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Deep roots - a conceptual history of 'sustainable development' (Nachhaltigkeit)

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Ulrich Grober

Deep roots –

A conceptual history of ‘sustainable development’ (Nachhaltigkeit)

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Abstract

In the last two decades, the concept of ‘Sustainable Development’ has made a steep career as a political and ethical guideline for dealing with the planet’s ecological and social crisis. The concept, globally inaugurated in 1987 by the World Commission on Environment and Development (so-called Brundtland Commission) is, however, not a brain-child of the modern environmental movement. Its blueprint can be found in the professional terminology of forestry. ‘Sustained yield’ had been the major doctrine of international forestry for almost two centuries. This formula is a translation of the German term ‘nachhaltiger Ertrag’.

The roots of this concept can be traced back to the era of early ‘European Enlightenment’, when German Kameralists, inspired by the English author John Evelyn and the French statesman Jean Baptist Colbert, began to plan their dynasties’ woodlands ‘nachhaltig’ – in order to hand them along undiminished to future generations. The word itself was then coined in 1713 by Hanns Carl von Carlowitz, head of the Royal Mining Office in the Kingdom of Saxony, in order to meet the challenge of a predicted shortage of timber, the key resource of the time.

This paper on the historical evolution of the concept of sustainability is thought to be a contribution to the 20th anniversary of the report of the Brundtland Commision.

1 The concept of ‘sustainable development’

The word sounds somewhat technocratic. ‘Sustainable development’ looks like the brainchild of some multi-national commission. A formula of compromise achieved in the midnight hour of a tiring negotiation-marathon. It has, some critics say, the smell and flexibility of plastics and feels like something thoroughly artificial. Once you trace its conceptual history back to the roots, however, an aura begins to shimmer around the word: ‘Sustainability’ gradually gains the quality of something timeless and precious.

As a matter of fact, ‘sustainable development’ entered the global stage during the 1992 ‘Earth Summit’ in Rio de Janeiro. The United Nations presented it as their strategic concept for shaping – and indeed saving – the future of the ‘blue planet’. It promised to become the key-word for describing a new balance between the use and the preservation of nature’s potentials and resources. The Brundtland Commission, which paved the way to the Rio summit, had defined it in 1987 as “a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” [1]

The formation of this concept can be traced further back.[2] In 1980, the ‘International Union for the Conservation of Nature’, an association of nation states, environmental agencies and NGOs together with UNEP, the environmental programme of the United Nations, and the World Wildlife Fund, a non-governmental organization, published their ‘World Conservation Strategy’. Under the patronage of the UN-General Secretary, this declaration was simultaneously presented in 34 capital cities around the world. Its title: “Living resource conservation for *sustainable* development”.

A few years before, in 1974, the term ‘sustainable’ had become a central issue in a document of another international organization. At a world conference in Bucharest on ‘Science and Technology for Human Development’, the ecumenical ‘World Council of Churches’ (WCC) discussed a new socio-ethical guideline. Partisans of a theology of liberation, ‘swords-to-ploughshares’-pacifists and ecologically-minded advocates of a spirituality of creation combined their forces and replaced the old WCC-formula “responsible society” by the new term “just and *sustainable* society”.[3] Using the biblical term ‘husbanding’, the conference stated “that the future will require a husbanding of resources and a reduction of expectations of global economic growth.” It demanded the transition to a global welfare society, based on ‘sustainability’ within the next generation.

The merit to have introduced the term ‘sustainable’ into political language, however, belongs to the Club of Rome. In March 1972, this globally operating think-tank published the epoch-making report on the ‘Limits to Growth’, written by a group of scientists, led by Dennis and Donella Meadows of the ‘Massachusetts Institute of Technology’ (MIT). Describing the desirable “state of global equilibrium”, the authors used the word ‘sustainable’: “We are searching for a model output that represents a world system that is: 1. *sustainable* without sudden and uncontrolled collapse; and 2. capable of satisfying the basic material requirements of all of its people.” [4]

2 A modern concept with deep historical roots

Linking the verb ‘sustain’ with the suffix ‘-able’ and coupling it with ‘development’ was certainly a semantic innovation.[5] The source and blueprint for the new term, however, was a concept, which had deep roots.

Those lay in the professional terminology of forestry. ‘Sustainability’ is a semantic modification, extension and transfer of the term ‘sustained yield’. This had been the doctrine and, indeed, the ‘holy grail’ of foresters all over the world for more or less two centuries. The essence of ‘sustained yield forestry’ was described for example by William A. Duerr, a leading American expert on forestry: “To fulfill our obligations to our descendents and to stabilize our communities, each generation should sustain its resources at a high level and hand them along undiminished. The sustained yield of timber is an aspect of man’s most fundamental need: to sustain life itself.” [6] A fine anticipation of the Brundtland-formula.

The English term ‘sustained yield’, used since the middle of the 19th century, was a fairly literal translation of the German word ‘nachhaltig’. In its original version, the concept made its debut in print in a book published in 1713, more than 250 years before the Brundtland-Report. The ‘Sylvicultura oeconomica’, the earliest comprehensive handbook of forestry, was written by the German nobleman Hanns Carl von Carlowitz (1645 - 1714).

The author deals with the question, how to achieve such conservation and cultivation of timber, “daß es eine continuirliche beständige und *nachhal–tende* Nutzung gebe“, (that there would be a continuous, steady and *sustained* use). Carlowitz was head of the ‘Königliche Oberbergamt’ (Royal mining office) in the silver mining and metallurgy district of the ‘Erzgebirge’ in the Kingdom of Saxony. As such he was the supreme authority in one of the oldest, most prosperous and technically advanced mining areas of Europe. The problem which he tackled in the 400 pages of his book had been troubling economists and statesmen throughout Europe for quite some time: a predicted shortage of timber, the key resource of the time. The sudden realization that this resource was getting scarce was probably something like the 17th century equivalent to the ‘peak oil’ discussion at the beginning of the 21st century. A network of experts from

different European countries communicated, cooperated and acted in various directions in order to find adequate solutions. The concept of sustainability was the result of a long common quest.

Carlowitz had two important sources and models: A folio-sized book published in 1664 in London: John Evelyn's 'Sylva', and Jean Baptiste Colbert's 'Ordonnance' of 1669, concerning the royal forests of France.

3 "Let us arise and plant" – John Evelyn's 'Sylva'

The first step was taken in England. Scarcity was the mother of invention. The primal initiative for turning towards sustainable methods of forestry came from the Commissioners of the British Royal Navy. In 1662 they feared that a shortage of timber, especially of tall oak trees, would threaten their plans to equip their fleet with bigger and better ships, thus strengthening the wooden 'bulwarks of the kingdom' and – indeed – the spearhead against the 'Hollanders' and other rivals in the bloody struggle for global reach and global control.

Those fears were not unfounded. Since 1500, Britain had been continually losing much of her woodlands. The growing population increased the need for firewood and house-building material. New glass factories and ironworks consumed huge amounts of charcoal, their only fuel. During the Civil War (1642 - 1651) many of the traditional feudal laws and customs protecting the woods had collapsed or were abandoned. As the countryside was more and more deforested, a potentially disastrous resource crisis came in sight.

The admirals brought the topic before the Royal Society, the newly founded research institution which had in its ranks some of the most brilliant minds of the country. In several discourses the Royal Society

discussed the topic. Among the contributors were John Winthrop, Governor of the American colony Connecticut, a chemist, who had experimented with new techniques of making tar and pitch; Dr. Jonathan Goddard, a professor of physics, expert on the anatomy of ligneous plants, and Christopher Merret, a physician interested in natural history and pharmacy, with knowledge of the methods of forestry practised in France and Germany. The soul of the project, however, was John Evelyn (1620 - 1706). He was put in charge of compiling the material and elaborating a proposal for the solution of the timber problem.

Evelyn was one of the founding members and most active Fellows of the Society, a landed gentleman of elegant looks, far-travelled, conceited and pious. A courtier, close to King Charles II., a garden designer, entrepreneur, bee-keeper, connoisseur of the fine arts, author of books with a wide range of topics. His estate, Sayes Court in Deptford, was a celebrated sight on the road from London to Kent, highlighted by a unique arboretum of native and foreign trees. His estate bordered on the Royal Navy Dockyard. “Wood-born as I am”, he boasted he could “bring any Tree (beginning by time) to any form” [7]

Within two years after the oral discourse in the halls of the Royal Society, Evelyn had completed his book. On February 16, 1664 he presented to the King, the Royal Society and to the public his 'Sylva or a Discourse of Forest Trees and the Propagation of Timber in His Majesties Dominions'. The book became a 17th century best-seller and instigated, according to Evelyn’s remarks in later editions, the planting of millions of trees all over England. It tackled the timber problem in a way that certainly went beyond the schemes of the Royal Navy.

Opulently ornamented with quotations from biblical and classical sources, ‘Sylva’ presents a comprehensive survey of contemporary dendrological

knowledge. It combines detailed descriptions of numerous species such as oak, elm, beech, holly and fir, with precise instructions of how – and when – to plant and transplant, prune and fell trees, how to “increase the beauty of Forests and the value of Timber”.

First of all, the author, a staunch monarchist, blames “the Cromwellian Rebels… Usurpers and Sequestrators” (p. 278) for the “furious devastation of so many goodly Woods and Forests”. But his analysis goes much deeper. As it discusses the underlying economic and social forces, ‘Sylva’ reads like a modern-day UN-report on the decay of tropical rainforests: “The late increase of shipping… multiplication of glass-works, iron furnaces and the like” and most of all the “disproportionate spreading of tillage” (p. 1) and the “destructive razing and converting of woods to pasture” (p. 262) had caused the devastation of the “greatest magazines of wealth and glory of this nation” to become “epidemical” (p. 270).

Evelyn then launches a frontal attack on his contemporaries, who were “so miserably lost in their speculations” in order to “satisfie an impious and unworthy Avarice”. It is not surprising to read in his ‘Kalendarium’ that the day after he presented his discourse to the Royal Society, Evelyn went to Court to see a performance of Ben Jonson’s ‘Volpone’, a satirical portrait of the greedy and frivolous Venetian high society.

As the sober analysis turns into a passionate call for a “new spirit of industry in the Nobility and Gentry of the whole nation” (p. 278), Evelyn pleads for the conservation and restoration of eco-systems: “May such Woods as do remain intire be carefully Preserved, and such as are destroy’d, sedulously Repair’d” (Dedication). The sowing and planting of trees had to be regarded as a national duty of every landowner, in order to stop the destructive over-exploitation of natural resources.

His passionate call „Let us arise then and plant!“ (p. 279) is backed by numerous examples of successful forestry all over Europe. He points to the “Noble Forest of Nuremberg” as an example for an “almost continual forest” (p. 279). He mentions Montello-Wood (p. 294) in Northern Italy, which over the centuries had provided sufficient timber for the famous Arsenale of Venice and applauds the legislation of Luxembourg where “no farmer is permitted to fell a timber-tree without making it appear he hath planted another”. As he describes the practice of land-owners in France and Germany, who “divide the woods and forests into eighty partitions, every year felling one of the divisions, so that no wood is felled in less than fourscore years” (p. 268), the book touches on the basic methods of early sustained-yield forestry. Numerous long quotations on the subject ranging from the Bible to Greek and Roman authors such as Pliny, Virgil and Ovid and more modern voices like Nikolaus Cusanus, Philipp Melanchthon and William Shakespeare round up his arguments.

From his material and his personal experience, Evelyn derives a number of more or less practical proposals. He recommends, for example, the dislocation of the ironworks from ‘Old England’ to the densely-wooded territories of ‘New England’, i.e. the American colonies (p. 264). But his most urgent plea – and the *leitmotiv* of his book – is to take into consideration the interests of the future generations, of ‚posterity’. Each generation was “non sibi soli natus” (not born for itself), but “born for posterity” (p. 273). In this context, Evelyn develops the ethics of a responsible and provident society: „... men should perpetually be planting, that so posterity might have Trees fit for their service...which it is impossible they should have, if we thus continue to destroy our Woods, without this providential planting in their stead, and felling what we do cut down with great discretion, and regard to the future” (Vol. II, p. 205).

A 17th century forerunner of the Brundtland report, centred on the all important resource of the ‘wooden age’, ‘Sylva’ was immensely successful on the book-market. The first edition was followed by many others. Tree-planting in parks and on roadsides became a national game with landed gentry all over Britain. As far as forestry is concerned, however, it had no durable impact. For Evelyn’s contemporaries, a combination of two strategies seemed to open the way to never ending affluence: Bringing the natural resources of the globe into the country and substituting materials that were becoming scarce.

The reconstruction of the City of London after the fire of 1666 was easily accomplished by timber imports from the Norwegian woods and the American colonies. The substitution of wood by fossil fuels was well under way. Coal, at first the ‘sea coal’ from the Newcastle area, seemed to easily cover the energy needs of the rapidly developing industry. Evelyn was sceptic about either strategy. In 1661, in a book entitled ‘Fumifugium’, he had warned in vain of the side-effects of burning fossil fuels on the environment and the human organism. His early plea for a responsible management of natural resources in ‘Sylva’, was disregarded as well and remembered as just another fine piece of literature from the age of Restoration.

4 “Passer le fruit à la postérité“ – Colbert’s ‚Ordonnance’ of 1669

In France, the alarm bells had been ringing as early as 1661. An instruction by King Louis XIV. stopped the sale of timber from the royal forests. The young ‘Roi-Soleil’, concerned about the “rétablissement de la navigation” in his country, had realized – and expressed in a handwritten statement – “combien il était nécessaire de faire un bon ménage des bois” [8]

Author of the idea to radically improve the management of timber supplies and forests was Jean Baptiste Colbert (1619 - 1683), the king's foremost 'Domestique', the almighty 'Intendant des Finances' and secretary of the navy. "La France perira faute de bois" (France will perish due to the lack of timber) was Colbert's battle-cry (some modern historians suspect: false alarm) in order to get a grand-style "réformation des forêts" under way.

In the beginning, the prime goal of this reform was simply to increase the royal revenues and to fill the king's notoriously empty 'trésor'. The reform of forest-management, moreover, was embedded in Colbert's strategic objectives and part and parcel of his programme of mercantilism: Encouraging new manufactures, introducing modern industries, stimulating commerce and foreign trade would increase the circulating wealth of the country, strengthen the taxpaying capacity of the people and thus ultimately serve the larger vision of 'la gloire du Roi'.

Timber was a strategic resource. Most of the new manufactures would heavily depend on sufficient and reasonably-priced char-coal. The continual growth of foreign trade, a decisive element of mercantilist economy, was impossible without an efficient merchant navy. Commerce was considered a form of warfare. It demanded protection by an armada of war-vessels. In 1661, however, the French 'marine' was practically nonexistent, whereas the great rivals Britain and – even more so – the Netherlands had built up strong sea-forces. Louis XIV. and Colbert recognized this weak point in their strategy. Shipbuilding became one of their primary objectives. For securing the supply of oaks to the newly-built arsenals, the devastation of the country's timber forests had to be stopped.

Historians of forestry estimate that in the few decades since the beginning of the 17th century, the size of the woodlands in France had diminished

from about 35 % of the nations' territory to roughly 25 %. The reform started under Colbert's personal supervision in 1662 with an inquest into the condition of the royal forests. It resulted in a general inventory of the crown's woodlands. Within the following years, a huge collection of reports and statistics was gathered which gave a detailed survey of the location and quality of the terrains, the nature and the age of the wood, the authorized pasturage, the cutting rights and the money value of the cuttings. The picture revealed what the royal government considered a gross abuse of the King's property. With the help of corrupt officials, the usurpation of rights and illegal cuttings had become normal. The crown's woodlands were being ruthlessly over-exploited by speculators, timber-merchants and neighbouring residents, by 'les seigneurs', the landed gentry, as well as by peasants, stockbreeders, landless poor and vagabonds.

As the desolate picture became clearer, a bundle of measures was designed to put an end to such abuse, to ascertain the power and tighten the control of the government over the royal forests. They all aimed at the reestablishment and conservation of the forests. "La réduction des usages à leur possibilité" [9] (reducing the use according to the capacity) was put forward as a guideline. There were regulations against clear-cutting ordering the foresters to leave trees under the age of 10 years and a certain number of old seed-trees untouched.

The final draft of the "grande ordonannce forestière" included a lot of bureaucratic details, specifying the minimum age of foresters, charging penalties for vagabonding, arsoning, etc. The decisive reforms concerned: Replacing 'useless' officials by able foresters, who obtained the jurisdiction over the private and communal forests; reducing grazing in the forests; reorganizing the system of timber sales; establishing a tight control over

the using rights, especially a general abolishment of the ancient right to freely use the firewood.

The contrast between Colbert's administrative methods and Evelyn's strategy of mobilizing his peer-group, the English landowning gentry, is sharp and obvious. A look at the preamble of the French text shows, however, that the idea of responsibility for future generations was not at all absent: "Il ne suffit pas d'avoir rétabli l'ordre et la discipline, si par de bons règlements on ne les assure pour en faire passer le fruit à la posterité." [10]

The new 'ordonnance' was put into effect in 1669 and let to instant success. Within a ten years period, the royal revenues from timber sales increased considerably. It was, however, not a durable triumph. Enforcing the new rules turned out to be 'un veritable travail des Sisyphe'. Due to the apathy and negligence of the administration, the local 'égoismes' and the force of old customs, 'la grande réformation des forêts' achieved little to nothing. On the eve of the Revolution, there was less woodland in France than in 1669.

Despite the failure of Colbert's strategy, concepts like 'bon ménage' (good housekeeping) and 'bon usage' clearly paved the way to the 20th century ideas of 'wise use' and 'sustainable development'. Especially, they inspired a new and closer look at nature's forces and time-scales.

In 1765, Jean Jacques Rousseau recommended a sustainable form of forestry in his outline of a constitution for the island of Corse: "Il faut établir de bonne heure une exacte police sur les forêts et en régler tellement les coupes que la reproduction égale la consommation." [11] Rousseau's idea of a balance between consumption and reproduction was inspired by the traditional methods of forestry he had seen in his native Swiss mountains.

In his plan for the development of Corse he gave yet another fine definition of sustainability avant la lettre.

It was this new focus on the 'bon ménage', the good management of natural resources that led in the first half of the 18th century to a fast rise of interest in the 'Oeconomia naturae', as the Swedish naturalist Carl Linné in 1749 called his field of research. The botanic works of René Antoine Réaumur, Georges Louis Buffon and Henri Louis Duhamel du Monceau, widely read throughout Europe, developed ideas of the 'Ordonnances' and prepared the way to the birth of 'Oecologie' as an offspring of scientific biology. This new concept was first presented in 1866 by Ernst Haeckel, an ardent admirer of Goethe, Humboldt and Darwin.

5 Carlowitz and the coining of 'Nachhaltigkeit' in 1713

The edicts of King Louis XIV., Hanns Carl von Carlowitz wrote in his 'Sylvicultura oeconomica', already implied "das gantze summarium" (the complete summary) of his own project.[12]

Carlowitz had been in touch with forestry since his childhood days. He was born in a castle near the Saxon town of Chemnitz in 1645, when the 30-Years' War that had devastated Saxony more than any other German territory slowly grinded to a halt. For generations, his family had been in charge of the forests and hunting-grounds of the reigning dynasty. After retiring from the military his father had been appointed the Prince's 'Ober-Jägermeister'. Among his duties was the supervision of the rafting-business. The transport of timber from the distant mountain-forests of the Erzgebirge to the mining and melting-facilities located in the foothills had become a key question for the state's economy. The immediate surround-ings of the mining towns had been denuded of woods by long periods of over-exploitation.

As a young man, Carlowitz had spent five years abroad. In 1665, a year after the publication of ‘Sylva’, while Colbert’s ‘grand réformation’ was well underway, he set off for his ‘grand tour’ of Europe. Its itinerary stretched from Sweden all the way to Malta and included longer stays – good times and diligent studies – in Leyden, London and Paris. A long journey at one of the most exciting periods of European intellectual and political history: He was in Leyden, the Dutch bastion of early ‘European Enligthenment’, when Spinoza’s pantheistic philosophy that claimed the identity of God and Nature (*deus sive natura*) was the talk of the town. His stay in London coincided with the famous ‘annus mirabilis’ 1666. The 21-year-old German nobleman witnessed the aftermath of the great plague, watched the fire destroy the City of London and the Dutch navy attack the British fleet on the River Thames. Prince Rupert, the German-born archetypal Cavalier, legendary Navy Commander and fellow of the Royal Society, Carlowitz claimed later, had personally freed him from prison during the xenophobic riots in the days and nights of the great fire. Although Carlowitz later neither mentioned the name nor quoted from the book, it is highly probable that he had been in touch with circles around John Evelyn and, given his interest in forestry, became acquainted with ‘Sylva’. The book he wrote as an old man is full of hints that he had studied Evelyn’s epoch-making publication carefully.

After five years of travelling, Carlowitz returned to his native Saxony and entered the state service. The dominating doctrine of the time was ‘Kameralismus’, the central European brand of mercantilism. For more than 30 years, Carlowitz served as high-ranking official in the Saxon mining administration, located at the old silver-mining town of Freiberg. His office controlled - and indeed managed – the district’s hundreds of ore-mines and metallurgy-manufactures. It was a centre of scientific and technical innovation of European fame and certainly had a global view. The Russian tsar Peter I. came for a visit – and a shift of work in the mine.

Output-figures from the former Inka silvermines at Potosi in the Spanish colony of Peru were probably as closely watched as the scarce information about porcelain-manufacturing in the Chinese city of Jingdezhen. At the beginning of the 18th century, the re-invention of porcelain was one of Saxony's successful commercial projects in which the 'Oberbergamt' was actively involved.

Carlowitz had just been appointed head of the mining administration by August I., Kurfürst of Saxony and King of Poland, when in 1713 he published his 'Sylvicultura oeconomica. Anweisung zur wilden Baumzucht' (instruction for cultivating wild trees). In the 400-page folio book, he deplores the rapid devastation of forests all over Europe, and especially in Saxony. He predicts a severe economic crisis due to the shortage of timber. In the long run, this resource-crisis would ruin the silver mines and melting industry, thus breaking Saxony's economic backbone.

Carlowitz criticizes the contemporary short-termed way of thinking which was centred solely on making money: Woodland was being cleared because agriculture seemed more profitable than forestry. The common man had no motivation to plant trees, knowing he would not harvest them in his lifetime. He wasted timber, thinking the supplies were inexhaustible. Once the forests were ruined, however, the revenues would cease for many years to come. In the name of apparently quick profits, unrepairable damage had been done.

The 'Sylvicultura oeconomica' makes a number of practical proposals for resolving the resource-crisis: Practising "Holtzsparkünste" (the art of saving timber) by applying energy-saving stoves in housing and metallurgy and by improving the heat-isolation of buildings. Searching for "Surrogata" (substitutes) for timber, namely fossil fuels such as turf. Cultivating new

forests by “Säen und Pflantzen der wilden Bäume” (sowing and planting of wild trees).

Against the devastation of the forests ‚Sylvicultura oeconomica’ puts up the strict rule: "Daß man mit dem Holtz pfleglich umgehe" (that we use timber with care, p. 87). The term 'pfleglich' is – according to Carlowitz – an ‘age-old term’ meaning ‚economically’, but also indicating the need to care for the renewal of forests that had been cleared. A balance should be reached between renewal and cutting so that timber could be used for ever, continuously and perpetually. In the author’s opinion the traditional term ‚pfleglich’, however, seemed to express but insufficiently the idea of using natural resources sparingly and on the long run. Discussing "wie eine sothane Conservation und Anbau des Holtzes anzustellen, daß es eine continuirliche beständige und nachhaltende Nutzung gebe“ (how to achieve such conservation and growing of timber that there will be a continual, steady and sustained usage, p. 105) ‚nachhaltend’ or ‘nachhaltig’ appears in the modern sense of the word for the very first time.

And more so, not only the word but also the structure of the sustainability concept and the contours of the ‘three pillars’ of sustainable development can be traced in the book.

How does Carlowitz deal with ecology? Nature is "milde" (mild) and “gütig” (kind), mater natura – mother nature. The author speaks of the “life-giving force of the sun”, the “wonder of vegetation” and the “admirably nourishing spirit of life within the soil” (p. 22). He puts the external ‘Gestalt’ of the trees in a context with their inner form, “the signature and constellation of the sky, under which they green” (p. 21), with their “matrix”, Mother Earth and her natural work. Nature is “unspeakably beautiful”. It is never to be fathomed and keeps many things hidden before man. But

everybody can read in the “book of nature” and find out by experiments "wie die Natur spielet" (how nature plays, p. 39).

What sort of economic thinking is to be found in the book? The starting point is a simple statement: Man no longer inhabits the garden of Eden. He cannot rely on nature to provide an eternal abundance. Instead he should come to nature’s aid and work with her ("mit ihr agiren", p. 31). Like Evelyn before him, Carlowitz quotes from Genesis 1, 2. 15 the words which serve up to now as a formula for sustainability: ‘Abad’ and ‘schamar’, ‘dress’ and keep’ the soil. In Luther’s translation, which the pious Lutheran Carlowitz was familiar with: “Bebauen und bewahren”, cultivate and preserve. Here are the fundamentals of ecological economics: Recognizing that there are limits to the use of natural resources, man must not act against nature ("wider die Natur handeln"). Instead he must “follow” her and be a true housekeeper with her offerings. Every lavish, wasteful and harmful use of nature, the over-use, the ruinous exploitation is sinful.

According to his economic thinking, Carlowitz outlines his social ethics. Fundamental is the idea that everybody has a right to nourishment and subsistence, including the "armen Untertanen" (the poor subjects) and the "liebe Posterität" (dear posterity). Stability and durability of the community and responsibility for future generations are the underlying principles derived from the author’s social conscience. Thus the ‘Sylvicultura oeconomica’ not only became the cradle of a new scientific term. It made the contours of a new cultural concept clearly visible.

6 Translating ‘Nachhaltigkeit’

“Baked bread is savory and satisfying for a single day; but flour cannot be sown, and seed-corn must not be ground.” It was the Abbé, a figure in

Goethe's Wilhelm Meister novel who formulated what can be read as a beautiful metaphor for sustainability.[13]

How did the common-language-word 'nachhaltend' that Carlowitz picked for outlining more precisely a new method of dealing with forests and timber turn into a scientific concept? Carlowitz died in Freiberg in 1714, one year after the publication of 'Sylcvicultura oeconomica'. His book was compulsory reading for 'Kameralisten', economists and foresters in the decades to come. In the course of the 18th century, his term 'nachhaltend' was slightly modified to 'nachhaltig'. In this semantic form it developed into a well-defined concept of forestry, used and understood in German-speaking territories throughout Central Europe. The cameralist literature of the time is full of definitions echoing Carlowitz – and anticipating the essence of the Brundtland formula.

To quote just a few examples: "Eine nachhaltige Wirtschaft" (a sustainable economy) said Wilhelm Gottfried Moser, a cameralist and forester in a book published in 1757, is as "reasonable, just and wise as it is certain that man must not live only for himself, but also for others and for posterity" [14] Alexander von Humboldt, who had studied mineralogy at Freiberg and got involved with forestry while working for the Prussian mining department at Bayreuth, defined sustained-yield in 1792 as "steady and safe husbandry aiming at a balance between offspring and annual consumption." [15] Only a few years later, Georg Ludwig Hartig, head of the Prussian forest department, called for a mode of harvesting timber that should yield as much as possible in a way that posterity would have at least as much benefit from it as the presently living generation.

In this epoch, the concept of 'Nachhaltigkeit' became the fundament of a new scientific approach to forestry. The underlying idea was systematically developed, made operative and put into practice. In the 1730's, the Brunswick forester Johann Georg von Langen started a "Forsteinrichtung"

(the planning of a forest) on the basis of a detailed survey of the Harz-Forests. In Sachsen-Weimar, Duchess Anna Amalia, who at the same time got the 'Weimar Klassik' project started, initiated in 1761 the first general forest-survey of a German territorial state based explicitly on the concept of "Nachhaltigkeit". The woodland was surveyed and divided in equal parcels. The soils were assessed, animals and plants classified. Timber reserves were calculated. New growth was planned for long periods ahead. Anna Amalia's foresters and 'Jägermeister' had the year 2050 (!) on their time horizon. On the basis of geometry, mathematics and plant biology, sustained yield forestry developed into a science.

The devastation of the woodlands was stopped. The new system of managing time and space in a forest, however, led to a drastic reduction of biodiversity. The man-made "Normalwald" had to be as homogeneous as possible: a monoculture. The mosaic of a pristine forest was turned into the check-board pattern of a timber plantation. Pressing the life of a forest into formulas and figures, warned the Thuringian "Forstklassiker" Gottlob König in 1841, would ultimately provoke a revenge of nature: "The growth and the health of the woods depend on very fine and deeply-hidden threads".[16] His warning was directed against the deep-seated hubris of his fellow-foresters, but especially against the new 'laissez-faire-liberalism' which tried to turn the highest possible yield of timber (and of money) into the ultimate goal of forestry. It took long and fierce struggles, which are still going on today, to reestablish and strengthen the idea that "Nachhaltigkeit" depends on the natural regenerative capacity of the eco-systems and had to include a multitude of functions. Woods are no mere timber-plantations. They are just as well habitats of wild plants and animals, and areas of watershed protection.

In the second half of the 18th century, the first schools teaching the new scientific forestry were founded in remote places like Ilsenburg in the Harz

mountains (1761) and Zillbach in the Thuringian Forest (1785). These privately-run schools were soon replaced by forest academies, such as Tharandt, the famous Saxonian forest academy, founded by Heinrich Cotta in 1811. The German 'Forstmeister' and their schools soon gained international reputation. The academies sent their graduates abroad and attracted students from all over Europe and spread the idea of "Nachhaltigkeit" - "sustained yield" forestry all over the world.

The ties to Scandinavia dated back to the first half of the 18th century. Johann Georg von Langen, for example, the Brunswick forester, worked many years as adviser to the Danish court, building up a forest-management in Denmark and Norway. Tsar Peter I. and German-born tsarina Katharina II leaned on German experts for the establishment of forestry in Russia. Despite the wars of the Napoleon era, there were particularly strong ties between German and French foresters. Bernard Lorentz, a native of Alsace, started his career in the French-occupied territories along the Rhine, and became a life-long-friend of 'Forstklassiker' Georg Ludwig Hartig. In 1824 Lorentz became the founder and first director of the French 'Ecole Nationale Forestière' at Nancy.

During the first years, the curriculum at Nancy was fully dependend on books translated from German, among others Hartig's 'Anweisung zur Holzzucht'. Lorentz' successor at Nancy was Adolphe Parade, an Alsacien as well, who had spent several years in Saxonia and graduated from the Tharandt academy in 1819. Under his directorate, Nancy gained wide reputation. During the 19th century, the German and French academies educated the elite of the foresters of the world.

In this course of events a precise translation of 'Nachhaltigkeit' became necessary. The Swiss forester Karl Albrecht Kasthofer who had studied in Heidelberg and Göttingen around 1800, translated the German "Kunstwort" (artificial word) 'Nachhaltigkeit' by "produit soutenu et égal

d'une forêt". Adolphe Parade simply wrote: "production soutenu". These translations stuck quite closely to the original. The French verb 'soutenir' is derived from the Latin 'sustinere', meaning to support, hold out, hold up, hold back, 'nach-halten'. The English translation which appeared around the middle of the 19th century was based on the same Latin word: Nachhaltigkeit – sustained yield.

7 Sustained Yield and Wise Use

It took several decades until the concept of sustained-yield reached the United States; up to 1900, there was hardly any forestry which deserved the name sustainable. The timber industry was the third largest in the country. It was highly profitable and followed a 'cut out and get out' strategy. Describing the situation of the 1890ies, an era obsessed by economic growth and a "fury of development", Gifford Pinchot (1865 – 1946) found that "the most rapid and extensive forest destruction ever known was in full swing". [17].. He analyzed that "not a single acre of Government, state, or private timberland was under systematic forest management anywhere on the most richly timbered of all continents… When the Gay Nineties began, the common word for our forests was 'inexhaustable'. To waste timber was a virtue, not a crime. There would always be plenty of timber and everything else in America for everybody, world without end… The lumbermen… regarded forest devastation as normal and second growth as a delusion of fools… And as for sustained yield, no such idea had ever entered their heads." [18]

It is true, however, that at the same time there were strong and successful efforts for the preservation of some of the country's natural treasures, leading to the establishment of the first national parks at Yellowstone (1872) and Yosemite (1890). But in sharp contrast, the ancient forests

outside the protected wilderness areas were ruthlessly destroyed by logging. Long-term management was non-existent.

The first attempts to implant the idea had been made by German immigrants. Carl Schurz, who was Secretary of the interior from 1877 to 1881, had attacked in 1889 the destruction of the forests as “wanton, barbarous and disgraceful vandalism” [19] and warned that America was recklessly wasting her heritage. Bernard F. Fernow, a forester, trained at the Prussian forest-academy at Hannoversch-Münden, became the first chief of the tiny Bureau of Forestry. But he hardly gained any influence, alienated even his supporters and was ridiculed by the timber barons as an impractical theorist.

The situation changed under his successor, Gifford Pinchot, who replaced him in 1898. Born in a family of French descent, that had made a fortune with timber in Pennsylvania, Pinchot studied forestry in Europe in 1889/90. His mentor and idol became Sir Dietrich Brandis (1824 – 1907), a botanist and practitioner of forestry with a world-wide reputation. Brandis had started his career as director of the botanical garden in his hometown Bonn. For decades he had worked for the British colonial administration in Burma and India, where he was hailed as the ‘father of tropical forestry’, and had retired, writing a voluminous book on the trees of India. Brandis encouraged the young American student to take up his studies at the ‚Ecole nationale forestière’ of Nancy.

In France, Pinchot saw the first forests that were managed by professional foresters. In the following summer, Pinchot joined Brandis’ lengthy excursion to some of the model-forests of Central Europe and got a precise picture of the most advanced practices in Germany, Austria and Switzerland. What he saw made him critical of German Forestry, “in which everything is regulated down to the minutest detail”.[20] He was much more impressed by what he experienced in Switzerland. In the Sihlwald, a

municipal forest south of Zürich, which had been under continuous forest management for a thousand years, he saw forestry depending solely on selective cutting and natural regeneration. “I believe”, he later wrote in an paper for the American Forestry Association, “that the advocates of forest reform in America can set before themselves no better model and take encouragement from no worthier source.” [21]

‘Wise use’ became Pinchot’s *leit-motif* when he built up the new Forest Service under President Theodore Roosevelt, a devoted naturalist and his personal friend. Its principles were laid out in 1905 in a manual entitled ‘The Use of the National Forest Reserves’ which stated: “The prime object of the forest reserves is wise use. While the forest and its dependent interests must be made permanent and safe by preventing overcutting or injury to young growth, every reasonable effort will be made to satisfy legitimate demands.” [22]

Pinchot’s concept is rooted in the ethics of classical utilitarianism as described by Jeremy Bentham (1748 – 1832) and John Stuart Mill (1806 – 1873). Their formula “greatest good for the greatest number” is extended by the dimension of time. ‚Wise use’, as understood by Pinchot, meant: the use of natural resources for the greatest good of the greatest number for the longest time. The new concept was the platform of the Conservation Movement which was launched by Theodore Roosevelt and Pinchot. Its ‘Declaration of Principles’ stated: “We regard the wise use, effective protection, especially from fire, and prompt renewal of the forests on land best adapted to such use, as a public necessity and hence a public duty”. [23]

‘Wise use’ and ‚conservation’ were adaptations of the European sustained yield-concept (‘bon ménage’, ‘Nachhaltigkeit’) under the conditions of the American landscape – and moreover the American way of life. Putting it into practice turned out to be extremely difficult. It was at first attacked and

undermined and then radically diluted and usurped by industrial interests. Resistance, however, came also from a totally different direction, from the advocates of wildnerness who called for the ‘preservation’ of pristine nature.

Nonetheless, the concept survived and served as a guideline when a simultaneous economic, ecological and social crisis hit the USA in the 1930s. Franklin D. Roosevelt’s ‘new deal’ had a strong ecological component. In the struggle against the erosion of soils, the so called ‘dustbowl’, the Civilian Conservation Corps engaged millions of young unemployed with reforestation and restoration of nature. ‘Wise use’ became the starting point for the ecological concept of ‘Land Ethics’, which Aldo Leopold (1887 – 1948) developed from his long professional experience in Pinchot’s Forest Service, his discussions with the British ecologist Charles Elton and his encounter with the German ‘Dauerwald’ experiments. The classical summary of ‘Land Etihcs’: “A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.” [24] Leopold’s ecological philosophy became influential in the 1960s, when a new ecological conscience awakened all over the world.

8 “…an innate ability to live sustainably with nature”

It is remarkable that the first proposals for a more sustainable use of natural resources were initiated by the British Royal Navy, an institution engaged in the struggle for global power. The French King Louis XIV. started his great reform of forestry 1661, the same year in which the construction-works for his pompous palace at Versailles began. The ‘Sylvicultura oeconomica’ is dedicated to August I., King of Saxony and

Poland. Its publication in 1713 coincided with a boast of splendour at the royal court in Dresden that clearly showed pathological traits.

Baroque figures such as Evelyn, Colbert and Carlowitz were states-men, members of the power elites, dedicated followers and faithful servants of their kings. Seen in this light, the birth of ‘Nachhaltigkeit’ reveals its ambivalence: Was it originally meant to be a tool for strengthening the power of a ruling class and prolonging a specific life-style, marked by a lavish luxury unheard of in history? A strategic argument for dismissing legitimate claims of the lower classes? Or does it signify a split within the elites? Was it designed as an emergency-brake to be pulled by farsighted, conscientious objectors to the ruin of their countries and nations? Respon-sible citizens who tried to form the new within the shell of the old?

The answer to any of these questions is not clear. It seems quite obvious, however, that these pioneers of sustainability shared values beyond the narrow short-term interests of their rulers and adhered to a tightly-knit European network of intellectuals that launched the era of ‘Enlightenment’.

The ‘Zeitgeist’ they all drew from and their philosophical background was the Cartesian Revolution. Descartes had formulated his mind-expanding idea in his ‘Discourse de la méthode’, published in Leyden in 1637: By knowing and exploring the forces of fire, water, air and all the other matters that form our environment, we would be able to become ‘maîtres et possesseurs de la nature’. Developing from Cartesian origins the philosophy of Baruch Spinoza and his school made a decisive ‘ecological’ turn. It promoted since the 1660s the thesis that God and nature were identical (*deus sive natura*). Spinoza made a distinction between empirical nature (*natura naturata*) and the underlying ‘divine’ productive forces and generative energies of nature (*natura naturans*), eternally circulating and pulsating within ‘natura naturata’. Seeking a new balance between faith and reason, Physico-Theology spread during the last decades of the 17th

century from England to the Continent. Among others, the Anglican clergyman William Derham, member of the Royal Society, taught that every animal, every plant, even the minutest detail of nature belongs to the great chain of beings and was put there according to God's plan.

An attitude of respect towards nature was still unbroken in that early stage of European Enlightenment. It is no coincidence that during the time of the 'Weimar Klassik' Spinozism and physico-theological thoughts were revived by among others Herder and Goethe. Their powerful thinking influenced the generation of 'forest-classics' who laid out the concept of 'Nachhaltig-keit'. It influenced the romantic view of nature as well as Alexander von Humboldt's scientific approach to a geography of plants which paved the way for Ernst Haeckel's coining of 'Oecologie' in 1866.

There is hardly a way back to coherent Spinozist or Gotheanian world views. We should, however, try to find and employ a set of images, stories and guidelines that have the capacity to take their place. There seems to be no chance of bringing an enlarged idea of sustainability to life without a deeply-felt respect for nature and a firm belief that nature is not a mere store of resources and a depot for waste.

It is true, the exciting debates on ecology, basic human needs and global equity that sprang up in the 1960's and 70's provided the inspiration for the design of 'sustainable development'. However, neither the idea nor the concept is really new. This particular way of thinking and acting is deeply rooted in the cultures of the world. The biblical rule of 'abad' and 'schamar' has many analogies in other religions and pre-modern systems of wisdom. Within this broad context, there is a distinct European heritage associated with the concept of sustainability. It has matured over a period of three centuries. It aims at a more responsible management of our natural resources, respecting nature and serving the basic needs of the people and of future generations.

In the light of this long and awe-inspiring history of the concept, it may be easier to find an access to the complex set of ideas we call ‘sustainability’ – and thus to the basic questions and solutions for our common future. It is an idea laid out in the last decades of the 20th century by international organizations such as the Club of Rome and the World Wildlife Fund, put on the world-wide agenda by European Social Democrats such as Willy Brandt and Gro Harlem Brundtland and turned by the United Nations into their programmatic guideline for the 21st century. It is inspired by the conviction “that deep within our human spirit there is an innate ability to live sustainably with nature.” (Charles, Prince of Wales) [25]

Notes

1. World Commission on Environment and Development: *Our common future* (so-called Brundtland Report), Oxford, New York: Oxford University Press, 1987, p. 43.

2. Cf. Grober, U. : Modewort mit tiefen Wurzeln – Kleine Begriffsgeschichte von ‚sustainability' und ‚Nachhaltigkeit', in: *Jahrbuch Ökologie 2003*, München: C. H. Beck, 2002, pp.167-175.

3. Robra, F.: *Ökumenische Sozialethik*, Gütersloh: Chr. Kaiser Verlagshaus, 1994, p. 104.

4. Meadows, D. et. al.: *The Limits to Growth,* London: Potomac Associates, 1972, p. 158.

5. Cf. Simonis, U.E.: *Nachhaltigkeit in internationaler Sicht – Festvortrag,* in: Schriftenreihe des Deutschen Rates für Landespflege, Heft 74, Bonn: DRL, 2003, pp. 2-9.

6. Duerr, W. A.: *The Role of Faith in Forest Resource Management*, in: Rumsey, F., Duerr, W. A. (Eds.), Social Science in Forestry. A Book of Reading, Philadelphia: W. B. Saunders, 1975, p. 36.

7. Evelyn, J.: *Sylva or a Discourse of Forest-Trees and the Propagation of Timber in His Majesty's Dominions*, London 1664, Dedication.
The complete text of the first edition is available at *www.bedoyere.freeserve.co.uk*. The following quotes are from a later edition of Sylva, ed. by A. Ward, published in York in 1786.

8. Cited in Devèze, M. : *La grande réformation des forêts sous Colbert*, Nancy, 1962, p. 78.

9. ibid., p. 193.

10. cited in ibid., p, 55.

11. Rousseau, J.J. : *Projet de constitution pour la Corse*, in : Oueuvres complètes, ed. by Bernard Gagnebin, Vol. III, Paris, 1964, p. 927.

12. Carlowitz, H. C. von : *Sylvicultura oeconomica – Anweisung zur wilden Baumzucht*, Leipzig, 1713. (Reprint, bearb. von K. Immer u. A. Kiessling, mit einer Einleitung von U. Grober, Freiberg, 2000, p. 84).

13. See Goethe, J. W.: *Wilhelm Meisters Lehrjahre*, Book 7, Chapter 9.

14. Moser, W. G.: *Grundsätze der Forst-Ökonomie*, Frankfurt, Leipzig, 1757, p. 31.

15. Humboldt, A. von : *Über den Zustand des Bergbaus und Hütten-wesens in den Fürstentümern Bayreuth und Ansbach im Jahre 1792*, Berlin, 1959, p. 153.

16. Cited in: Schwartz, E.: *Gottlob König. 1779 - 1849. Ein Leben für Wald und Landwirtschaft*, Erfurt: Kleinhampl Verlag, 1999, p. 348.

17. Pinchot. C. :*Breaking New Ground.* Commemorative Edition. Washington, D.C.: Island Press, 1998, p. 23.

18. ibid., p. 27.

19. ibid., p. 84.

20. ibid., p. 35 .

21. ibid.

22. ibid., p. 273.

23. ibid., p. 364.

24. Leopold, A.: *A Sand County Almanac*. With Essays on Conservation from Round River, New York: Ballantine Books, 1970, p. 262.

25. HRH The Prince of Wales, Foreword to: Charlie Pye-Smith, Grazia Borrini Feyerabend: *The Wealth of Communities*, London: Earthscan, 1994, p. VIII.