THE HISTORICAL ARCHAEOLOGY OF THE MEDIEVAL CRISIS IN SCANDINAVIA

Birgitta Berglund,
Katarina Eriksson,
Ingunn Holm,
Håkan Karlsson,
Jenny Karlsson,
Susanne Pettersson,
Anna Sundberg,
Bo Ulfhielm &
Stig Welinder

In the wake of the Black Death in 1350 Europe saw demographic disaster, economic decline, and social and political breakdown. Thousands of farms were deserted. This is the Medieval Agrarian Crisis. The latest decades of outland archaeology, primarily within the frames of rescue archaeology, have made it possible to outline the course of the crisis in the forested parts of middle Scandinavia. The 14th and 15th centuries were a time of economic change rather than economic decline. However, various areas changed in different ways. When taking outland production into account the medieval crisis has to be conceptualised in another way; it was not solely an agrarian crisis. It was also early industrial expansion and change towards extensive farming.

Key words: medieval crisis, outland, outland production, deserted farms, land clearance, summer farms, mass catching, iron production, tar production, mining, blast furnaces

THE MEDIEVAL CRISIS

The 14th century saw economic decline in most of Europe. The medieval crisis is recorded in data on harvests, trade, tenancy rents, taxes, and population size. It was accompanied by warfare, peasant rebellions, social turbulence and breakdown, and aristocratic repression. The crisis was triggered by the Black Death that reached Europe in 1347 and Scandinavia in 1349 (Harrison 2000; Benedictow 2004).

In the 1960s and 70s a joint Scandinavian research project, the Scandinavian Research Project on Deserted Farms and Villages (Swe.

Ödegårdsprojektet), collected large amounts of data and discussed the crisis from a Scandinavian perspective (Gissel *et al.* 1981). The crisis was reconstructed as percentages of deserted farms and population decline from written records on ownership, buying and selling, and taxes and rents in relation to arable land. That is what was recorded by the medieval bureaucracy, and accordingly the crisis is often denoted an agrarian crisis in Scandinavia. Little relevant archaeology was available at the time of the research project.

In Norway desertion percentages of more than 40 % were reconstructed in most of the country. Typical percentages in Denmark and Sweden were 10–30 %, and in Finland 5–10 %. The differences were due mainly to the use of different kinds of data and different methods. Recent research hints that all in all about 40–50 % of the Scandinavian population died in the Black Death and the subsequent pandemic plagues during the 14th and 15th centuries (Myrdal 2003:166–189), in parts of the area possibly more (Antonson 2009).

A main problem in the discussions of the 1970s was whether the plague pandemics were the most important or possibly the only reason for the crisis. It was noted that some farms were deserted already before the 1350s, and thus it was discussed whether the Black Death hit a society already in crisis, for instance due to overexploitation and climatic deterioration. However, less effort was invested in the reconstruction of the build-up of the crisis than in the recovery of society after it. The simple reason was the easier access to informative written records from the 16th and 17th centuries than before 1350.

We will try to discuss the medieval crisis in middle Scandinavia 30 years after the Scandinavian Research Project on Deserted Farms and Villages. We will use the data from historical archaeology that have come to light during this period, not least within the frames of rescue archaeology. The increase in available data has been huge, and various kinds of sites that were hardly known in the 1960s have been recorded and excavated in large numbers. This is valid especially for areas outside the cultivated and urban parts of the country.

It is notable that the large-scale Ystad Project on long-term change in the south Scanian cultural landscape found few indications of medieval decline in agrarian activity (Andersson & Anglert 1989). Pollen data and theoretical calculations suggested that the landscape was not used above its carrying capacity towards the 14th century. Mats Widgren has suggested the same for all of southern Sweden (Widgren 1995).

In parts of Trøndelag, in areas more marginal from the viewpoint of corn cropping than in southern Scania, the archaeological record on land clearance and farmyards displays a more complex and dynamic process than the written record for the period 1200–1600 (Berglund *et al.* 2003). One reason is that the written record has little to tell about outlying-land production.

The most recent study of expansion and stagnation in marginal land is the one on north-western Scania by Per Lagerås (2007). After some centuries of expansion some farms were deserted while others were not during mid-medieval time. Anders Ödman has previously studied the same area (Ödman 1998, 2001).

OUTLAND ARCHAEOLOGY

The Scandinavian Research Project on Deserted Farms and Villages studied the agrarian landscape, that is, farmyards and the farms' inland of arable land and meadows. A complete farm, however, also consisted of its outland (Andersson 1998; Hansson *et al.* 2005:77–88). The outlying land was used for forest grazing, iron production, fishing and hunting, slash-and-burn cultivation, for timber supplies, tar, birch bark, and for many other purposes. In most of Scandinavia the outland production was of more importance within the economy of the peasant households and within the market economy than the inland production (Svensson 1998).

Today there is a great deal of data especially on charcoal and iron production and on the use of pitfalls. Dozens of iron-smelting furnaces, charcoal pits and pitfalls have been radiocarbon dated. It is possible to discuss whether the medieval crisis had another course when seen in the perspective of outlying-land production than that of the agrarian crisis reconstructed from written data on the cultivated landscape (*cf.* Holm 1999; Nilsson 2005).

THE RESEARCH AREA

We have chosen to study an area in the middle part of the Scandinavian Peninsula. The research area consists of the county administrative districts (Nor. *fylke*; Swe. *län*) Värmlands län, Hedmark, Gävleborgs län, Dalarnas län, Jämtlands län and Trøndelag, which actually is two *fylke* (Fig. 1).

The part of Scandinavia in focus is a generally forested area with cultivated land along the coasts, fiords and river valleys, and around

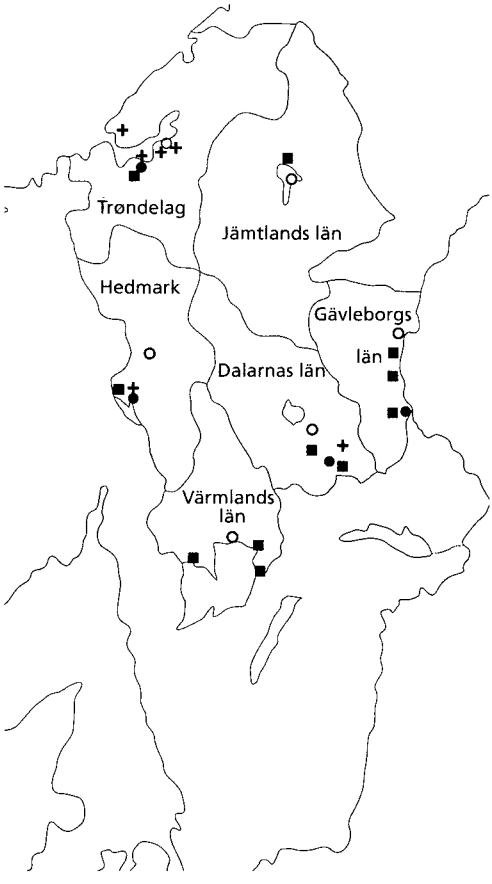

Fig. 1. The research area in middle Scandinavia with sub-areas. Black dots = towns; black dots with a cross = cathedral cities; circle = major market place; black square = strongholds outside the towns and cities; crosses = monasteries outside the towns and cities (partly from Lunde 1987; A.-L. Eriksson 1995; Hemmendorff 1996; Mogren 2000; Andersson & Schedin 2001; Monié Nordin 2005).

the largest lakes. Part of the Scandinavian high mountain backbone is situated between Hedmark and Trøndelag in the west and Dalarnas län and Jämtlands län in the east. Part of the middle Swedish mining area, *Bergslagen*, is included in Dalarnas län and Gävleborgs län.

Royal, church and feudal power was little exerted in the area until the 14th century or even later. The exceptions are the establishing of the royal and episcopal cities of Hamar and Trondheim in Hedmark and Trøndelag, respectively, in the 10th and 11th centuries. In these Norwegian *fylke* there also were large estates (Røskaft 2003). Urbanism and monasticism in Dalarnas län and Gävleborgs län are 15th-century phenomena, while the strongholds are mainly from the 14th century. Many of them disappeared during the early 15th century. This is valid also for the single stronghold in Jämtlands län and for those in Värmlands län.

Market economy was present in all of the research area during the Middle Ages, but the organising power was little visible as monumental sites. The obvious exceptions were the best agricultural districts, for example parts of Hedmark and Trøndelag, and the *Bergslagen* mining district in the south-eastern part of the research area (Fig. 1).

THE DATA SET

We have collected all available radiocarbon dates from the time span AD 1–1800 for various kinds of sites in the research area (Table 1). In some of the administrative districts in the research area there are local antiquarian institutes with reassuring records of nearly all the radiocarbon dates ever obtained within the districts. In other districts some of the co-authors have spent much time scrutinizing libraries and archives for dates.

	Värmlands län	Hedmark	Gävleborgs län	Dalarnas län	Jämtlands län	Trøndelag
Farms and farmyards	57	77	11	139	10	
Clearance of land	18	22		33	35	
Summer farms		11				
Small-scale iron production	36	76	68	122	97	88
Charcoal production	10	58		30		
Tar production		12				
The Falun copper mine				28		
Mass catching	17	18	22	6	60	

Table 1. The number of dates/dated sites in the data set organised according to county administrative district and type of site.

From sites and features with more than one dated sample we have used reasonable mean values. Thus, the figures in Table 1 and accordingly the graphs in Figures 2–9 note the number of features and sites, not the number of individual dates. The hundreds of dates from the

Gråfjell area in Hedmark are not included in our data set (Amundsen 2007; Rundberget 2007). They are commented upon in the text.

All the dates are calibrated and thus meant to be readable as the common historical time-scale (Ramsay *et al.* 2006). We have not systematically recalibrated dates previously calibrated according to various methods. All dates are associated with statistical errors of various sizes. In the graphs in Figures 2–9 we have placed each date in its statistically most probable century.

There are other methods for presenting large amounts of radiocarbon dates (*e.g.* Magnusson 1986). Our graphs (Figs. 2–9) represent both an honest attempt to present the actual amount of available data and easily survivable overviews to be used in the interpretative discussion. Of course the latter has to be guided by cautiousness and common sense. What are seen in the graphs are long-term trends, not what happened in single centuries.

What is also seen in the graphs is a summary of modern land pressure and exploitation resulting in rescue archaeology in addition to various research strategies within field projects with research grants. These factors may differ among the various districts in the research area, thus making comparisons between the districts problematic.

In Hedmark almost all the dates derive from rescue archaeology during the last 30 years. This is valid also for Gävleborgs län and Dalarnas län. The advantage is that a more or less random selection of sites have been excavated within those part of the districts where land has been exploited. Bias based on the idiosyncratic ambitions of individual research projects is not present, or at least only to a limited extent. In Dalarnas län, systematically the oldest clearance at each rescue-archaeologically excavated site has been radiocarbon dated. This of course influences the graph in Figure 3. Otherwise, the graphs for Dalarnas län are based on a selection of relevant data from a list of more than 500 individually dated samples.

In Värmlands län 150 dated samples out of a total of 186 derive from research projects. The small group of researchers that planned the field and laboratory programs was especially interested in the Late Iron Age and the Middle Ages. Accordingly the late radiocarbon dates are few. Rescue archaeology in Jämtlands län is a rarity. Nevertheless a remarkable number of pitfalls and bloomery furnaces have been radiocarbon dated.

Trøndelag is an area with high modern land pressure and a univer-

sity department responsible for the rescue archaeology in the district. For our data set it has been surmountable to present only the dates of iron-production furnaces. Bloomery iron production is a special research interest of the department of archaeology at the local university (Stenvik 2005). It is, however, obvious that radiocarbon dating of iron production has not only been popular in Trøndelag during the latest decades (Figs. 5–6).

In addition to radiocarbon dates we will discuss dendrochronologically dated log houses. There are excellent published overviews of tens of houses from the Swedish part of the research area, most of them from Dalarnas län and Jämtlands län. Houses presumed to be older than 1600 have been systematically dated. Houses older than the very late 13th century are not known (Landström & Bartholin 1987).

Quite another kind of data is pollen diagrams. We have not made a systematic survey of all available informative and reasonably well-dated pollen diagrams from the research area. Our selection has been easily found in published literature. The pollen data will underline trends seen in the radiocarbon dates of the archaeological sites. The actual diagrams will not be presented here but only a simple overview of events of interest for our discussion (Table 2).

It is notable that dates of the actual houses may indicate and date the desertion of farmyards. Pollen diagrams, on the other hand, indicate and date the desertion of the arable land and pasture of the farms.

HOUSES, FARMYARDS AND VILLAGES

In Gävleborgs län and Jämtlands län the number of abandoned farmyards has been calculated (Fig. 2). The dates are based on interpretations of series of radiocarbon dates and on the interpretation of the presence and absence of various artifact types. The abandonment of a farmyard may indicate that the farm had been deserted, or that the farmyard had been moved to a new nearby location. It is tempting to suggest that the increase in the number of deserted farmyards in the 14th and 15th centuries (Fig. 2) is related to the medieval crisis.

For Värmlands län, Hedmark and Dalarnas län the graphs are based on radiocarbon analyses of post-holes, hearths, wall-ditches, and a multitude of other kinds of remains from general settlement activities (Fig. 2). The patterns in the three histograms are very different. At least in part, this reflects ambitions within the local rescue archaeology and, as concerns Värmlands län, local research programs. However, there are

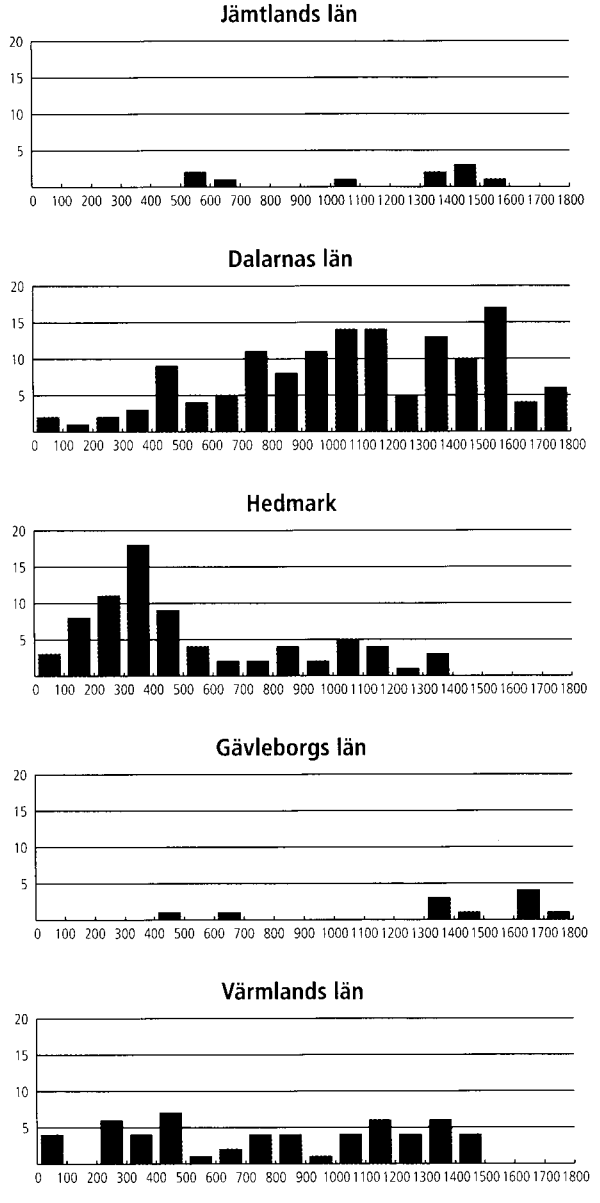

Fig. 2. The radiocarbon dating of farms and farmyards AD 1–1800. Jämtlands län, Gävleborgs län = the date of the abandonment of farmyards (number of sites); Dalarnas län, Hedmark, Värmlands län = the number of radiocarbon dates of settlement site features.

no dates from Hedmark and Värmlands län after the 14th and 15th century, respectively. It is reasonable to interpret this as population decline and desertion of farms.

In the graph for Dalarnas län in total there is a stop in log-house building for a century after 1365 (Raihle 1990:Fig. 8). The pattern is

the same in other areas where many log houses are still standing (Landström & Bartholin 1987; Hovanta 1994). For a century there was no need and possibly no labour force to build new log houses. This is not an indication of a total desertion of farms but of the breakdown of the continuous everyday life on the farms. According to the radiocarbon dates, however, life went on in the farms and villages.

The archaeological data on houses, farms and villages correspond to the description of an agrarian crisis by the Scandinavian Research Project on Deserted Farms and Villages. It is indicated that farms were deserted in our research area. Archaeology does not, however, have data to quantify the desertion as was done by the historical research project in the 1970s from the written record, except possibly for Jämtlands län. Helge Salvesen, a member of the historical research project, estimated the number of deserted farms in Jämtlands län to about 410. Modern estimates based on, among other things, field registrations suggest 600–800 (Hansson *et. al.* 2005:69–70; Antonson 2009). As much as 50–60 % of the farms may have been deserted in Jämtlands län.

PASTURE AND ARABLE LAND

The occurrence of clearance of arable land and possibly grazing areas is dated from charcoal underneath clearance cairns and lynchets. The process of clearance has been very different in those parts of the research area with sufficiently many radiocarbon analyses for an evaluation (Fig. 3).

In Dalarnas län and Jämtlands län clearance of land expanded during the 11th century. In Jämtlands län this activity declined after the 12th century, while it continued and culminated in Dalarnas län during the 14th century, that is, the very century of the medieval crisis. In Hedmark, too, clearance activity increased around the 15th century after a long period with no dated clearance cairns and lynchets. Värmlands län has few dates, but the presence of clearance activity in the period 1200–1500 is indicated.

The long series of dates from the site Röysfetet in Hedmark (Amundsen 2007:Figs. 190–191) starts in 700, culminates 800–1000 as concerns dates of clearance, and culminates in 1200–1700 as concerns dates of the continuous use without any decline indicating desertion or less intense use of the area.

Thus, the chronology of the process of land clearance is not in agreement with the general view of farm desertion after 1350. New land

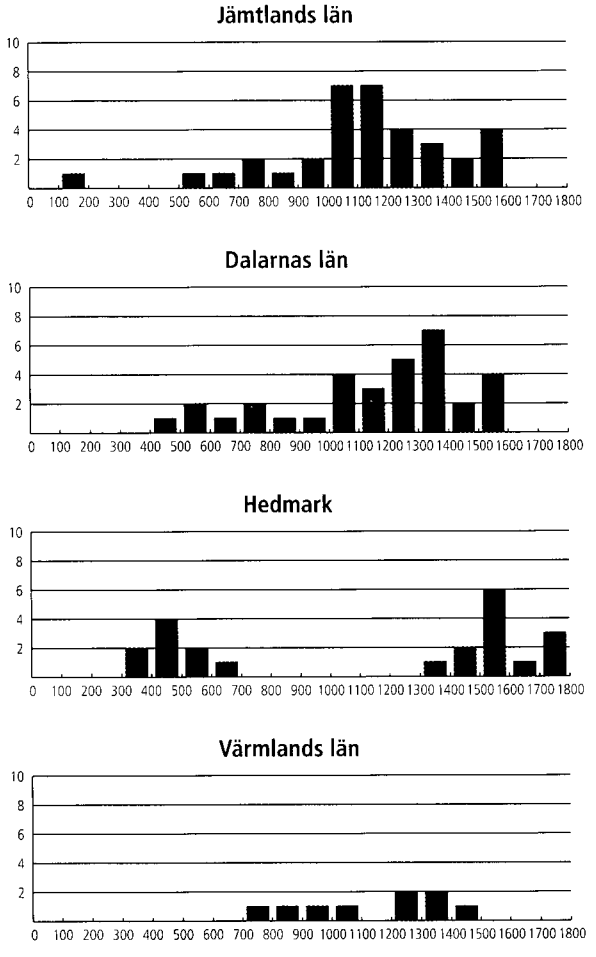

Fig. 3. The radiocarbon dating of clearance of arable land AD 1–1800 (number of radiocarbon dates).

was continually cleared. In Dalarnas län there was even a boom-period during the 14th century, while the corresponding period in Hedmark is linked to the recovery towards the end of the crisis.

The pollen diagrams summarised by us (Table 2) are all from what is today forested areas or the summer-farm landscape. The latter is where the seasonal summer farms (see below) were in use until the late 19th or early 20th century. The chronology of the diagrams is based on interpolation of radiocarbon dates. It is actually less accurate than what is shown in our overview (Table 2).

	Start of forest grazing	Period of corn cropping	Decline in agricultural activity	End of cultivation and grazing
Jämtlands län				
Gammelvallen	800	1300–1850		1850
Öjingsvallen	500	1000–1850		1850
Munkebovallen	1300	1600–1800		1800
Dalarnas län				
Svedjan		1600–		
Tryggåsvallen		1300–		
Persbo		1300–1900		1900
Stor-Flen		1000–	14th century	
Skallskog	800 (?)	1300–1900		1900
Läde	800 (?)	1000–1800	14th century	1800
Gävleborgs län				
Hamra	1300	1600–1900		1900
Hedmark				
Røgden	1400			
Gammeltorpmyra	800 BC	800–1400		1400

Table 2. Overview of relevant events in selected pollen diagrams from the research area (from Hafsten 1992; Emanuelsson 2001; Karlsson 2001; Mattsson 2001; Hansson *et al.* 2005:Tab. 31; Wallin 2006).

Grain has been cultivated and grazing has taken place in all of the forest and upland areas covered by the pollen diagrams. It is notable how corn cropping or forest grazing started in many areas around 1300–1400. In considerably fewer areas this was a time of decline or a total stop in agricultural activity.

In the research area, the time of the medieval crisis was more often a period of clearance of land and expansion of pasture than stagnation. This is especially apparent in Dalarnas län. In general it was a period of dynamic change as concerns cultivation and stock-breeding in outlying land.

SUMMER FARMS

The summer farms (Nor. *seter*; Swe. *fäbod*) were seasonally used for forest and upland grazing of the cattle and, at least during the period 1600–1900, dairy production for the market. Summer farms, or rather some kind of cattle-posts away from the main farms, have been in use in Scandinavia since the Early Iron Age.

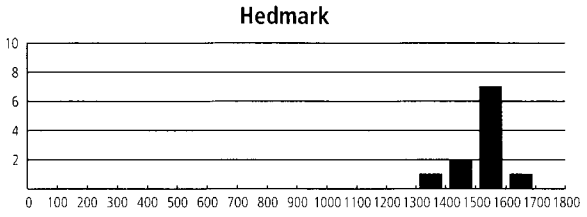

Fig. 4. The radiocarbon dating of summer farms AD 1–1800 (number of radiocarbon dates, settlement site features).

There is a series of radiocarbon analyses with close to a reasonable number of dates from Hedmark (Fig. 4). It shows how the use of summer farms increased after the 14th century. The houses at the site Røysfeltet in the Gråfjell area are dated to the period 1300–1700 (Amundsen 2007: Fig. 227). At the site Deset Østseter they are dated to 1300–1500 (Amundsen 2007: Fig. 265). These summer farms were established around the time of the crisis. The same, or at least forest grazing, was demonstrated for Gävleborgs län, Dalarnas län and Jämtlands län with the aid of pollen diagrams sampled near early modern summer farms (Table 2).

Many deserted farms were turned into summer farms in Jämtlands län during the 14th and 15th centuries, as demonstrated by the excavated site Eisåsvallen (Hansson 2005:89–90) and generally discussed by Hans Antonson (2004:214–221).

IRON PRODUCTION

The study of pre-industrial iron production has a long tradition in Scandinavia. Long series of radiocarbon dates of iron-smelting furnaces and slag are available from all the districts in the research area (Fig. 5). The production of charcoal is closely linked to iron production, but the excavation of charcoal-production sites started later in Sweden, so there are fewer radiocarbon dates of charcoal pits than from the actual iron-production sites with the exception of Hedmark in Norway (Fig. 6).

There are obvious local boom-periods in the iron production, for example 300–700 in Jämtlands län, 800–1000 in Värmlands län, and 700–1100 in Dalarnas län. The graphs for charcoal production mirror those for iron production during the latter two boom-periods (Figs. 5–6).

The kind of bloomery iron production in focus here – not to be confused with water-powered blast furnaces (see below) – came to a stop in Värmlands län in the 14th century, and decreased notably in Hedmark at the same time, as did charcoal-production. The same hap-

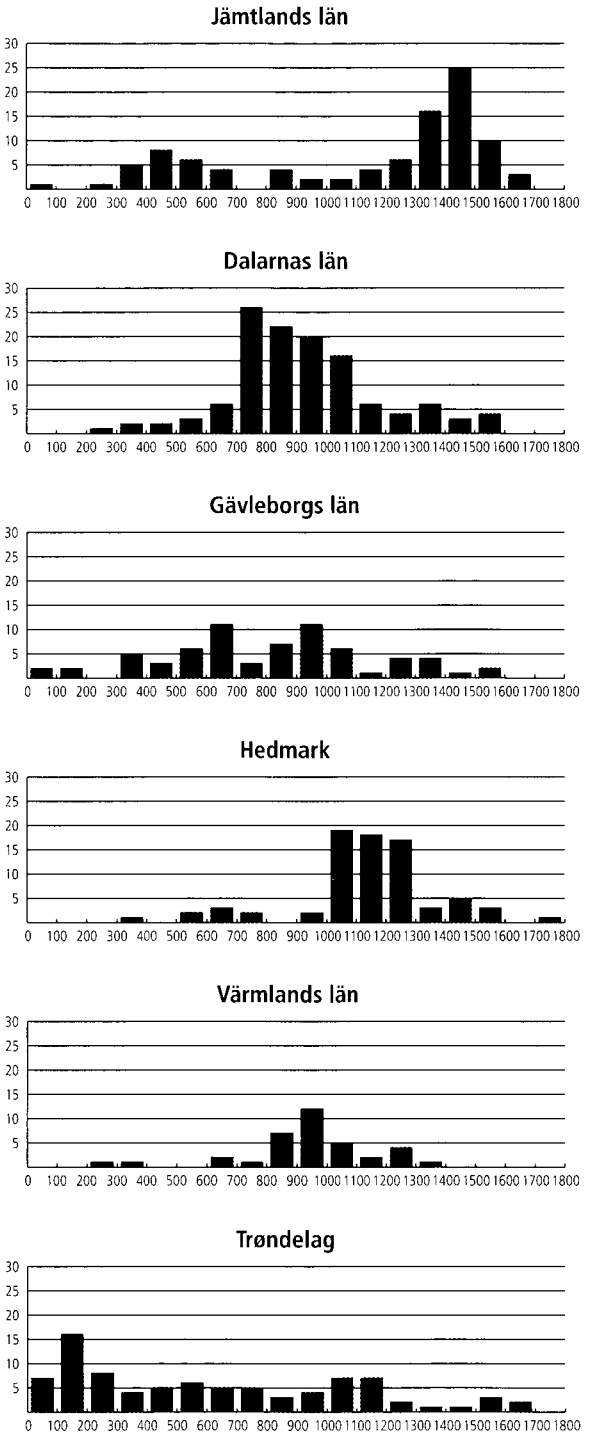

Fig. 5. The radiocarbon dating of small-scale iron production AD 1–1800 (number of radiocarbon dates, mainly of furnaces).

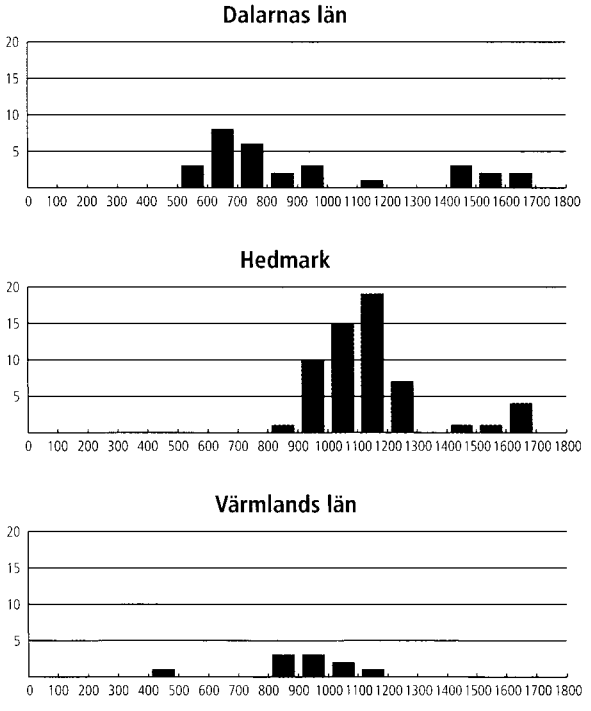

Fig. 6. The radiocarbon dating of charcoal production AD 1–1800 (number of radiocarbon dates of charcoal pits and stacks).

pened in Trøndelag a century earlier. In Gävleborgs län and Dalarnas län iron production decreased already around the 11th century but did not came to a total stop until the 16th century.

Thus, in the south-western part of the research area the decline in iron production was related to the medieval crisis during the 14th century. In the other district boom-periods came and went independent of that crisis during a millennium.

Jämtlands län has a pattern all in itself. The 14th century saw a remarkable increase in iron production (Fig. 5). The second boom-period of iron production in the district started during the medieval crisis. The same is valid for the north-western part of Gävleborgs län adjacent to Jämtlands län.

The summary of more than 600 radiocarbon analyses from southern Norway by Jan Henning Larsen (2004:Figs. 5–6) shows a continuously decreasing number of dates per century from the 13th century and onwards for iron production and the 14th century and onwards for charcoal production. It is obvious that this kind of iron production for the market came to a stop as a consequence of the medieval crisis,

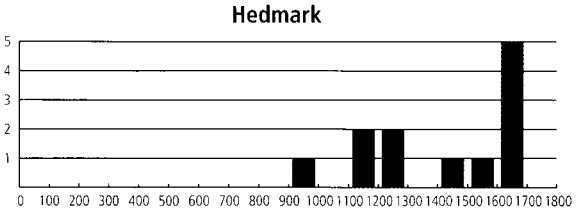

Fig. 7. The radiocarbon dating of tar production AD 1–1800 (number of radiocarbon dates of tar pits).

although the production had decreased already before the 14th century in some areas like Trøndelag and Gråfjell (Rundberget 2006, 2007:321). In the local studies in Setesdal (Bloch-Nakkerud 1987) the 14th century is pinpointed as the time of a total stop in production. The long series of dates of charcoal pits may even hint at the decades around 1350.

The Middle Ages saw a general change in the bloomery-furnace production, from production for the market to small-scale production for local household use. In some areas this change was related to a breakdown of the production during the 14th century and the medieval crisis. In Jämtlands län the opposite took place.

The changes outlined above must, however, also be related to the introduction of large-scale iron production in blast furnaces. That will be done below.

TAR PRODUCTION

There are only few and fairly recent excavations of tar production sites (Hennius *et al.* 2005; Hennius 2006). In the research area there is a small series of radiocarbon dates from Hedmark (Fig. 7). It suggests that tar production continued uninterrupted through the medieval crisis. The series of dates from the Gråfjell area starts in 1700 (Amundsen 2007: Fig. 281).

MASS CATCHING

Pitfalls for moose and reindeer have been excavated in fair numbers since the 1960s, but in the research area there are many radiocarbon dates only from Jämtlands län (Fig. 8). There is no obvious pattern in the distribution of the dates. One reason may be that it is difficult to get high-quality samples for analyses of pitfalls from a stratigraphical point of view.

The small number of dates from Värmlands län and Hedmark seem to follow the same pattern as the iron production. Mass catching came to a stop and decreased notably, respectively, around the 13th and

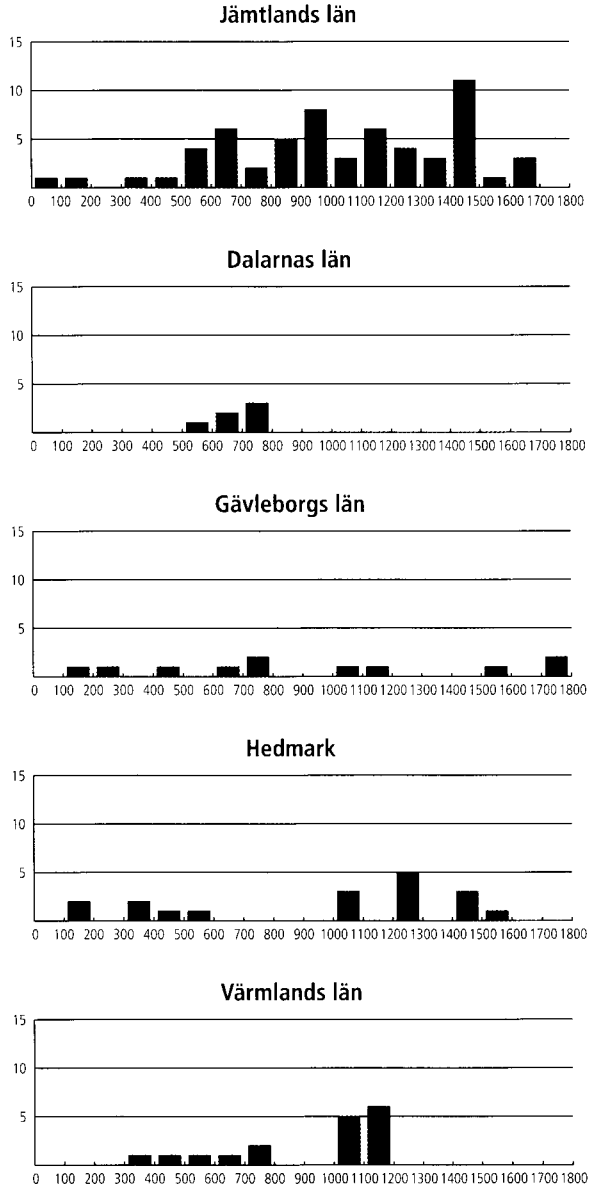

Fig. 8. The radiocarbon dating of mass catching of moose and reindeer AD 1–1800 (number of radiocarbon dates of pitfalls).

14th centuries. The latter decrease is confirmed by the data from the Gråfjell area (Amundsen 2007:Fig. 120). Also in Jämtlands län the patterns seem to be similar to one another. Iron production increased in the 14th century, and mass catching culminated during a short period around the 15th century.

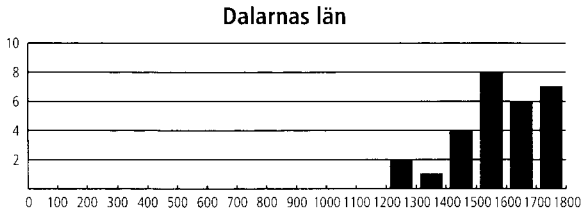

Fig. 9. The radiocarbon dating of the Falun copper mine (number of radiocarbon dates of various copper-production features).

Egil Mikkelsen in his survey of mass catching in southern Norway (1994) has demonstrated that pitfalls were in continuous and equal use until about 1700. Large-scale constructions requiring a big labour force to maintain and harvest them, on the other hand, stopped being used at the end of the 13th century. The use of hunting cottages and the accumulation of bones outside the cottages in the west Norwegian high mountains also decreased around 1300 (Mikkelsen 1994:Fig. 75). Egil Mikkelsen's interpretation was that wild reindeer was close to extinction towards the end of the 13th century due to overexploitation. However, it is notable that the mass catching did not start again after a period of recovery. The medieval crisis did not cause the breakdown of mass catching of reindeer in the Norwegian high mountains, but it contributed to its not being restarted after its breakdown for other reasons.

Mass-catching of moose and reindeer in pitfalls and other constructions decreased in parts of the research area around the 13th and 14th centuries. The relation to the medieval crisis is not obvious, as demonstrated by the local study in southern Norway (Mikkelsen 1994). Jämtlands län again is an exception. The number of pitfalls in use increased during the 15th century in the same way as iron production a century earlier.

MINING AND BLAST FURNACES

The earliest archaeologically excavated and radiocarbon-dated blast furnaces for iron production are situated in the southern part of *Bergslagen*, slightly to the south of the research area. They were established in the 12th and 13th centuries (Th. Eriksson 2002; Eriksson & Pettersson Jensen 2002; Anund & Skyllberg 2003). The Falun copper mine and smelteries were, according to the earliest radiocarbon dates, established in the 13th century, and the activity increased in the 15th and 16th centuries (Fig. 9). The very start may have occurred even earlier (Qvarfort 1977).

The charcoal production in charcoal stacks is linked to the new unlimited need for charcoal in the early industrial production of iron and

copper. The earliest radiocarbon dates are from the 15th and 16th centuries in Gävleborgs län and Dalarnas län. The early modern peaks in Figure 6 are mainly formed by dates from charcoal stacks.

Thus, the decline in bloomery-furnace iron production in Värmlands län, Gävleborgs län, Dalarnas län and Trøndelag around the 12th century (Fig. 4) was due to the introduction of the new industrial methods. Full-scale production according to the old technique continued only in Hedmark, where the medieval crisis meant a stop, and in Jämtland, where the production actually increased (Fig. 5). In these two districts the continued bloomery-furnace production was based on new, more efficient types of furnaces, in Jämtlands län from the 11th century (Magnusson 1986:170–171) and in Hedmark from the 14th century (Holm 1999:373).

New technology, both small-scale and industrial scale technology, was introduced in the centuries around the medieval crisis. The total production increased, also during the 14th century, rather than decreased. However, there were changes in organisation and relations to household and market production associated with the various technologies. This must be discussed on the basis of all the data on economy present in our database (Figs. 2–9, Table 2).

LONG-TERM CHANGE

In spite of the data being of variable quality in the different parts of the research area, one conclusion is justified. There is not one unanimous pattern of change in all of the area. We can grasp the variation by outlining three different trajectories of long-term change. Common, however, are a pattern of expansion, change generally around the 14th century, and the emergence of a new kind of economy.

The royal and episcopal structure in Trøndelag had its economic basis in rich and expanding farmland and outlying-land production, and this is also the case in Jämtlands län. The reoccurring plagues from 1350 and onwards meant a demographic disaster with desertion of hundreds of farms, archaeologically demonstrated in Jämtlands län and known from written history in Trøndelag. Many of the deserted farms in Jämtlands län were turned into grazing land, hay-making land and summer farms (Hansson *et al.* 2005:89–92). Iron production in bloomery furnaces increased, in Jämtlands län during the 14th century and in Trøndelag during the 16th century.

In Dalarnas län the disaster of the Black Death is drastically demon-

strated by the total stop in log-house building in the 1350s. At about the same time farms were deserted in Gävleborgs län. Simultaneously, land clearance and the establishing of summer farms increased in Dalarnas län. The idea is that bread, beer, ox-traction and ox-hide were needed in the new mining and blast-furnace industry denoted *Bergslagen* in the southern parts of Dalarnas län and Gävleborgs län. The clearance of woods for arable land and grazing in Dalarnas län during the 14th century is especially notable. Continuous forest clearance during the 14th and 15th centuries has been noted also in southern Sweden (Ericsson 2004).

The outlying-land production in Värmlands län, especially the northern forested part, and Hedmark and other parts of Norway collapsed at various points of time during the 13th and 14th centuries, in some areas somewhat earlier, after centuries of expansion and development of a market economy. The relation to the mid-14th-century disaster is far from obvious although in some areas there may be a close connection. In Hedmark there was land clearance and the establishing of summer farms in the outland. A corresponding expansion in forest grazing is seen also in Dalarnas län, Gävleborgs län and Jämtlands län. The idea is that a general change towards extensive household-oriented farming took place during the 14th and 15th centuries (*cf.* Antonson 2004:206–212, 2009).

As far as there are archaeological data available on farming settlement, these data generally confirm the conventional reconstruction of a medieval agrarian crisis indicated by deserted farms from the mid-14th century onwards. Our data, however, mostly concern outlying-land production, like mass catching and iron production, in forest and low mountain outland. The trajectories of change outlined above, thus, are not to be applied to central farming areas. Nevertheless, they are of importance in understanding the main course of the medieval crisis.

THE NEW ECONOMY AND THE FLEXIBILITY OF OUTLAND USE

The 14th and 15th centuries saw a demographic catastrophe and the breakdown of the social and economic structure. In some areas there was change in the local economy, among other things the establishing of *Bergslagen* in the south-eastern part of the research area and the corresponding industrial development in parts of southern Norway, already well before or just a few decades before 1350. In other areas

the change is closely linked to the crisis and especially the time after the culmination of the crisis, that is, the change was part of the recovery from the crisis.

Notable examples of change in local economies are the increase in bloomery-furnace iron production in Jämtlands län and less conspicuously in Trøndelag, the clearance of corn-producing land and the increase of forest grazing and the establishing of summer farms in Hedmark and Dalarnas län, and the establishing and increase in mining and blast-furnace iron production in the latter area and Gävleborgs län.

In forested land and low mountain land, that is outland, the economy during the Early Middle Ages in Scandinavia was a broad-spectrum economy with local market specialisations and relations to regional markets. The local economies were linked to royal, aristocratic and episcopal elites from an agricultural point of view, and in addition to that to urban centres like Hamar and Trondheim in the Norwegian part of the research area. In the wake of the demographic disaster in the late 14th century the market broke down in parts of the research area, and in some areas the market-oriented production decreased or disappeared. Outlying-land production, however, has an inbuilt flexibility in its broad-spectrum economy. If one kind of production had to be abandoned, other possibilities existed. Outland production is characterised by continuous flexibility and, thus, a readiness for change – and actual continuous change.

There are signs in our data that the outland production in the research area changed according to local demands and boom-periods in the centuries before the 14th century, parallel to a general expansion in population, land use and market economy. During that century, and in most parts of the research area, there was intensification in change. The local economies reacted to the crisis in different ways in different areas: the emergence of a new kind of market economy based on new iron-production technology; the change towards extensive cattle breeding and dairy production; production for the local, developing, mining and blast-furnace industry; or a general re-orientation from a regional market economy to a local household and subsistence economy.

THE MEDIEVAL CRISIS

The course of events that started during the 14th century has been denoted 'the agrarian crisis'. Certainly many farms were deserted and a great deal of arable land was left uncultivated (Myrdal 1999:119–123).

The Black Death was a demographic disaster that triggered downward feedback of social instability and economic stagnation, a classic example of a crisis that eventually was turned into a new start within a new structure (Myrdal 2006).

However, the outlying land and outland production did not see much of a crisis. The many-sidedness in the inland-outland economy offered many different choices when the local economies had to adjust to regional change. The outland production contained flexibility. It functioned as kind of protective net in times of crisis, and so it did when the labour force and market broke down during the medieval crisis.

Farms and arable land were the backbone of medieval society as concerns ownership, identity and prestige. Accordingly, it was tax-paying and bureaucracy, and accordingly, farms and arable land have been the basis for the study and conceptualisation of the changes in the 14th and 15th centuries as an 'agrarian crisis'. In the outland those centuries meant continuous structural change within the frames set by the series of plagues, the development of early industry, and the increasing influence of the royal power and aristocracy. An interesting problem to discuss from other kinds of data than those recorded by us is whether the areas where outland production actually increased during the medieval crisis reflect direction by local and regional authorities in order to compensate for the lost taxes and rents from the deserted farms, or if it was a way for peasants to hide their production in the forests and mountains from the authorities, which turned increasingly repressive during the crisis.

Birgitta Berglund, NTNU, Museum of Natural History and Archaeology,
SAK, 7491 Trondheim, Norway

Katarina Eriksson, Länsmuseet Gävleborg,
Box 746, 801 28 Gävle, Sweden

Ingunn Holm, Museum of Cultural History,
P.b. 6762, St. Olavs Plass, 0130 Oslo, Norway

Håkan Karlsson,
Yttre Heden, 783 90 Säter, Sweden

Jenny Karlsson, Skogsstyrelsen
Hedbygatan 45, 776 33 Hedemora, Sweden

Susanne Pettersson,
Stavsnäsgatan 31, 654 69 Karlstad, Sweden

Anna Sundberg, Kulturmiljö, Länsstyrelsen Gävleborg,
801 70 Gävle, Sweden

Bo Ulfhielm, Länsmuseet Gävleborg,
Box 746, 801 28 Gävle, Sweden

Stig Welinder, Department of Humanities, Mid Sweden University,
871 88 Härnösand, Sweden

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