Man is made of mud
"Soil", bio-logical facts and fiction, and environmental history

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Der Mensch ist aus Lehm geformt
„Boden", bio-logische Tatsachen und Vorstellungen und Umweltgeschichte

1 Introduction

Within the five essentials of an ecosystem (space, matter, energy, information, time) soil is not directly listed. However, it is one of three physical manifestations of "space", besides air and water, and an important purveyor of matter. All beings move through and are defined by either one or even more of these media of space. At least terrestrial and airborne organisms depend directly on soil, as the medium that support plants and carries animals, that builds the surface layer of the earth, and provides the basic matter for any organism.

So, considerations about soil should start from the fact that it is a physical prerequisite, or even a determinant, for many organisms, including man. But before going into material aspects it seems necessary to emphasize that science and scientific approaches are nothing but means of constructing nature. Thus the prerequisites of these scientific means, the objects of their focus, and their epistemological goals have to be reflected first, not only to prevent ourselves from circular results, but also to look for the underlying opinions. As, of course, there would be no progress from the factual alone, as only opinions about facts and matters produce progress in the long run, be it technological, scientific, or else. This is Epiktet, Ockham, and Popper more than roughly remembered. It is intuitively understood that Environmental History will have to deal not only with physical, pedological, ecological, or other factors of soils but also and perhaps even more legitimately with reifications of human attitudes, belief, and superstition about soil. The subject also includes facets of the "nature-nurture" problem, which deals with the problem to what extent human features are intrinsic by means of "natural" and to what extent are those features culturally generated, respectively.

Zusammenfassung

Der Aufsatz fasst eine Reihe von Aspekten zusammen, die zu einer Anthropologie des Bodens führen. Sie repräsentieren basale Konzepte des menschlichen Umgangs mit Boden, werden aber in umwelthistorischen Erwägungen zumeist übergangen. Der Aufsatz nimmt seinen Ausgang bei Erwägungen über die biblische Ableitung des Menschenbegriffs und verbindet dann den Begriff „Boden" mit dem des „Raums". Die materiellen Eigenschaften des Bodens bilden sich in den Menschen ab. Hieraus ergeben sich Verdinglichungen zu den Vorstellungen über Abstammung, Verwandtschaft und Determinismus.

Schlagworte: Boden, Anthropologie des Bodens, Umweltgeschichte des Bodens.

Summary

This paper aims at resuming aspects of an anthropology of soil. These features are constitutive for human approaches to soil, but are mostly overlooked though in environmental history. The paper starts with a derivation of the term "man" from ideas related to soil in the Old World. It then transforms "soil" into "space" and considers bio-related issues, to what extend soil materials influence the bodily composition of humans. From here reifications lead into the fields of offspring, genealogy and determinism.

Key words: Soil, anthropology of soil, environmental history of soil.

For humans, beings that reflect their environment, soil is not only a given matter but has also a transformed quality, for example as being one of the "magic" (in terms of pre-enlightenment sciences) four constituents, soil, water, air, and fire, that were important in ancient and medieval philosophy. The meaning of them being ambiguous. It is as well as the physical quality of any of these constituents that make man think about these elements. But it is also the "principle," the concept behind these elements, as man sees it that makes people worship one or more of these elements.

This essay is divided into three parts, according to the different manifestations of soil: 1) on mythical and metaphoric prerequisites of soil concepts, 2) soil related issues in biological features, and finally 3) problems of territoriality: the latter merges ideas of the two previous. Since one must look at soil as being a holistic matter, it is difficult to consider one property without taking the others into account. This contribution specifically aims at collecting some aspects and impacts of "soil" from a general point of view, without which an "environmental history of soil" would be incomplete, at least in my understanding. I do not intend a complete presentation rather than a brief outline of the topic, as to stimulate and encourage further studies along lines sketched here. I will move into realms of cultural history and biological facts and will demonstrate that they reciprocally influence each other. Most of the topics mentioned are still waiting for becoming well integrated into a synthethic environmental history of soil. Thus, this paper will not lead to a general conclusion beside those facts and narratives summarised. It should be read as a suggestion instead.

2 Man: Adam, and Adamah. Soil and Creation

In any agricultural society the concept of soil is also an issue of myth, of master narratives that influences societal concepts and values. In the Old World culture of European-Near-Eastern origin the metaphoric encompasses the history of creation as well as deterministic concepts. Soil has an ambiguous meaning in Jewish-Christian religion. The Lord God banished Adam and Eve and assigned them to earn their living painstakingly by tilling the soil [Gen 3: 14–19]. Thus, soil became related to humans in various facets of the *conditio humana*, soil made man work. Work is an important part in the evolution from apes to man, according to one important philosophical forerunner of environmental history: Friedrich ENGELS argued that *work* created man [1876 (1962: 444–455)].

Genesis claims also that some kind of soil, dust, mud, or clay was the matter man was made of. Although this statement can be seen as an expression of the inferiority, the worthless, and the ephemeral, as man describes himself before the Lord God, this expression instantly co-founds the metaphoric link between "soil" and unsophisticated earth-orientated and practical understandings of offspring. It is intuitively obvious that "soil" in this perspective is in a mythical way related to "inheritance," to "ancestry," and "genealogy".

The creationistic story is rather prosaic [Gen 2:7, King James Bible]: "Then the Lord God formed man *of dust from the ground*, and breathed into his nostrils the breath of life; and man became a living being." According to the revised [of 1984] German translation by Martin Luther, it reads: „Da machte Gott der HERR den Menschen *aus Erde vom Acker* und blies ihm den Odem des Lebens in seine Nase." [Then the Lord God made man *of soil from the field*…] However, the Latin bible, the "Vulgate," states: "Formanit igitur dominus deus *de limo terre* et inspiravit". An old translation into German used "*clay*" for "*limo terre,*" which has the meaning of mud, or sludge, which emphasizes aspects of fertility (besides the phrase that man was made "of soil of the *field*" instead of any arbitrary dust), given the Middle Eastern fertile river valley situations.

These minor but decisive differences in the translations of the phrase into different languages and throughout time sheds light on the change of concepts behind the translators expressions, even in one common cultural context, and even nowadays. The modern German phrase "*soil from the field*" is rather significant, as it includes the pictures of fertility and procreativity, whilst "*dust*" transports concepts of infertility and inferiority.

However, this first glance hermeneutic approach lacks from deeper insight into the Hebrew text, as the Hebrew phrase (*adamah*) means "*out of the soil from the field*" (from the soil of arable land). The linguistic derivation of *adam* (man) from *adamah* is pointing to his intrinsic dedication for cultivating the soil. Somewhat later man was cursed by the Lord God and bound to die, as the Lord God said, to "return to the soil" [which becomes now the dusty and the dry, becomes "*afar*" (dust; dusty and dry soil; Gen 3, 19)].

I cannot resist the impression that optimistic translators of the Talmud were closer to tacitly underlying a "soil"-concept whereas tendential pessimistic translators emphasized more the "dust"-concept. Interestingly enough "clay" might bear closer relations to the religious forerunners of the forming religion in the Middle East. In Mesopotamia man was creat-

ed by the gods from "clay," to which the blood of a slaughtered god was added, see the Atramhasis epic (at least 3600 BP), Tablet I, lines 210 succ.; cf. also the Enuma Elish epic, which is only slightly younger, Tablet IV, lines 1–34.[1] These are amongst the oldest sources we know that bring together blood and soil in the context of creation and ancestry. The Atramhasis epic mentions also a plague of wind erosion [Tablet II, line 14], which is nothing but the knowledge about the threat by an early Mesopotamian "dust bowl" event.

The same general idea of creation is modified in the Ashkenasim folklore tale about the *golem*, an artificially created human made of a lump of clay, supernaturally endowed with life and strength. Instead of blood the powerful and life giving sign of JHWH, the Lord, is written on the forehead of the golem. A contemporary interpretation of this tale would have to end up with genetically altered organisms, or creatures, and finally human clones, expressing that man has totally conquered the soil, being it physical or metaphysical.

The etymologic analysis of the linkage of *adam* and *adamah* meets with an obstacle from the inconsistency, that the Lord God later did not well receipt the sacrifice of Cain, the agriculturalist, but that of Abel, the pastoralist. The difficulty of interpretation stems from the fact that the Lord God himself acts inconsistent with the agricultural innovation although he himself put up this perspective development when he determined man to work in the field by the implications of his creation. It is likely to assume that the Genesis-text expresses different views of different authors at different times. The tale about the murder of Abel can be considered as a general cipher for the competitive struggle between different ways of land governance between pastoralists and agriculturalists.

However, the Old World also provides an idea of merging "soil" and "ancestry" that is enclosed in the creation of the mythical founder of the city of Athens. The general idea behind this myth is likewise lively in indigenous myths in other parts of the world. The myth is enclosed within the story of the emergence and formation of the city of Athens: Hephaistos tried to rape the goddess Athene, and his semen fell on her thigh. She removed it, and the semen fell on the soil. The soil, *Ge*, which is "Mother Earth", conceived the semen and gave birth to Erichthonios (*Ἐριχθόνιος*), the mythic king of Athens (LORAUX, 1993). The word *autochthonous* is a compound of *αὐτό –, self* and *χθών, soil.*

The myth is used in the civic discourse of the Athenians to mark differences between their origin and that of other Greek tribes, who experienced catastrophic migrations before finally settling down. The "authochthony topic" (LORAUX, 1993) became constitutive for the self-recognition of Athenians in terms of a "noble origin" and "noble succession". "The Athenians are thus the only legitimate inhabitants, opposed to all those who are so-called immigrants and foreigners, although they are in fact on their own land – that is, all the citizens of other *poleis*." (LORAUX, 1993).

The "semen" is a prerequisite that describes implicitly a feature of soil that leads directly to the metaphor of "*Mother Earth*". This idea became a powerful and influential metaphor, even up to contemporary European philosophers (e. g. SERRE, 1985, especially the part on landscape). I assume that the worldwide used metaphor of Mother Earth (or equivalents, respectively) was brought up independently in different places because of its self-evident meaning.

While knowledge on Old-World philosophy and religion is abundant and accessible for me, the same does not hold true about other important systems of belief that are widespread in the world. I am unfortunately unable to cope with the task of reviewing Chinese, Hindu, Buddhism, Islam, and other world religious ideas. But to my surprise, ethnologists, anthropologists, and environmental historians have obviously not yet focussed the soil problem in world religions, natural religions, and indigenous systems of belief with respect to questions sketched here briefly. Nothing useful in this context can be found e. g. in *The Golden Bough* (FRAZER, 1907). Recently a survey on various relations between soils and society from a multicultural perspective became available, which contains short communications to questions brought up here (LAMAHR and ROBAUT, 2001). It deals not only with soil practices in various indigenous societies but also with general questions of spirituality and culture with respect to various world religions. However, even the most recent and comprehensive environmental history of China (ELVIN, 2004) does not deal with "soil", demonstrating that this issue is still outside the focus of historians.

Certainly, the concept of Gaia, which became quite influential in non-scientific contexts of modern cultural criticisms in the Western hemisphere, has to be added in a way to Mother Earth related quasi religious views (LOVELOOK, 2000). The modern Gaia concept refers to the mythical antique Greek Gaia, the life giving and generating mother earth. As such modern ideas might today be ephemeral, the Jewish-Christian religion had seriously to cope with alternative concepts in the past, especially in its subcultural

expressions, in a long lasting struggle that culminated in the inquisition. One of the best documented cases is that of Domenico Scandella, better known as Menocchio, who lived in the Italian Friuli of the 16th century and who had his own ideas about the creation of the world (GINZBURG, 2002). He is obviously just one tip of numerous icebergs of the subcultures of that time. Menocchio's model of the world is clearly influenced by very ancient thoughts about the four bodily humors and the four main elements that survived as tacit knowledge. According to the Greek philosopher Empedokles all matter is derived from the four elements, water, fire, air, and soil. It has been further developed by Plato and Aristotle. Especially the latter added qualities to the elements, as dry, warm, cold, wet, which became decisive in ancient medicine, as they indicated the humor of individuals. The concept of the four elements and humors was widespread in "scientific" mediaeval Europe. Menocchio relied on the contemporary "scientific" interpretation of the world rather than on the creationistic view of the Roman Church. He believed that the ground/soil is dedicated from the beginning of times to walk on and is stomped upon all day long, and it is in the midst of the other elements, which are arranged and contracted as in an egg, where the yolk is the centre and the shell the periphery (GINZBURG, 2002, chapter 34): "The yolk corresponds to the earth, the albumen to the air, the thin tissue that is between the albumen and the shell to the water, the shell to the fire: and they are joined together in this way, so cold and heat, dry and moist may work on each other. And our bodies are made out of and composed of these elements: by our flesh and bone we mean earth, by blood we mean water, by breathing air, and by heat fire. Our bodies are composed of these four elements."[2] To me the metaphor of the egg is, of course, not randomly used by Menocchio. His picture is just one in countless interpretations of elements of the environment as religious metaphors and messages to humans, to remember them the beauty and perfection of the creation.

A recent contribution by PATZEL (2003) offers access to psychological interpretations in soil sciences, and emphasizes in one of its chapters the importance of the unconscious for the emergence of soil concepts, as e. g. is demonstrated by Jungian dream analysis of those dream episodes enclosed in interrogation reports of "Benedanti"[3] of the 16th century by the officers of the inquisition.

Menocchio was sentenced to death and burnt on the pyre for heresy. But the important message from that example is, that there are many subcultural contexts in everyday life that deal with natural objects as are animals, plants, or soil in a metaphorical way, given the sheer superstitious knowledge. More examples of mediaeval superstition (or "folklore") with respect to soil may be found in GURJEWITSCH (1986, chapters on peasants and saints), to mention only one important contribution.

3 Soil, space and their reflections in reproduction and production

Soil features are reflected directly in the composition of organisms. Generally each food web starts with a plant eating organism. As plants grow by incorporating the minerals from the soil that is supporting them, plants from soils of different composition differ in their mineral composition too. Animals feeding on plants in their home range carry this soil signature though it becomes altered for metabolic reasons. Finally the top predators in a given home range will also end up with mineral signatures that reflect the soil signature of this range.

Within the set of soil related human activities, geophagia[4] (earth-eating, dirt-eating) is known for all ethnic groups on all inhabited continents. Earlier anthropological scholars stressed cultural backgrounds for this habit, as they are often embedded in ritualised practices. Furthermore it appears that the habit was linked with the ideas of "Mother Earth", the "Good Earth," and that it can also to be seen as subtle expressions of territoriality. I mention it in this chapter, as it serves as a good example of a "nature-nurture" soil problem. Despite of being culturally embedded in what ever context, and considered of being an earth orientated magic practice, more recent studies on geophagia have emphasised the nutritional benefit soil eaters gain by the uptake of trace elements and nutrients (REILLY and HENRY, 2000). Moreover the uptake of comestible earths can provide suitable absorptives and detoxicants for the consumption of phytotoxines, which are typical e. g. for Andean tubers (BROWMAN and GUNDERSEN, 1993). Since a phytotoxic burden of nutrition can be generally assumed before times of advanced plant breeding and the introduction of sophisticated meal preparation techniques, one would assume geophagia being a widespread and very common practice in agricultural societies. Not only anecdotic but even suitable in terms of prevention of malnutrition is the consumption of soup made of soil in times of dearth, as is described in "The Good Earth" by Han Suyin. Given the fact that soil is the biomass richest medium of the world (biomass provided mostly by microorganisms), one could

imagine certainly to overcome food shortage by eating soil soup – if one manages to swallow it.[5]

If "soil" is understood in a broader functional sense it becomes inextricably linked to features of "space". The aim of this chapter is to further briefly outline features of soil and space in relation to organisms and materials related to human culture.[6]

3.1 The study of provenance of biomaterials: inorganic components

„*Der Mensch ist, was er isst*" – this German pun[7] reflects a trivial insight into general physiology. Humans, as well as other organisms, consist of that matter that is incorporated. In case of inorganic matter or organic matter that is physiologically degraded into inorganic components, this matter (elements and their isotopes, which are atoms of different atomic weight) may be stored in bodily tissues as well as in the human skeletal system, if they are not excreted. Thus the skeleton does not only serve as an internal supporting feature for the organism, and as site for the hematopoietic system, but also as the main storage organ for minerals. Mineral elements and their ions are most important for basic physiological processes within cells and the cell walls. Quite a few of the elements are under physiological control in terms of physiological uptake, metabolisation, and storage rate. There can be a physiological discrimination against or in favour of elements, as e. g. Strontium (Sr) can be discriminated in favour of Calcium (Ca). As in any mammal, the human physiology prefers Ca instead of Sr for the main mineral compound of the bone. Since humans are at the end of a food chain, their bone contains normally least Sr compared with non predating mammals of the same food web.

However, minerals, their isotopes, and their ratios are not evenly distributed in soils of the world (SCHMIDT, 2003). Specific local patterns in isotopic features consequently lead to reflections of those patterns in living organisms. The isotopic ratios are reflected within each step of the food chain, but specifically altered in their proportion due to metabolic kinetics of the isotopes. In consequence their ratios in individuals will offer minor but significant differences in their composition in comparison to individuals from another part of the world, continent, region, or area. Even social control of nutritional components, that leads to such differences, can be traced back. Consequently these differences are observed for reconstructing food chains or food webs in archaeology or contemporary ecology (AMBROSE, 1993; SANDFORD, 1993; SCHUTKOWSKI et al., 2001; ZLATEV and KUVLEFF, 2003).

If soil trace element patterns are known for regions, countries, or areas of continents the isotopic patterns may serve as indicators for reconstructing the spatial origin of a human or other organism. These analytical tools are valid to reconstruct immigration in prehistory down to the individual's level (e. g. GRUPE et al., 1999). Although this approach was elaborated for geological and archaeological purposes it can also be used in forensic studies to trace unidentified corpses back to their presumable country of origin, even in times of supermarkets and globalisation (HÖLZL et al., 2004).

Such reconstructions also reveal information about exploitation patterns in human communities through the study of skeletal series, in terms of main nutritional components. For instance, estimates can be made about the bulk plant nutrients from the analysis of bone. This allows to deduce the use of specific crops, if they are distinguished from each other by their principle photosynthesis carbohydrate compound (three- or four-carbon molecule near the start of the Calvin cycle, C3- vs. C4-plants). Maize, sugar cane, and millet for example are C4-plants, whilst many other cultivated plants, including cereals, are C3 plants. Evenly the stable isotopes of nitrogen are indicative, rough-

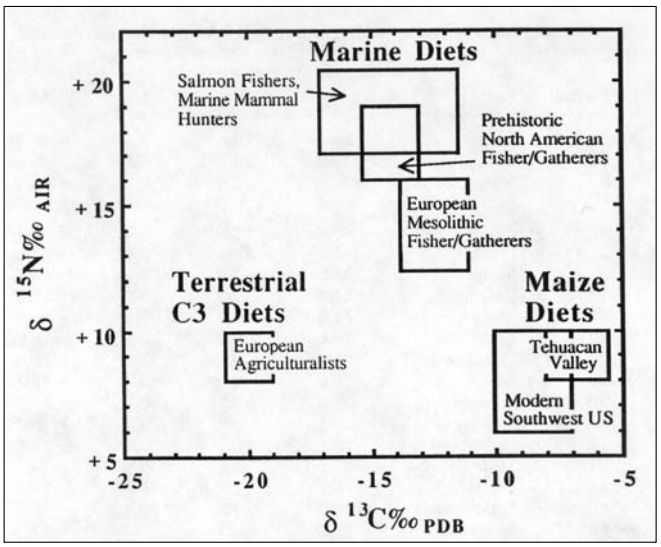

Figure 1: Isotopic composition in terms of nitrogen (N)/carbon (C) ratios of bone collagen from humans with isotopically distinct diets (adapted from HUTCHINSON & NORR, constructed from data quoted after SCHOENINGER et al., 1983)

Abbildung 1: Verhältnisse stabiler Isotopen (N/C) im menschlichen Knochenkollagen bei Nahrungsspektren mit grundlegend differierenden Isotopien (nach SCHOENINGER et al., 1983)

ly for the proportion of animal products in the nutrition (see Figure 1). Using those signals enabled e. g. HUTCHINSON and NORR (1993) to suggest the time for the introduction of maize into the North American South-East.

Until recently bulk and trace element studies were also used to reconstruct food webs and land use systems in terms of prevailing crop or meat production (e. g. SCHUTKOWSKI et al., 1999). However, so far published empirical data in case studies from which such conclusions were drawn upon, caused doubts for epistemological reasons, as was demonstrated by reanalysing the same sets of samples (FABIG and HERRMANN, 2002). The problem is still under discussion. The general principle of such approaches must be correct by reasons of theoretical deductions. Undoubtedly this approach would be especially useful in studies on soil use in prehistoric times.

3.2 The study of provenance of biomaterials: space related DNA features

The constancy of distinct distributions of plant and animal species is within the first experiences in the discovery of the natural world: ice bears in the Arctic, Tse-Tse flies in Africa, Osage Orange trees in North-America. The bio-geographic distribution of species depends on the trivial fact that the set of factors required for their existence and propagation usually occurs only in limited areas (there are only very few ubiquitous species that can be neglected here). These factors derive from climatic and soil conditions, which are not evenly distributed over the world. The distinctness of biogeographic patterns might be camouflaged by the interference of other species, mostly man, who (unintended or deliberately) provides ecological niches for the use of organisms that are not indigenous.

Among the well known examples for intended introductions are maize to Europe, wheat to the Americas and others of the set of the portmanteau biota (CROSBY, 1986). Such introduced species do not grow on any spot but only in those areas, where basic ecological requirements are fulfilled, be it by nature or by human activity.

Examples for animals might be restricted here to cattle and sheep, which both require a specific land use regime for grazing.

However, those "anthropogenic niches" or "anthropogenic licences" are also used (in terms of spreading) by vermin, which essentials of life are by definition contrary to human interests. A nice example offers the *Colorado beetle* (*Leptinotarsa decemlineata*, "potato beetle"), which lived inconspicuously in remote hills of Colorado until the days of the Western trail. Its feeding plant was *Solanum rostratum*, but as soon as European settlers brought in potatoes (*Solanum tuberosum*) in 1859 it became an opportunistic consumer of this plant. Now it had simply to jump literally from one potato plant to the next, it needed only a slight acceleration by the new railway transportation system to reach the North American East Coast already in 1874 (see ELTON, 1958). Europe was first hit already around 1870, and in 1980 the beetle had spread that far east as already behind the Caspian Sea. This remarkable example is not likewise shown by all intruding species, but it demonstrates how much the pattern of spreading can depend on human soil related activities.

As for the Colorado beetle the peopling of the earth is a process of opportunistic spreading in space and time into suitable environments. Since humans successfully cope with almost any environment by cultural innovations, they became cosmopolitans. This process took only 40.000 years for the anatomically modern *homo sapiens sapiens*, what is almost a comparable speed to that of the Colorado beetle, since man had to rely on successful preparations and adjustments of soils and self invented implements of transportation.

All humans, as well as all other organisms, are the monophyletic procreation of a common male and female ancestor, which means in terms of practical life from a minimum number of a similar set of ancestors. Every living individual can be considered to be at the end of a branch of the genealogical tree. Due to modes of DNA – inheritance this ancestry can be rooted backwards in the female line by the use of mitochondrial DNA (mtDNA, the *Ancient-Eve-Theory*, see CANN et al., 1987). In males phylogenetic lineages can be drawn back on Y-chromosomal features (BOWCOCK et al., 1994). Differences in the originally similar DNA features increase during time, since mutations are accumulated. As people in given geographic areas have more common offspring than people from two far distant areas, these differing features are not equally distributed but accumulate in given areas by time. Thus by time people in distinct geographic areas or regions are discriminated by sets of differences in their genetic features (coding and non-coding DNA polymorphisms) from people in other regions. These aspects hold true also for animal and plant species in a given region. Therefore the genetic composition in any territory is necessarily "unique".

Although the overall variability between groups of people is smaller than between the individuals of the groups, genet-

ic profiles of groups are highly indicative with respect to geographical allocation of individuals. DNA profiling techniques nowadays analyse source materials for racial and regional origin of the causer (DE KNIJFF et al., 1997). Those techniques are also available for historic or prehistoric source materials (HERRMANN and HUMMEL, 1994; HUMMEL, 2003), and have already provided suggestions for or confirmation of the ancestry of certain historical celebrities (e. g. the evangelist Luke from Syria, VERNESI et al., 2001).

Genetic tools are equally capable of providing insight into plant and animal ancestry. The genetic relationship among European cattle breeds and the evidence of its Near-Eastern origin is a valuable information with respect to the neolithisation of Europe (BLOTT et al., 1998; BRADLEY et al., 1996; TROY et al., 2001). Currently suggestions have been made to focus trade routes and breeding patterns of cattle within Europe by means of mtDNA analyses (HERRMANN et al., 2002).

Moreover sets of DNA-sequences of the Y-chromosome (so called *haplotypes*) that are inherited jointly through paternal lines have turned out to be also informative with respect to geographic origin of the bearer. Databases are built up currently by forensic scientists (http://ystr.charite.de/index_mkl.html ; http://www.reliagene.com/) to locate ancestry of individuals (Figure 2).

In conclusion DNA features indicate the geographical origin or relation of organisms.

3.3 The study of provenance of artifacts

The fact of unequal distribution of chemical elements and isotopes in soils and related matters is also the basis for archaeometric analyses to discover the provenance of artefacts. The types of analyses outlined above can be extended to isotopic and trace element profiles of metals, such as copper of Arad (HAUPTMANN et al., 1999), Mediterranean pottery (MOMMSEN, 2003) and even stones, as e. g. the marble stones of Didyma, Milet (BORG and BORG, 2003), that were brought to Milet from the whole Aegean.

Moreover, as was mentioned above, artefacts made of biomaterials or biological remains can also be analysed by means of molecular biology (for examples see (2) above). Those approaches do not only provide insight into genetic features of the materials. Here again information on soil and space related features can be derived and transformed into insight into complex human action and interaction, such as trade routes and patterns of colonisation.

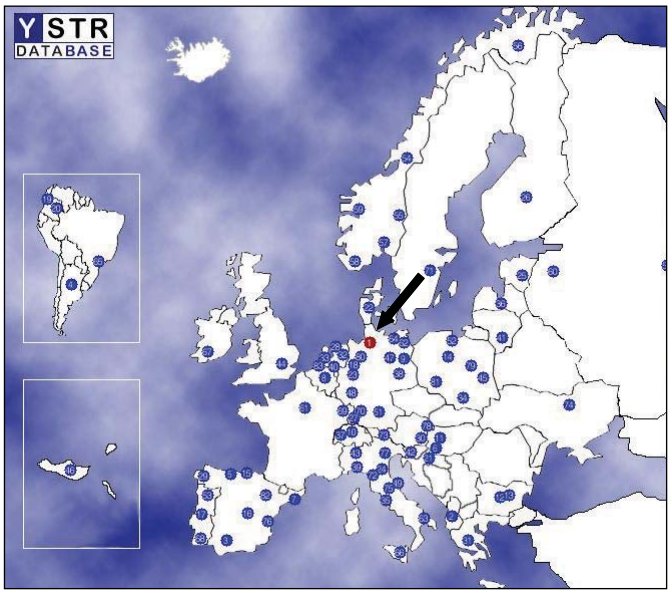

Figure 2: Map of geographic distributions of human male groups analysed for their Y chromosomal haplotypes in contemporary Europeans (http://ystr.charite.de/index_mkl.html) as provided by the Y-STR database. A haplotype found through the analysis of source material can be searched for its frequency and geographic distribution by a simple data retrieve.
The arrow points to one single match for a questioned haplotype found previously only once in Northern Germany. The haplotype query in this example represents the skeleton EN462 from Enger, Northern Germany, which is likely the legendary Duke of Saxony, Widukind, an opponent of Charlemagne at the end of the 8th century AD. The rarity and the geographic occurrence of the haplotype in question may be taken as further evidence for the authenticity of the skeleton (molecular data by courtesy of S. HUMMEL and D. SCHMIDT, Dept. of Historical Anthropology, University of Göttingen). In reverse, haplotype queries may indicate to geographic origin of individuals as shown in this example.

Abbildung 2: Geographische Verteilung eines männlichen, Y-chromosomalen Haplotyps im gegenwärtigen Europa. Die Karte beruht auf der Datensammlung der Rechtsmedizin der Humboldt-Universität Berlin (http://ystr.charite.de/index_mkl.html) und bildet im Prinzip das geographische Vorkommen des gesuchten Haplotypen ab. Im konkreten Fall wird lediglich ein einziger rezenter Fundort in Norddeutschland für den historischen Haplotyp des Individuums EN 462 (mutmaßlich Herzog Widukind) angezeigt. Seltenheit des Haplotyps und geographische Übereinstimmung können als Unterstützungsfaktoren für die Zuschreibung des Skeletts herangezogen werden. Genetische Herkunftsbestimmungen durch Verortung von Haplotypen in geographischen Arealen sind als Standard forensischer und historischer Analysen etabliert.

3.4 Soils and biological hazards

Clinal[8] geographic distributions of "soil"-features bear not only the potential to foster human spreading but also for reducing quality of life or even to endanger the living. They hereby become one determinant for human colonisation, such as latitude and altitude, although it might be generally difficult to recognise and discriminate the direct influence of features of the soil s.str.

Natural scarcity or absence of trace elements is as well decisive for the health status of a population. I arbitrarily mention only two of them. Keshan disease is caused by Selenium (Se) deficiency in Keshan and other Chinese soils (FANG et al., 2003), it causes severe disturbances in cardiovascular systems and pregnancy. Endemic goiter is caused by the absence of Iodine (I) that can ultimately lead into mental retardation. There are numerous diseases caused by element deficiency, which are widely discussed in medicine, nutrition science, and medical geology. However, sufficient bioavailability of these elements is depending primarily on their availability in soils on which crops and fodder plants are grown and animals are breed on.

Moreover, some inherited diseases show a clear geographical distribution. They might be concentrated geographically due to specific marital behaviour (e. g. endogamy, first cousin marriages). But some are not. They can be related to vector transmitted disease, against which they may provide a certain resilience, for instance sickle cell anemia against malaria. As the ecology of the transmitting mosquito depends on environmental features, including suitable slops for the development of the larva, also soil conditions have impact. This impact might be more obvious, if the "natural factors" as mosquito and the inherited disease are combined with some "cultural factors". A certain resistance against malaria can be gained also by another inherited metabolic disease, glucose-6-phosphate dehydrogenase deficiency (G-6-PD). The resistance seems to be improved by simultaneous consumption of fava beans (*vicia fava*), but may lead to fatal results of affected persons as in cases of "favism". Therefore a strict consuming regime for beans has to be kept, that is associated with climax activities and mating seasons of the mosquito. Fava beans are crops produced by horticulture, but also on larger plots. G-6-PD is mostly known for the Mediterranean and West Africa. Interestingly enough its Mediterranean occurrence corresponds roughly to the extension of the Roman Empire, from which time the use of fava beans is common in those parts of Europe and the Mediterranean until nowadays. It is important to know that variants of malaria existed even in river valleys and swampy areas north of the Alps. Therefore the consumption of fava beans was likely the suitable strategy here too, as fava beans were introduced during the Roman occupation. Although not well understood this is a remarkable example for the interconnectedness of "natural" and "cultural" features and their coevolution.

For important and selective infectious diseases in terms of population history that are related also to soil features or at least geographical variation in ground composition see numerous maps and provided information by the World Health Organisation (http://www.who.int/globalatlas/). Parasite eggs can survive in soils and infect people who work in orchards or consume uncleaned root vegetables. Also pathogens that cause severe infectious diseases can survive in soils and may infect people who touch the dirt, as e. g. holds true for poliomyelitis, anthrax, and tetanus. Finally, it is likely that pathogens of zoonoses from free ranging or breed animals are transmitted to humans by dirt contact or inhaled soil dust.

As the few examples of this chapter illustrate, soil is or can become a hazardous medium. Cultural practices may both unintentionally enhance or deliberately reduce its dangerous potentials.

4 Soil related concepts, determinisms, and reifications

4.1 Ancestry, genealogy, and kinship

My further consideration is based on a European and Jewish-Christian centred view, as outlined above. However, there can be no doubt that underlying initials of this perception of "inheritance" are and were independently present also in other cultures or cultural areas. I assume the intuitive understanding of the relation between soil and fertility/productivity in any horticulturalist or agrarian society, presumably even prior in gatherer societies.

The genetic concepts of the Old Testament[9] are those of the stockbreeders and pastoralists who think in terms of blood relatives, and blood replacement, as blood is the essential quality and the seat of life. Therefore blood became the agent and substrate of inheritance and any empirical based genetic theory before the scientific discovery of genetic materials depends (at least somehow) on the explanation value of "blood"[10]. In addition, the belief in influence of environmentally mediated features on the physical appear-

ance of offspring was usually also taken for granted. This is illustrated by Jacob's arrangement to put rods in the drinking water of the flocks and let them conceive while drinking. Thus Jacob was able to increase the number of ringstraked, speckled and spotted sheep and goats. Such environmentalistic ideas remained the prevailing "scientific" theory almost until the end of the 19th century, even in natural science. It was, for example, generally accepted that a birthmark of a child developed because the mother had looked into an open fire during pregnancy.

Concepts that take distinct environmental factors as being very influential for bodily appearance are widespread and favoured in societal discourses for their ostensible and suggestive power of persuasion. Such concepts shaped for example studies on immigrant families to the USA by the renowned anthropologist Franz BOAS (1858–1942). He dismissed preponderance of genetic influence in immigrant families and claimed that environmental factors after immigration into the USA lead to bodily changes already in descendants of the first generation. Boas thus became a principle witness for a liberal immigration policy. This demonstrates the impact of opinions about apparently empirical data on societal and policy decisions. Recently a reassessment of BOAS' data has proven that his conclusions are not really supported from his data, that he overestimated observed differences, and drew conclusions not scientifically justified (SPARKS, 2001).

It is obvious that such environamentalistic concepts are and were related to or perhaps did even co-found the concepts of physiognomists, who determine the character and even capabilities of a person from facial or other bodily characteristics. Similarity of people within a given geographic area is higher than between such areas, due to that the former have more genes in common. This obvious empirical experience influences the uneducated consciousness and assumes bodily features as emergence of geographic or "soil" features. Physiognomic concepts are amongst the most important and influential constructs in human social discrimination, and might be considered an anthropological constant.

Moreover, in practical coexistence human groups experience language boundaries, which are often related to geographic boundaries. Geographic barriers as rivers, mountains, forests, deserts, oceans etc. are effective physical borders of marriage systems, whereas languages are social borders, although both systems fit well when superimposed. In any case genetic differences between two populations separated by geographic and/or linguistic borders will increase. There are numerous examples in history that despite any knowledge of the scientific rationales claims are made on territories by using arguments of ancestry. Within such conflicts those, who use "genetic" reasoning are usually in a better position and considered to have better arguments than those who argue on a cultural basis. Even in "non-scientific" societies genealogy (that is applied knowledge of a genetic concept) is an important argument. It legitimates claims of authority, power, ownership, and responsibility (see e. g. Gen 1,5 and Num 2 & 3 for examples of genealogy and applied genealogical knowledge).

Therefore these reifications lead directly into rules for social interactions. It makes discrimination possible between two human groups or even populations by arguments that refer directly or indirectly to spatial, soil, or blood features, which become synonymous at least to a certain extent. And by this combination they implicitly evoke the idea of property. Especially the latter idea was disputed by ROUSSEAU [1755 (1994)][11], when he stated: "*The true founder of civil society was the first man who, having enclosed a piece of land, thought saying, 'This is mine', and came across people simple enough to believe him. How many crimes, wars, murders and how much misery and horror the human race might have been spared if someone had pulled up the stakes or filled in the ditch, and cried out to his fellows: 'Beware of listening to this charlatan. You are lost if you forget that the fruits of the earth belong to all and that the earth itself belongs to no one!'*" (p. 55).

For his theory on early civilisations Julian STEWARD (1949) began with a formulation of a tier model of early civilisations. He could have done this not without an implicit fallback on concepts of genealogy and property. Conquest which becomes in his opinion a common feature of developing nations is based on ideological constructs of property and genealogy that aims to conceal the actual aspects of sheer power and source control. Consequently among cultural anthropologists STEWARD (1955) has to be considered one of the first who discussed the influence of property behaviour in terms of territoriality (see below).

The allowance of land governance by individuals, who where appointed by the ruler, became for example an important character of societal development throughout the European medieval centuries, and later reallocation of land property in terms of its secularisation improved state-forming during the late Medieval and in Early Modern centuries.

Consequently and summing up, if "soil", as both the material and mythical prerequisite of ancestry, becomes linked with space and human societies, the following problems will raise from merging these apprehensions:

- "Space" is a self-evident feature of "soil"
- soil is mythically tied to ancestry and kinship[12]
- genealogy and kinship is the basic rationale in self-recognition of human populations in different given spaces.

It seems that no creationistic myth exists that would not link ancestry (genes) and soils (space) rather directly. However, there are different ideas on access and availability of space in different cultures and systems of belief.

4.2 Territoriality

Territoriality was defined by SACK (1986) as *the attempt by an individual or group to affect, influence, or control people, phenomena, and relationships, by delimiting and asserting control over a geographic area*. This area is called *territory*. The motif of territoriality has both praxeologic and decision-making backgrounds. Evolutionary biologists have adapted economic theories to describe the behaviour of territorial animals, including territorial primates and man, in terms of costs and benefits. These impact on the individual's ability to survive and reproduce successfully. Considering abundance of sources in a given area their defence may be beneficial for the individual or the society and may lead to exclusion of others from using the source. Territorial behaviour should be awarded by numbers of offspring. Although such sociobiological functionalisation almost always excludes the specific of cultural evolution, territorial behaviour in man may be described according to cost-benefit analyses. Cost-benefit analyses should result in adaptive behaviour. But in complex human cultures it is not easy to identify who actually behaves adaptive. Territoriality for humans may be a powerful geographic strategy to control people – sometimes, but sometimes cost-benefit considerations may suggest alternative strategies. In terms of ecological behaviour human societies are generally thought to be less territorial in areas of resource scarcity, while benefits in defending abundant source materials exceed their costs and thus may lead to territorial behaviour. Cultural ecological explanations of spatial organization within anthropology have tended to ignore the possibilities of winners and losers, even when considering behaviour such as warfare. Anthropologists and sociologists concerned with conflicts of interests, on the other hand, have tended to focus on conflicts between classes or other social units, assuming homogeneity of interests within these units, as was criticised by CASHDAN (1992). Evolutionary biology at least contributes the insight that flexible and alternative strategies do not contradict the reachability of ultimate goals: for example to become and stay the owner of a territory for a very long time. Contrary to Rousseau's moralistic opinion freeholders may be considered being part of a natural behaviour (territoriality). However, this should not to be mistaken for a moral verdict over this behaviour, as this is judged only *within* every respective society.

Now we have ended up with a few essentials that merge often in human cultures: uneducated concepts of genetics, genealogy, ancestry, and concepts of territoriality.

4.3 Geographic determinism, blood and soil

Jean-Pierre Purry, born in 1675 in Switzerland, a later employee of the Dutch East India Company, came up with the idea, that countries located between 30 and 36 degrees of latitude "far surpass the others in fertility, as one can see even in the land of Canaan, of whose provinces Galilee is one of the finest". Purry tried to convince the East India Company to send immigrants to those areas and get them supported by slave labour (GINZBURG, 2003). He died 1735 in the city of Purysburg, South Carolina, that he had founded. His idea of latitude and fertility is remarkable for its basic rationale that claims that there are areas in the world that are more productive than others. Of course, this is part of the physiocratic view, as was emphasised by Adam Smith and others. But, Purry is a Calvinistic fundamentalist, whose economic Protestantism is even amplified by his experiences within the Dutch company. His perception anticipates a conducting overall concept of "productivity" that turns into a decisive episteme, as it becomes a general perception on humans, the society and the world as a whole in those days (BURKHARDT, 1974). It is the 18th century that consolidates definitely ideas of inferiority and superiority in terms of "productivity" with respect to nature (cf. the contemporary idea of the "great chain of beings", see LOVEJOY, 1936) as well as to societal issues (emergence of the "third class") as to the European special course[13], sometimes termed as the "European miracle" (JONES, 1987). Productivity (of what ever) becomes a key issue, and it is considered the "superior" outcome of "competition".

During the second half of the 19th century the Darwinian theory of organismic evolution became also appealing for explaining differences in societal organisations of nations and cultures. Links were drawn between geograph-

ic features such as climate, soil, and topography and human populations. It was assumed that biological (racial, genetic) differences were decisive for human societal achievements and that these "natural prerequisites" were responsible for the observable differences in civilisations. This view disregarded the importance of cultural concepts and praxeology within human societies, and Friedrich Ratzel (1846–1911) is usually referred to as being the founder of this "geographic determinism". He is the then exponent of ideas that go back as far as to the Greek philosophers, to medieval and early modern concepts (to mention only Theophrastus), and discussions during the time of the enlightenment, e. g. Kant. The concept has been very influential in nationalistic discourses at the beginning of the 20th century and was promoted amongst others by influential philosophers (e. g. Oswald Spengler) and geographers (e. g. Ellsworth Huntington). The natural fallacy of this concept lies in the misunderstanding of cultures, nations, and states as being equal to organisms, and thus being subject to the principles of natural selection. Furthermore, as BRAUDEL (1949/1994) emphasised, the geographic milieu can be considered a strong determinant, but more decisive are continued human efforts, the "human milieu", as BRAUDEL says, to cope with those geographic limitations and perhaps to overcome them. His argument is about the design of a new and most successful ship in the Medieval, the cog that cannot be explained in terms of determinism, which of course holds true for almost any invention.

It is interesting that although geographic determinism widely dismissed, it survived to some extent (e. g. WITTFOGEL, 1957), getting recently a popular renaissance by the work of Jared DIAMOND (1997). One may speculate, if the societal determinants that bring about these ideas again to day, are similar to mentalities at the end of the 19th century. A kind of geographic determinism is still also lively in contexts of present day environmental psychology. It is directly derived from the nationalistic concepts of Ratzel and others at the end of the 19th century into early adaptations in psychology, as by HELLPACH [1911 "Die geopsychischen Erscheinungen," later to become "Geopsyche" (1935/1977)[14]]. HELLPACH'S work is equivocal, not only because he contributed also to the sorry efforts of DE RUDDER and LINKE (1940) and that of VON EICKSTEDT (1941), but also because of ontologic assignments rather than scientific deductions. This is amidst the time of a climax for the metaphoric use of "soil" in terms of political constructs and reifications in Germany.

It has to be remembered that since the late European 18th century and enhanced by (German) Romanticism, pessimistic views on urban life arose. This anti-urbanism was promoted by influential philosophers (e. g. Spengler) but even more by nationalistic movements in Europe of the first decades in the 20th century. HELLPACH (1939), DE RUDDER and LINKE, and VON EICKSTEDT were influential scientists and promoted the anti-urban attitude. In combination with anti-industrial distrust, the Nazis formed an anti-urban and anti-technological ideology. The "Aryan race" was believed endangered by migration into cities. As a consequence the ideology propagated the return to an agrarian society, which is one of the backgrounds for "Volk ohne Raum" (nation without space), as agrarian production is an economy of scale in terms of space. As early as 1930 the chief-ideologist for Nazi agrarian affairs, DARRÉ [15]outlined this concept of anti-urbanisms and tied it to "soil". Already in this speech Jews were accused of being perfectly adapted to city-life, while Germanic people were considered to be peasants by eternal (divine?) appointment. By constructing this difference the racist concept of the Nazis was thus added another aggressive facet.

The phrase "blood and soil" became programmatic in Nazi ideology. BRAMWELL (1985) translated it in the shortest possible way: the "unity of race and land". DARRÉ'S adaptation of "blood and soil" was originally a demagogic phrase to transport and promote crude ideas of inheritance of estate (1930/1940), as he wanted to change titles of inheritance only to the eldest son, to prevent constant division of plots.[16] Blood was his synonym for kin (1930/1940).

Within Nazi ideology these topics became merged: geographic determinism, soil, rules of genetic and cultural inheritance, and racism. Although DARRÉ was marginalised within the Nazi hierarchy at the beginning of World War II, his initiatives developed further within the ideology of the regime. The unity of race and land became the master plan for designing conquered areas, mostly in Eastern Europe. Setting up the "General Arrangement Plan East" (*Generalplan Ost*) advice was included for land reclamation and governance (MEYER, 1941), which defined "Aufbauelemente einer deutschen Heimatlandschaft" (Design of a German home-land; see Figures 3 and 4). This remodelling of the landscape was finally not realised because of the German surrender.

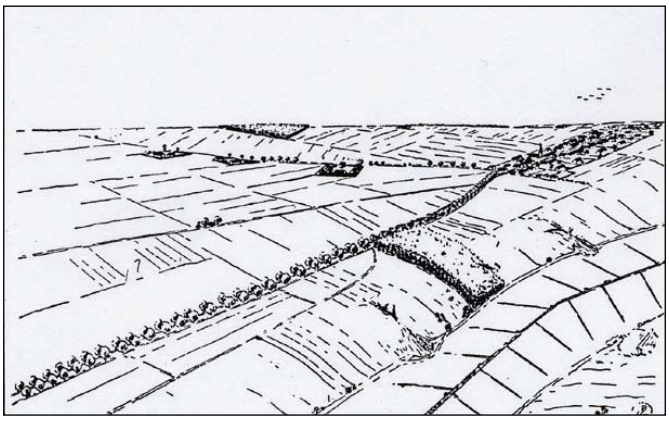

Figure 3: From JUNGE (1941).The caption states: unshaped "cultural steppe" (*Kultursteppe*), following only principles of agrarian use for the benefit of each single farm, as was purported for Eastern Europe landscapes by Nazi planners. Almost no woods and shrubs, relinquished to impacts of climatic disturbances (wind, frost etc.), ineffective use of soil productivity.

Abbildung 3: Legende der Originalabbildung (JUNGE, 1941): „Ungestaltete ‚Kultursteppe'. Die Flächen sind ausschließlich nach Gesichtspunkten der landwirtschaftlichen Nutzung und zwar der Nutzung durch den einzelnen Betrieb aufgeteilt. Bis auf einige, meist auch einseitigen wirtschaftlichen, also unter dem Gesichtswinkel einer umfassenden Landeskultur zufällig erhaltenen Waldstücken ist alles Gehölz und Strauchwerk entfernt, um möglichst große ‚Kulturflächen' zu erhalten. Preisgegeben allen Witterungseinflüssen (Winden, Frösten usw.) wird aufs ganze und weitere Sicht die Bodenkultur in ihren Erfolgsmöglichkeiten und zwar auch in ihrem wirtschaftlichen Nutzen eingeengt."

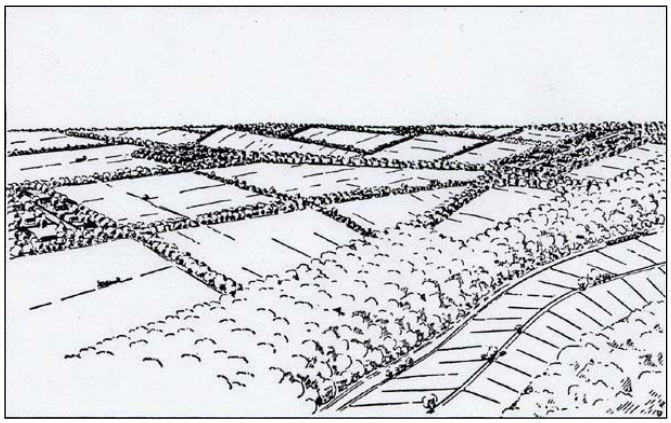

Figure 4: From JUNGE (1941). The caption states: designed German cultivated landscape of the future. Mistakes of the cultural steppe removed, diminished wind erosion by hedges, positive effects on microclimate and improvement of productivity. Increased cultural and economic success by sophisticated spatial patterning of villages, roads hidden by tree rows against birds view of enemy aircraft fighters.

Abbildung 4: Legende der Originalabbildung (Junge, 1941): „Gestaltete deutsche Kulturlandschaft der Zukunft. Die Fehler der Kultursteppe sind beseitigt. Planmäßig angelegte Windschutzstreifen und -flächen beeinflussen nicht nur die ‚Kleinwetterlage' und damit die wirtschaftliche Nutzung der Bodenkultur aufs günstigste, sie werfen selbst wesentliche Erträge ab (Holz, Flechtruten, Beeren usw.). Durch eine planvolle siedlungsmäßige Gestaltung (großangelegte Kulturflächen, entwickelte und verteilte Dorfanlagen) wird der kulturmäßige wie der wirtschaftliche Erfolg noch besonders gesteigert. Beachtung verdienen noch zwei Einzelheiten: Der kleine Wasserlauf in der Senke des Vordergrundes ist durch parallel verlaufende Gräben noch nützlicher für den ihn begleitenden Grünlandstreifen gestaltet, und die Straßen sind durch ihre weitgehende Einbettung in Waldstreifen und durch die Schaffung ähnlicher anderer Baumreihen für Fliegereinsicht so gut wie unkenntlich gemacht."

4.4 Landscapes

Soil is transformed by human action into landscapes, primarily by the driving forces of working the soil and by concepts of productivity behind agricultural activities. Cultivated landscapes may therefore be considered as being the most complex expression of the grand total of production and reproduction derived from human action. But landscapes exist not only through human action but also by means of human perception which transforms a landscape into a scenery. Both types of transformation are based on concepts of colonisation or exploitation of "nature".

The process of colonisation produces specific genetic entities: domesticated plants and animals, as well as "self-domesticated" humans. Processes underlying and governing the patterns of reproduction are cultural (in terms of breeding and marital concepts). Working the soil, tilling the field, protecting the woods, planting hedges, breeding the animals, moderating a hydraulic system: all agrarian societies end up with a specific landscape. Finally, landscapes exhibit a "physiognomy" as specific as that of humans. The natural fallacy is to mistake any genetic result associated with the specific landscape as for that of Darwinian selection. Landscapes and everything in them are cultural products.

Landscapes are the most complex non-technical environmental structures in the world produced by human impact. They are physical objectifications of long term experiments under natural conditions. Thus it seems impossible to me to consider landscapes as palimpsests. One may write a completely new text in a different language on a parchment, but alterations of soil from earlier activities will add to or take from the quality of soils. Mistakes may end up with problems for future generations (e. g. erosion, salinization;

acidification). Therefore, long lasting effects in terms of *longue durée,*[17] hold specifically true for soils and soil coined landscapes. However, as "constant" as a landscape might be, for example Tuscany has not much altered its physiognomy since the days of the Roman Empire, all what is in this landscape, regardless animate or inanimate, has changed through time. The genetic composition of humans, plants, and animals are continuously altered, even without reasonable input from other regions. Since cultural meanings are also altered during time, the apparent constancy of landscapes supports human self recognition about and human pretension of "constancy". In this way landscapes save the natural fallacies of constancy and determinism.

The phrase "places of moments" includes specifically emotional bonds to "soil". Many people, who went abroad or became displaced, express a deep desire to be buried in home soil. They express a desire for "return", for getting back "to the roots". Virtually the latter term ties people to the soil, and it should not be overlooked that the metaphoric background literally borrows its semiotic cipher from plants rooted in the soil. As any of the countless examples in literature and poetry, Walt Whitman offered a formula for these emotional bondings in his "Song of Myself":

I lean and loaf at my ease observing a spear of summer grass.
My tongue, every atom of my blood, form'd from this soil, this air,
Born here of parents born here from parents the same, and their parents the same,
I, now thirty-seven years old in perfect health begin,
Hoping to cease not till death.

Of course, Whitman is not talking about "soil" in its physical meaning, but as being an essential element also of the world *meta*physically experienced by humans and their kin. He is talking about the soils and the landscapes to be found in mental maps of human cultures.

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Notes

1 I owe special thanks to my colleague Dr. Reinhard Kratz, Professor for the Old Testament at Göttingen University, for his advice and help. I refer here to the German edition of these two ancient Babylonic texts. Both quoted after: KAISER, O., DELSMANN, W. (eds.) (1993/94). For Enuma Elish see Vol. III/3, ed. by W. RÖMER, p. 592. For the Atramhasis [Atrahasis] epic see Vol. III/4, ed. by K. HECKER et al., p. 623. The English Lambert & Millard-Edition is obsolete.

2 Quoted from GINZBURG (1980) The cheese and the worms, The Johns Hopkins University Press, Baltimore & London, p. 69.

3 Benedanti were kind of a sect in upper Italian Friaul (see GINZBURG, 1980).

4 I wish to thank Bill Woods for stimulating me to think about geophagia.

5 An anonymous reviewer is gratefully acknowledged, who suggested also taking into account a religious background for geophagia, specifically in the context of "Mother Earth". This assumption seems convincing and very likely, at least to me, as eating soil would mean an act of incorporating the goddess and thus to tighten or renew the connectedness with her. Unfortunately I have no information available to support this approach further or more detailled.

6 For a general overview in terms of archaeometry see HERRMANN et al., 2002.

7 The German words for "*he/she is*" and "*he/she eats*" are pronounced almost in the same way, which is the basis for this pun. However, "*What you eat makes what you are*" is an old European phrase, and supposedly also known in other parts of the world.

8 Derivation from "clines"= gradients of features in space.

9 See applied genetic knowledge and superstition by which Jacob composed and enlarged his flocks (Gen. 30, 25–43).

10 However, also semen and urine as bearer of soul features may be taken for magic practices with soil, e. g. the medieval idea of producing a *homunculus*. Here advice can be found that a successful sublimation of a homunculus is fostered by the use of soil from underneath

gallows, because it contains the humoral effluents from the executed, which are the bearers of life features.

11 I do not misunderstand the principal direction of Rousseau's essay as a criticism of the absolutistic society and state. But he definitely brings in the idea that land should be classified as a common property.

12 An argument even recently used during ethnic clearance in the Balkan war: "Where the soil covers Serbian bones, there is Serbian land."

13 cf. the "Europe's Special Course" – Project of the Breuninger Foundation, headed by R. P. Sieferle.

14 The fifth edition was not printed due to paper shortage in 1941, but released in 1949, without revision of text and references (sic!). Editions 6 to 8 are unchanged reprints of the 5th edition, that was enlarged only by *one* single post war endnote (p. 255)

15 In fact, DARRÉ drew on much earlier ideas such as those of Bartels (see FULLER, 1996). Besides the monograph of BRAMWELL (1985) that of EIDENBENZ (1993) is the most instructive political analysis of this subject.

16 „Wenn schon [.] die Frage gestellt wird nach der Beziehung des Volkes zu seinem Boden, so sind wir damit doch noch weit entfernt von dem Sinn der Einheit von ‚Blut und Boden', die den Kraftquell der nationalsozialistischen Bewegung und die Grundlage unseres Staates bildet. Denn Blut und Boden stehen nicht nur beide als Voraussetzungen unseres Staates in einem äußeren Zusammenhang, sondern bilden nach der germanischen Weltanschauung als Sippe und Hof sich gegenseitig erhaltende Glieder einer zeitlos dauernden rechtlichen Einheit." R. W. DARRÉ (1936), Blut und Boden. In: Grundlagen, Aufbau und Wirtschaftsordnung des nationalsozialistischen Staates, Vol. 1, Part 1, No 3, p. 2. Industrieverlag Spaeth & Linde, Berlin.

17 In the meaning of long lasting effects instead of cyclic appearance of the structural phenomena, but turning soil into arable land that had been used by humans before may also be considered a phenomenon of longue durée, let alone slash-and-burn cultures, abandoning of fields after warfare and their re-cultivation etc.

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Anschrift des Verfassers

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