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Swidden cultivation.

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The first creature not afraid of fire, *Homo erectus* ,discovered nearly two million years ago the advantage by applying human food plants growing in the ashes succeeding natural forest fire, and therefore became the powerful prehistoric hominins ahead of animals. The use og fire and stoneaxe felling of trees, developed the prehistoric rural economy. Swidden cultivation came to be man's method of growing food plants, and thus the fundamental activity of maintenance. *Homo erectus* left Africa more than one million years ago to colonize this globe, and handaxes have been found attending these humans. The high level of sophistication in axe production, imply their ample importance. Human culture, social organisation, art and economy arose as a consequence of this kind of nourishment. Swidden cultivation has evolved as empiric knowledge observed from generation to generation. Such knowledge is for the benefit of the most adaptive, and it is the most fundamental principle among all living life. We are an example of properties that have been developed through evolution and selection. It is adaptive to have the ability of such a survival strategy, and individuals who have such properties will have an advantage. This basic mecanism is a prerequisite for the development of swidden cultivation. It is therefore irrelevant to ask questions about the age of swidden cultivation. It is as old as man himself. In swidden cultivation the harvest was followed by preliminary pasture land suitable for cattle breeding for some years, before reversion to new forest - sprouting and a succeeding regrowth of the forest enduring for several years to come; indicating next prosperous forest generation cycle. It must have been more profitable for the society to move to new forested territory, once the most convenient plots had been consumed, than to wait for the regrowth to repeat the cultivation cycle on the same land. Therefore all societies were inclined to be nomadic by origin. Accordingly hunting – gathering - fishing economy is not the precurser for agriculture.

The swidden cultivation cycle can be investigated by studying the farming practice over an extended period of continuous cultural and environmental, ecological change (Conklin 1961 29). Farming is determined partly by environmental factors like climate, soil, natural vegetation, topography and partly by socioeconomic factors, such as the customs of the people and the level of technology that they have atteined. To trace the spread of swidden cultivation is difficult owing to the nature of the evidence, but the origin of this activity is fare back in prehistoric times. Swidden cultivation is here defined as the cultivation of human food plants in the ashes of burnt vegetation, mostly forest land. Thus fire clearance husbandry for grass production is not primary swidden cultivation according to this interpretation, but even so grass has always been the most important secondary harvest from swidden cultivation. This kind of tillage almost without the use of mechanical tools is assumed originally to have been the most common cultivation method (Clark 1945 57-71. Steensberg 1955 65). Tribal wanderings in abundant forestland was the usual survival. Axes for felling trees and sickles for harvesting are the only tools required. All other implements needed was made of suitable pieces of local wood. In Northern Europe fire-rake was made of birch and harrow was produced from a spruce top.The great demand for axes of the very best quality led to an enlargement and intensification of activities concerning their supply from prehistoric times onward. Flint and stone were the best raw materials for making tools. And so mining of flint and stones have been of vital importance, and the distribution of these products revealed professional craftsmen and widespread large-scale trade. In Early Bronze Age the axe absorbed a large part of the copper or bronze in use, but it continued in many areas to be made of stone. And later metal became available for tools in substantial quantities, and several varieties of sickles occurred, before iron took over the employment of metal tools for farming.

The swidden cultivators penetrated the virgin forests, clearing small patches, taking one or a few crops and passing on to new forests. The temperate forests were so dense and capable of regeneration that their exploitation was repeated through history. But in the long run this changed the face of the countryside; altered the forest or created extensive regions of cultivated land and

meadows. And as man expanded north and west in Europe, the forest had but small power of recuperation in the marginal zones, as for example on the poorer sands of the north-west which was reverted into open heath. The temperate forests of Central Europe were so extensive and capable of regeneration that their occurrent exploitation did not end with the final clearance of the limited range of soils capable of being cultivated. The Mediterranean forest was less dense and fare more fragil, and in some tracts it reverted to open heath and later to desert on the very poorest land (Clark 1952 91-107). Hunting and fishing has been the main nourishment only in climatic marginal areas without forest. Man has always attacked forest, and so swidden cultivation have destroyed huge areas. This forest consumption accelerated, assisted by pasturing animals, and later also continuing for other utility until today by greedy Europeans in the so called "third world".
The fall-off of oak, elm and lime trees in Neolithic period is attributed to the climate break or to husbandry of Man (Lamb 1977 414). When neolithic people appeared in Denmark (tammimaa), heath and grassland began to replace forest. The generalization that all primitive hoe-and-dibble planters used fire as a tool in cultivation seems justified (Stewart 1956 121-122). This burning indicates swidden cultivation (Iversen 1949). Due to shortage of sufficient suitable forests, or owing to a flooded river, clearing and manuring the soil, or for various other edaphic reasons, cultivation on cleared land in fields has taken the lead at particular times in different places and different stages of cultures in the world.
Much forest was used and land was changed into open heath and desert. In Middle-Europe field cultivation came in common use from about 500 A.D. But in the northern areas the colder climate about 850 - 1000 A.D.(Lamb 1977 426) led to the Viking (Pyraticus) swidden cultivation explorations. The Vikings were swidden cultivators, but as the forest was limited, they had to immigrate to find their living in new forests. The effects of Anglo-Saxon and Scandinavian pioneering upon the landscape of England were summed up in the Domesday Inquest of 1086 A.D.(Darby 1950 22). One of the questions put by the Domesday Commissioners was, "How much wood?" The Viking colonizations were led by the kings and caused by necessary expansion of the swidden cultivators of the inlet (vikja). The king was responsible, and if he did not succeed, he could be killed; as Sviar are used to make the king responsible for both good and bad years (Ynglinge Saga,chapt.43. Hkr.ed.1911). There is, however, no doubt that swidden cultivation has been practised since prehistoric times (Montelius 1953 41-54), and medieval evidence indicates the cultivation of rye and turnips in forest clearings over large parts of Scandinavia, greatly stimulated by the immigration of Finns, finally during the 16th and 17th centuries A.D.
In other parts of the world swidden cultivation continued until the European colonisation in the 16th century A.D. From now on the colonists applied restrictions and limited native fire-clearance to the territory that could not be of any benefit for the Europeans.
Urbanisation and field cultivation began in Crete about 2000 B.C.and in Greece without any cultural break. Increasing population and lack of forest had allready caused this in the Middle East. Migrations in the classical European tradition of history writing has often been described as due to warfare and occupation, but my suggestion is that the basic reason was traditional tribal migratory subsistence. The circumstance which frequently is mentioned in written sources is often misleading; concerning the fact that migrating swidden cultivators in confrontation with stationary field farmers were invaders and also some times provoked plunderings and warfare that furthermore could lead to occupation.
Rye – Secale.
European cereals, wheat, barley, oats and rye, originated in western Asia from ancestors belonging to the natural flora. The grasses from which wheat and barley are descended have never grown wild in Europe. The cultivation of cereals seems to have been introduced into Europe from the Near East. The relationship between wild and ancestral forms and the location of the original distribution patterns is partly identified by evidence from cytogenetics, ecology, archaeology and plant geography (Zohary 1971, 253-258). During the 4th millennium B.C.the proto Indo-European language was located in the Altai Mountains of Central Asia and the swampy forests of northern Europe. In the beginning of the 3rd millennium B.C. proto-Hittites reached Anatolia. The probable

homeland of a fairly mobile, late neolithic culture of animal breeding agriculturalists is the foothills and steppe country from N.W. of the Caucasus to N. of the Caspian. (ˆ Friedrich ˆ 1966 27). Cultures have been previously established on the lower Middle Danube or/and across the Balkans to the Danube and along the Mediterranean to Spain. By the end of the Ice Age and the final retreat of the glaciers, forest invaded the steppes and tundras, following behind the ice sheet across the North European plain to Scandinavia. The boulder clays formed by the last ice sheets maintain heavy coniferous forests in Northern Europe. Spruce has come from east much later adjusted to colder climate. Climate fluctuation has continuous changed the face of the forest.

The origin of rye cultivation is much younger than the domestication of wheat, barley and oats. Rye has a great variety of closely related wild forms, weedy forms (primitive), half-weeds / half-cultivated races and fully established domesticated varieties. The inter-relationship between these forms is in general explained, and progress is recently made in the identification of the wild progenitors, their ecology and their geographic distribution, and thus the probable mode of origin and place of origin of the culrivated rye. Rye is used to colder climates than other cereals, and is found on mountain plateaux and slopes. Rye is cross-pollinated in contrast to wheat and barley,which are almost fully self-pollinated. Finally in Secale we do not encounter a simple complex of interfertile wild types, weeds and domesticated derivatives. Instead, rye comprises two aggregates: an ensemble of annual weeds and cultivated types (Secale cereale), and another of wild perennials indicates that some genetic sterility is present here as well. But in spite of these differences, annual cereale weeds and domesticants, and perennial montanum wild races show close morphological resemblance. F1 hybrids are yet semi-fertile, and show normal chromosome pairing in meiosis (except for the translocation multivalents). Furthermore, cereale and montanum stocks are still interconnected in nature by extensive hybridisation." (Zohary 1971,25). All montanum ryes are wild, perennial and interfertile and chromosomally similar and have fragile spikes. They are frequent in the Armeno-Anatolian region and build massive stands in non-arable lands, and they are important in steppe and steppe-like formations and colonises edges of cultivated land and roadsides.

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Rye evolved first as a weed (Vavilov 1917 561-590), and the weedy races are the direct sources from which cultivated rye forms are derived. Rye is a secondary crop (Helbaek 1971, 265), and thus appears relatively late in archaeological remains. All undomesticated cereale races are ˆ either weeds in cultivation or occur exclusively in places drastically disturbed by agricultural activity suggests that this derivation is recent. Weedy /cereale ryes most probably started to evolve only after the advent of west Asiatic agriculture. If this assumption is correct, the incorporation of rye as a weed should have started when the Neolithic fertile crescent wheat and barley agriculture expanded north. In other words, the evolution of weedy ryes commenced when the Armeno-Anatolian plateaux were colonised and opened up for cereal cultivation. If the wild ancestor of Secale cereale is Secale montanum, the question might be asked why the genetic divergence between the progenitor stock and the man-dependent derivatives in Secale is wider than in the other Old World cereals. Why does the presumed Secale montanum ancestor differ chromosomally from the cereale stock and why cereale x montanum F1 hybrids are semi-sterile, while in wheats, barley and oats the wild and tame types in each ”pair” are chromosomally similar and fully interfertile? The most likely candidate for the ancestry of the weedy and cultivated cereale complex is the perennial Secale montanum, and the place of origin of the cereale complex is the geographic center of Secale montanum; Anatolia and Armenia (Zohary 1971 257).

Fire.

Occasional forest fire was the cause of the earliest clearance of forest, making open land for swidden cultivation, and hence mankind acquired the experience of how to manipulate fire when it was needed. In fact this obtained fire-control was the basic skill that gave man predominance and separated him from animal. While prairie and forest fire may occasionally be caused by lightning, that is the exeption rather than the rule. In 90 out of 100 cases they are caused by man, either willfully or accidentally. Therefore, fire is to be classed among the anthropogenous factors (Stewart

1956 125). The data on grasslands of the tropical and temperate zones support the view that they have been formed and have undoubtedly been maintained by man by means of fire. The implication that man used fire as a tool in remote prehistoric times is strong (Stewart 1956 129).
Charcoal from forest fires succeeded by pollen from cultivated plants are preserved as fossil indicators in lake sediments and soils, and can give access to fire history and consequently to human history.(Patterson 1987 3-23). Charcoal and pollen keep well, and can therefore be used as a record of potential past swidden cultivation. Investigations have developed many theories about the effect of human agriculture on natural vegetation. Iversen (1934 341-358, 1941 68 pp.) was the first to observe the corresponding raises in charcoal and fall in oak and pine pollen, giving him the idea that fire was used for forest clearance. And as the fire occurred in the burning-resistant deciduous forest, he suggested that it represented human activity. Thus he developed his primarely much debated "landnam" hypothesis. When Iversen (1949,1-25) found similar vegetation changes at three different sites, he concluded that such synchroneity could occur only if the changes were due to the same cause. "Landnam" could not occur simultaneously across the landscape, but was the human practice. He (Iversen 1952 65-103) presented pollen and charcoal diagrams from western Greenland in support of his hypothesis and, at the same time, undertook a series of experiments in collaboration with archaeologists to prove that early humans could have affected the vegetation in the manner he hypothesized (Iversen 1956 36-41). Iversen presented more conclusive pollen and charcoal evidence from a study at Draved Forest in southwest Jutland (Iversen 1964 59-70, 1969 35-49 Steensberg 1979).
Archaeologists have often described pastoral tribes armed with battle-axes attacking other tribes. Using eqipment made of wood, leather and other organic not durable material, and dwellings in temporary huts or tents, and so leaving few remains for archaeologists. Thus peaceful tribes, often called Boat-axe cultures, are wrongly interpreted as warriors owing to their axes used for cutting trees. Interpretations of historical interactions between vegetation and fire based upon pollen and charcoal analyses are still in the early stages of development, even though sophisticated methods are now in use to identify the effect of fire on vegetation.

The Swidden Procedure

Human beings have as fare back as they have existed, been able to use fire for the cultivation of food plants. Swidden cultivation has so been the common system of farming; a work cycle ensuring the continuance of the desired ecology and altering the habitat to the benefit of man. Therefore, fire and its control is closely related to the development of culture and so to its social implications of basic significance to cultural history. A swidden culture group stress community-wide conformity in their varied tasks, not only for selected individuals, but also for the group as a whole. If the activity is not a communal labor, it has at least close relationship in timing. The group is dependent on obedience to a leader, lama, noita, seidmadr, and the process of swidden cultivation among traditional peoples appear as a complex of ritual ceremonies. There is a great sociological variation, as the different groups has evolved under diverge environmental circumstances around the world.

Site selection

The first step in the swidden procedure was to select the most beneficial site in the forest. This was of so great importance, that it required specially skilled young men to be sent out to find and mark the most profitable locality. Folkways or customs that are considered conductive to the welfare of society and so, through general observance, develop the force of law, are often becoming part of the formal legal code. And so the mores may become systems of morals and systems of morals are formalizations of the mores. The moral systems have determined the customs of the peoples and influenced the behavior of individuals (Northcote 1916, Angus 1925, May 1931).
In swidden cultivation search for new forest for future need was of acute importance, and so the tribe was dependent on the success of the noita and his traveling young men. But when field farming took over,and traveling was not needed any more, male homosexuality came to be considered as abnormal and immoral. As homosexuality is considdered to be a fundamental part of male sexuality (Kinsey 1948 610), it is significant that the so called "developing regions" of the

third world, where swidden cultivation still survive, also are accepting homosexuality as a social function. The Roman custome of forming a union with another male by the legal expedient of declaring him a "brother" appears to have persisted into the early Middle Ages, although it became controversial for some outlying provinces in a handbook of Roman law compiled (in Greek) in the fourth or fifth century and translated into Syriac,Armenian,and Arabic for Roman citizens living in regions of the East where Latin and Greek were not understood. Sustained and effective oppression against homosexuality gradualy spread north and east in Europe as its function in swidden cultivation vanished during the Middle Ages after introduction of field cultivation (Boswell 1994 218).Kinsey A C. 1948. Sexual behavior in the human male. W.B.Saunders Company. Philadelphia and London.Boswell J. 1994. Same-sex unions in premodern Europe. Villard Books. New York.

The first step in all swidden technologies was the search for consumable forest. The Finns so developed a sophisticated system of securing the best spruce forest for their nourishment. For this purpose blameless young men were selected by the noita, and sent out in late autumn and early winter (lähteä eriin) to recognice and mark out first class forest (eräpyhä) for the future need of the tribe. These young men marked the selected forest with the tribal mark (puumerkki) on the most visible tree. The tribal patterned woven ribbon was tied to the tree in a visible position (kirjavainen puu), and treetrunks around the chosen sight were girdled in order to make it noticable. From now on this sight, eräpyhä, was respected as occupied. It was taboo, pyhä, for other tribes, regardless it was distant from the location to which the travelling young man belonged. When he returned in early spring (tulla erästä), he described in runic poetic form the forest sites he had inscribed during his journey. Runa made it easier to remember. Noita had a social organization, which was correlated with the presence of berdache, or called bate by the Crow Indians (Angelino & Shedd 1955 121). The integration between noita and his staff of preferred young men appear to have been established on homosexuality. Noita also found his successor among these men (ragr,argr) (Sonnenschein 1966 76). These young men had to be without any blemish. It is some times mentioned that they should have good teeth without defects. My suggestion is that this was connected with the skill of performing the applicable sound (screatus, scritobini) to vibrate the drumskin (kirjua, huutaa, seid lätir, galdr). The same organization can be traced in the Saga literature of the Norwegians in Snorre Sturlasson; Harald Hårfagre cap.35 and Olav Trygvasson cap. 62-63. These are examples of the Christian defense of these vanishing old customs (Hirschfeld 1902 244-263).

The word pyhä denote: circumscribed, confined, sacred (Eurén 1860, Lönnrot 1930) and is connected with a sacred place or object or rather a holy forest (pyhä ouda) (Lästadius 1959 34). Pyhä predominates human power resembling supernatural (Vilkuna 1956 193). Pyhä seems to have changed from a more technological term to an abstract notion during the times (Vilkuna 1956 188, Anttonen 1994 26). Suomen Kielen Etymologinen Sanakirja (1962 668) explains pyhä in Värmland Finnforest as a recent denotion of this expression: Pyhä is devil, the spirit of shaman (noidan henki) bewitched (noiduttu, noidan pilaama), something that a sorcerer, shaman has spoilt, sustainen, polluted, something that pertains to the deceased and has to do with death (kalma). The marked huuhta-location (pyhälikkö) and specially the burnt huuhta was pyhä until it was sown, until its transformation by burning changed it into a rye-producing site in benefit for its tribe. Eräpyhä was connected with such places where huuhta-cultivation gave maximum crop: selected places in the spruce forest recurrently far away, where they in older times often also brought their dead to rest after the last journey. Such places were in the outskirts and in contact with the witchcraft (hiisi) and the ancestors relation to the places. Eräpyhä was connected with places that were something in between, neither forest nor grainfield.

Clearing

When a forest location, eräpyhä, was taken into use, axemen, kirvesmies^ , cut or girdled the trees in the clearing and they often arranged a successive felling by means of the wind. The fallen site was left for drying over the summer, and the next winter`s snow pressed the branches down to

obtain a more complete burning. Killing the trees by girdling succeeded by fusions of girdling, wind- and axe-felling, developed as transitional stages towards axe-felling. To clear the wood by axes and fire is proved to be old. Vicomte Lepic cut down a small oak some eight inches in diameter using "a polished Danish flint hatchet eight inches long" without injury to the blade (Sir J.Evans, 1897 162). Dr. Jacob Friesen experimented with chipped and polished flint axes to test their relative effectiveness; briefly he found that whereas he needed seven minutes to fell a pinestem 17 cm. in diameter using a chipped axe, he could manage a similar stem in five minutes with a polished one (Nietsch 1939 70). The polished axe is thus no chance element in the material eqipment of neolithic man. It not only reflects his capacity to shape timber to his needs for houses, boats and other purposes, but symbolizes his activities as a lumberman, activities without which he could not have practised the new form of economy in the deciduous zone of Europe (Clark 1952 94). When neolithic man appeared, heath and grasslands soon began to replace forest (Linkola 1916 73, 216). The aim with the clearing was to get the felled trees to cover the ground in the site uniformly, and the site was left for the trees to dry. Felling the trees by axe and also cutting of larger branches instead of girdling, made the drying time shorten from decades to a year or two.

Burning.

The season for burning was determined by the agricultural crop to be sown and by the climate of the area. The timing of the burning depended on the weather. It had to be done after a prolonged spell of dry weather, and on a day with some wind bringing rain afterwards. The fire was ignited to get a slow and thorough burn; downhill, against the wind and inwards on the site. Before midsummer the second year after clearing noita was responsible for finding the right time for burning. This was of great importance for a good result. Rain just after the burning caused a hard crust on the ashes which the small rye seeds could not penetrate by their own weight, and the sown seed was attacked by animals, birds, wind and torrid sunshine. Therefore burning had to be carried out at the right time before the weather changed from high-pressure with sun to low-pressure bearing rain, leaving just time enough for the burning to die out and cool off sufficiently before sowing.

Planting.

Planting was done straight into the ash, when it was still warm after burning. Seeds for sowing was commonly taken from the spikes hooking to the roof and walls during threshing, according to the natural spread of seeds by hooking to movables. The seeds fell into the loose ash by its own weight. The warm soil was utilized to accelerate sprouting. Burning was timed so, that the rain came just after sowing. Consequently swidden cultivation was practised without any ploughing or hoeing. However, the seeds that had landed on stones, were swept down into the ash to sprout.

The sociology of swidden cultivation varies much throughout the world, since it has evolved at diverse times and environmental conditions. An accurate timing of the burning-sowing procedure or rather a correct prediction of the approaching rainshower was of crucial importance. Thus sophisticated methodes have been developed in different swidden cultures. It could be done by means of a pendulum (Hamilton 1986 53) or by observations of bowels of newly slaughtered animals or other ”ritual” aspects accustomaly performed as a public ceremony. Rare fossil teeth, "thunder tongues", are prized for their magical properties. When scratched to the trunk of a felled tree just before ignition, these fossils can cause the entire swidden to burn as if struck by lightening (Conklin 1957). Some cultures believe that the smoke from swidden fire causes rain, and so a communal timing of the swidden burning is important. The smoke gives the rain spirit a signal to send rain for the new crop to sprout. If the burning is not coordinated and someone burns before the others, the rain will cause unburnable humid fields for others (Ruddle 1974). As Linnaeus noted on his visit to Öland (Linnaeus,C.v. 1745), the actual burning would be done in the summer,but preferably just before rain which served to wash the ash into the soil. But fire has certain consequences regardless of the objectives of the cultural group. Fire will reduce the threat of insect pests and concurring plants.

Fenching.
But a good deal of the wooden material was not completely burnt. The biggest logs that did not burn completely, were used for the fence around the site. This fence usually was a construction with zig-zag notching to protect the crop from grazing animals. During the drying period craftsmen from the clan selected suitable pieces of wood from the fall as material for making tools and other objects. No work was done to the soil in the clearing. The biggest trees were girdles and left to dry, the stumps were left to rot in the ground and the stones were not moved. Only the halfburnt wood usefull for the fence around, or for other purpose was taken away before sowing.

Harvesting .
Only one crop was harvested in most areas of Northern Europe , before the site was abandoned, but after a couple of years the site produced grass for feeding animals. In southern areas the site was sawn and harvested for two or more times before desertion.

Fallowing
Swidden cultivation has characteristic features quite different from field cultivation. The size of the burnt area, the cultivated area, was a variable factor of the greatest importance. Decreasing crop in times of climatic deterioration was compensated by a corresponding expansion of the swidden acreage and vice versa. This correlation between the swidden area and the climate is often misjudged and even also ignored by science. In periods there were colder climates in Europe, like the "little Ice Age" 1550-1700 A.D. During these periods swidden cultivation was increasing, and in the intermediate periods there was a decrease or a standstill. Accordingly climate fluctuation always had an even influence on swidden cultivation. In Southern Europe, under Mediterranean conditions of climate and soil, the forest was open in character and was composed largely of evergreen oaks and pines. Once cleared, it showed less regenerative power than did the forests to the north; already by classical times much of it seems to have disappeared. Classical writers provide abundant indications of the existence of forest (Semple 1931 261-96). Homer spoke of "wooded Samothrace", and Zacynthos, Sicily and other "wooded country." (Homer: Iliad xiii. 13;xvi. 482-84; xvi.643-46;xx. 490-92 (see also x.154-57; xxi.340-49); Odyssey i.246; ix.186 (see also xiii.243-46; xiv,1-2). The general impression left by classical authors is that the Mediterranean lands were then more densely wooded than they are today, and that the extensive forests which remained were for the most part in the mountainous areas (Darby 1956 186). Certainly at the dawn of history Europe was covered with immense forests available for swidden cultivation.

Domestication of animals.
The clearance of the forest and the successive cultivation of cereals and other food plants inside the fenched sites was the precursor for domestication of animals, development of stock-raising and trapping of wild animals. But these activities extend far beyond the range of the earliest reachable documents. Even though economic life of early man can be investigated in relation to the wider economy of nature. The taming of reindeer and the development of various forms of herding have enabled the people of the north to inhabit exceptionally harsh regions, and to provide themselves with the means of transport that is so vital in these areas, and with meat, milk, skin and other animal products. The domestication of animals is one of the great problems in the study of man`s cultural history. To solv this problem it has been important for the scientific approach to establish a chronological framework into which the various forms of deer-herding and other activities of the different peoples in the taiga and tundra zones should fit. Thus, many monocentric theories of the emergence of reindeer-herding in Eurasia are assumed. In fact there was no particular starting point for a gradual spread. Diverging forms or types of reindeer-herding arose inevitably in disparsed places and times, and the reasons for the genesis of these lies in the scope for the procedure of swidden cultivation.Domestication of animals developed later in human history than cultivation of food plants. Domestication of animals slows down natural movement and largely removes the

desire for extended fortunate migration (Darling 1956 778). The deserted swidden sites yielded a good growth of grass. As they were fenced, they were used for grazing cattle and for hay production. I suggest that these locations supported domestication; wild animals broke in through the fence to reach the wanted food. This occured especially in periods when the climate was deteriorating and natural food for wild animals was insufficient. Thus swidden cultivation through climate variation came to be the precursor for domestication of animals often succeeded by cattlebreeding.

Hunting.

Hunting contributed only comparatively slightly to the economy of prehistoric man. For example in the south and south-east og England hunting played a very minor role by comparison with stock-raising; 0,9-3,4% wild- to 99,1-96,6% domesticated animals (Clark 1952 48). On sites occupied by Stone Age farmers in Denmark the proportion of wild to domestic animals was only 200 bones belonging to wild species while 10000 bones from domestic. In Switzerland hunting seems to have played a much greater part in the economy, probably because the hunting society was developed from the swidden cultivators getting wild animals trapped in their fenshed clearings, and from this situation more sofisticated trapping developed. The wooden tread-trap with spring valve and snare is constructed in the fensh around the clearing.The rich grass production for some years before the forest took over the abandoned clearing (niitto ahoˆ), was of essential importance for the domestication of the reindeer-herds in Northern Eurasia (Jettmar 1952 737-766). As the Finns moved north and west as far as the spruce forest reached, the reindeer-herds accompanied them ,eating grass on niitto aho, and so the domestication of the reindeer increased due to the interaction with the Finns. And entrapping of wild animals in holes in the fence around the huuhta came to be habitual for the Finns and for the Saami, who also developed this enclosure system further for use in the reindeer herding (hukanhuone) and for the entrapping of wild reindeer (vuoma, vuobmi, hvammer). This kind of interaction had also happened during earlier climate deteriorations, last time in the Viking Age. But during the little Ice Age 1550-1700 A.D., when swidden cultivation reached its north-western limit, the ethnic situation came to develope divers in Finland and Scandinavia. Reindeer-herding is utilized both by the Saami and Finnish population in Finland, but in Norway and Sweden it is a privilege of the Saami. Can be it is not so surprising, that DNA family trees suggest that Scanians (skåninger) and Saami are very closely related (European DNA).

Huuhta subsistence.

After the warm centuries of the Middle Ages in North Europe (the Little Optimum), the decline of climate occured about 1300 A.D. Some migratory Finnish tribes accelerated their moves in the forests of East Europe and came to Carelia and Savolax about 1500 A.D. These tribes mostly cultivated rye (juureinen, korpiruis, metsruis, talviruis) and turnip on burnt spruce forest land, requiring a four year cycle from the cutting of the forest in April (huhtikuussa) until harvesting (Soininen 1959. Heikinheimo 1915). During the severe climate deterioration of the so-called "little Ice Age", 1550-1700 A.D., the expansion of the Savo-Carelian/Finnish swidden cultivators accelerated considerably, acquiring a niche in nourishment, namely the big virgin spruce forests of Northern Eurasia. This increase was due to the huuhta-technology; the migratory cultivation of rye and turnip in the ashes of burnt spruce forest. In the little Ice Age this expansion conveyed from Savo-Carelia towards west and north in Scandinavia not only as far as the spruce forest existed here, but also eastwards to Twer in Russia and across the Atlantic to America. The spruce was not yet valuable as timber like the pine. Written sourses is telling us how useless the spruce forest was at that time, and so the authorities wellcomed the migrators as a new taxpaying population.

On the good land a new generation of forest made huuhta cultivation possible once more after 80 - 100 years, but the crop this second time was not so big as the first time on virgin forest. As long as spruce forest for burning was available, huuhta cultivation was maintained. In Finnforest of Solör-Värmland it kept on until about 1850 A.D. and even further on in some backwoods areas, where

timber transport did not pay.

Weatherforecast.
In ancient times the change in weather was stated by the climatological phenomenon that the coldfront changes the electromagnetic ionising in the air from positive ionising to negative, and after a limited time the rain was falling. This limited time also depended on other factors such as wind-speed, but still the rain could be estimated by an empiricist. This electromagnetic change was made visible by a vibrating drum-skin (tambo/sampo). Finegrain bark-flour (tamppu made of tammipuund: "ohm-ohm-ohm---/ohmen / ahmen". This vibrating drum-skin forms the flour into a slightly curved dim linear pattern. The curvature fluctuate, showing the changing point from positiv to negativ. As the lines alter from concave to convex, passing the straight lines when a clear visible and complex pattern of interpenetrating triangels of different dimensions appear, just at the turn of neutral uncharged air. By repeating this drum ceremony the neutral uncharged turning point is stated, just when the lines are straight, correct and therefore forming a clearly visible complex of triangular figures. And the coming low pressure and rain is predicted. The drum-skin (kirjokansiˆ) got a pattern consisting of triangular forms which are employed ornamentally in primitive art all over the world. Such weatherforecast or omen (pyhär-ohman) was performed in swidden cultures only. Field cultivators had no need for this exact rain prediction. The ceremony fell therefore out of use and was even forbidden as heathen in Christian civilization.
An interesting question is, however, when this ancient ceremony vanished? Fragments still remains in particular cultural features as religious ceremonies (mantra sacred formula in Hindu, Buddhist, Tantric and Lamaist cults), litterature, dance, folk music and ornaments. And still it is of value in philosophic orders, representing the basic energies of the universe as background for mystical diagrams, and so giving a basic pattern to ornamental art (not only Yoga art). This geometrical pattern, power diagram (yantra) is the visual equivalent to the primal sound OM or AM, the chanted seed-sound (mantra). OM - the seed symbol of sound,has its visual equivalent in bindu,the point, prefiguring the mandala; the circle. This basic sound is described by philosophers as the purest manifestation of sound without frequency, movement or vibration: the primal sound, or the original self-generating sound from the beginning of times (Mookerjee 1975 30). The magic power of sound is the Word, the Tao in Taoism, the Brahman of the Upanishads and Logos in the Holy Bible, also altered to filioque (and from the Son). Gospel of John 1.1-14;"In the beginning was the Word, and the Word was with God, and the Word was God --- and the Word was made flesh, and dwelt among us". I suggest that transition from the swidden cultivation to the stationary field cultivation was succeeded by change to monotheism.
Next to the human voice the drum has been the most common musical instrument. It has been made in many varieties and was known in almost every age and culture. More than 1600 different expressions meaning drum are entered in The Grove Dictionary of Musical Instruments (Blades 1984 610-611). Among these are madala, mridanga, p(a)uke, samba, tambo(ur), trom(me). Trom is confined to the North-European languages and tambour to the South-European. Drums producing their sound from tightly stretched membrans can be struck, plucked, friction or singing membrans. Singing membrans are made to vibrate by speaking or singing into them, as with the kazoo, the membrane does not yield a note of its own but merely modifies the voice, serving numerous sacred or ritual purposes and are credited with magical power. In the most ancient civilizations the popularity of all kinds of drums are established by numerous representations of the instrument in a variety of shapes and sizes (Blades 1984 601). A drum-type used to accompany the voice evolved in Turkey some time after the earliest migration of Indo-European speakers into Western Asia, continuing migrating westwards as far as Spain where it is known as zambomba and the rring to the tuning-paste applied to the skin. The tuning was achieved by applying a paste consisting of flour and water (occasionally boiled rice, clay, ashes or iron filings) to the center of the skin, which lowered the sound to the required pitch (Kaufmann 1967 220). The only detailed textual source for the early mridanga is the dramaturgic treatise tyas stra, a Sanskrit book on Dance, Drama and Music, attributed to the sage Bharata (about 100 A.D.). This does give some details of a composite

barrel-drum set called mrdanga in the chapter on membranophones. These scattered references partly reflect the cumulative development of the text, but partly also the conception of the set as an element og a higher ensemble, the three puskara (”rain-clouds”), ablue lotus and name of Dyaus (”Reservoir of the Waters”). The waistes drum panava and the pot-drum dardura. Their origin is ascribed to the saga Svati (the Pole-star), who made them with the aid of the divine smith Visvakarman in imitation of the drums of the gods after meditating on the effect of rain on lotus leaves during the monsoon season (Dick 1984 694).
Obtaining the thin taut drum-skin to vibrate by means of the sound, singing, canna later ganna,(incantaciones), seid lätir, galdr (Fritzner, 1877,p.181) was also a custom by the old Saami,originally the same custom as by the swidden cultivating Finns. A membrano-phonic way to create mysterious figures, runar, on the drum, bumba (Shefferus p.137). Beating the drum is not mentioned in the Saga literature (Fritzner,1877, p.161) or in the oldest descriptions of the Finns. Ganna was performed by the male shaman or noita, but during the late Middle Ages this custom vanished. The vibration was now obtained by beating the drum and foresaying, gandreid, hahmleypur, was taken over by women, völva.
The triangular pattern on the drum-skin was the sign for the noita to give his orders of burning, and so the rye was sown as soon as the ash had cooled off sufficiently to dance naked in the clearing. The rye was left to grow for two summers before harvesting. The crop was chared in three equal parts: one third for the people taking part in the work, one for the keeper of the forestland and one third for the organizer usually the noita of the tribe.
Compared with stationary field farming huuhta could give extremely big harvest under optimal conditions, but it fell off radically under inferior circumstances. Cultivation experiment carried out with at least 130 years old swidden rye in an artificial huuhta, has stated that harvest can be more than 12000 fold. One seed grew a big sod consisting of 162 long straws, and each straw carrying an ear containing 75 seeds. Thus it is suppositional that a birds (lom) skinn full of rye (0,5 kg.) , was responcible for the production of up to 6.000 kg. I discovered these rye seeds in an old riihi in Grue Finnforest,Solör in 1973. This riihi had not been used for drying rye since before 1880. My test growing took place in the herbgarden of The Hedmark Museum in Hamar 1988-1990.

Ethnic boundaries.
To secure the annual harvest, a tribe had many clearings on diverse soil and topography and in various progress of the process. Interaction between tribes performing different specialities was also usual. Continuous rain might prevent burning, and thus cancel cultivation for the season, but a practical system of clearings and interaction between the neighbour tribes acquired ample nourishment. As swidden cultivation apparently required seasonable work, these tribes had relatively long periods of time without any strict agricultural occupation. However, these "free time" periods were necessary for training the collaboration ability of the tribe members in advantage for the most complex procedures of the cultivation cycle. This training was accomplished by means of poetry, song, dance, music and other performed,so called "primitive", ceremonies under public attendance. Therefore runic poetry has been of great importance in Finnish culture from ancient times. The Finnish huuhta cultivation was an important cultural feature maintaining ethnic boundaries between the Finns and their Scandinavian interacting neighbours. Still today some cultural traits sustain ethnic boundaries, such as the ability of predicting the weather and also healing to some extent. Some people are still considered and consider themselves having so called supernatural gifts. A few specially talented people have the power and skill to manipulate nature, animals and even human beings. Some of this manipulations, however, can be acquired and practised by nearly everybody. Many of these for us today strange peculiarities and bizarre rituals are derived from the complex of Swidden cultivation.

Analyces of conception.
Let us use the forestland as object. There has been various ways of exploitation in the forestland. Swidden cultivation, animal nourishment, logging and a variety of other kind of harvesting and

functions. This different practic (usage) can bee a purpose for conflict between associates. At the finnish arrival in Scandinavia, they came in touch with Scandinavian people (farmers), the army (Swedish and Danish), official administration, industry (mining) and business (proprietors). This convocation came to conflict some time, and so there are written sources. But commonly interaction occured. The different actors had a divergence in their wiev and opinion about forestland, but their ideas changed during interaction. Some times actors avoided conflict by keeping silent about their purpose, or they changed opinion according to social loyalty. The conception of location and forestland will be incomplete, if the actors social and institutional context is not considered. An analysis of the conceptions of the different actors, tells nothing about which considerations will be underestemated and which will be predominant in a conflict. An analysis pr.ce. of the different conceptions record (roll) in the policy making procedure; how actors cooperate, is of great importance.

As an example, I put the long lasting conflict between swidden cultivation and honka logging. Swidden cultivation was represented by the Forestfinns, and after some time also by the farmers, who engaged the Finns to organize huuhta swidden in the home forest near their valley farms. Loggin was represented by the forest owners, nobility and merchants in the towns. These two actors finns and owners, played the main part in the conflict.

Forestfinns had a functional network and controlled the forest suffisiently to keep controlled lokal management. As they also were engaged loggers, the owners had to listen to them to a sertain extent. But the owners had the economic power, and they used it.

Official administration had no real influence in this matter. Restrictions conserning swidden was continuously constituted. This laws had no serious consequence, but a small penalty from time to time.

Army did not take part in this conflict directly, but both Swedish and Danish companies bought as much rye grain as the Finns could presently offer for sale.

In this manner and also as secret agents for both parts and guides through the forest, Finns influenced on the warfare.

Other examples of conflicts are often conneced with relationship between depopulation of Finnforest and centralization in towns.

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