Hunters and agriculture
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Fornvänn 255-258
Ingår i: samla.raa.se
Debatt

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Over the years much has been written on the reasons why happy hunters and gatherers took up agriculture and the backbreaking toil associated with it. Lee’s study of the !Kung bushmen persuaded him that all hunters led an equally carefree life all the time, and he has apparently managed to persuade most archaeologists that such was invariably the case. The present generation of archaeologists, who have never lived “out of the rifle-barrel”, may be spell-bound by Lee—but we must never forget that his study of the !Kung bushmen was just that, a study of one bushman tribe, during a limited period of time, a study which is in no way relevant to hunters and gatherers living under such conditions as prevailed in Europe, North Asia or North America. The literature now so glibly quoted for the “easy life” of hunters and early farmers is quite irrelevant and gravely misleading as far as conditions in prehistoric and early historic Europe north of the Alps and in North America are concerned.

In the Kalahari food is available all through the year to the hunter who knows where to look for it, and there is no “critical material” without which man cannot survive. It is all too easy to forget that, in a cool or a cold climate, the hunter must not only eat—he must also protect himself from the cold. Furs, shelter and fuel are as essential as food! Lee is right insofar as most hunters have a fairly easy time of it most of the time, but certainly not all the time. There are, invariably, lean times, mostly every year, during a particular season, sometimes at longer, irregular intervals, lean times which will weed out the weak and the unlucky.

In most subarctic areas this critical time is late winter, when stores are running low, when the crust on the snow makes movements extremely difficult and, above all, audible, when the cold will kill the careless or the unlucky, when the ice is no longer strong enough to carry the seal hunter or the fisherman, when there is not yet a green leaf to be seen and when the salmon have not yet come up the rivers.

Small wonder that prehistoric hunters and fishermen did all they could to improve conditions for the game and for the herbs and plants which contributed to their larder. And we must never forget that, apart from the Eskimos and the Aleuts, all the “hunters” got more than half their calories not from meat and fish but from “groundfood”, mostly of vegetable origin, acquired by collecting and scavenging.

Odum (1971) defines an ecosystem “as a community of organisms in a given area interacting with the physical environment, so that energy flow leads to clearly defined food chains, biotic diversity and exchange of materials between the living and non-living parts”. Transforming this concept to one comprising also humans, the essential components of the non-cultural environment become distance, topography, minerals, flora, fauna and climate.

The landscape, the ecosystem, was never static, although we often tend to think of it as such. Not only were there long-time changes of climate but also short-term ones, mirrored in changes in the composition of the forests and of the animal life. Also, in early post-glacial times there were no bogs, all the depressions which had been scoured clean by the Great Ice being either full of glaciary deposits or the sites of clear lakes. The game and the predators, of which man was one, lived in ecological balance, which was upset only when man started to practice husbandry and agriculture.

When, for one reason or another, the number of game animals decreased mesolithic man had no choice: he either died or moved to other hunting grounds, leaving it to the eco-
system to find its new balance. But where stores of agricultural products enabled “primitive farmers” to survive such a period without moving they would keep up a high hunting pressure, thus making it well-nigh impossible for the game to recover. Thus, the introduction of agriculture, particularly if agriculture was adopted by the indigenous population rather than introduced by “invaders” unfamiliar with the local fauna and with local hunting methods, may have been, and in most cases probably was, devastating to the local fauna and, thus, to those locals who tried to stick to a hunting way of life.

Lapland is a classical example of this. All through the Stone Age and the partly concurrent Bronze Age which, in that country, lasted to the end of the first millennium A.D., the local economy was founded upon wild reindeer, elk and salmon. The Laps can first be discerned by about 1000 A.D., as marginal farmers and fishermen, with iron tools acquired from their neighbours in the west and in the south. Within less than 500 years they had managed practically to exterminate both elk and reindeer within their territory. By about 1500, but not until then, did it become necessary for them to domesticate what few reindeer were left and to abandon their sedentary life for one of long-distance transhumance, following the domesticated herds between the winterlands and the summerlands. This, however, led to an even heavier hunting pressure on whatever game was left and, to this very day, there are no wild reindeer and hardly an elk or a bear in the lands through which the Laps pass, where there is no trace of the recovery of the ecosystem so evident in the rest of the Scandinavian peninsula.

If any game is to survive in a land peopled by farmers, the latter must adopt a conservation policy and enforce it. What happened in 19th-century Sweden and in presentday Africa shows what happens when such a conservation policy is neglected. In the late 18th century the age-old conservation laws preserving wild-life and regulating the length of the hunting season were abolished in Sweden, just at a time when the lumber trade and the charcoal-hungry iron industry expanded rapidly. Everybody working in the forest carried a fire-arm and shot anything that moved. In consequence, elk, bear and roe-deer were practically exterminated and wild reindeer completely so. By the early 19th century perhaps 200–300 elk survived, in the far north, as well as 32 roe-deer at Övedskloster, in Scania.

At the very last moment it was realized that something would have to be done. Both deer and elk received complete protection. Still, their numbers recovered only very slowly, since the original forest had been turned into a “culture forest”. By this time the iron industry used cokes rather than charcoal and the forests were managed so as to yield lumber for the saw-mills. Only the very largest trees were harvested, all the trees were left to grow till they reached maximum size. The forests consisted of trees of all ages and no one surface was ever cleared. Also the beaver was exterminated which meant that there were no new silted-up beaver ponds such as afford good grazing and browsing.

These were the forests of the story-books, the forests which we think of as “natural” ones—but they were culture-forests without any undergrowth whatever. Grazing was poor indeed—there was simply no food for elk, bear and deer.

Even after nearly a century, in 1939, the situation was still precarious. To be sure, numbers had increased and hunting had been permitted since the turn of the century, although at an extremely restricted scale. In 1939 about 2 000 elk were shot in the country, out of a total population of, probably, slightly more than 10 000 but certainly less than 15 000 animals. The dramatic change came in the late 1950ies, when the numbers of elk and deer suddenly started to increase. By 1984 the elk population of the country was about 500 000, and the harvest about 150 000. What was the reason?

The principles of forestry had changed. Instead of selectively cutting only the largest trees we now clear-cut, i.e. cut every tree over large areas, up to several hundred hectares each. At first, the uninformed public complained bitterly, claiming that the large, cleared areas “looked horrible” and the re-
planted forest, with all trees the same age, looked “artificial and dull”.

For various biological reasons, the clear-cut areas have to “lie fallow” for two years before being replanted. Already by the first autumn they will be covered by a rich herbaceous vegetation, including wild raspberries, blueberries, Epilobium a.s.o., wonderful fodder for elk, roe-deer, black cock and capercaillie, and most of them edible and potentially useful.

At the same time we realized that the biological principle practiced were wrong. Ever since hunting had again become permitted, only male animals could be shot. The average size had decreased dramatically since all the best bulls were killed. The sex ratios were all wrong, as was the age distribution of the few male animals left. Most of the cows were not covered. Nowadays, bulls, cows and calves are killed in equal numbers, the sex distribution is in balance, the age distribution is better although far from ideal, and reproduction good. Today, the forester’s ideal is one elk per square kilometre even though a pine forest consisting of stands of different ages can usually support up to 3 grown animals per square kilometre, although at the cost of some damage to young trees.

But this also means that hunting is necessary or the elk population will expand beyond the carrying potential of the ecosystem only to collapse, as it did on Isle Royale in Lake Superior when the wolves were exterminated and hunting banned. In a balanced ecosystem the herbivore and the carnivore populations keep a balance. In mesolithic Europe the carnivores were man, wolf, lynx, wolverine, fox and, to a certain extent, bear. In a collapse situation, such as characterized Scandinavia in the 19th century, man increased his efforts to exploit the herbivores but did not devote any time or attention to the carnivores, which starved. This was the period when wolves turned upon domestic stock!

For a century and more we have built up a very extensive and efficient fire-fighting and fire-preventing service. Forest fires are now few and far between. At a symposium in Anchorage, some ten years ago, forestry officials of Alaska, East Siberia and Canada agreed that “natural causes”, such as lightning, storm friction and the like, cause forest fires which annually burn about 0.5% of the total forest area of those countries, thus affording grazing areas for game, and we may assume that conditions were much the same in the deciduous forests of prehistoric Europe.

Clearcutting now fulfills the same functions as did forest fires, it means a return to natural conditions. Today, the clear-cut areas are colonized by various herbs during the two years of fallow, after which they are planted with spruce or fir. It takes another four years or more before the young trees are big enough to dominate the plant system. In mesolithic times trees were not planted. Re-colonization would have been first by herbs, much as today, followed by birch which would in turn have been replaced by pines and spruce.

It is quite evident that mesolithic man observed that the wildlife benefited from the improved grazing and that he realized that burning limited areas of the endless forests improved hunting. In Scandinavia we have found numerous charcoal levels in the bogs, incontroversial evidence of forest fires, charcoals that strongly suggest that mesolithic man at least occasionally did burn the forest. This was also one way of improving conditions for such local edible plants as could invade the burned areas, an autochthonous and very primitive “agriculture”. Such an improvement of the elk biotope (in the north) and the deer biotope (in the south) enabled mesolithic man not only to increase his harvest of elk, deer and small game but also to collect more, and a wider range of, wild vegetables and berries, it enabled more people to live in any given area.

But it also made life more precarious. If a hard snow winter killed three quarters of the elk and of the deer, as occasionally happens, or if out-of-season spring rains killed the capercaillie chicks, or if the salmon run failed, there were no reserves which could feed so many humans. Death by starvation stalked the hunter as well as the farmer.

The real ecological catastrophe and eco-
Economic break-through came when early man learned to produce vegetable products which could stand storage for an extended time, such as could be used as reserves for winter. There were not many of these in the Scandinavian forest: dried blueberries, lingonberries, fermented Angelica and fermented leaves of Epilobium and Rumex, rootstocks of cat’s-tail and of water-lily, acorns and nuts, seeds of Elymus and other grasses. Wheat and barley proved far easier to plant and to harvest than were the native grasses and, once seed material had been obtained, farming became predominant, in spite of the high labour input necessary. The low figure for labour input in agriculture quoted by Cohen (1972) are as misleading as are Lee’s figures for hunting and collecting, since they refer to tropical and subtropical conditions and to optimal soils. They have no relevance to northern Europe, North America or north Asia, where the labour input in pre-industrial agriculture was well over 2000 hours a year for survival. Labour input had to include not only preparing the land, sowing, tending and harvesting the crop but also building and maintaining “winterproof” houses, including stables and barns, collecting winter fodder for the animals and collecting firewood for the winter, not to speak of preparing linen, nettle and woollen textiles as well as furs for clothing. But most years the farmer could produce sufficient grain and other vegetable products to last him through the winter and he could thus disregard the law of diminishing returns when hunting, he could survive even when the game population was much too small to support a true hunting population—which meant that the farmers did not give the depleted game any chance to recover. This is why we find so very few bones of game animals among the refuse in neolithic and later sites, this is why the kings reserved the hunting of elk and deer for themselves only—there were too few animals left!

The habit of clearing the forest by burning a fraction of it every year or every few years may explain why mesolithic man or perhaps rather mesolithic woman found it easy to adopt the idea of sowing or planting, since the burned surfaces would have yielded a great variety of edible wild vegetables. The step from collecting parts of existing plants, which grew where the air-born seeds had been observed to fall the previous year, to trying to increase the number of plants on the cleared ground, by planting or by burying collected seeds, may have been a short one.

During the climate optimum of the early neolithic the “farming frontier” moved very far north in Scandinavia. After some time this frontier regressed, the early farmers in the marginal areas reverting to a hunting, fishing and collecting economy. This must have been a traumatic experience in a landscape where, to judge from the number of sites an from the osteological material in the sites, several centuries of over-hunting by numerous farmers had drastically decimated the big game.

References

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