow their pleonexia, their non-satiation for more goods. In this manner he opened the way to the image of human kind in Mainstream Economics, the homo oeconomicus [HOMO OECONOMICUS & HOMO POLITICUS] (Petersen and Faber 2018: Chapter 12).

"In modern times the 'house' that economics deals with is no longer one single household. Toward the beginning of the 17th century, the expression 'Économie Politique', political economics (Bürgin 1993: 243), emerged in France. Now the *oikos* incorporated the entire state. Economics dealt accordingly with the entire state and the questions of apportion and allotment within it: How can the greatest possible amount be produced and how should that amount be distributed? Thus, economy came to mean the production of wealth and prosperity for the state.

At the end of the 18th century the analysis of economic systems and their dynamics increasingly became the focal point. The object of economics has since been the interactions on markets in which the transaction of goods and services takes place. The transformation of the economy from household economy to market economy as it began in early modern times was thus emulated by economics" (Faber and Manstetten 2010: 17).

2.2 Adam Smith and the 'invisible hand'

The most decisive contributor to modern economics was Adam Smith (1723 – 1790). With his book *The Wealth of Nations* (1977), he is generally considered to be the founder of modern economics. It is by no means accidental that he had (at Glasgow) a chair for moral philosophy, for up to his time economics had been a part of practical philosophy in the Western world. In contrast to Aristotle, Smith saw labour as essential for the wellbeing of humans. In a further deviation from Aristotle, he considered division of labour to be central

for economic activity, which in turn made exchange on markets necessary. Smith emphasised that this kind of economic activity led to a dynamic development with innovations and growth of the national product [EVOLUTION]. While from the beginning of the art of political economy in the 16th century the state was perceived as a single house and the king as its administrator, Smith did away with such a conception; instead he thought that the individual decisions of the economic agents, be they consumer or producer, led by an 'invisible hand' to the enhancement of general welfare, albeit not explicitly intended by the individuals. Smith's approach can be traced back to the ancient philosophy of Stoicism (Petersen and Faber 2018: 198-2012; see also Faber and Manstetten 2007: 63-66 and chapters 3 and 5). In this way, he brought back the harmonious side of nature, like it is exemplified in the system of the sun with the movements of the planet, as noted by Hegel (1822/1970: 347).

"Smith's ideal of a good life for the individual is based on the serene calm of the sage of the Stoic age: He who is in harmony with himself, his fellow man, and the whole of the world lives truly well. Economically, this means that possessing few goods will suffice. In contrast to Stoicism, however, Smith emphasizes that the individual as an individual cannot even be self-sufficient in the ideal state. He is fundamentally dependent on his fellow human beings both for the constitution of his psychic life and for his irretrievable need. In addition to the affect of self-love as a no less original impulse, man's psychic life includes the feeling of sympathy that leads people to share in the life of others (Smith 1759/1985: 1 & 4). Smith derives his ethic from this original attachment which requires good action that a well-informed and impartial onlooker must be able to agree with (Smith 1759/1985: 194)" (Faber/Manstetten 2014: 149-150; our translation).

Adam Smith was the main representative of Classical Economics (and Karl Marx was the first to refer to the group as the 'classical economists'). Smith and the other classical economists, in particular David Ricardo (1772 – 1823), Robert Malthus and (1766 – 1834), Jean Baptiste Say (1767 – 1832), Jeremy Bentham (1748 – 1832) and John Stuart Mill (1806 – 1873) emphasised the need to re-orient political economy away from the personal interest of statesmen to the welfare of individuals. The latter two also opened the path to neoclassical economics, which we deal with in the next section.

2.3 Georg Friedrich Hegel and the system of wants

In his treatise on law (1821/1970, Georg Friedrich Hegel (1770 – 1831) developed a normative theory of the economy called 'the system of wants' ('das System der Bedürfnisse') which is part of his *Theory of the Civic Society*. This concept implies first that

the economy is viewed as a system, i.e. it has a certain durability. Second, in contrast to Marx, Hegel does not view this system in the first instance as a system of production, but he considers the want which calls for production which in turn serves the want. Hegel begins with the individual economic actor who is the bearer of wants. We note in passing that this is in accordance with the approach of Mainstream Economics.

Hegel considers four rights to be central for the individual. They are (for an extensive discussion see: Petersen and Fulda 1999, Petersen and Faber 2018: chapter 17):

1. freedom of consumer sovereignty,

2. the right to be able to attain subsistence and well-being.

While these two rights concern human beings as private persons, the next two pertain to human beings as members of the community:

3. to be regarded as good and acknowledged by others.

4. every person has the right to contribute to a general purpose.

It is interesting to note that only the first right is considered by present day Mainstream Economics while the other three are ignored. Although Hegel only presents a purely theoretical analysis, his comprehensively philosophical perspective enables him to include social and political aspects beyond economic ones [HOMO OECONOMICUS & HOMO POLITICUS].

2.4 Karl Marx' two main propositions

Karl Marx (1818 – 1883) considered himself to be a pupil of Hegel, even though he ignored the latter's eminent 'system of wants'. While Hegel dealt with all of the major problems Marx addressed (Petersen/Faber 2018: chapters 17 and 21), from an economic point view, it was the classical economist David Ricardo (1772 – 1823) who primarily influenced Marx.

While over a century of heated debates ensued following the publication of Marx' treatise *Capital* ((1954/1867, 1956/1885, 1959/1894), at the end of the 20th century a certain consensus emerged between Marxian and Mainstream economists regarding major elements of Marx' economic theory (Petersen/Faber 2018: Chapters 8 and 9), such as the Law of the Tendency of the Rate of Profit, the Labour Theory of Value, and his pioneering, penetrating view concerning environmental and research problems of capitalistic production (Baumgärtner et al 2006: 114-116; Petersen/Faber 2018: chapter 8) [JOINT PRODUCTION].

However, Marx' two main propositions continue to be debated:

1. Production determines social structures.

2. Production has its own logic; thus, even wants are determined by its dynamics as the example of the transition from stagecoach to railway shows.

It is for these reasons that Marx assumed that production can be rationally planned, thus not only producing the required goods but also the corresponding wants. As a result, Marx and his successors overlooked essential elements of real economic affairs, as can be seen in the 2008 financial crisis (Petersen/Faber 2018: Chapter 18). In particular, he and the Marxist economy are not sufficiently able to take into account the unpredictability and dynamics of the economy. Despite all his inconsistencies, we must not neglect the fact that Marx develops a well-tended approach to his categories. He sees that the concept of justice should not naively be brought into play, for he shows that based on modern private law capitalist exploitation must appear perfectly just. He has set the bar high for a justice-oriented critique of capitalism. No critique of capitalist society can ignore Marx's objections to demands for a fair wage (Petersen/Faber 2018: in particular 113-116).

It is difficult to compare Marx' economic theory with the economics of his time or with present Mainstream Economics because it is not only an economic theory but also a theory of politics, science and philosophy. In addition, it is a critique of the economics of his days. Most of all, however, Marx wanted to revolutionise society with his critique. Thus, reading his work, one asks oneself, is it written by a philosopher, a scientist or a political agitator? His work is often overly complex and difficult to understand. Perhaps Marx' main achievement is that he has shown how important and fruitful his comprehensive interdisciplinary approach is; it enabled him to analyse historical, social, political and economic interdependencies in a congenial way. The only one who can cope with him is Hegel (Petersen/Faber 2018: Chapters 17 and 21).

Finally, it has to be noted that no one else has analysed and understood the dynamics of social and economic development as thoroughly as Marx has. Further, Marx has the merit of having initiated and contributed to several branches of economics today, in particular business cycle theory, growth theory, evolutionary economics, input-output analysis and environmental economics (Petersen/Faber 2018: Chapter 23).

3. Neoclassical Economics (Mainstream Economics)

3.1 Historical origins

Neoclassical economics, the main paradigm of present Mainstream Economics, evolved in the second half of the 19th century. Important contributors are Hermann Heinrich Gossen (1810 – 1858), Leon Walras (1834 – 1910), Stanley Jevons (1835 – 1882), Francis Y. Edgeworth (1845 – 1926), John Bates Clark (1847 – 1938), Vilfredo Pareto (1848 – 1923) and Eugen von Böhm-Bawerk (1851 – 1914). They restricted the economic problem and were thus able to define it more precisely in mathematical terms. Except for the latter, they orientated themselves toward the natural sciences, in particular physics, and assumed that ethical problems could be solved mathematically in a fashion similar to that of natural scientists. The Austrian economist Carl Menger (1842 – 1921) has to be mentioned in addition, despite the fact that he did not use mathematics. In his book *Principles of Economics* (1890), Alfred Marshall (1842 – 1924) wrote a summary of neoclassical economics which was used by generations of economists as the standard textbook.

The paradigm of neoclassical economics reduces all economic action to the *homo oeconomicus* [HOMO OECONOMICUS & HOMO POLITICUS], the utility maximising individual. The founders of utility theory, Jeremy Bentham and John Stuart Mill originally introduced the term *utility* as a measure of consumers' pleasure or satisfaction. Their combination of psychology and economics created empirical and theoretical difficulties. As a consequence, neoclassical economists purged their theory of psychological elements; instead of using the ambiguous term *utility* they employed instead the more general concepts of *preferences* and *preference function*. This process came to end with the seminal essay *On the Nature and Significance of Economic Science* (1932) by Lionel Robins (1898 – 1984), which is a self-reflection of economics as a science. It upset the academic community of economists and had far-reaching consequences because it gave economics a systematic foundation.

In contrast to other social sciences, neoclassical economic theory has given economists a common language and a consistent set of concepts exhibiting formal elegance. The core of the theory, general equilibrium theory, was developed by the French economist Leon Walras in his ground-breaking work *Elément d'Economie Politique Pure* (1874). It shows how household demand and commercial supply lead to an equilibrium of prices in markets. Prices are denoted as "equilibrium prices" when prices have reached a point such that neither buyers nor sellers have any reason to change their plans (Debreu 1959).

The limits of the science of economics led to new developments. Perhaps the most influential one was the development of game theory by the mathematician John von Neumann (1903 – 1977) and the economist Oskar von Morgenstern, who published their book the *Theory of Games and Economic Behaviour* in 1944 (see Leonard 1995). It also opened the way for interdisciplinary cooperation with other social sciences and with natural sciences. Not a few Mainstream Economists today believe that game theory has replaced the paradigm of general equilibrium theory with game theory (Leininger 1996). Another development was the founding of a new branch of economics, public choice or new political economy, in the sixtieth of the previous century. Their representatives focused their attention to the relationship between economy and politics, which had been neglected by Mainstream economics. They thus tied in with the tradition of classical political economy.

3.2 Development in the 21st century

During the second half of the 20th century, the neoclassical approach has won acceptance in more and more economic areas, for example in capital theory, micro foundations of macroeconomics, welfare economics, international trade, monetary theory, public finance, growth, development and theory of finance. In addition, further areas have been developed during the second half of the 20th century, evolutionary economics, institutional economics, resource economics and environmental economics. The manifold critique of the *homo oeconomicus* has led to the branch behavioural economics, which has gained much acceptance over the past two decades. Behavioural approaches employ psychology and neuroscience in addition to micro-economics. Its approach is strongly experimentally based.

One of the great achievements of neoclassical economists is that they were able to formulate the core piece of welfare economics in a rigorously scientific manner (see e. g. Debreu 1959, Mas-Collel et al. 1995), such as Smith' philosophically based metaphor of the invisible hand (see above).

Neoclassical economics disposes with its statistically based method, econometrics, a powerful tool to analyse and measure economic interrelationships. During the last decades, this method has been supplemented by experimental economics in empirical economic research.

After the financial crisis in 2008, neoclassical economics has come under scrutiny by various critics, not only heterodox representatives but also major representatives of

Mainstream Economics (e.g. Admati/Hellwig 2013; Piketty 2014S and various books by Joseph Stiglitz).

Mainstream Economics deals with the environment in two ways. Its branch Resource Economics deals with the supply of resources, while Environmental Economics deals with the environment as an absorber of emissions, waste water and waste. Thus, the environment is seen as a subsystem of the economy.

A summary of the methodological foundations of Mainstream Economics, along with its general strengths and weaknesses, is given in the INTRODUCING MINE.

4. Founding Thinkers of an Ecological Economic Approach

Ecological Economics can be traced back to two different historical origins; for ease of representation, we shall outline two of their major representatives. We turn to the Classical Economist Thomas Robert Malthus (1766 – 1834) in Section 4.1 and the poet William Wordsworth (1770 – 1850) in Section 4.2. A comparison of their different approaches is given in Section 4.3. (All of the following in Sections 4.1 to 4.3 is taken from Becker, Faber, Hertel, Manstetten 2005; some of the wording has been adapted).

4.1 Robert Malthus: the opposition of humankind and nature as the result of a divine order

"Malthus published his most important work, *An Essay on the Principle of Population,* in 1798. At the centre of his essay is his thesis that population growth is necessarily restricted by the limitations of the natural environment [SUSTAINABILITY & JUSTICE]. Several contributions to Ecological Economics refer to this premise (see e.g. Daly, 1996: 119ff). It should be noted, though, that Malthus' economic thought is framed in a very specific philosophical and theological context and is thus marked by a specific view of nature and humankind. An appreciation of this context and its meaning for Malthus is necessary for a proper understanding of his economic considerations" (Becker et al. 2005: 300).

Malthusian Law

"We begin our argument with an outline of Malthus' view of nature and humankind as well as his theological ideas. … The starting point of his considerations in his *Essay on the*

Principle of Population is 'the general question of the future improvement of society' (Malthus [1798] 1976: 15). Malthus' answer not only includes socio-political and economic aspects but is also largely founded on philosophical and theological reflections.

At the heart of the essay is the so-called Malthusian Law: According to Malthus, population expansion and growth in food production follow mathematical paths which imply, by logical necessity, the occurrence of food shortages and the possibility of poverty and deprivation. This is because, according to Malthus, natural laws specify that population growth is always substantially quicker than the growth in agricultural output:

'I say that the power of population is indefinitely greater than the power in the earth to produce subsistence for man. Population, when unchecked, increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio'" (Malthus [1798] 1976: 20). This circumstance leads to ongoing crises since the restrictions of food will lead now and again to a population reduction due to hunger and illness (Malthus [1798] 1976: 20).

The opposition of humankind and nature as the result of a divine order

"In the last two chapters of his essay, Malthus places his considerations within a philosophical and theological context through which a certain understanding of nature, humankind and God are expressed. According to Malthus ([1978] 1976: 117f.), the world as it is, is an expression of God's will, including the inescapable constraints with which human beings are confronted given the aforementioned physical order of nature" (Becker et al. 2005: 301).

"Malthus views the creation and formation of mind from matter as a continuous divine process. In doing so, the mind represents the divinely preferred, higher principle which distinguishes itself from lower matter and is localised in the human being. There is no spirit or mind within nature. Mind especially encompasses human reason which is able to recognise the physical laws created by divine order as well as the societal ordering following from it. The enhancement of all intellectual abilities and virtues of humankind are founded upon that order.

However, the mind does not elevate itself through self-motivation. Its perfection requires external excitement. The human being experiences excitement by nature. His needs compel him to economise, and the natural laws which govern the growth in population and food supplies necessitate and inspire a constant determination to improve the mind. In this respect, the natural laws and conflicting growth rates of population and food production supposed by Malthus ([1798] 1976: 120) – as well as the resulting misery – serve the divine intention to perfect the human mind. Malthus regards mind and nature as opposites. The

human being emerges from the torpor and corruption of chaotic matter ([1798] 1976: 117) and external pressure is required so that he may, in accordance with the divine intention, rise from the lower state of nature. Without this excitement 'man [remains] as he really is, inert, sluggish, and adverse to labour unless compelled by necessity' (Malthus [1798] 1976: 120).

Essentially, two aspects therefore characterise Malthus' view of nature: Nature is (i) a faulty and generally negative state of lethargy which needs to be overcome and (ii) exudes a natural physical order which humankind is necessarily subjected to. This perspective is a variation on the understanding of nature in the modern age. According to Malthus, the human mind and nature remain – as with Francis Bacon (1561 – 1626) (see Section 2.1) and Rene Descartes (1596 – 1650) – two disparate and opposed entities, whereby it is the human mind which represents the higher principle. According to Bacon, however, humankind can – and indeed should – rely on the capabilities of its mind to govern, control and use nature through reason with the assistance of science and technology (Bacon [1620] 2000: 221, (II; 52)). This comprises the idea that science and technology are ultimately capable of entirely liberating humankind from dependency on nature and thus from all misery, such as hunger and illness (Schäfer 1999: 102ff; Faber/Manstetten 2003: 101).

In contrast, Malthus does not only view the laws of nature as the possibility to govern and control nature, but also as essential and unavoidable conditions of human life. Humankind is able to recognise and utilise the laws of nature; it is precisely this which stimulates human reason and is therefore a necessary incentive for its improvement. However, in Malthus' view, nature can never be overcome. The restrictions imposed upon humankind by the Malthusian law must, by necessity, remain ever present in order to ensure a continuous extraction of mind from lethargic matter and to encourage humankind in the development of its reason as well as its virtuous conduct. In this respect there exists a certain constant confrontation between nature and mind, nature remaining an ultimately unconquerable restriction on human activity" (Becker et al. 2005: 302).

4.2 William Wordsworth: inherent conflict between the modern economy and nature

We have seen "that Malthus' economic thought is framed in a very specific philosophical and theological context and is thus marked by a specific view of nature and humankind. An appreciation of this context and its meaning for Malthus is necessary for a proper

understanding of his economic considerations. In this way, however, the relationship between Ecological Economics and Malthusian thought is illuminated and gains in significance.

In order to highlight this and furthermore to present another perspective for the conceptual foundations of Ecological Economics, Malthus' views will be compared with those of his contemporary William Wordsworth. In the same year as Malthus' essay appeared, Wordsworth published the *Lyrical Ballads* together with Samuel Taylor Coleridge (1772 – 1834). This is generally considered the beginning of English Romanticism and Wordsworth is regarded as a distinguished poet of that movement.

Like Malthus, Wordsworth experienced the beginning of the modern economy (the industrial revolution) and modern economic thought (Classical Economics). As a result, he was witness to the same economic reality as Malthus; he provides, however, a very different interpretation. This is a direct consequence of the fact that Wordsworth's considerations on economics are imbedded in an entirely different philosophical context" (Becker et al. 2005: 300).

Wordsworth's discovery of an inherent conflict between the modern economy and nature

"Wordsworth's economic views are in stark contrast to the theory developed by Malthus and the consequences derived from it. For Wordsworth, the economy of the time was by no means an ordained order which is in accordance with natural laws. The economy and its effects, particularly the existing social disparity, were specific and man-induced characteristics of the age (Wordsworth, Excursion, IX 206).

Wordsworth observes the transformation occurring in his time as a result of the modern economy and modern economic thought. He recognises in them an entirely new and previously unknown form of human commerce and economic activity, with unpredictable repercussions (Wordsworth, Excursion, VIII 87-94).

In his characterisation of the economy of his time, Wordsworth concentrates on three features:

(i) the pace,

(ii) the unforeseeability and

(iii) the ceaseless dynamism of the ongoing economic transformation, his description of which suggests, through the allusion to war, a destructive potential.

Where does this destructive potential of the modern economy originate? For Wordsworth, this negative potential is a consequence of modern economic man's alienation from nature.

Through this alienation, he loses his orientation on nature which is necessary for the fruitful unfolding of his creative power. The loss of orientation especially holds for economic activity, which Wordsworth regards as a specific expression of human creational power. Economic activity thus becomes characterised by an excessive and endless production of goods. For Wordsworth, the modern economy abandons the reference to nature which is essential to orientate humankind's production on the (divine) origin of creative potential which is exhibited in her. The place previously held by an orientation on the creativity of nature is vacated and replaced by the orientation on profit (Wordsworth, Excursion, VIII 180-185):

'Men, maidens, youths, / Mother and little children, boys and girls, / Enter [the fabric], and each the wonted task resumes/ Within this temple, where is offered up / To Gain, the master- idol of the realm, / Perpetual sacrifice.'

Such a lack of orientation on nature and its replacement by an alternative orientation on profit, leads to a loss of the inner point of reference for creational and productive action and to an unrepentant production. The desire for profit is unlimited. From it, a limitless production emerges. The consequences of a loss of orientation on nature in economic action is exemplified by Wordsworth's description of London and its yearly market (Wordsworth, Prelude 1805, VII 650-707). Here, an excessive and unrepentant production becomes apparent which is completely estranged from any orientation on nature. Wordsworth sees in this a destructive potential of the modern economy: it can unleash, for humankind as well as for nature itself, destructive forces if it produces solely in reference to itself, without orientation on nature.

On the one hand, human beings themselves become pawns in this form of economy with its unbounded dynamism (Wordsworth, Excursion, IX 113-122). On the other hand, however, it is Wordsworth's particular achievement to recognise that it is not only humankind but also nature which is abused and potentially endangered (Wordsworth, Excursion, VIII 151-156).

Modern economy: alienation from nature

As a result of his concept of nature and humankind, Wordsworth therefore observes an unnatural conflict between humans and nature in the economic structures of his time. Accordingly, he regards the modern economy as a new form of alienation from nature. In contrast to Malthus and the political economy of the time, Wordsworth does not view nature as a framework of restrictions and conditions on human development and economic activity but explores the interchangeable relationship and ultimate unity of humankind and nature

in a divine origin. Only in this light does Wordsworth analyse the role of the economy for humankind and nature.

These perspectives enable Wordsworth to examine the effects of the modern economy on humankind and nature in a manner not possible for the political economy of the time, particularly not for Malthus. Wordsworth not only observes the threat that the modern economy imposes on people's lives, but at the same time also the related negative impact of this form of economy on nature. This insight is primarily an abstract one, not one founded on the actual observation of environmental damage. It follows substantially from Wordsworth's analysis of the foundations and structures of the modern economy, based on his understanding of nature and humankind. However, it is precisely this insight which gives Wordsworth's thinking a special relevance for Ecological Economics" (Becker et al. 2005: 305-306).

Wordsworth's general philosophical concept of the initial unity of nature and humankind

"Wordsworth holds that a divine spiritual principle prevails equally in nature and the human being. … This 'active' principle, which entwines humankind and nature, is demonstrated in the creative power of the human mind, meaning its ability for creative production: its capability of bringing forth inventions, art, new thoughts and ideas. This ability is also found in nature which itself is a continuous expression of evolution and of constant creation (Wordsworth, [1814] 1936: IX 1ff). Man's creative productivity is therefore an expression of his initial unity with nature. Its perfected realisation, however, requires a close interrelation of humankind and nature (Wordsworth, Prelude 1805, XII 370ff).

Thus, Wordsworth emphasises an important aspect of human beings: their talent for creativity and potential to create [EVOLUTION]. In contrast to reason, which is considered a solely human capability, the creative ability is also ascribed to nature. Humankind's creative power and that which is revealed in nature coexist in a relation to one another because humankind's creative power requires orientation, i.e. it requires a point of reference. It is not a divine power, independent, absolute or capable of creating out of itself. It is a dependent and derived power which needs orientation on – and interaction with – nature in order to revel in the initial (divine) power of creation. This orientation of humankind's creative capacity enables a perfection of both of humankind and nature. In this sense, nature is for Wordsworth an initial point of reference for the human mind. It provides orientation and also – in accordance with the pantheistic views of the young poet – always refers the mind to the divine origin, the 'one life' and divine unity of all being. There exists, therefore, an inner mutuality between nature and humankind" (Becker et al. 2005: 303-304).

4.3 Malthus' and Wordsworth's contributions in comparison

We have seen that "the considerations of Malthus and Wordsworth are based on very different philosophical and theological foundations. Their different understandings of the relationship between human beings and nature, and ultimately their whole economic conception, arise out of this disparity. From the comparison of Malthus and Wordsworth, it becomes apparent that the enquiry into the relationship between the economy and nature, which is at the centre of modern ecological economics, depends substantially on the underlying image of humankind and nature" (Becker et al. 2005: 306).

Three issues

"In the following, the view of humankind and nature upon which the thinking of Malthus is founded will be reflected on and contrasted with the contrary understanding of his contemporary Wordsworth. We show that the economic considerations of both authors are based decidedly on the premise of their views and that their alternative interpretations of contemporary economy and the relationship between economy and nature may thus be explained. From the comparison of Malthus and Wordsworth, we can draw conclusions for modern Ecological Economics,

- identifying its Malthusian understanding of nature and reflecting on the capacities and limits implied for further research.
- We can ascribe a central role in the conceptual history of Ecological Economics to Wordsworth and present his philosophical presumptions as a fruitful alternative for Ecological Economics" (Becker et al. 2005: 299).

By proceeding this way, we focus attention on the principle importance of the philosophical foundations underpinning this field of research.

Our comparison "pertains to three issues in particular:

(i) the interrelationship between Ecological Econom.ics and Classical Economic Theory,

(ii) the understanding of nature and humankind upon which research in Ecological Economics is founded, and

(iii) the scientific self-image of this field of research.

In addressing these points, we adhere to standard definitions and regard Ecological Economics as a subject which is concerned with the relationship between economy and nature, the causes of modern environmental problems and enquires after a sustained

compatibility of economy and nature (Costanza, 1989, 1991; Proops, 1989: 60; Faber et al., 1996: 1ff; Edwards-Jones et al., 2000: 3).

The reference to Malthus in Ecological Economics is not new. This discipline has regularly been seen as standing in the tradition of Classical Economics (Christensen, 1989; Costanza et al., 1997: 19ff; Spash,1999) and in this regard has also been referred to Malthus (Christensen, 1989:2 0; Daly, 1996: 3f; Costanza et al., 1997: 25f)" (Becker et al. 2005: 299-300).

Malthus and the accordance of the liberal economy with the natural order of the world

"For Malthus there exists an opposition between the human being and nature, founded in logical, ever-present and divinely ordained natural laws (see Section 4.5 above). Economic activities and structures should take into account the laws which govern nature and humankind. For Malthus, the liberal economy of the time is a precise expression and direct consequence of the divine and natural order of the world. In this regard, the social and economic structures are no longer an expression of the times but become timeless. Thus, economic laws are revealed in these structures, which follow by necessity from the divine order of the world.

Thus, for Malthus, the natural order of society, which functions akin to a great machine with self-love acting as the central driving force of human activity, is a logical consequence of the inevitable laws of nature. The same applies to the existence of rich and poor and to a certain degree of deprivation from which the latter cannot be spared (see Malthus [1798] 1976: 74; 115; 121). In Malthus' view, neither the fundamental characteristics of the economic sphere of his time in general nor the misery of the working class in particular were an expression of human error or social misguidance, but essentially a consequence of the natural order of the world" (Becker et al. 2005: 304).

Wordsworth's conception of nature

"Wordsworth's conception of nature [TELEOLOGICAL CONCEPT OF NATURE] and humankind [HOMO OECONOMICUS & HOMO POLITICUS] enables him to offer an alternative account of nature in his considerations on economics than is possible for Malthus and the Classical Economic thinkers in general. He is thus able to gain different insights into the relationship between nature and economy: Wordsworth recognises a fundamental conflict between humankind and nature inherent in the ideological foundations of the modern economy. As a result of theoretical and philosophical reflections, he considers nature to be fundamentally endangered [TELEOLOGICAL CONCEPT OF NATURE; INDIVIDUAL, COMMUNITY &

ENTIRETY]. As early as the end of the 18th century, his thinking uncovers possible roots of the modern environmental crisis. These are, in Wordsworth's view, already integral parts of the fabric of the modern economy. In this respect, Wordsworth can be regarded an early ecologic critic of the modern economy" (Becker et al. 2005: 301).

As an aside, we point out that several critical reflections on the modern economy and modern economic thought existed in literature around 1800. Several poets reflected on economic developments and were especially concerned with possible negative consequences for nature. In this respect, we should mention the German Romantic poet Novalis (1772 – 1801) (see Becker and Manstetten, 2004), and the American transcendentalist Henry David Thoreau (1817 – 1862) (see Becker, 2003). Some further important insights on possible causes of the modern environmental crisis can also be found in Goethe's *Faust* (see Binswanger et al. 1990).

5. Founding and Development of Ecological Economics

Section 5.1 covers the pioneers of Ecological Economics and major contributions made to the field, while Section 5.2 deals with the role of the human actor in Ecological Economics. We then turn to the influence of Malthus on Ecological Economics in Section 5.3, and in Section 5.4 we point out how Wordsworth's reference point *nature* is an apt source of inner orientation for Ecological Economics. (All of Sections 5.2 to 5.4 is taken from Becker, Faber, Hertel, Manstetten 2005; some of the wording has been changed.)

5.1 Pioneers of Ecological Economics and its physical perspective

The pioneers of interest for questions regarding environmental economics were K. William Kapp (1910 – 1976) and Karl Polanyi (1886 – 1964) in the 1940s, and Kenneth Boulding (1910 – 1993) and Herman Daly in the 1960s. The publication of the *Limits of Growth* by Meadows et al. in 1972 initiated an encompassing and ongoing debate on the environmental repercussions of the modern mode of production and consumption. Following meetings of environmentally interested economists and ecologists in the 1980s, the International Society of Ecological Economics was founded in 1989 along with its journal *Ecological Economics*. The papers in *Ecological Economics: The Science and Management of Sustainability* (Costanza 1991) give a good overview of the state of

Ecological Economics at that time. Inge Røpke (2004, 2005) gives a representative overview of developments in the field up to 2005.

Physical perspective on production and consumption

The material balance approach was introduced by Ayres and Kneese (1969; see e.g. Faber et al. 1995: 15 f.). This approach is based on a material balance that takes into account the mass conservation of all raw materials used in production processes and corresponding effluents, emissions and wastes generated during a period. The ground-breaking work *The Entropy Law and the Economic Process* (1971) by the Romanian Nicholas Gerogescu-Roegen (1906 – 1994) laid the physical foundations of Ecological Economics. This physical perspective on production and consumption led Ecological Economists to emphasise the limits

- of the availability of natural resources and
- of the capacity of nature to absorb waste water, emissions and waste (Niemes, H./M. Schirmer 2010).

In contrast, Mainstream Economists see a tremendous range of substitutability of resources and capacities for degradation.

Different origins of Ecological Economics

Since representatives of many disciplines are working on environmental problems, it is no surprise that Ecological Economics as a field is characterized by different schools of thought. In addition, it was already noted above that its widely generated spectrum of views and questions can be attributed to the two different origins of Ecological Economics: While Malthus' ideas are also compatible with the resource and environmental perspective of Mainstream Economics, Wordsworth's perspective is definitely far away from them and therefore has led to more heterodox approaches (Røpke (2004, 2005).

Difference to Mainstream Economics

The main contrast of Ecological Economics to Mainstream Economics is that the former views the economy as a subsystem of the environment, as noted above, while the latter views the economy and environment in the reverse relationship.

5.2 The human actor within Ecological Economics

The Malthusian limitation of nature leads to restrictions which "become especially apparent and problematic when the human actor, in an economic context, is concurrently interpreted as a homo oeconomicus, i.e. as a selfish and rational utility maximiser. He is then forced to restrict his own self-interest, wherever the limits of nature place an external constraint upon him. A compatibility of economy and nature then only appears to be possible if the homo oeconomicus [HOMO OECONOMICUS & HOMO POLITICUS; Manstetten 2000] surrenders his self-interest in the face of these external constraints which are placed upon him by nature's boundaries. An alternative idea of compatibility, based on an inner unity of both, seems to be unthinkable in the context of the Malthusian view of nature and the homo oeconomicus. That the homo economicus is not sufficient for ecological economic research has already been recognised and discussed; several contributions concerning the understanding of the human actor within ecological economics have been made" (Becker et al. 2005: 3007). For example, Siebenhüner (2000) has introduced the concept of a homo sustinens. He argues, "The assumption that human behaviour is self-interested and utility-maximizing denies the influence of ethical and social norms on individual decision making." Similarly, Jager and Jansen (2000: 317) remark, "…the powerful concept of the rational actor seems to be invalid according to experimental research in economics and psychology" [see Faber et al. 1997, Söderbaum 1999, Nyborg 2000, Gintis 2000, and Faber et al. 2002].

5.3 The influence of Malthus on Ecological Economics

"At present, much of Ecological Economics is based on an image of nature which is best described as Malthusian. In particular, this is expressed in the important discussion surrounding the significance of the laws of thermodynamics for the relationship between economy and nature. Following Georgescu-Roegen (1971), the second theorem of thermodynamics plays a key role in Ecological Economics. With respect to this, a necessary restriction and limitation of economic processes is derived as a result of the physical laws of nature (see Daly 1980, 1996; Faber et al. 1995; Ecological Economics 22, 1997, Special Issue; Baumgärtner et al. 2006; Niemes, H./M. Schirmer 2010).

This is clearly a very important insight concerning the relationship between economy and nature. Ecological Economics has thus revealed a necessary determination of the economy through the laws of thermodynamics [THERMODYNAMICS; JOINT PRODUCTION]. This determination has been recognised as a central aspect of the relation between economy and nature, and its consideration as a necessary condition of sustainable development [SUSTAINABILITY & JUSTICE].

However, this perspective denotes only one aspect of the relationship between economy and nature. There are other aspects which cannot be recognised within the thermodynamic view of nature [TELEOLOGICAL CONCEPT OF NATURE; BASICS OF LIFE]. The thermodynamic perspective thus leads to a restricted idea of compatibility between nature and economy: a juxtaposition of economy and nature based on a limitation of economic activity. This perspective makes different, further-reaching ideas of compatibility hard to conceive" (Becker et al. 2005: 307).

5.4 Wordsworth: nature as a source of inner orientation for Ecological Economics

Wordsworth's ideas show that this Malthusian "understanding of the human being, nature and economy is not sufficient for an encompassing modern enquiry into the compatibility of economy and nature. The differences between Wordsworth's and Malthus' views highlight the fact that, based on a Malthusian comprehension of nature and economy, neither the causes of modern environmental problems may be fully understood, nor an encompassing compatibility of economy and nature achieved. At the same time, Wordsworth offers a further important perspective on this issue. His considerations point out that a conceptualisation of sustainable compatibility [JUSTICE & SUSTAINABILITY] has to be related to a different understanding of nature, humankind and the economy

Nature as a point of reference for humankind

Wordsworth considers nature as a point of reference for humankind. Humankind can only fulfil its destiny by not turning away from nature (as by Malthus), instead turning to and orientating itself on nature. This orientation on nature is, for Wordsworth, an essential condition of a good life. With this perspective, Wordsworth abandons the modern understanding of nature put forward by Bacon and Malthus, in as much as humankind and nature are not viewed in conflict with one another but in harmony.

In this regard nature no longer remains an outer restriction for humankind (as by Malthus), but represents a source of inner orientation. For Wordsworth, a good life is inseparably connected to an interrelationship with nature. This requires an encounter with and a respect for nature. Respect for nature is not merely based on external norms or an unexplained, inherent value of nature, but is an integral aspect of human existence and a good life. This means a self-understanding of the human being which directly entwines the perfected being of humankind with an orientation on and respect for nature, could become

part of a suitable understanding of the human actor in Ecological Economics (see Becker 2003). In his pursuit of economic activity, he would appreciate nature as an integral feature of his good life. From this perspective, nature is more than just a consumption goods or factor of production, serving human purposes or representing a physical condition of economic activity [TELEOLOGICAL CONCEPT OF NATURE]. Instead, nature is elevated to humankind's point of reference and with that, also serves as an orientation for his economic activity. The idea of an orientation of the economic process is also an underlying concept of modern Industrial Ecology. Here natural structures and systems are regarded as potential models for economic systems (see e.g. Frosch/Gallopoulos 1989; Ayres/Ayres 2002).

Compatibility of economy and nature

Given the above, Wordsworth's economic considerations may be ascribed an important position in the history of thought on Ecological Economics: Wordsworth explicitly concentrates on the significance of the economy for nature and the relationship between nature and humankind. He addresses the compatibility of economy and nature and develops the idea of an orientation of economic activity on nature. On the other hand, Wordsworth criticises the economic view of his time and its philosophical foundations – particularly the classical economic view. He observes specific and new structures in the modern economy which cause an inherent alienation of humankind and nature: the individual pursuit of profit and a primary orientation on self-interest. A crisis in the relationship between humankind and nature is seen to be the result. With this, nature is no longer appreciated as a point of reference but becomes an object of the economic process. For Wordsworth, this leads to a loss of the good life: Human actions become groundless and excessive and the human being a mere object of the economic process.

Wordsworth offers an alternative understanding of nature which leaves behind the confined structures of the modern economic understanding, and precisely through this, enables a remarkable insight into the causes of modern environmental problems. The problems lie in the alienation of modern economic man from nature, in the separation of his economic production from its original creational orientation on nature. However, this insight is repressed as long as Ecological Economics operates only within a Malthusian understanding of nature and exclusively takes the homo oeconomicus approach. Ecological Economics is therefore in need of critical reflection of its own (often subconscious) understanding of nature and the human actor in order to avoid unconsidered presuppositions which are inadequate or too narrow to succeed in its research task" (Becker et al. 2005: 307-308).

5.5 Final remarks

Ecological Economics is further described in INTRODUCING MINE which provides a summary of the 15 concepts.

Some readers may be interested to know which concepts of MINE are more likely to be mapped to Malthus and which more to Wordsworth. This question can only be answered for some concepts, and for those only in a rough way. The concepts THERMODYNAMICS, JOINT PRODUCTION, and ABSOLUTE & RELATIVE SCARCITY can all be attributed to Malthus. The concepts TELEOLOGICAL CONCEPT OF NATURE, BASICS OF LIFE, HOMO OECONOMICUS & HOMO POLITICUS, INDIVIDUAL, COMMUNITY & ENTIRETY, and SUSTAINABILITY & JUSTICE can be attributed to Wordsworth.

6. Literature

The content of MINE originates from scientific work published in books and peer-reviewed journals. Quotes are indicated by a special typographic style.

The project team would like to thank the publishers **Edward Elgar**, **Elsevier**, **Routledge**, **Springer** and **Taylor & Francis** for granting a reproduction permission.

Furthermore, we want to express our gratitude to Bernd Klauer, Reiner Manstetten, Thomas Petersen and Johannes Schiller for supporting the MINE Project and granting the permission to use parts of the content of their book “Sustainability and the Art of Long-Term Thinking.”

We are indebted to Prof. Joachim Funke, Ombudsman for Good Scientific Practice at Heidelberg University and the legal department at Heidelberg University, for their advice and support.

The main sources of this concept are the following publications:

Becker, C., Faber, M., Hertel, K., Manstetten, R. (2005) Malthus versus Wordsworth. Perspectives on humankind, nature and economy. A contribution to the history and the Foundations of Ecological Economics. *Ecological Economics: 53: 299-310*.

6.1 References

Philosophy

Aristotle (1984) Politics. (Translated by C. Lord) University of Chicago. Press, Chicago.

Aristotle (2000) Nichomachian Ethics. Ed. By R. Crisp (Cambridge Texts in the History of Philosophy), Cambridge University Press, Cambridge.

Hegel, G.W. F. (1821/1970) Grundlinien der Philosophie des Rechts oder des Naturrechts oder Staatswissenschaft im Grundrisse. Suhrkamp, Frankfurt a. M.

Hume, D. (1777/1975) Enquiries concerning Human Understanding and concerning the Principles of Morals reprinted from the 1777 edition with Introduction by L.A. Selby-Bigge, third Edition with text and notes by P.H. Nidditch, Oxford.

Kant, I. (1790/1911) Critique of Aesthetic Judgement, transl. J. C. Meredith, Oxford.

Kant, I. (1787/1982) Critique of Pure Reason (translated by N.K. Smith). London.

Manstetten, R. (2000) Das Menschenbild der Ökonomie. Der homo oeconomicus und die Anthropologie von Adam Smith. Freiburg, München: Alber. [This book is an excellent survey of the development, strengths and weaknesses of Mainstream Economics from a philosophical perspective.]

Marx, K. (1954/ 1867) Capital, vol. 1, first published in German, Progress Publisher, Moscow.

Marx, K. (1956)/1885) Capital, vol. 2, first published in German, Progress Publisher, Moscow.

Marx, K. (1959/ 1894) Capital, vol. 3, first published in German, Progress Publisher, Moscow.

Petersen, T. and H. F. Fulda (1999) „Hegels System der Bedürfnisse“, Dialektik 3/99: 129-146. [A penetrating essay on the relevance of Hegel’s “Systems of Wants”.]

Petersen, T. and M. Faber (2018) Karl Marx und die Philosophie der Wirtschaft. Unbehagen am Kapitalismus und die Macht der Politik. 4. Edition, Alber, Freiburg.

Schelling, F. W. J. (1809/1997) Philosophische Untersuchungen über das Wesen der menschlichen Freiheit und der damit zusammenhängenden Gegenstände. Ed. by T. Buchheim, Hamburg.

Origins of Mainstream Economics

Bacon, F. [1620] (2000) The New Organon. Ed. Lisa Jardine and Michael Silverthorne. Cambridge: Cambridge University Press.

Bürgin, A. (1993) Zur Soziogenese der Politischen Ökonomie. Wirtschaftsgeschichtliche und dogmengeschichtliche Betrachtungen. Marburg.

Faber, M. and R. Manstetten (2014) Was ist Wirtschaft? Von der Politischen Ökonomie zu Ökologischen Ökonomie. 2nd edition, Alber, Freiburg. [The book deals with various concepts of MINE.]

Marshall, A. (1920) Principles of Economics (Revised ed.). London: Macmillan; reprinted by Prometheus Books. [This book has been the main textbook for Mainstream Economics for decades.]

Schäfer, L. (1999) Das Bacon-Projekt. Von der Erkenntnis, Nutzung und Schonung der Natur. Frankfurt a. M.: Suhrkamp.

Smith, A. (1759/1985) Theorie der ethischen Gefühle, translated and edited by W. Eckstein. Hamburg.

Smith, A. (1776/ 1978) der Wohlstand der Nationen, introduced and translated by H. Recktenwald. Munich.

Smith, A. (1977) An Inquiry into the Nature and Causes of the Wealth of Nations. Encyclopedia Britannica, Chicago et.al.

Origins of Ecological Economics

Christensen, P.P. (1989) Historical Roots for Ecological Economics – Biophysical Versus Allocative Approaches. Ecological Economics 1, 17-36.

Faber, M. and R. Manstetten (2010) Philosophical Basics of Ecology and Economy. Translation by Dale Adams from Mensch – Natur – Wissen. Grundlagen der Umweltbildung. Vanderhoek & Ruprecht, Göttingen 2003. Routledge, London and New York.

Meadows, D.H., D.L. Meadows, J. Randers and W.W. Behrens (1972) The Limits of Growth. New York, Universe Books.

Røpke, I. (2004) The early history of modern ecological economics. Ecological Economics 50(3-4): 293-314.

Røpke, I. (2005) Trends in the development of ecological economics from the late 1980s to the early 2000s. Ecological Economics 55(2): 262-290.

Spash, C. (1999) The Development of Environmental Thinking in Economics. Environmental Values 8, 413-435.

Robert Malthus

Hollander, S. (1997) The Economics of Thomas Robert Malthus. Toronto, Buffalo, London: University of Toronto Press.

Malthus, T.R. [1798] (1976) An Essay on the Principle of Population. Ed. Philip Appleman.

New York, London: W.W. Norton & Company.

Pullen, J. M. (1981) Malthus' Theological Ideas and their Influence on his Principle of Population. History of Political Economy 13, 39-54.

Winch, D. (1987) Malthus. Oxford, New York: Oxford University Press.

William Wordsworth

Bate, J. (1991) Romantic Ecology. Wordsworth and the Environmental Tradition. London: Routledge.

Becker C., Faber M., Hertel, K., Manstetten, R. (2005) Malthus vs. Wordsworth: Perspectives on humankind, nature and economy. A contribution to the history and the foundations of ecological economics, Ecological Economics 53: 299–310. [This paper is the main source for the historical origin of Ecological Economics.]

Coupe, L. (Ed) (2000) The Green Studies Reader. From Romanticism to Ecocriticism.

London, New York: Routledge.

Curtis, J. (Ed) (1993) The Fenwick Notes of William Wordsworth. London: Bristol Classical Press.

Fischer, H. (1974) William Wordsworth. Präludium oder Das Reifen eines Dichtergeistes. Ins Deutsche übertragen, kommentiert und mit einer Einleitung versehen von Hermann Fischer. Stuttgart: Reclam.

Isenmann, R. (2003) Natur als Vorbild. Plädoyer für ein differenziertes und erweitertes Verständnis der Natur in der Ökonomie. Marburg: Metropolis.

Stallknecht, N.P. (2000) Strange Seas of Thought. Studies in William Wordsworth's Philosophy Waterman, A.M. (1983) Malthus as a Theologian: The First Essay and the Relation between Political Economy and Christian Theology. In: J. Dupaquier, Malthus Past and Present. London, New York, Paris, 195-214.

Wordsworth, W. and T. Coleridge [1798/1802] (1965) Lyrical Ballads. The text of the 1798 edition with the additional 1800 poems and the Prefaces. Ed. with introd., notes and append. by R.L. Brett and A.R. Jones. London: Methuen & Co.

Wordsworth, W. [1814] (1936) The Excursion; The Recluse, Part I, Book I. Ed. from the manuscripts with textual and critical notes by Ernest de Selincourt and Helen Darbishire. (The Poetical Works of William Wordsworth, Volume V). Oxford: Clarendon Press.

Wordsworth, W. [1805] (1979) The Prelude. 1799, 1805, 1850. A Norton critical edition. Ed. Jonathan Wordsworth et al. New York, London: Norton.

Wordsworth, W. [1807] (1936) Ode. Intimations of Immortality from Recollections of Early Childhood. In: Complete Poetical Works. Ed. Thomas Hutchinson and Ernest de Selincourt. Oxford, New York: Oxford University Press, 460-462.

Wu, D. (1993) Wordsworth's Reading. 1770-1799. Cambridge: Cambridge University Press.

Romantic literature

Becker, C. (2003) Ökonomie und Natur in der Romantik. Das Denken von Novalis, Wordsworth und Thoreau als Grundlegung der Ökologischen Ökonomik. Marburg: Metropolis.

Becker C. and R. Manstetten (2004) Nature as a You. Novalis' Philosophical Thought and the Modern Ecological Crisis. Environmental Values 13, 101-118.

Binswanger, H.C., M. Faber and R. Manstetten (1990) The Dilemma of Modern Man and Nature. An Exploration of the Faustian Imperative. Ecological Economics 2, 197-223.

Connell, P. (2001) Romanticism, Economics and the Question of 'Culture'. Oxford: Oxford University Press.

Hertel, K. (1997) London zwischen Naturalismus und Moderne. Literarische Perspektiven einer Metropole. Heidelberg: C. Winter.

McKusick, J.C. (2000) Green Writing. Romanticism and Ecology. Basingstoke.

Mainstream Economics

Admati, A./Hellwig, M. (2013) The Bankers' New clothes. What's Wrong with banking and What to Do about it. Princeton University Press. Princeton and Oxford.

Debreu, Gerald (1959) the Theory of Value, Wiley, New York. [Classic text on general equilibrium theory.]

Hicks, J. (1965) Capital and Growth. Oxford.

Keynes, J.M. (1963) "Economic possibilities of our grandchildren", in: J. M. Keynes, Essays in Persuasion, New York: 358-373.

Leininger, W. (1996), "Mikroökonomik", in Hagen, J. v./Bösch-Supran, A., Welfens, P.J.J., Springer's Handbuch der Volkswirtschaftslehre 1. Springer, Berlin, Heidelberg, New York: 1-4.

Leonard, R. J. "From parlor games to social science: von Neumann, Morgenstern and the creation of game theory 1928-1944", Journal of Economic Literature XXXIII: 730-761.

Mankiw G. N. (2016) Macroeconomics, 9th edition, Worth Publishers.

Mas-Colell, A., M.D. Whinston and J.R. Green (1995) Microeconomic Theory. Oxford University Press, New York, Oxford. [This book is still the most important textbook on the theory of Mainstream Economics.]

Neumann, J. von and O. Morgenstern (1944) Theory of Games and Economic Behaviour, Princeton University Press, Princeton. [This is the pioneering book on game theory.]

Piketty, Thomas (2014) Capital in the Capital in the Twenty-first Century, translated from the French.

Robbins, L. (1932) "On the Nature and Significance of Economic Science", London. [Classic text on the methodology of Mainstream Economics.]

Samuelson, P. (1947) Foundations of Economic Analysis. Harvard University Press. Cambridge, Mass. [A classic textbook for Mainstream Economics during the second half of the 20th century.]

Samuelson, P. (1983) Rigorous observational positivism: Kleins's envelope aggregation; thermodynamics and economic isomorphisms", in F. M. Adams and B.G. Hickmann (eds.). Global Econometrics: Essay in Honour of Lawrence Klein. MIT Press, Cambridge, Mass.

Walras, L. (1874) Elément d'Economie Politique Pure. Corbaz, Lausanne. [Founding text of Mainstream Economics.]

Homo Oeconomicus

Bernholz, P. (1998) Homo oeconomicus and homo politicus: a comment. Kyklos, 51: 409-415. [This short paper gives a critique of the concept of Homo Politicus developed by Faber et al. 1997.]

Faber, M. (1999) Was ist Wirtschaft? Was ist die Wissenschaft von der Wirtschaft? Dialektik 1999/3: 13-41.

Faber M. (2008) How to be an ecological economist. Ecological Economics 66(1):1-7.

Faber, M., Manstetten, R., Petersen, T. (1997) Homo politicus and homo oeconomicus. Political economy, constitutional interest and ecological interest. Kyklos, 50: 457-483. [The paper develops the concept of homo politicus from an economic and philosophical perspective.]

Gintis, H. (2000) Beyond Homo oeconomicus: evidence from experimental economics. Ecological Economics, 35: 311-322.

Jager, W., Janssen, M.A. (Eds.) (2000) The Human Actor in Ecological– Economic Models. (Special Issue), Ecological Economics, vol. 35, pp. 307 – 418.

Jager, W., Janssen, M.A., De Vries, H.J.M., De Greef, J., Vlek, C.A.J. (2000) Behaviour in commons dilemmas: Homo oeconomicus and Homo psychologicus in an ecological-economic model. Ecological Economics, 35: 357-379.

Kliemt, H. (1984) Nicht-explanative Funktionen eines "Homo oeconomicus" und Beschränkungen seiner explanativen Rolle. Homo Oeconomicus II: 7-49. This paper was written by a philosopher, who has also dealt with many aspects of economics.

Manstetten, R., Hottinger, O., Faber, M. (1998) Zur Aktualität von Adam Smith; Homo Oeoconomicus und ganzheitliches Menschenbild, Homo oeconomicus, XV(2):127-168.

Nyborg, K., (2000) Homo economicus and homo politicus: interpretation and aggregation of environmental values. Journal of Economic Behavior & Organization, 42: 305-322.

Petersen, T., Faber, M., Schiller, J. (2000) Umweltpolitik in einer evolutionären Wirtschaft und die Bedeutung des Menschenbildes. In: K. Bizer, B. Linscheidt, A. Truger (Editors), Staatshandeln im Umweltschutz. Perspektiven einer institutionellen Umweltökonomik. Duncker & Humblodt, Berlin: 135-150.

Siebenhüner, B. (2000) Homo sustinens - towards a new conception of humans for the science of sustainability. Ecological Economics, 32: 15-25.

Söderbaum, P. (1999) Values, ideology and politics in ecological economics. Ecological Economics, 28: 161-170.

Ecological Economics

Baumgärtner, S./ M. Faber/ J. Schiller (2006) Joint Production and Responsibility. On the Foundations of Environmental Policy. Cheltenham, UK, Northampton, MA, USA: Edward Elgar.

Costanza, R. (1989) What is Ecological Economics? Ecological Economics 1, 1-7.

Costanza, R. (Ed) (1991) Ecological Economics: The Science and Management of Sustainability. New York: Columbia University Press. [The first encompassing book on Ecological Economics.]

Costanza, R.; J. Cumberland; H. Daly; R. Goodland and R. Norgaard (1997) An Introduction to Ecological Economics. Boca Raton: St. Lucie Press.

Daly, H. (1980) Valuing the Earth. Economics, Ecology, Ethics. Cambridge, London.
Daly, H. (1996) Beyond Growth. Boston: Beacon Press.

Ecological Economics, Special Issue (1997) The Contribution of Nicholas Georgescu-Roegen. Ecological Economics 22, 171-312.

Edwards-Jones, G.; B. Davies and S. Hussain (2000) Ecological Economics. An Introduction. Oxford: Blackwell Science.

Faber, M. and R. Manstetten (2010) Philosophical Basics of Ecology and Economy. Translation by Dale Adams from Mensch – Natur – Wissen. Grundlagen der Umweltbildung. Vanderhoek & Ruprecht, Göttingen 2003. Routledge, London and New York.

Faber, M./ Frank, K./ Klauer, B./Manstetten, R/ Schiller, J./ Kyklos C. (2005) “On a general theory of stocks”. Ecological Economics 55: 155– 172.

Faber, M. and R. Manstetten (2003) Mensch-Natur-Wissen. Grundlagen der Umweltbildung. Göttingen: Vandenhoeck & Ruprecht.

Faber, M. and R. Manstetten (2003) Philosophical Basics of Ecology and Economy, Routledge, London, New York.

Faber, M./ Manstetten, R/ Proops, J. R.L. (1996) Ecological Economics. Concepts and Methods, Cheltenham, UK, Northampton, MA, USA: Edward Elgar.

Faber, M.; H. Niemes and G. Stephan (1995) Entropy, Environment and Resources. An Essay in Physio-Economics. Berlin et al.: Springer.

Faber, M./ Petersen, T. (2006) Natur und Gerechtigkeit als Grenzen der Ökonomie, Discussion Paper Series 434, Department of Economics, University of Heidelberg.

Faber, M./ Proops, J.L.R (1986) Time irreversibility in economic theory: a conceptual discussion. In Faber (ed.) (1986) Studies in Austrian Capital theory, Investment and Time. Springer Verlag, Heidelberg.

Faber, M./ Proops, J.L.R./ Speck, S. with Jöst, F. (1999) Capital and Time in Ecological Economics. Cheltenham.

Frosch, R.A. and N.E. Gallopoulos (1989) Strategies for Manufacturing. Scientific American 261 (9), 94-102.

Georgescu-Roegen, N. (1971) The Entropy Law and the Economic Process. Cambridge, Mass. [The pioneering monography on the physical foundation of Ecological Economics.]

Huber, W. (1990) Konflikt und Konsens. Studien zur Ethik der Verantwortung, München.

Klauer, Bernd, Reiner Manstetten, Thomas Petersen and Johannes Schiller (2017) Sustainability and the Art of Long-Term Thinking, Routledge, Abington, Oxon and New York, NY.

Niemes, H./M. Schirmer (2010) Entropy, Water and Resources. Heidelberg et al., Physica Verlag.

Proops, J.L.R. (1989) Ecological Economics: Rationale and Problem Areas. Ecological Economics 1, 59-76. Reprinted in M. Faber, R.. Mannstetten and J.L.R. Proops (1996).

Schefold, B. (2000) “Ökonomische Bewertung der Natur aus dogmengeschichtlicher Perspektive – eine Skizze”. Lecture at the “Workshop ökonomische Naturbewertung” June, 26, 2000, Göttingen, published in 2. Jahrbuch Ökologische Wirtschaftsforschung.

Solow, R. (1985) “Economic history and economics”. American Economic Review 75: 328-331.

Wodopia, F-J. (1986) “Flow and fund approaches to irreversible investment”, in M. Faber (ed.), Studies in Austrian Capital Theory, Investment and Time, Heidelberg.

Empirical studies

Faber, M., Niemes, H. and Stephan, G. (1983) Umweltschutz und Input-Output Analyse. Mit zwei Fallstudien aus der Wassergütewirtschaft (Environmental Protection and Input-Output aanlysis. With Two Case Studies in Water-Quality Management). J.C.B. Mohr, Tübingen.

Faber, M., Stephan, G. and Michaelis, P. (1989) Umdenken in der Abfallwirschaft. Vermeiden, Verwerten, Beseitigen, Springer, Heidelberg.

Green, D.P. Shapiro, I. (1994) Pathologies of Rational Choice Theory. A Critique of Applications in Political Science. Yale University Press, New Haven.

Michaelis, P. (1991) Theorie und Politik der Abfallwirtschaft. Eine ökonomische Analyse. (Studies in Contemporary Economics). Springer, Berlin, Heidelberg et. al.

Petersen, T., Faber, M. (2000) Der Wille zur Nachhaltigkeit. Ist wo ein Wille ist auch ein Weg? In: Birnbacher, D. and Brudermüller, C. (Editors), Zukunftsverantwortung und Generationensolidarität. Schriften des Institutes für angewandte Ethik e. V., Band 3, Königshausen und Neumann, Würzburg: 47-71).

Petersen, T., Faber, M. (2000) Bedingungen erfolgreicher Umweltpolitik im deutschen Föderalismus. Zeitschrift für Politikwissenschaft (ZPol) 1/00: 5-41. [This paper shows the empirical relevance of the Homo Politicus for the development of the waste management in Germany.]

Petersen, T., Faber, M. (2005) Verantwortung und Kuppelproduktion. Grundlagen der Umweltpolitik, Zeitschrift für Politikwissenschaft, 1/05:35-59.

Petersen, T., Faber, M. and Herrmann, B. (1999) Vom „Müllnotstand“ zum „Müllmangel“. Die neuere Entwicklung in der deutschen Abfallwirtschaft, in: Müll und Abfall, 31: 537-545.

Proops, J.L.R., Faber, M. and Wagenhals, G. in Cooperation with Speck, S., Müller, G., Jöst and Gay, P. (1993) Reducing CO_2 Emissions. A Comparative Input-output-study for Germany and the UK. Berlin, Heidelberg, Springer New York etc.

Sagoff, M. (1988) The Economy of the Earth. Philosophy, Law, and the Environment. Cambridge University Press, Cambridge, U.K.

SRU, (1998) Der Rat von Sachverständigen für Umweltfragen: Umweltgutachten 1998. Umweltschutz: Erreichtes sichern – neue Wege gehen, Stuttgart.