Shieling or Something Else?

Iron Age and Medieval Forest Settlement and Land Use at Gammelvallen in Ängersjö, Central Sweden

BY MARIE EMANUELSSON, ULLA BERGQUIST, ULF SEGERSTRÖM, EVA SVENSSON & HENRIK VON STEDINGK

Abstract

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The Gammelvallen site in Ängersjö parish, Hälsingland, was studied by a combination of archaeological and palaeoecological methods in order to examine a preliminary interpretation of the site as a medieval shieling. The archaeological investigation indicates that it was a settlement used seasonally. Pollen analysis, loss-on-ignition and radiocarbon dating of a local peat stratigraphy suggest that the site has been used since the beginning of the Late Iron Age, initially for forest grazing, and during the Middle Ages, for cultivation of cereals as well. These results, taken together with archaeological and palaeoecological studies of Ängersjö village, suggest that Gammelvallen was introduced as a shieling in an integrated farm–shieling system at the beginning of Late Iron Age, thus supporting the original interpretation but putting the time of the establishment of Gammelvallen back about 500 years. This paper advocates the strength of interdisciplinary methodology for studies of forest settlement history.

Marie Emanuelsson, Department of Forest Vegetation Ecology, Swedish University of Agricultural Sciences, SE-907 81 Umeå. E-mail: Marie.Emanuelsson@svek.slu.se
Ulla Bergquist, The Cultural Heritage Unit, County Administration of Västmanland, SE-721 86 Västerås. E-mail: Ulla.Bergquist@u.lst.se
Ulf Segerström, Department of Forest Vegetation Ecology, Swedish University of Agricultural Sciences, SE-907 81 Umeå. E-mail: Ulf.Segerstrom@svek.slu.se
Eva Svensson, Institute of Archaeology, Lund University, SE-223 50 Lund. E-mail: Eva.Svensson@ark.lu.se
Henrik von Stedingk, Department of Forest Vegetation Ecology, Swedish University of Agricultural Sciences, SE-907 81 Umeå. E-mail: Henrik.von.Stedingk@svek.slu.se

Introduction

In the forest regions of central and northern Scandinavia, the extensive forests around the villages were important both as land for the establishment of sedentary settlements of secondary character and as resource area in the pre-industrial agrarian society. The forests were used for various purposes, e.g. slash-and-burn cultivation, forest grazing and hay-making; hunting and fishing; production of charcoal and iron. Some of these activities forced people to stay at seasonal or periodic forest settlements for shorter or longer periods of time.

Many of the small forest settlements, e.g. farms, shielings and crofts, that have been abandoned are known by name and location in historical documents, but some are known only as archaeological sites. One of these sites is Gammelvallen – or sometimes Kolsättvallen – on the mountain Frosktjärnsberget in Ängersjö parish in Hälsingland. Archaeological investigations in 1982 and 1985 suggested that the site had been a shieling (Sw. *fäbod, säter*) established in the Middle Ages (Karlenby 1985; Magnusson 1989).[1] Shielings were means of utilizing large forest areas

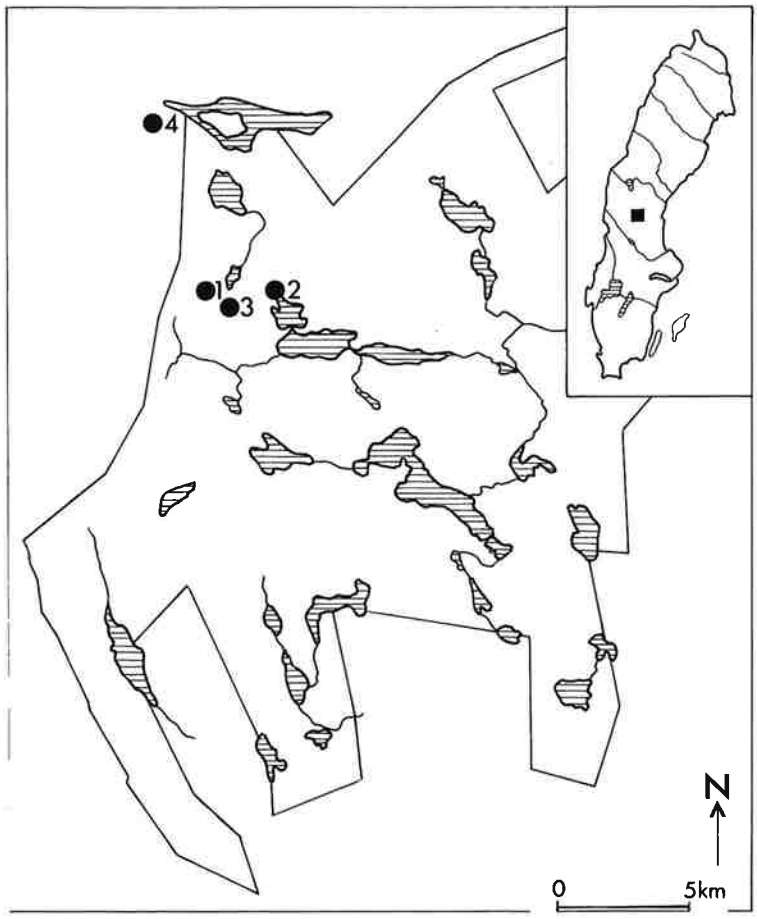


Fig. 1. Ängersjö parish with the places mentioned in the text (solid circles): 1. Gammelvallen on Frosktjärnsberget. 2. Ängersjö village. 3. Halla. 4. Kolsätt in the parish of Ytterhogdal. Inset map of Sweden with the parish of Ängersjö marked with a solid square. Drawing: T. Borstam.

distant from the farms in summertime for grazing, hay-making and occasionally cereal cultivation.

Analysis of this type of archaeological site is seldom straightforward. In this case, the interpretation of Gammelvallen as a shieling was based on three arguments: the name, the location and the type of remains (Magnusson 1989), which may all be questioned. The first argument for a shieling was the name Gammelvallen, used by the local inhabitants of Ängersjö, and which means "the old shieling place". However, the settlement might have been used as something other than a shieling, e.g. a farm, entirely or during periods of its existence (cf. Bladh *et al.* 1992) or the name might be a construction of our days to explain the unknown function of the site. Secondly, Gammelvallen is situated in a "typical shieling location" in the forest. But location is no tenable argument to distinguish between different types of forest settlements, because farms – deserted or not – are found at similar, or sometimes the same, sites as historically known shielings (e.g. Montelius 1975, pp. 35 ff., pp. 120 ff.; Gissel *et al.* 1981; Bladh *et al.* 1992; Emanuelsson & Segerström 1998). The third line of reasoning was that the foundations at Gammelvallen were initially interpreted as small, simple dwelling houses. Yet, dwelling houses are expected to be found at different kinds of seasonal, periodic or sedentary settlements.

The aim of the study was to examine the interpretation of Gammelvallen as a shieling by completing the archaeological investigation and by performing a local pollen analysis. To validate this interpretation, Gammelvallen must be recognized as a seasonal agrarian settlement in contrast to a sedentary agrarian settlement or a non-agrarian

settlement.[2] The combination of archaeological and palaeoecological methods enables us to study both the characteristics of the settlement and the forms of land use. Further, the objectives of the paper are to discuss the following questions: What type of settlement was it and when were the settlement and the land use initiated at the site? What sorts of buildings were found at the site and what kind of land use practices have taken place in the forest around and on the settlement site?

Background and site description

The parish of Ängersjö is situated in the north-western part of the province of Hälsingland in central Sweden (Fig. 1). The region is dominated by a few large and many smaller rivers, running from the north-western mountain area to the east coast. A hilly topography and numerous lakes and mires characterize the landscape. The soil is mainly made up of sandy and silty till, but glaciofluvial sediments are deposited along the valleys (Lundqvist 1969). As part of the southern boreal forest region, pine and spruce are the dominating tree species in the area. Deciduous trees, such as birch, alder and aspen, are also present.

The village of Ängersjö, which is located by the lake Lill-Ängersjön, is the major settlement in the parish, but there are some smaller settlements as well. The parish is, and always has been, sparsely populated, and when the name Ängersjö appeared for the first time in cadastral records for the year 1542, only four peasants were mentioned (Mogren 1996, pp. 88 f.; Wennersten in press). However, the village dates back to Viking Age or early medieval times, according to an archaeological investigation of its infields (Mogren 1996), or even to the Late Iron Age, as indicated by the preliminary results from a pollen analysis from the village (U. Segerström, unpubl. data). Pollen analyses from two lakes in the vicinity of Ängersjö imply continuous impact of animal husbandry from the Early Iron Age in the region (Påhlsson in press).

Gammelvallen (61°59′N, 14°49′E; 490 m a.s.l.) is situated on a plateau of the north-facing slope of the mountain Frosktjärnsberget barely 3 km west of Ängersjö village and fully 1 km from the parish border. It is a registered archaeological site (no. 45 in Ängersjö parish), consisting of a few square-shaped low depressions in the ground. The mire selected for the palaeoecological study lies about 100 m from the nearest depression (Fig. 2). The mire, which is roughly 80 cm deep, is approximately 15 m in diameter and partly covered with trees. Dwarf-shrubs, mosses and sedges are major components of the ground vegetation.

Methods

Archaeology

Gammelvallen has been investigated on several occasions, in 1982, 1985 and 1992–1994, the latter as part of the archaeological project "The Use and Change of a Forest Environment" (Andersson *et al.* 1995; Mogren 1998).[3] The most important issues addressed were the structure, function and dating of the settlement site. For this, an inventory was made of an area of barely 1 hectare, in order to find all visible remains of buildings, fences, cultivation and other activities. Layers of charcoal were located using a soil probe. The excavations were focused on the square-shaped depressions, but some areas without observable remains were also excavated. Radiocarbon analysis was used to date four of the square-shaped depressions and two charcoal layers. At the features, three of the samples for dating were collected from the former ground surface underneath the soil banks around the depressions.

Investigations of this type of archaeological site involve a series of problems. First, during field inventory and ocular examination, there are great difficulties in finding and identifying remains of buildings from the Late Iron Age and the Middle Ages (Svensson 1992; Andersson & Svensson 1997, p. 222), which is, according to the investigations of the village, the most plausible age of Gammelvallen. The problem is pronounced for simple buildings that have neither stone-built fireplaces nor obvious foundations. Next, the area is large and only a part was excavated; features and

activity areas may have been overlooked. Due to the first problem, this is reinforced when the excavation area is chosen. Finally, the area was covered with forest, and although the trees were cut down, tree roots and uprooted trees may have disturbed the ground. Dark layers with charcoal are complicated to interpret; are they remnants from hearths, deliberate burnings to clear the ground, natural forest fires or carbonized tree roots?

Vegetation history

Pollen analysis is one of the most important methods to study the vegetation history, including the land use history, of an area. The method is based on the continuous accumulation of pollen in, for example, peat or lake sediment, over hundreds or thousands of years, and on the correspondence between the vegetation and the pollen assemblage at a given period of time (e.g. Moore *et al.* 1991). Changes in the vegetation, due to natural disturbances or human impact, are indicated in altered pollen assemblages. The size of the represented area is determined by the size of the sampling site (Jacobson & Bradshaw 1981; Prentice 1988). A mire of about 200 m^2, i.e. the size of the mire at Gammelvallen, catches a significant part of the pollen from the wind-pollinated tree species found within a few hundred metres of the mire (e.g. Bradshaw 1988; Sugita 1994; Calcote 1995; Hicks 1998). Pollen from the ground vegetation, e.g. dwarf-shrubs, grasses and herbs, derives from a much smaller area due to its near-ground shedding.

Using a Wardenaar peat sampler (Wardenaar 1987), a 79 cm peat monolith was taken from the mire. The peat core was sub-sampled and analysed for pollen, charcoal and mineral matter. Sample preparation and pollen analysis were per-

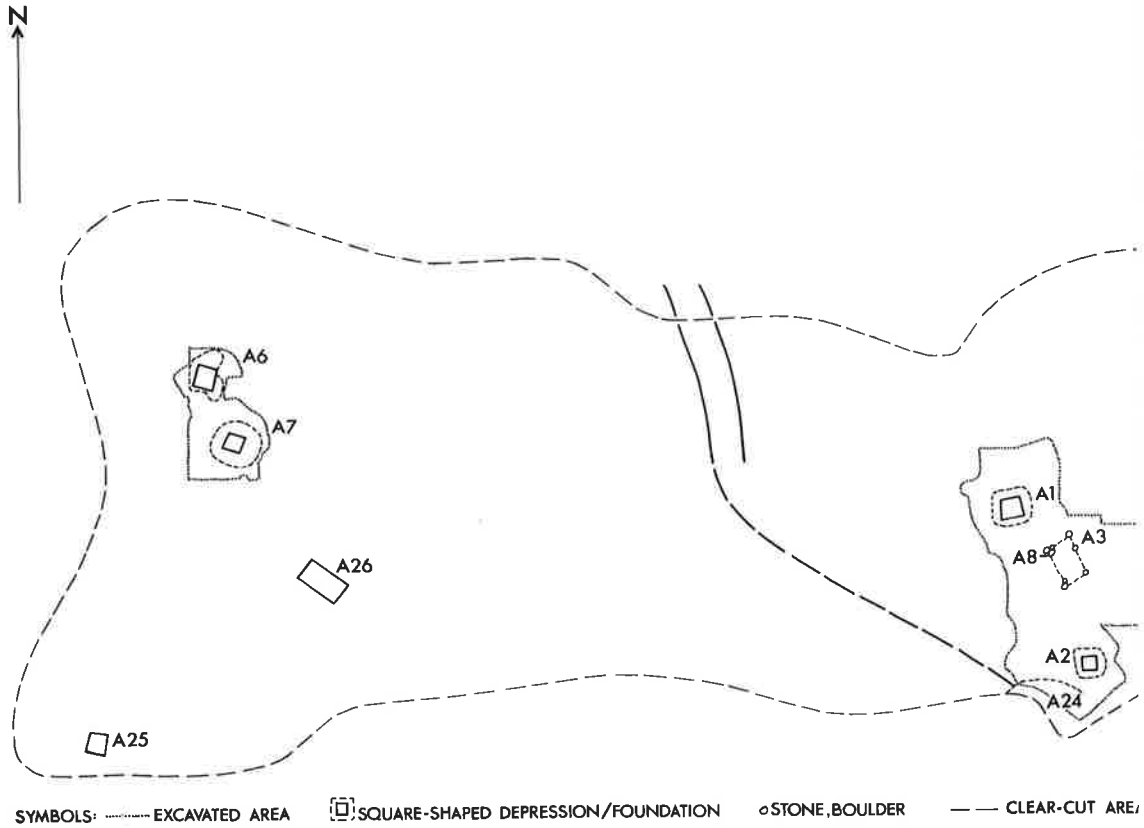
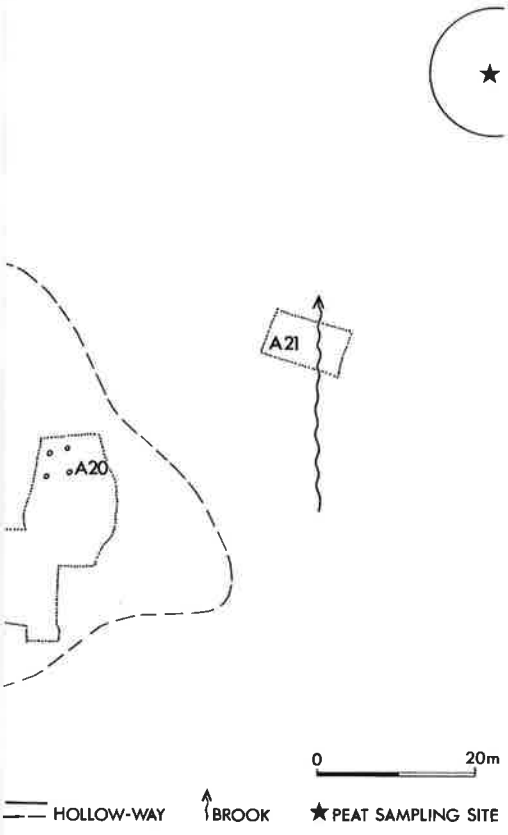


Fig. 2. Mapped and excavated areas at Gammelvallen with the features mentioned in the text. The sampled mire is marked with a star. Drawing: U. Bergquist and T. Borstam.

formed using standard methods (Moore *et al.* 1991, pp. 39 ff.). For the identification of pollen types, the key by Moore *et al.* (1991, pp. 86 ff.) and a reference pollen collection were used. From each sample about 500–700 pollen grains were counted; the percentage frequencies of each pollen type were calculated based on the total terrestrial pollen sum including sedges for each sample, and the results are presented in a diagram. Microscopic charcoal particles were counted in terms of fragments larger than 50 µm and 150 µm respectively on the pollen slides; the size limits were chosen to record charcoal particles of predominantly local or on-site origin (Tinner *et al.* 1998; Pitkänen *et al.* 1999; Ohlson & Tryterud 2000). The percentage of charcoal particles was calculated based on the sum of terrestrial pollen and the number of charcoal particles on each level. The mineral matter component in the peat, and thereby the impact of erosion, was determined using loss-on-ignition analysis. Small peat samples were dried for 12 h as a minimum at 105 °C and exposed for 4 h to 550 °C for organic combustion (cf. Heiri *et al.* 2001). Age determinations were made with ^{14}C analysis of selected bulk and macrofossil samples from the peat. Calibrations of the ^{14}C dates were performed with the programme Calib 4.2 (revised version of Calib 3.0; Stuiver & Reimer 1993).



Results and interpretations

Archaeology

The archaeological site consists of two areas with at least seven house foundations (Fig. 2). The two areas are roughly 100 m apart and a pathway runs between them. Most evident is the northern part of the pathway, where it continues as a hollow-way down the slope. There is a brook with remains of a small dam to the east of the areas. The dam (feature A21) might have been used for cooling milk or other food products (cf. Nyman 1963, p. 71).

Sections of the two areas have been excavated. In the western area, three square-shaped depressions (A6, A7 and A25) and one rectangular depression (A26) are found, whereas there is a stone sill foundation (A3) flanked by two square-shaped depressions (A1 and A2) in the eastern area. The sill was most likely the foundation for a 5.5 × 3.1 m large timbered storehouse, the interpretation being based on the following reasons: the foundation was made up of a few stones instead of a solid sill; there was no hearth in the building; and the floor was raised above the ground. On a small height, which is considered a favourable housing site, there is another, albeit very uncertain, stone sill foundation (A20). If correctly interpreted, it is also a storehouse. The ground between the square-shaped depressions has almost certainly been cleared of stones; it is most obvious in the eastern part of the site where a layer of stones (A24) is found. There are no clear indications of clearance cairns, field areas or terraces. Moreover, occupation layers are absent in the excavated areas with the exception of a charcoal layer in one of the

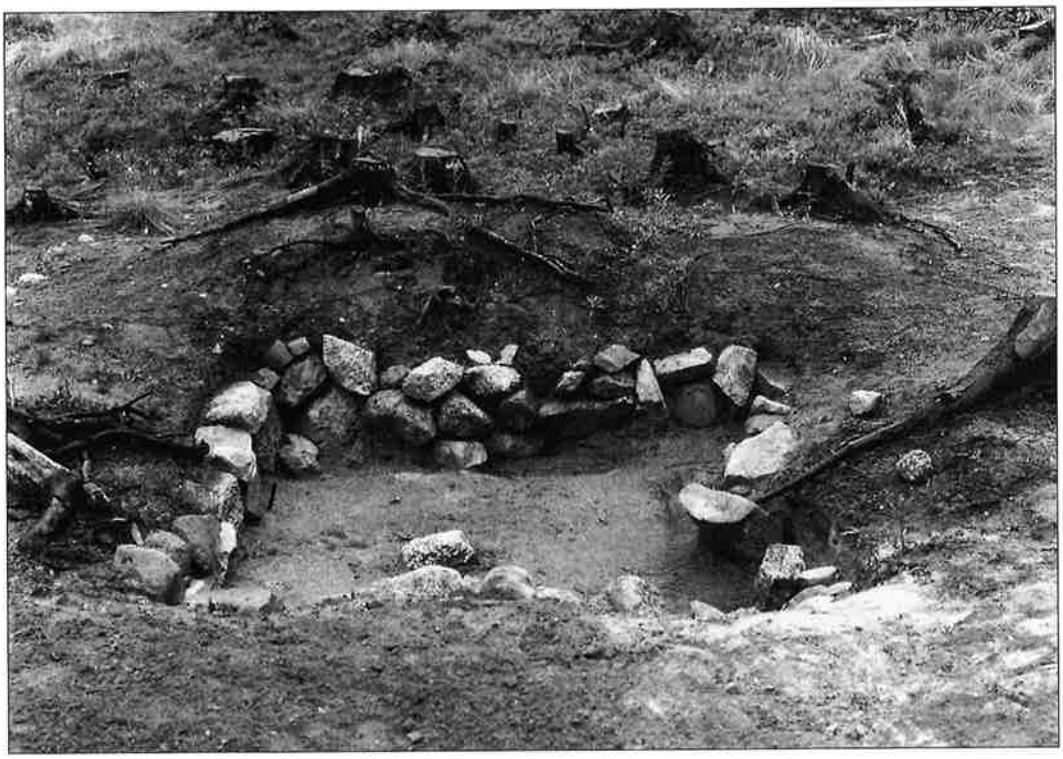


Fig. 3. The foundation A7, which measures 2.3 × 2.1 m internally. Photo: U. Bergquist.

square-shaped depressions (A1). The reasons for absence might be seasonal use; usage during a short time; activities that did not result in cultural layers; waste deposition at another place, for example on cultivated fields or meadows; relocation of the timber buildings; poor preservation conditions; post-settlement fires that consumed the organic matter; or a combination of some of these reasons. The number of finds is also small; only ten items, including three whetstones, one knife blade and two horseshoe nails have been found.

The most obvious constructions are the square-shaped depressions (Fig. 3). These are foundations which have been dug into the ground. Internally they measure between 2.1 and 2.7 m, with a depth ranging from 0.15 to 0.5 m relative to the original ground surface. The soil from the foundations was heaped up around the depressions as low banks of varying width. The construction of the inside walls lining the depressions varies: there are foundations without stones, ones with stones in the corner, and foundations with a complete stone base, built with stones of different size. The constructions are not interpreted as dwelling houses since they are small and lack fireplaces. They might have been small buildings with lowered floors standing by themselves or cellar pits under larger buildings, which are known from other locations in the forest region of central Sweden (Johansson *et al.* 1997, pp. 26 ff.; Mogren 1998, p. 228; Svensson 1998, pp. 111 ff.; S. Nilsson pers. com.). In either case they would have been storing places for milk or other food products (Erixon 1947, pp. 188 f., p. 205; Nyman 1963, pp. 70 f.). However, nothing indicating a large building has been found at Gammelvallen.

The result of the ^{14}C analysis of Gammelvallen is presented in table I. The age determinations, which were carried out on samples taken from the former ground surface under the soil banks (A1, A2 and A7), correspond to the time – primarily the Middle Ages – of the forest clearing for the establishment of the foundations. In the case of

Table I. The ^{14}C dates and calibrated ages from the archaeological excavations of Gammelvallen on Frosktjärnsberget. The analyses were made by the Radiocarbon Dating Laboratory at Lund University (LuA; AMS analysis), the Swedish Museum of Natural History in Stockholm (St; conventional analysis) and the Ångström Laboratory at Uppsala University (Ua; AMS analysis). The calibrations were made with the program Calib 4.2 (revised version of Calib 3.0; Stuiver & Reimer 1993). Age values in parentheses are intercept values.

Laboratory code	*Construction*	*^{14}C age BP*	*Calibrated age AD: intercept and min and max ranges at 2 σ*
St–9504	A1 (square-shaped depression, ground surface under bank)	730 ± 95	1059 (1282) 1410
Magnusson 1989, p. 172	A1 (square-shaped depression, charcoal layer; hearth?)		Younger than 250 years
St-13151	A2 (square-shaped depression, ground surface under bank)	415 ± 95	1325 (1450) 1661
Ua-11023	A6 (square-shaped depression, charcoal layer in the house foundation)	380 ± 80	1408 (1481) 1662
Ua-11022	A7 (square-shaped depression, ground surface under bank)	555 ± 65	1294 (1404) 1447
LuA-4293	A7 (square-shaped depression, ground surface under bank)	1320 ± 90	561 (683) 937
St-10447	A8 (charcoal layer; hearth?)	1100 ± 220	538 (904, 910, 976) 1376

the different dates, 7th to 10th century and 14th to 15th century respectively, of A7, our interpretation is that the oldest one possibly represents the time of the construction and that the younger date might be the time of the restoration of the foundation (cf. Segerström 1995). However, caution is required in the discussion of the age of the settlement due to the discrepancy between these two dates. The date of the charcoal layer in one of the foundations (A6) probably represents the age of the house. Although the charcoal might have been produced when the building was destroyed, it originated from the material, for example, timber logs, that were used for the construction. Therefore, depending on the source of the charred material, the age of the house might be overestimated by some tens or hundreds of years. The dating of two charcoal layers (in A1; A8), at first interpreted as hearths (Karlenby 1985; Magnusson 1989, pp. 171 ff.; cf. Mogren 1998, p. 228), is difficult to evaluate for two reasons: the interpretation is most likely incorrect because the charcoal layers are not associated with any construction; the origin of dated material is uncertain.

In all, Gammelvallen is interpreted as a settlement used seasonally on the basis of the nature of the archaeological remains and the site, which differ from medieval farms in the southern boreal forest region (e.g. Olausson 1985; Olausson 1989; Ekman 1996; Andersson & Svensson 1997; Andersson & Svensson in press). The site was definitely in use in the Middle Ages, but one ^{14}C date indicates that it also was occupied in the Iron Age. No remains suggesting any kind of agricultural land use have been recognized at the site.

Vegetation history

The local vegetation history of Gammelvallen and the forest around the site comprises four major vegetation and land use phases, i.e. pollen assemblage zones identified in the percentage pollen diagram (Fig. 4). The chronology of the vegetation history is based on five ^{14}C dates (Table II) and on the fact that spruce is present in the entire pollen diagram; the development of spruce forests in the region has been dated to *c.* 300 BC elsewhere

Table II. The ^{14}C dates and calibrated ages from the peat sample from Gammelvallen on Frosktjärnsberget. The analyses were made by the Ångström Laboratory at Uppsala University (AMS analysis). The calibrations were made with the program Calib 4.2 (revised version of Calib 3.0; Stuiver & Reimer 1993). Age values in parentheses are intercept values.

Laboratory code	*Depth (cm); type of sample*	*^{14}C age BP*	*Calibrated age AD: intercept and min and max ranges at 2 σ*
Ua-14281	40–41; bulk of peat	55 ± 90	1677 (1952) 1955
Ua-14825	40–41; macrofossil (bog moss)	45 ± 65	1674 (1953) 1955
Ua-14826	46–47; macrofossil (seeds), peat	345 ± 55	1439 (1517, 1597, 1619) 1658
Ua-14827	56–57; macrofossil (bark)	655 ± 60	1264 (1300, 1373, 1377) 1412
Ua-14282	62–63; bulk of peat	1240 ± 55	662 (776) 955

in the area (Engelmark 1978, p. 43; M. Emanuelsson unpubl. data), thus suggesting that the bottom of the present diagram is younger than that.

I. *Closed forest before initiation of human impact around AD 700–900*: The forest consisted mainly of pine, spruce and birch. Juniper, dwarf-shrubs, e.g. bilberry, cowberry, crowberry and heather, buttercups, rose species, ferns and club mosses were present in the forest, while sedges and cloudberry grew on the mire. The high degree of humification of the peat and the frequently occurring decomposed wood layers indicate that the mire was drier than today. Despite the occurrence of a few charcoal particles, the forest appears locally to have been relatively undisturbed by fires. The high portion of tree pollen in the diagram implies a closed forest canopy, i.e. a forest not under any human impact that would be recorded as vegetation changes (cf. Hicks 1988, pp. 190 f., pp. 199 f.).

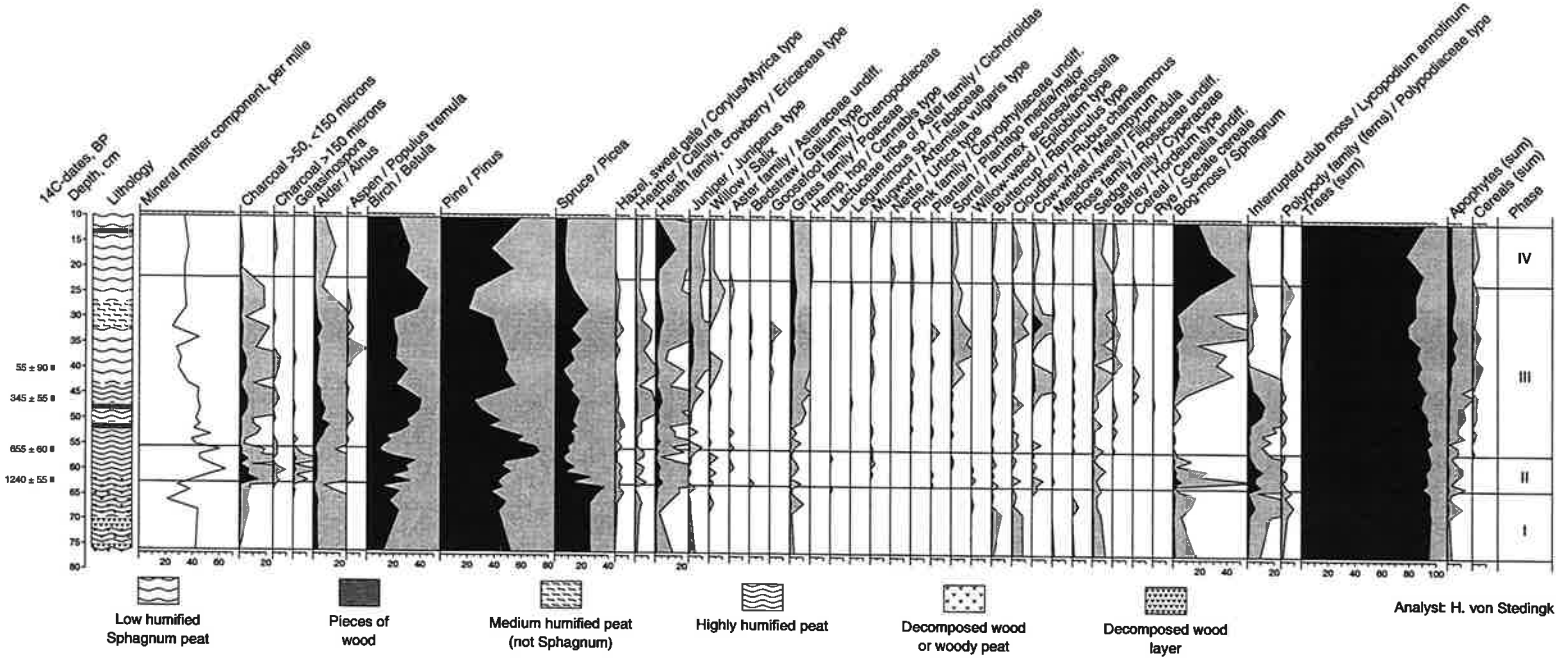
II. *Forest grazing from c. AD 700–900 until c. AD 1300*: Substantial changes took place in the tree species composition around *AD* 700 to 900. The portion of spruce pollen declines while percentages of birch and pine increase consecutively. These changes occur simultaneously with more charcoal particles and the presence of the fungal spore *Gelasinospora*, also indicating fire (type 1; van Geel 1978, pp. 48 f.). The large portion of charcoal particles and the presence of particles larger than 150 µm indicate burning near the mire or burning of a significant area in the surroundings, for example on the archaeological site (Tinner *et al.* 1998; Pitkänen *et al.* 1999; Ohlson & Tryterud 2000). Stratigraphical changes in the peat, such as high proportion of mineral matter and absence of wood remnants, suggest that the erosion from the surrounding terrestrial land increased and that fewer trees were growing on the mire (Moore *et al.* 1986, pp. 209 ff.). The forest canopy was less closed and plants such as dwarf-shrubs, grasses, cow-wheat and anthropogenically favoured herbs, e.g. mugwort, aster species, willow-weed, plantain and sorrel increased or were added to the ground flora of the forest. The changes in the pollen assemblages, as well as in the peat stratigraphy, taken together, suggest that the forest became more open as a result of deliberate burning to improve the pastures and impact from grazing cattle (Behre 1981; Vorren 1986; Hicks 1988; Gaillard *et al.* 1994, pp. 51 ff.; Segerström *et al.* 1996, pp. 44 f.; Bradshaw & Mitchell 1999).

III. *Cereal cultivation and forest grazing from c. AD 1300 until around 1800/1900 (estimated date for the 25 cm level)*: Pollen from barley, and to a lesser extent rye, suggests that cereal cultivation took place at or in the vicinity of Gammelvallen from *c. AD* 1300. This interpretation is based on the very restricted cereal pollen dispersal from small ancient fields surrounded by forest (Segerström 1991; Emanuelsson & Segerström 1998, pp. 87 f.). After about 400 years, arable weeds like

Fig. 4. The percentage pollen diagram from Gammelvallen, Ängersjö. From the left: uncalibrated ^{14}C dates; depth scale in cm; lithology; mineral matter in per mille; charcoal particles >50 µm and >150 µm respectively, *Gelasinospora* and individual pollen and spore types; sum curves of major pollen groups. Black fields represent the percentage of each pollen type and the grey fields represent the 10 × exaggeration of the percentage values. Pollen types that occur in low frequencies and are not relevant for the interpretation have been excluded. Note that only one date (Ua-14281) is given at 40–41 cm.

Gammelvallen, Frosktjärnsberget

Ängersjö, Hälsingland



goosefoot species, e.g. fat hen, are present according to the pollen diagram. These species are considered to grow on manured fields because they require a high amount of nitrogen and regularly cultivated soils (Viklund 1998, pp. 131 ff., pp. 138 ff.). The presence of arable weeds indicates either a change in farming practices – from fields without manuring to manured fields – or a change in pollen dispersal caused by relocation of the fields or a change in the forest usage (cf. Segerström *et al.* in press). As cow-wheat, sorrel and charcoal particles increased and the degree of humification of the peat declined simultaneously with the appearance of goosefoot pollen, these changes rather imply the intensification of the human influence, and thereby suggest improved pollen dispersal from previously manured fields. The impression of increased impact of forest grazing is also strengthened: the fluctuating tree species composition; successively rising portions of juniper, dwarf-shrubs, sorrel and grasses; the presence of mugwort, aster species, bedstraw, plantain and pink family species. These species are favoured by grazing and trampling of animals, dung from cattle and an open forest canopy where light reaches the ground (Behre 1981; Vorren 1986; Hicks 1988; Andersson *et al.* 1993; Gaillard *et al.* 1994, pp. 51 ff.; Lindbladh & Bradshaw 1995, pp. 156 f.; Segerström *et al.* 1996, pp. 44 ff.). Juniper is not grazed by the cattle, and is therefore seemingly favoured by the grazing pressure. Nonetheless, the direct agrarian impact was plausibly only moderate since the overall vegetation changes were minor and the tree species still dominate the pollen assemblage.

IV. *Closing forest from around 1800/1900*: Pine-dominated forest recovered after roughly 1000 years of agrarian land use. The "modern" forest was influenced by logging and forest management practices (cf. Östlund *et al.* 1997, pp. 1200 ff.; Ericsson *et al.* 2000, pp. 233 ff.); importantly, however, there were more dwarf-shrubs, grasses and herbs growing in this forest than before the Iron Age human impact. A few pollen grains of cultivated cereals still occur in the upper part of the diagram, which corresponds to the late 19th and early 20th centuries. This pollen most likely originates from cultivations located at Halla, a permanent settlement established in the early 19th century about 700 m from Gammelvallen, and not from fields at the study site. This interpretation is due to the fact that there is no indication of the existence of Gammelvallen at the beginning of the 19th century according to the enclosure map of Ängersjö from 1813–1815 (Lantmäterikontoret, Ängersjö 4; Ängersjö 6), and that cereal pollen dispersal from a large open cultivated area – in this case Halla – is enhanced compared to the minor cultivations at Gammelvallen (cf. land use phases III above; Vuorela 1973; Hall 1988; Hicks 1998). Pollen dispersal from Halla, which is situated at a slightly higher elevation than Gammelvallen, is also facilitated through the sparsely wooded forests of this time (Ericsson *et al.* 2000).

To sum up the palaeoecological investigation, the agrarian impact has influenced forest vegetation more than 1000 years. The initial Iron Age land use at Gammelvallen was forest grazing, whereas cereal cultivation was added in medieval times. During early modern times, cultivation was carried out on manured fields and forest grazing was intensified.

Discussion

Interpretation: a shieling site

The interpretation of Gammelvallen as a shieling site (Karlenby 1985; Magnusson 1989) is reinforced in this paper. According to the archaeological investigation, Gammelvallen was a seasonal settlement, and the pollen analysis suggests that the area was first used for forest grazing and later for cereal cultivation as well. Hence, it follows that it was a seasonally used agrarian settlement. Nonetheless, a shieling is defined in relation to a farm or village and therefore, the conclusion that Gammelvallen was a shieling must be derived from its relationship to Ängersjö village or some other nearby permanent settlement. If no connection to such a more permanent settlement existed, Gammelvallen might have been a hitherto

unknown type of seasonal agrarian settlement (cf. Andersson *et al.* 1995), for example, used as part of a nomadic system. Still, the medieval origin of the infields of Ängersjö village (Mogren 1996, pp. 97 f.) and the medieval dates of the foundations at Gammelvallen (Table I) make the farm–shieling relation very likely.[4] The interpretation of Gammelvallen as a shieling during the Middle Ages is also supported by the appearance of mapped shielings (Johansson *et al.* 1997, pp. 24 ff.; Svensson 1998, pp. 108 ff.), historical parallels (Nyman 1963) and palaeoecological studies of historically known shielings (Kvamme 1988; Segerström *et al.* 1996; Emanuelsson & Segerström 1998; Olsson 1998; Regnéll & Olsson 1998; Svensson 1998, pp. 108 ff.). However, the usage of a shieling might have been variable over time (e.g. Montelius 1975; Emanuelsson 1997), i.e. Gammelvallen could have been used as a permanent settlement for one or more short periods. This type of short-term variation would be difficult to detect in the archaeological and palaeoecological data.

According to the pollen analysis, forest grazing was initiated at Gammelvallen at the beginning of the Late Iron Age. But was Gammelvallen a shieling from the very start? The Late Iron Age date of foundation A7 is supported by the contemporary human impact, and thereby suggests a settlement from AD 700–900 at Gammelvallen. However, to answer the question above we have to return to the farm–shieling relationship and Ängersjö once more. In this paper, we assume that there was a permanent settlement at Ängersjö from the beginning of the Late Iron Age based on the results of the pollen analysis, i.e. cereal cultivation and animal husbandry (U. Segerström, unpubl. data), although there are no archaeological remains indicating a Late Iron Age settlement. This assumption, together with the probable settlement at Gammelvallen, makes the interpretation of Gammelvallen as a shieling feasible. These arguments also propose the establishment of an integrated farm–shieling system (cf. Mogren 1998, p. 228) in the forest region of central Sweden at the beginning of the Late Iron Age. It is also possible that both Gammelvallen and Ängersjö were Late Iron Age shielings for another permanent settlement in the region. Present-day major settlements in the neighbouring parishes are found within 25 km of Gammelvallen and Ängersjö. This distance is comparable to the distances between villages and historically known shielings (e.g. Frödin 1925, pp. 160 ff.). Nonetheless, this alternative reasoning questions neither the interpretation of Gammelvallen as a Late Iron Age shieling nor the conclusion of the establishment of a Late Iron Age farm–shieling system.

Buildings and land use at a shieling

The shieling Gammelvallen, as interpreted from archaeological and palaeoecological findings, may be compared with historically known shielings regarding their buildings and land use. The usage of land and resources determined what kind of buildings and other constructions were needed at a shieling site. Forest grazing by cattle, and thereby probably also milk production, and cereal cultivation have taken place at Gammelvallen. Therefore, houses and facilities to stall the cattle at night, and for cooling, preparing and storing milk as well as storing grain are expected to be found at Gammelvallen. Constructions for these needs are also found at 19th-century or present-day shielings together with dwelling and cooking houses (Table III). At Gammelvallen, the square-shaped depressions and the dam in the brook are analogous to milk storage and cooling facilities at ethnologically recorded shielings. In these, butter, cheese and other food products could be stored cold in the summer. However, indications of dwelling houses, cooking houses or fireplaces and cowbarn are absent, although one of the areas with high phosphate values may signal the position of a byre (cf. Table III; Linderholm 1998; Bergquist in press). The most plausible reason for the absence of these is that the remnants of the buildings have been overlooked as houses leave no or few observable remains and only a part of the area has been excavated (cf. the section "Archaeology" under "Methods").

There are no indications of hay-making in the pollen diagram from Gammelvallen. Hay-making

Table III. Comparison between general features at historically known shielings (Nyman 1963; Montelius 1975, p. 130) and features found on Gammelvallen according to the archaeological and palaeoecological investigations. Some features are marked as not essential at a shieling site.

A historically known shieling site	*Gammelvallen on Frosktjärnberget*
Several groups of houses	Yes, probably two groups of houses
Dwelling house / house with fireplace	No
Cooking house / fireplace (not essential)	No
Storehouse (storing place for food products)	Yes, five or six square-shaped (or rectangular) depressions; dated
Dam in the brook (cooling facility)	Yes, not dated
Cow-house and/or fences	No, but maybe in areas with high phosphate values (Bergquist in press)
Storehouse (grain or hay) / hay-barn	Yes, one or two stone sill houses
Hay-making area / meadow (not essential?)	? No clearance cairns, but stone-cleared areas around the houses; no hay-making according to the pollen analysis
Cultivated area or field (not essential)	No clearance cairns, terraces etc., but cultivation may have existed in the non-investigated area between the groups of houses; cereal cultivation according to the pollen analysis
Pathway to/from the shieling site	Yes, not dated

on grass meadows at the shieling site would have given rise to higher portions of grass pollen (cf. Segerström *et al.* 1994, p. 192), but the steady and low-percentage frequencies of grass pollen suggest that the area between the two groups of foundations was grazed (Groenman-van Waateringe 1993). These findings agree well with the absence of meadows at the shielings in the easternmost part of central Sweden during the late 19th and early 20th centuries (Frödin 1948, pp. 2 ff.). However, both in Ängersjö parish (Lantmäterikontoret, Ängersjö 4; Ängersjö 6) and in other parts of central Sweden and Norway, grass meadows regularly occurred at historically known shielings (Levander 1943, pp. 244 ff.; Olsson 1998; Regnéll & Olsson 1998; Svensson 1998, pp. 102 ff.). Nor has the sampled mire at Gammelvallen been used for hay-making (cf. Segerström *et al.* 1996; Emanuelsson & Segerström 1998, pp. 85 ff.; Hörnberg *et al.* 1999).

There are no visible remains of cultivation, such as clearance cairns, fields or terraces at Gammelvallen, although cereal cultivation on manured fields has taken place at or close to the shieling site, as indicated by the pollen analysis. The absence of recognizable features may simply be an effect of the farming practice, e.g. small irregular fields, which may have been cultivated with a hoe, intensely manured and harvested with a sickle; this would not result in large clearance cairns or obvious field boundaries or terraces (cf. Gren 1997, pp. 23 ff.; Myrdal 1999, pp. 44 ff.). It may be partly due to the lack of knowledge regarding features of small cultivations at forest locations in central and northern Sweden, since most research in agricultural history has been carried out in southern Sweden (cf. Gren 1997). Other interdisciplinary studies of the forest regions present the same kind of discrepant results (e.g. Kvamme 1988, p. 355; Hörnberg *et al.* 1999; Segerström *et al.* in press; M. Emanuelsson & S. Nilsson unpubl. data). However, discrepancies like these may, when used complementarily, elaborate the interpretations of small-scale cultivations in the forest regions. This type of studies, including Gammelvallen, are also starting to question the general theory of diminishing cereal cultivation and expansion of animal husbandry during the

late medieval agrarian crisis (cf. Gissel *et al.* 1981; Myrdal 1999, pp. 128 ff.). Instead, cereal cultivation was initiated in the Late Middle Ages in the forest regions, though it often occurred in combination with grazing (cf. Holm 1995, p. 151; Segerström 1995, pp. 10 f.; Emanuelsson & Segerström 1998, pp. 88 f.; Regnéll & Olsson 1998, pp. 67 ff; Svensson 1998, pp. 118 ff., 129 ff.; Segerström *et al.* in press).

Conclusion

A combination of archaeological and palaeoecological methods has proved to be necessary to examine an archaeological site as Gammelvallen (cf. Kvamme 1988; Svensson 1998b). In applying an interdisciplinary methodology, the interpretation has been elaborated, partly due to complementary results, partly due to discrepant results. The integration of two disciplines, however, is not only a matter of putting together the results, but is also the joining of two ways of studying and understanding history. In so doing, the history of Gammelvallen may be read like this: it was introduced as a shieling in an integrated farm–shieling system at the beginning of Late Iron Age, thus supporting the original interpretation but putting the time of the establishment of Gammelvallen back about 500 years. The initial forest grazing continued throughout the Middle Ages and early modern times. The dung from the grazing cattle was used for cereal cultivations from the Late Middle Ages, which challenge the general view of decreasing cultivations during the late medieval crisis. The lack of grass meadows at the shieling site does not correspond to the conditions at historically known shielings in the region, but on the other hand, the remains of buildings at Gammelvallen have analogous facilities, e.g. milk storage, at the shielings.

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Notes

1. The chronological periods are used as follows: Iron Age 500 BC–AD 1050; Early Iron Age 500 BC–AD 550; Late Iron Age AD 550–1050; Viking Age 800–1050 AD; Middle Ages AD 1050–1520; Late Middle Ages AD 1350–1520; early modern times AD 1520–1700.
2. In this paper, we use the words *agrarian* and *agriculture* for cereal cultivation, hay-making and forest grazing, irrespective of whether the activities were carried out separately or in combination with each other.
3. The archaeological investigation is more thoroughly described by Bergquist (in press).
4. The following discussion will concentrate on Ängersjö village because of the knowledge of its agricultural history (Mogren 1996; Påhlsson in press; U. Segerström unpubl. data). However, Gammelvallen may have been used by some other village, e.g. Kolsätt which is located about 6 km north of Gammelvallen (cf. the name Kolsättvallen) or by farms in two or several villages (cf. Montelius 1975; Svensson 1998).

Archive

Lantmäterikontoret, Östersund

Personal communication

S. Nilsson, Department of Geography and Tourism, Division for Social Sciences, Karlstad University.

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