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Exploitation and Overexploitation in Societies Past and Present

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Archaeological Approaches to the Long-Term History of the Landscape

Abstract

The paper discusses the two rather controversial approaches to the landscape in prehistoric archaeology. First, the physical landscape is treated as the arena of subsistence activities, second, the 'symbolic landscape' constructed by societies as the context of their social and spiritual lives. It is subsequently discussed how many pitfalls there are not so much in the empirical reconstruction of the physical environment, but especially in the attempts to understand the man-land relationships and their transformations on the very long term: Ethnographic analogy has the danger to degrade prehistory to a clone of subrecent societies and to deprive it of its originality. Ethnocentrism brings modern values in. Ecological determinism reverses the causes and effects.

The second part gives an outline of the man-nature relations in the Lower Rhine basin since the last Ice Age as far as empirical data allow. It is the story of the 'domestication' of the landscape. After the small-scale reclamations of the Neolithic the forests were rigorously opened up in the first millennium cal. BC by the plough farmers of the Bronze Age. The so-called Celtic field system of the subsequent first millennium can be conceived as a measure to restore sustainability on the poor upland coversand landscapes. A restricted number of demographic data together with the long term environmental impact registrations of pollen diagrams allow us to follow the dynamics of environment and society over the last seven or even more millennia.

1. Reflections

Landscape archaeology: The ecological approach

Landscape archaeology deals with the use and transformation of the land surface and its vegetation by man in the past. It tries to trace these transformations through time in their cultural and geographical differentiation and it tries to understand the how and why of the inferred processes. It also tries to grasp the attitude of former people and societies to their natural surroundings and the meanings or symbolic connotations they connected to it.

Nowadays two landscape approaches can be made out as research lines. I will call these short hand the ecological and the symbolical. Let me first deal with the ecological approach. That is the field of study of settlement and subsistence, in relation to the natural environment by field archaeology, in cooperation with palaeobotanists, archaeozoologists and Quaternary geologists: The environment seen exclusively as a source of food and resource of raw materials. It is a very functionalistic

and positivist approach of man-nature relations. We should, however, ask ourselves: To what extent we can really *reconstruct* the landscape, and to what extent we can really *reconstruct* subsistence. Are these aspects of the past really knowable or should we better speak of our 'constructions' than of the more pretentious 'reconstructions'?

The landscape

Reconstruction of the physical environment is not very problematical. Landforms in the last few millennia have hardly changed and we can map sediments in the lowland zones, but former soil conditions are often difficult to assess on the basis of the eroded and degraded conditions of today. Dated palaeosols sealed below monuments like barrows or below colluvium or wind blown sand are rare and themselves not untouched as well.

Our view on former vegetation is more problematic. It is mainly 'reconstructed' on the basis of pollen diagrams, together with presumed soil conditions and with modern natural vegetation types as a reference. But pollen bearing deposits are not always available, especially not in the upland zones, and their interpretation is not easy to follow by a layman and not without pitfalls as well. This is demonstrated by a recent discussion in my country with nature conservationists who wanted to use prehistory as a reference for nature management, while we at the same time are using present day nature as our reference! Some environmentalists argued that large grazers, especially bovinds, had created a natural park woodland already in Atlantic times, criticizing the traditional view of the closed deciduous climax forests. It appeared to be very difficult to differentiate between both options on the basis of pollen alone.

Subsistence

An even more cautionary tale is subsistence. Agriculture as such is easily established on the basis of animal bones and charred botanical remains, but in all cases the main composition of the menu – the ratio between crop farming and animal husbandry, the role of wild plant food and of fishing – is rather speculative, since the differences in archaeological formation processes, in conservation and recovery processes make the data incomparable. The importance of milk is difficult to assess, even when there are plenty of animal bones. Calculation of population densities should in most cases be distrusted and always have large margins of error that are rarely or never mentioned. This altogether means that we only have a very general view on the range and volume of activities behind documented environmental changes.

Environmental impact

Reasoning from the observations of human environmental impact in the present, it is not difficult to specify the traces of impact we have to look for in the past. These are first of all vegetation changes, made visible in pollen diagrams: by fire, by cutting trees, by grazing and (over)grazing by herds of domestic animals.

Secondly, physical changes can be documented in sediments: soil degradation, slope erosion, coluviation, increased alluviation of valley floors and the formation of inland dunes. The accurate dating is, however, often problematical.

A major issue is to distinguish the anthropogenic effects from those brought about by natural change of climate, sea level and the like. Illustrative is the discussion over decades to explain the so-called elm decline in pollen diagrams around 5300-5000 BP, originally seen as the reflection of large scale pollarding of the lime trees and of extensive leaf foddering of enclosed cattle herds. It is now clear that the scale of the decline is far beyond the capacity of Neolithic farmers, that Neolithic animal husbandry was based on free grazing cattle and at any rate did not include byres, thirdly that the process can be best understood as the result of a natural disease or plague, like the Dutch elm disease.

A main general problem is to generalize from locally observed stratigrafies to more general landscape formation processes on a regional or even continental scale. But this is a general aspect of archaeology, the problem of the representativity of anecdotic observations.

Quarrying and mining

It was not only subsistence that transformed the landscape, but also the exploitation of mineral resources by means of open quarrying and deep mining: flint, igneous rock, copper, tin, iron. The spoil heaps, piled up at the mining sites, demonstrate the non-conservationist and wasting attitude of the miners. The large quantities of firewood needed in roasting the metal ores to obtain the metals must have caused additional deforestation as early as the Bronze Age. To this the enormous consumption of wood for trackways and wooden defensive structures like Biskupin, Poland, and the Celtic oppida of the late Iron Age added to the increased process of the opening of the forests. The concepts of sustainability and conservation seem to be alien to these activities, but at the other hand one might question whether there were any alternatives and whether the offer of nature was so overwhelmingly rich, that the resources seemed inexhaustible, even though certain mining sites seem to have come out of use because of their total depletion.

Landscape archaeology: The symbolic approach

This economic approach has been criticized in the case of hunters for viewing people as 'walking stomachs', by talking about food only, and that even with a 'meat fixation bias' since the botanical component of the menu is hardly visible archaeologically. For farmers we could as a parallel speak of 'settled stomachs'. But people did not live by food alone.

Ethnographic reference

Anthropology tells us that people in subrecent societies tried to understand their being and their environment. They live in a world of miracles that should be understood and in some way be brought under control: life and death, day and night, sun and moon, the seasons, storm and rain, thunder and lightning, fertility of plants, animals and men themselves. In stories and myths people reconcile themselves with the uncertainties of their lives and hand past experience and current knowledge over from generation to generation. They fill the world with powers and spirits of nature and of ancestors, and often link these with locations in the landscape. They seek to get some control over them, or at least communicate with them, by means of song and dance, rituals, offerings and tokens. Most of it is transient and only a part leaves lasting traces, but some acts are very durable.

Monuments in the landscape

We believe to see that these principles worked very similarly in later prehistory: People created in the landscape places of cult, visible to us by rock art and deposition. So we can observe that the landscape was not only exploited economically, but also given meaning: rocks and caves, rivers, lakes and bogs were apparently considered embodied with such powers or at least the media by which communication could taken place. In addition to the impressive body of ecological knowledge an equally impressive body of metaphysical explanations and meanings, much more than physically expressed in the landscape, must have been part of the daily life.

Apart of these means of giving the natural landscape a cultural signature, people transformed and constructed the landscape by reclamation and building of monuments, not only for the dead but for cult as well. The land was 'domesticated', brought under control, structured, brought into culture. We should realize that all of this was a cumulative process, an accumulative investment, inherited from earlier generations and passed on to the next. Once built a stone or earthen structure stood 'for ever', was extended or transformed. So this acculturation of the landscape is a continuous process of structuring and restructuring and extending, of reclamations as well as monuments, depositions and panels of rock art. As observed today many are the outcome of activities over long time spans, covering many generations, palimpsests of symbolic writing in the landscape.

Some biases towards the interpretation of the past

There are some serious restrictions to an unbiased assessment of the relations between man and his environment in the past on the basis of archaeological data:

- the use of ethno-analogies,
- ethnocentric views,
- ecological determinism,
- cultural diversity.

Ethnographic analogy

Yes, archaeologists make lavishly use of ethnography as a reference and even as a simple analogy of the past to better understand and interpret the archaeological remains. This way they try to overcome their often frustrating scantiness and poverty. In a closer look we see the tendency to construct views that surpass the factual information of the artefacts and their patterns by the choice of specific, well-studied ethnicities as a reference, which leaves hardly any space for original aspects of the prehistoric societies involved. So, the specialized Late Palaeolithic hunters become clones of the Nuniamut reindeer hunters, Mesolithic broad spectrum hunter-gatherers are clones of the North American Ojibwa Indians and the early Neolithic farming societies are made a mix of Amazonian Indians, New Guinea Papuas and North American Iroquois. Doing so we deprive the prehistoric past of its cultural uniqueness, of its originality and are in serious danger of circular reasoning: We make constructions of the past based on modern references and subsequently argue that processes and attitudes in the past were strikingly similar to those of today.

Archaeology, after a long period of intense profit from this anthropological inspiration is nowadays more aware of the dangers of this flirtation with the sister discipline. We should be so fair to admit that there is no good counterpart for the European Mesolithic, for the Linearbandkeramik and the complete Bronze Age, just to name a few, and that prehistory was not only different but also more diverse as the present, subrecent ethnographical record. Instead of *assuming* that the anthropological generalizations based on societies in the last one or two centuries are valid for various stages of the past, it is our task to *demonstrate* that this with some degree of probability is the case, or not. So we should clearly *show* that at least some of these anthropological 'rules' are the most plausible options to understand the patterns in the archaeological data. This is increasingly necessary when we go deeper into the past and are more remote from the modern men of today, and it is perfectly clear that anthropology does not work anymore when we meet societies that appear to have been fundamentally different: the Neanderthals. Their archaeology is only very partly understood in reference to the present, fundamentally different in many respects and lacking manifestations that we consider common to all humans, like family life, burial of the dead and material symbolism.

Ethnocentrism

Secondly, if we like it or not, we all have some preconceived ideas about the past, especially prehistoric societies, with two extremes: that of ruthless brutes or that of the Rousseau-an 'noble wilds'; ruthless brutes, uncivilized and spoiling savages as part of the wild. Or we idealize prehistoric societies, with their low population densities, living in an unspoiled and 'virgin' environment as 'pure' and in harmony with nature, gratefully cropping from it according to their needs, respectfully exploiting their environs, in a conservationist way that would please Green Peace and the World Wildlife Fund together. Self evidently both attitudes are wrong. Present day ethnography should already be a warning, with the numerous examples of overgrazing and ruthless overexploitation. Neither offers prehistoric archaeology itself arguments for such a conservationist view of the past.

Ecological determinism

A third handicap in studying man-land relations is ecological determinism: The idea that natural conditions would *prescribe* what people do, in such a way that we even can predict human behaviour from ecology. It leaves no room for the deliberate choices that people make, nor for the culture specific structuration processes. Adaptation to environmental conditions, based on intimate native knowledge systems seems such a very general principle, at least for prehistoric societies, that this should not be presented as a remarkable outcome of research, as still often is the case. *Self evidently* people adjusted, within their main technological capabilities, and preferred subsistence strategies to the natural conditions. In different periods people adapted in different ways to the same environment. When we observe that within one culture people lived under divergent ecological conditions it should be no surprise that they did so in a very different way. We should see it as the reflection of a flexible cultural system allowing a wide choice of subsistence and making it possible to optimally profit from specific natural circumstances.

Diversity

The fourth item is cultural and ecological diversity. I listed it because of the tendency perhaps of this congress to develop a world view. I fear that this is as yet far beyond our capabilities. It would mean a synthesis of a representative series of regional landscape histories or biographies, covering at least the last five to six millennia. While such biographies are very specific in climate, landscape, subsistence and cultural traditions, such a synthesis would mean a high level of abstraction. But landscape studies today are still very much bound to specific regions or cases.

2. Observations and interpretations

Hunters and foragers

Early man

Far before people had any impact on their environment they must have given meaning to it and this might very well have been the case far before we, as archaeologists, can conclude it on the basis of material evidence.

The impact of early humans on the landscape will not have been different from that of other scavengers and hunters, making paths and having dens, and far less than all herds of grazing ungulates. Even the important change from scavenging to the hunting of large game will not have made a difference. This must have taken place around 300.000 years ago or even earlier as demonstrated by the spectacular Schöningen javelins. In this way early Neanderthals competed but certainly did not replace the large predators. In subsequent times increased knowledge about animal life and behaviour must have been acquired, leading to the specialised hunting of migrating herds of herbivores in an interception strategy, based on the predictability of seasonal migrations, at least in the Northern hemisphere. The same holds for the properties of raw materials, used for their increasingly complex material equipment. It is the start of the development of an extensive 'native knowledge system'.

Rock art

The first rock art, as preserved in caves and in the open air in *abris sous roche*, from northern Spain to the Ural mountains, is the first positive sign that people had developed a complex system of symbols. These artists were modern humans, from c. 35.000 BP onward, who replaced the earlier Neanderthal man. In this context it is relevant that they expressed themselves not only on their mobile artefacts, but in the landscape as well, as a sign that specific features of it, like caves, played a role in their metaphysical world. We can argue that this is the stage of human evolution in which the scenery around was consciously perceived and so upgraded to 'landscape'. It is not unlikely that many aspects of the surrounding physical world played a part in this symbolism, be it that it is hardly possible to support this opinion with other arguments than the fact that animals are dominant in the pictures.

Fire ecology

We should realize that as a scavenger and later as a hunter and even as a beginning farmer man's impact was negligible as compared to that of the ruminant herbivores. In this respect the discussion is important whether and to what extent use was made of fire in hunting tactics and in manipulat-

ing the environment. Structured fireplaces as a sign of fire control go back to Neanderthal times, at least 100.000 years ago, but the first indications interpreted as the deliberate firing of vegetation or 'fire ecology' dates from the Mesolithic. The evidence of charcoal in dated peat horizons is, however, exclusively from Britain, especially Scotland, and completely lacking from the European continent. There are alternative natural explanations, which altogether make us hesitating to accept the argument. Most of it seems a wishful projection of the modern world (Africa, Australia, Indonesia, historical Scandinavia) into prehistory.

Settling down

A main change in the man-land relations took place in the end of the last glacial and the early Holocene when in widely separated regions on earth foragers settled down on fixed locations or in small territoria. This was a new way of life in which the exploitation of the permanent and readily available aquatic resources, inland as well as coastal, played an important role. We find such communities from the early phases of the Jomon cultur in Japan, along the lower courses of the Yang Tse and the Yellow River in China, to the Natufian of the Near East, the so-called aqualithic of Saharian Africa and the Maglemosian of Northern Europe. We can see this development as a specific answer to the new interglacial conditions by the socially and technically much more sophisticated fully modern man, *Homo sapiens sapiens*, as compared to the Neanderthals and their contemporaries. One innovation stimulated by this new life style independently in various contexts was pottery.

First farmers

In a few of these areas a unique constellation gave independently rise to farming: the settled way of life, based on the presence and exploitation of large-grained grasses. These are wheat and barley in the Near East around 10.000 cal BC, millet and rice in respectively Northern and Southern China around 7000 or even earlier and maize in Middle America around 5000. In the Near East the process seems to have been triggered by the combination of population increase and climatic deterioration, more specifically: the Younger Dryas climatic deterioration.. From then on real environmental impact starts, but small scale and not immediately. Food production means an intensification of land use, a growth of population, more restricted territories, a fixed relation with a small section of the landscape. In a few millennia agriculture had spread over most of the Old World.

Europe

The first *Bandkeramik* farmers of Central Europe opened small enclaves in the ‘virgin’ forests for their fields with wheat and barley and other Levantine crops. Small parts of the landscape were ‘brought into culture’ or cultivated. It was the start of the domestication of the wild, according to Hodder. This earliest Neolithic hoe cultivation on soils of permanent fertility, the loess, is barely visible in the environmental record. The confined patches of fields were surrounded by woodland that extinguished most of the pollen signals at the sample points in the brook valleys. People manifested themselves in their domain by means of long houses in fixed settlements, impressive in their times, especially for the people beyond the agricultural world, the hunters of the northern zone.

Native knowledge systems

The aspects of subsistence that archaeologically are documented in the Meso- and Neolithic show an intimate knowledge of what nature has to offer in the case of hunter-gatherer societies. The same holds for the selection of raw materials for the production of tools: the right wood species for the right functions, a careful selection of specific bones for implements. It seems justified to assume that this knowledge was general and also extended over domains badly or not at all documented in the archaeological record and of which the absence can be explained by differential conservation or by a lack of direct evidence. This means that aspects as animal behaviour and soil conditions must have been part of it and will have been used in settlement location strategies. That is exactly what we see. Modern palaeoecological research shows that most site locations are fully rational in the perspective of the agrarian capabilities of the societies involved.

Monumental imprints

New farming communities all over the West and the North of Europe developed a different way of life. Settlements seem to have been small and short-lived. In this pattern of shifting settlements and shifting fields megalithic tombs were erected for the dead. So, fixed points were created in the landscape visually demonstrating the rights on the inherited land and directly connecting the claims on specific territoria to the ancestors. The tombs became locations of offering and cult to the ancestral spirits as well, a function that in regions like Britain later shifted to special communal cult places. Such megalithic tombs were characteristic for most landscapes outside the central European loess zone: from Southern Spain to the Orkney Islands and Southern Scandinavia.

The ritual aspect, as demonstrated by the tombs, generally seems to have been a common factor of daily life, but there are some regions where people in the sequence of many generations concentrated their monuments, as it seems inspired by those visible from earlier times. The older monuments were reinterpreted and quite often even reconstructed to serve the new needs. Famous ex-

amples of such 'ritual landscapes' are the regions of Stonehenge and of Avebury in Wessex, the Morbihan with its stone lines or *alignements* in southern Brittany and the bend of the river Boyne in eastern Ireland. Many of these, remained in use well into the Bronze Age. In later prehistory, when the megaliths and the connected burial rituals became out of use, individual barrows took over the function of territorial manifestation, linked with the spirits of the forefathers.

There are still other manifestations of ascribed values to specific features of the land. One is the offering in bogs and in stretches of rivers, in Northern Europe from the earliest Neolithic onward and continued into the Roman Iron Age. Another are the panels of rock carvings from Bronze and Iron Age, well-known from the Alps at Mont Bego and Valcamonica and from many locations in southern Scandinavia. They show us pictures of a differentiated mythological world that are equally difficult to understand as those from the Ice Age, but that by their locations close to the arable show again that the profane and the ritual were two inseparable aspects of one and the same landscape, throughout later prehistory.

The term 'ritual landscape' is, however, more recently toned down since it was realised that even in the most impressive examples domestic sites are found as well. It appears that all landscapes have their ritual and domestic aspects, but that some indeed were more ritual than others or that in some cases their symbolic aspects were more prominently preserved than elsewhere. The domestic is at any rate always underrepresented and often hardly known, while enduring stone monuments strike the eye.

Exotics from the earth

Another sign of the important role the landscape has played in the minds of people, not often mentioned as such, is the apparent value ascribed to objects made of remarkable or 'exotic' materials, derived from specific, often unique and distant locations. These materials strike the eye by their colours or colour patterns, or by their properties and it is generally assumed that these objects were used in wide ranging exchange networks, which clearly demonstrates the ascribed value. Examples amber and jadeite, many types of flint, like the chocolata flint and the banded flint from Krzemionki in Poland and the brown flint from Grand Pressigny. That it is not only the remarkable material itself that made out the value, but the location as well as illustrated by the 'Group VI axes', mined high up at Great Langdale in the Cumbrian mountains, not a type of rock that strikes the eye, but first of all a striking location. In later prehistory copper, tin, bronze and gold, equally mined and linked with specific sources in remote land, replaced the old stone values.

Agricultural change and environmental change

Secondary products

Let us leave now the ritual and symbolic and return to the more profane, from the *imprint* on the landscape by various forms of manifestation to the *impact* by continued exploitation. I have chosen to discuss just an example from my own research experience: Northern Europe in Bronze and Iron Age.

A main economic development in the Later Neolithic is the increased use of so-called secondary products, or products that can be 'cropped' from the animal without killing it: traction power, milk, wool, dung. These secondary products brought about a revolution in farming life. Traction means ploughing and so the possibility of opening up poorer soils that gave lower yields per ha. Traction also means wheeled transport of bulk, increasing the action radius of the settled farmer. This bulk can be harvest, but dung as well, and so the men presumably became more and more involved in crop farming, in the Neolithic considered to have been predominantly the domain of women.

Wool means spinning and weaving, milk implies a dairy house industry, making butter and cheese, both attributed to women. Good proof of these activities is, however, not so easy. Woolen fabrics are rarely preserved, but certainly attested in the beginning of the Middle Bronze Age. Dairy farming can be based on age patterns of the slaughtered cattle and on special pottery types, connected with the making of cheese or butter. All this implies fundamental changes in the activity patterns of men and women, in the roles of both sexes in the farming practice: the men being more important in primary food production, the women being more confined to the house and in charge of activities there.

Expansion and destruction

The integration of animal husbandry and crop cultivation into one unified system of mixed farming is typical for the end of the Neolithic – the Beaker Period – and was fully established in the Early Bronze Age, at least in Northern Europe. It meant a wider environmental impact, as is visible in the pollen diagrams that show an increase of herbs and grasses, reflecting the large-scale opening of the woodland.

Long houses with stable parts, fixed fields surrounded by fences or ditches, arable soils, extensive plough marks all are widely established from the beginning of the Middle Bronze Age, c. 1700 cal BC and certainly have their roots in the centuries before. But in spite of the apparent measures to compensate for soil degradation, we observe that soils were widely exhausted and the rich brown earths transformed into the poor Humic Iron Podzols, the Brown Soils being characteristic for the earlier Beaker barrows, the podzols for the later barrows from the Bronze Age. Overexploitation went so far that the wind got grip on the sand and tracks of wind blown sand deposits became to

cover the old arable. The degradation of those poorer soils was compensated for by means of manuring. This can be identified by distinct arable soils, by high phosphate contents of these soils, by thin veils of pottery sherds over extensive areas and by weed associations in the palaeobotanical remains. Manuring can also be deduced from house plans with evidence of cattle boxes. Although these need not necessarily to have been used throughout the full winter, it means at any rate that dung must have been piled up in some periods and removed.

Restoring sustainability

The final answer towards a more sustainable arable farming, at least in Northern Europe, seems to have been the so-called Celtic Field system, developed in the late Bronze Age, between 1000 and 700 cal BC. This is an irregular lay-out of small quadrangular fields, that allowed a good agrarian planning and possibly a protection against wind erosion by hedges and brushwood on the low, separating banks between the fields. A strategic location in a gradient of lower and higher ground water tables diminished the risks of crop failure: the lower parts had a good crop in the dryer years, the higher part in the years with higher precipitation. Systematic manuring and the introduction of new crops, the oil seed *Camelina sativa* and the pulse *Vicia faba*, enabled a shift from long fallows of the Neolithic to a short fallow cycle and a systematic crop rotation.

For the Netherlands the territories were calculated at c. 100 km², with a central 100 ha Celtic Field with three to seven farms, forming an open hamlet, surrounded by outfields and heathland, presumably used for grazing sheep. Tracks of forest that produced wood for house construction, fencing and fire separated the communities. The communities were interconnected by sand roads, along which barrows remembered ancient ancestors and urnfields the more recent forefathers.

In more hilly country slope erosion, colluviation and the filling up of valley floors tell us about exploitation and overexploitation. On slopes lynchets or terracing was constructed to prevent slope erosion. In most valley floors several meters of sediment have piled up since the Mesolithic. Now and then, in deep excavations, Mesolithic remains come to light. Most of these sediments seem to be rather late and to date from Iron Age and historical times. The same is true for sedimentation in the Rhine / Meuse delta, which is most prominent in that period, signifying that in slope wash and all other erosive processes an equilibrium was broken in the end of prehistoric times. We can visualize these trends in a curve for environmental impact, based on a large series of independent pollen diagrams. We can derive from all environmental evidence a scheme for landscape changes, showing the major transformations in the two millennia BC. At last we can compare these schemes with a population curve (on a logarithmic scale) for the same period, to demonstrate how few people with population densities of only 2-5 per km² did away with most of the forest (*see pp.78-80*).

So in large parts of Europe major environmental destruction has taken place in later prehistory, a combination of poor soil conditions and a first 'mechanization' of arable farming in the form of the plough and draught oxen. Soil degradation and slope erosion was compensated for by manuring and a new arable system, or by terracing the fields in a hilly countryside.

From many other countries examples can be given of early overexploitation that is even larger in scale and more impressive. There is the option that – apart from climatic deterioration – large scale cattle herding disturbed the subtle ecological equilibrium in Northern Africa in the 5th millennium BC, and so contributed to or even caused the fast and wide extension of the Sahara desert.

The Mesopotamian irrigation systems of the 2nd and 1st millennium BC were fully dependant of continuous maintenance efforts and suffered from silting up and increased salinity.

The fast extension of the coastal plains in Greece and western Turkey in historical times, but also elsewhere around the Mediterranean, is clearly related to large scale slope erosion in the Hinterland, itself caused by a too intensive use, esp. the herding of sheep and goats. It is interesting to see that in the same landscape spoiled in this way many locations were given high symbolic values as demonstrated by sanctuaries, temples and myths.

Wet rice cultivation on terraced slopes in Southeast Asia, on the other hand, can be seen as an early form of extreme, but sustainable intensification, supporting high population densities, a new equilibrium in an artificial landscape, dependent of the maintenance by its human occupants.

So several statements might be made. Firstly, in the past the relation between man and the land had a very dual nature. On the one hand the landscape was valued, given highly symbolic connotations, filled with spirits and powers as visualized in mounds and temples. On the other hand it was exploited and used, often irrespective and certainly unaware of the long-term effects.

Secondly, it seems that the more destructive stages are not directly linked to agriculture as such: it is very difficult to point to Neolithic examples. This seems to have been a period of relative small-scale impact. The landscape was opened up, but not degraded. The two millennia BC demonstrate, however, a major change, at least in Europe: A combination of population increase and inadequate strategies mark the start of landscape destruction by overgrazing or soil exhaustion. It seems that population density itself should not be seen as a cause, but more the lack of measures to assure sustainability, given a certain population density. We should ask ourselves whether the changes were fast enough that people could be aware of these, or that for them the landscape in essence was static. The changing landscape dynamics - so very visible in our long diachronic perspective – might not have been identified and recognized as such in antiquity.

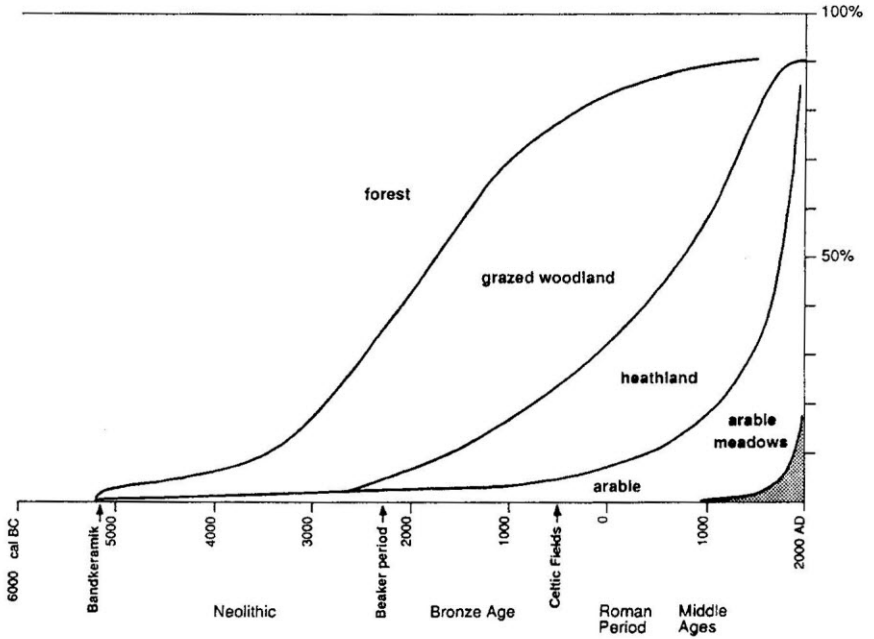
Biographies of the landscapes

Successive generations and successive culture traditions have made their imprint in the landscape in the course of time, be it in the form of more or less permanent structures, be it in the form of extensions of reclamations and of environmental disturbances. Every generation inherited the landscape and its layout from the generations before, made its interpretations of the old and added new. Manifestations of the past might not have been properly understood, will have been mythologized, denied or adopted and restructured. Old landscapes were replaced by new. So we find ruined megaliths and eroded barrows together with old field parcelling as traces of former active communities in nowadays unused moors. Each landscape is inscribed by successive generations and on the basis of these inscriptions archaeology can write what we call their biographies. These are stories of construction and destruction, at any rate of structuration processes, in increasing intensity. Much information is gone in the course of historical and recent land use, or invisibly hidden in the soil, but in combination of natural and cultural evidence these biographies can be written and teach us about the shift from the wild to the domesticated land, about former attitudes towards the landscape and the struggle for sustainability in the past.

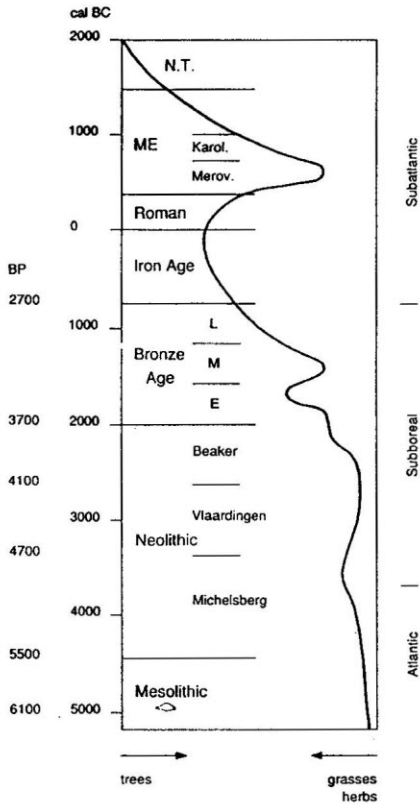
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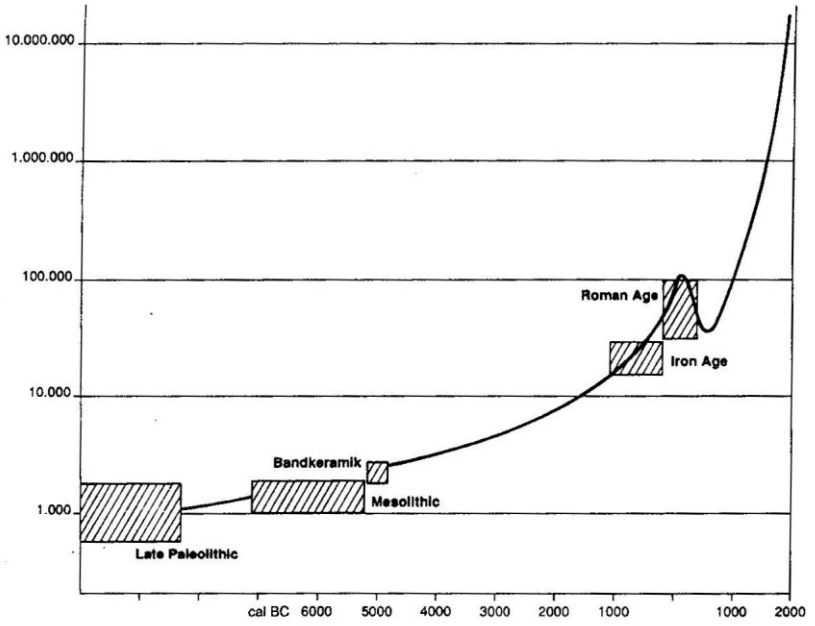
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Curve for environmental impact



Scheme for Landscape Changes



Population Curve