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A Deposition of Bark Vessels, Flax and Opium Poppy from 2500 BP in Sallerup, Southern Sweden

Abstract

This paper presents the results of palaeoecological and archaeological analyses of material from an excavation near Malmö, southern Sweden. The presentation focuses on a pit in a waterlogged area that contained well-preserved bark vessels and plant remains. Opium poppy and bundles of flax, the most conspicuous organic remains, were radiocarbon dated to about 2500 ^{14}C-yrs BP. A short compilation of other early finds of flax, that concentrates on flax in wetland depositions, is presented. The results of the pollen and plant macrofossil analyses indicate that the pit was located within a habitation area. This interpretation is supported by the finds of contemporaneous long-houses and cremation burials close to the pit and several arguments for a ritual deposition are proposed.

Introduction

Throughout Scandinavian prehistory there was a tradition that, when watery locations served as sacred places, humans tried to establish contact with deities or other supernatural powers through offerings and sacrifices (*e.g.* Stjernquist, 1963 ; Levy, 1982 ; Johansen, 1993 ; Karsten, 1994). The remains of these acts have often been found in connection with peat cutting, without any previous archaeological investigation. Although a full insight into prehistoric religion is impossible, we may elucidate some aspects of religious acts by studying prehistoric deposits in wetlands. Such archaeological material is normally quite variable and not only may pottery, flint, or metal artefacts be preserved, but also organic material. The latter is dominated by animal bones, represented by complete or incomplete skeletons. Finds of seeds, pollen and insect remains may provide important additional information. Taking this complexity into consideration, there is a need for interdisciplinary collaboration. Palaeoecological studies, osteological analyses, and wood analysis play an important role in the interpretation of the data presented here.

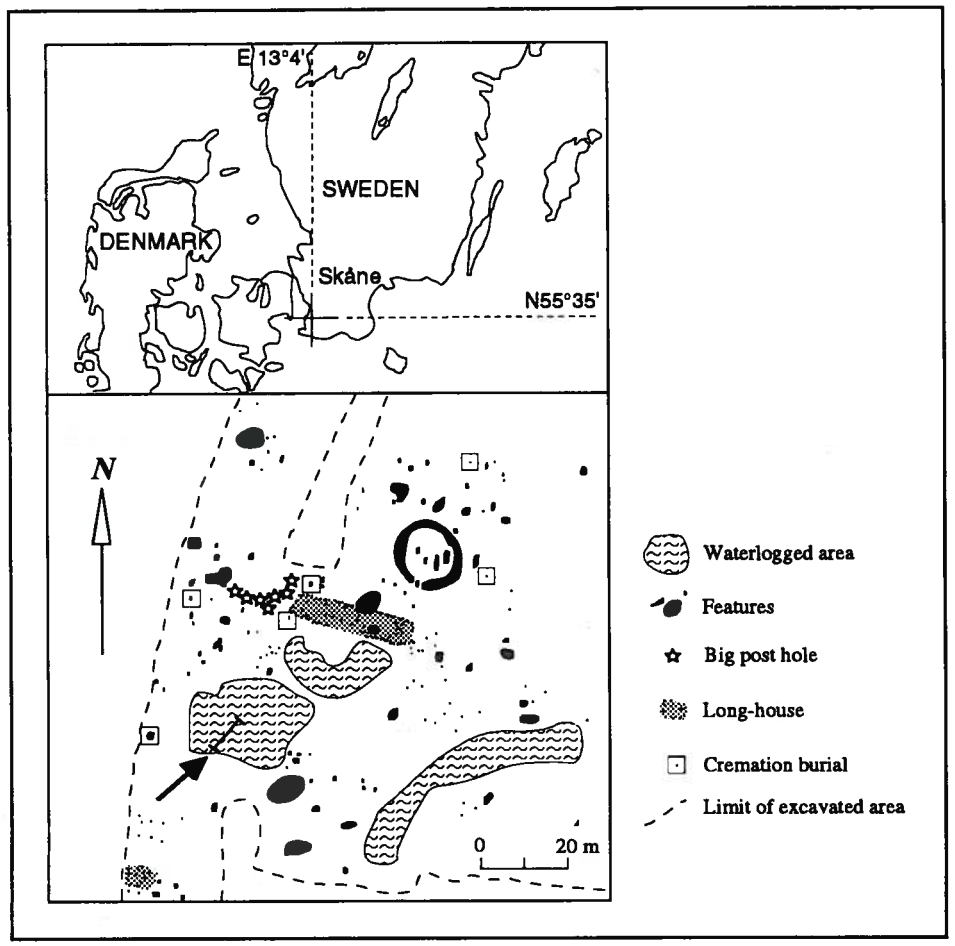

Fig. 1. Part of the excavated area and its position in southwestern Skåne. The position of the transect of feature 90 shown in Fig. 2 is indicated by the arrow.

Archaeological investigation

The site

During an excavation in 1991 in the parish of Södra Sallerup, southwestern Skåne, a pit with well-preserved organic material was investigated (Fig. 1). It was situated in a region on the boundary between the clay plain and the hummocky landscape that was previously known to be rich in prehistoric remains, *e.g.* the only known flint mines in Sweden (Rudebeck, 1986). Preliminary results of an earlier excavation in the area, where some thirty wickerwork pits have been found in a waterlogged depression, implied that the wetlands were used in ritual contexts. In and around these pits

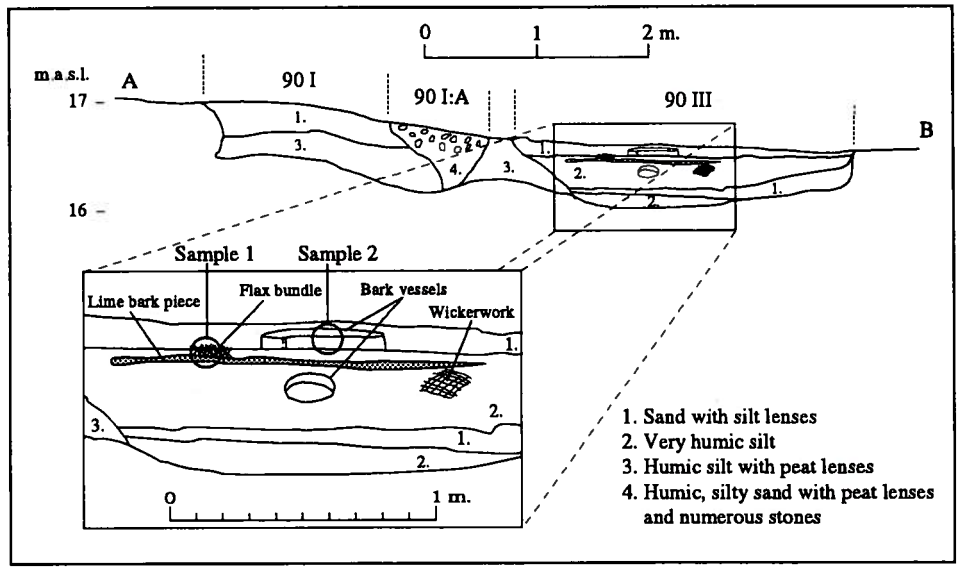

Fig. 2. Detailed section of feature 90 that illustrates the finds and the situation of the samples discussed in the text.

several wooden artefacts, flint implements, and bones (both animal and human) were found (Lindahl Jensen, in progress).

During the 1991 excavation, removal of the top-soil revealed several archaeological features, as well as three waterlogged areas, that were not visible from the surface. Among the features were pits from the Funnel Beaker Culture, pits and cremation burials from the Late Bronze Age, longhouses from the Early Iron Age, and seven very large stone-set post holes that were not apparently part of any house construction.

The feature

During the search for archaeological features in the waterlogged areas, between 0.3 and 0.5 m of the humic deposits were removed (Fig. 2). In the sand below these humic deposits in one of the areas an oval-shaped feature, about 6 x 3.5 m, was found. The high ground-water table complicated the archaeological investigation of this feature and a water pump had to be constantly used. On one occasion a small sand-slide revealed a large piece of bark and, just above it, a bark vessel. The vessel was carefully recovered, using plaster of Paris bandage, and was investigated further in the conservation laboratory at Malmö Museums.

The finds and the layers distinguished (Fig. 2) indicate several activities. Initially, an oblong pit was dug into the sand or, alternatively, a natural waterhole was enlarged. Later, two smaller pits were dug within the first one.

The pit in the centre (feature 90 I:A) contained only a few artefacts, among other things a flint dagger or spear. The other pit (90 III), located to the north, comprised several finds, many of which were composed of organic material.

The bark vessel was found in the uppermost sandy layer of 90 III. The vessel is approximately 0.5 m in diameter and its preserved height is 0.06 m. The sediment in the bottom of the vessel was sampled for pollen analysis and a large piece of lime bark (*Tilia sp.*), 1.5 x 0.4 m, was found in the layer under the vessel. This bark was radiocarbon dated to 2480 ± 60 BP (Lu-3639). On the bark, beside the vessel, a bundle was found, that later proved to be flax and gave a radiocarbon-date of 2550 ± 60 BP (Lu-3638). Just beneath the bark a second vessel, in very bad condition, was found, and wood analysis showed that this vessel was made of lime bark. On the inside of the sewn joint there was a resin packing. A wickerwork object in extremely bad condition was found in the same layer as the lime bark vessel. It almost looked like a folded straw mat and unfortunately it was impossible to conserve. Other wooden materials from this feature (90 III) were several pointed hazel stakes (*Corylus avellana*) and two objects of Pomoideae (*Crataegus, Malus* or *Sorbus*).

A preliminary analysis of the bone material from the pit, indicated that it originated from cattle and sheep/goat.

The pit (90 III) also contained pieces of pot sherds with rusticated or smooth surfaces, one bottom piece with carbonised food remains, and sherds with nail/finger imprints. This type of decoration, the so called B-group, was common during the Late Bronze Age. Through excavations at Fosie IV in Malmö, it has been possible to date this type of pottery to period V-VI of the Bronze Age or to the beginning of the Pre-Roman Iron Age (Björhem and Säfvestad, 1993). Flint and stone implements found in the feature consisted of flake scrapers, a burnt hammerstone and six quartzite millstones. Finally, burnt clay, charcoal, insects and hazelnut shells were encountered during the excavation.

In connection with a new excavation in 1992, east of the above mentioned area, it was possible to examine the rest of the waterlogged areas. Another pit found in the sand contained a hollowed tree trunk, planks, stakes and two more wood or bark vessels.

Archaeobotanical analysis

The aim of the archaeobotanical investigation was to obtain a picture of the local vegetation and land-use at the time of deposition, and to provide information about the possible role of plants in the act of deposition.

Two samples were taken during the excavation (Fig. 2 and Table I). Sample 1 was taken close to the flax bundle and analysed for pollen and macro-fossils. Sample 2 was taken from the dark deposit in the bottom of the uppermost bark vessel and was analysed for pollen only. The chemical and physical pretreatment of the samples followed standard procedures (Berglund and Ralska-Jasiewiczowa, 1986; Wasylikowa, 1986).

In spite of the large number of pollen taxa identified, many pollen grains could not be identified because of their very bad preservation. Unidentified pollen grains were not counted as in many cases it was difficult to distinguish them from other types of plant detritus. A rough approximation is that the unidentified pollen grains made up 20 % of the pollen sum although this is not believed to affect the general interpretation of the palaeoenvironment.

The preservation of macro-fossils, mostly seeds, was good. None of the seeds were carbonised.

The results of the archaeobotanical analyses are presented in Table I, and the interpretation of the vegetation and land-use history is presented below.

At the time of deposition the landscape surrounding the pit was open with very few trees. Some alder (*Alnus*) grew in wet hollows in the area as is indicated by the pollen, but probably not close to the pit as no macro-fossils were found. Single birches (*Betula*) may have been present in the vicinity. This open landscape was the result of intense land-use, which is indicated by the large number of human-impact indicators.

High pollen percentages of grasses (Poaceae undiff.) and ribwort plantain (*Plantago lanceolata*) indicate extensive grasslands. Because of the limitations of the pollen data, and because of the fact that meadows and pastures are often combined, it is not possible to be more specific about the use of these grasslands. The macro-fossil spectra do not help to clarify this relation. Regardless of the ratio between pastures and meadows, extensive grasslands are evident and thus, also, the importance of domestic livestock.

Arable fields were also present in the area. This land-use is indicated by the wide range of pollen and macro-fossils of plants commonly found as weeds in arable fields. The cultivated plants are weakly represented in the pollen spectra which is normally the case, as all cereals, with the exception of rye (*Secale cereale*), are weak producers and poor dispersers of pollen. Some pollen of the *Avena-Triticum* group (*sensu* Andersen, 1979) indicate the cultivation of wheat (*Triticum*) or, less probably, oats (*Avena*) not far from the pit. Some barley (*Hordeum*) was probably also cultivated. No cereals were encountered in the macro-fossil analysis.

Carbonised cereals, as well as carbonised seeds of other plants, are often found in samples from prehistoric settlements. Their presence is commonly

TABLE I. POLLEN AND MACRO-FOSSILS FROM FEATURE 90 III. SAMPLE 1 WAS TAKEN CLOSE TO THE FLAX BUNDLE AND SAMPLE 2 WAS TAKEN INSIDE THE BARK VESSEL (SEE TEXT). THE TAXA ARE DIVIDED INTO ECOLOGICAL GROUPS AND PRESENTED IN ALPHABETICAL ORDER WITHIN THESE GROUPS. POLLEN PERCENTAGES ARE BASED ON TOTAL POLLEN SUMS. N = THE NUMBER OF POLLEN OR MACRO-FOSSILS OF EACH TAXON COUNTED.

Taxa	Pollen Sample 1		Pollen Sample 2		Macrofossils Sample 1
	n	%	n	%	n
Trees					
Alnus	46	5.5	44	7.5	
Betula	29	3.5	23	3.9	
Carpinus	1	0.1			
Fagus			3	0.5	
Fraxinus	1	0.1	1	0.2	
Pinus	52	6.2	45	7.6	
Quercus	3	0.4	7	1.2	
Rosaceae cf. *Sorbus*			1	0.2	
Tilia	7	0.8	2	0.3	
Ulmus			1	0.2	
Shrubs					
Corylus	34	4.1	26	4.4	
Salix			1	0.2	
Plants of fresh meadows and pastures					
Anthemis type	5	0.6	4	0.7	
Campanula type	1	0.1			
Fabaceae undiff.			2	0.3	
Plantago lanceolata	52	6.2	26	4.4	
Polygonum bistorta type			5	0.8	
Potentilla type	1	0.1	5	0.8	
Ranunculus type			3	0.5	
Rhinanthus type	2	0.2	3	0.5	
Rumex acetosa					11
Rumex acetosella					8
Rumex acetosalacetosella	37	4.4	11	1.9	
Scabiosa			1	0.2	
Silene dioica					1
Stellaria graminea					2
Trifolium type	3	0.4	4	0.7	
Vicia type	1	0.1			
Vicia cracca type			2	0.3	
Plants of arable and ruderal land					
Artemisia	72	8.6	20	3.4	
Capsella bursa-pastoris					3
Chenopodiaceae	68	8.2	37	6.3	80
Chenopdium cf. *album*					211
Hornungia type	2	0.2	4	0.7	
Plantago major	4	0.5	4	0.7	
Polygonum aviculare	8	1.0	4	0.7	58
Polygonum convolvulus					2
Polygonum lapathifolium					26
Polygonum persicaria type	2	0.2	5	0.8	
Potentilla cf. *reptans*					1
Scleranthus			1	0.2	
Silene vulgaris					1
Sinapis type	4	0.5	9	1.5	

Taxa	Pollen Sample 1		Pollen Sample 2		Macrofossils Sample 1
	n	%	n	%	n
Solanum nigrum					7
Stellaria media					8
Thlaspi arvense					3
Urtica	2	0.2	1	0.2	
Urtica dioica					2
Cultivated plants					
Avena-Triticum group	12	1.4	2	0.3	
Cerealia undiff.	6	0.7	2	0.3	
Hordeum group	1	0.1	5	0.8	
Linum usitatissimum			1	0.2	22
Papaver somniferum					21
General apophytes					
Apiaceae	35	4.2	4	0.7	
Caryophyllaceae undiff.	10	1.2	7	1.2	
Cenaturea nigra type	6	0.7	7	1.2	
Chamaenerion angustifolia type	1	0.1			
Galium type			1	0.2	
Liguliflorae	78	9.4	65	11.0	
Poaceae undiff.	191	22.9	131	22.2	54
Rosaceae undiff.	1	0.1	11	1.9	
Rumex undiff.					6
Tubuliflorae undiff.	8	1.0	6	1.0	
Forest plants					
Rubus idaeus					2
Stachys sylvatica type	5	0.6			
Plants of wetlands					
Carex cf. *elongata*					66
Carex cf. *paniculata*					5
Cyperaceae	17	2.0	29	4.9	
Filipendula	18	2.2	10	1.7	
Galium palustre					1
Lycopus europeus					1
Mentha type	6	0.7			
Menyanthes trifoliata			1	0.2	
Potentilla palustris					3
Ranunculus sceleratus					4
Scrophularia nodosa					1
Solanum dulcamara					16
Typha latifolia	1	0.1	1	0.2	
Valeriana officinalis			1	0.2	
Aquatic plants (and animals)					
Daphnia ephippia					46
Potamogeton sp.					1
Ranunculus sect. *Batr.* cf. *peltatus*					7
Spores and charcoal (excl. from the sum)					
Equisetum	3		3		
Lycopodium annotinum			1		
Polypodiaceae undiff.	5		6		
Polypodium vulgare	1		1		
Pteridium aquilinum			4		
Sphagnum	2				
Charcoal > 25m	265		158		
Sum	833		590		680
Number of taxa	44		54		32

explained by the use of fire to facilitate threshing or that the seeds were accidentally dropped into fire places. Carbonised plant remains are most often found in rubbish pits. The absence of any kind of carbonised plant remains, other than a few pieces of charcoal, gives the impression that « normal » settlement activities, including threshing and the unintentional dropping of seeds into fire places, have not taken place adjacent to the pit in question.

The cultivated plants flax (*Linum usitatissimum*) and opium poppy (*Papaver somniferum*) are represented by macro-fossils but not by pollen (except for one pollen of flax). The absence of their pollen may indicate that these plants grew elsewhere and were brought to the pit and deposited by humans. However, Hall (1994) showed that very few pollen of flax may be found at distances more than one metre from a field where flax is grown and Gennard (1985) showed that this may be the case even within such a field. Therefore the local cultivation of flax close to the pit cannot be excluded. The absence of opium poppy in the pollen spectra may reflect the local absence of the growing plant, or it may be the effect of bad pollen preservation, which makes the identification of this pollen type difficult.

Plants of wetlands are represented by 6 taxa in the pollen analysis, and by 8 separate macro-fossil taxa. The strong representation of wetland plants (as well as the presence of some aquatic organisms) among the macro-fossils indicates that the pit was water-filled for some part of the year.

The pollen spectra from samples 1 and 2 are quite similar. Some pollen taxa are more frequent in the bark vessel, for example Rosaceae undiff. and Cyperaceae, while some are more frequent outside it, for example Apiaceae, *Rumex acetosa/acetosella*, *Artemisia* and Chenopodiaceae, but these differences are relatively small. Therefore no valuable information can be gained about possible contents intentionally placed in the bark vessel at the time of deposition. The similarity between the two pollen spectra indicates that pollen was deposited in the bark vessel some time after deposition, which means that it had no lid or any other kind of cover.

When the results of pollen and macro-fossil analyses are summarised and compared, it is possible to gain some information about the location of the pit within the cultural landscape. The high percentages of, for example, grass pollen indicate the existence of grasslands in the vicinity. However, there are also relatively high percentages of pollen and very high amounts of macro-fossils, that indicate the presence of nearby arable and ruderal land. This makes a location in a pure grazing area, such as an outfield, unprobable. Pollen of wheat/oats and barley indicate the presence of arable fields, but the percentages of these pollen types are not high enough to prove a location within an arable field. The taxa defined as plants of arable and ruderal land in Table I may reflect weeds in arable fields, or plants growing on ruderal land (for example the habitation area surrounding houses). If the pit was located in the habitation area, the absence of ordinary rubbish (for example charred seeds) is surprising. However, it is known from ethno-archaeological sources that the area around houses may be strictly organised, with different places for threshing, cooking, ritual activities, and so on. In summary, the most plausible interpretation is that the pit was located in a special and « silent » corner of the habitation area, with grasslands and arable fields in the vicinity.

Early finds of flax and opium poppy

Flax

Swedish prehistoric finds of flax were for a long time restricted to the Iron Age. Recently, however, finds of flax dated to the Bronze Age have been made. Single finds of flax pollen from a bog outside Stockholm have been dated to the Late Bronze Age (Karlsson *et al.*, 1995). From a settlement dated to 900-500 BC at Vistad in Östergötland, a carbonised seed of flax was found in a post-hole (T. Larsson, 1993). In a storage pit in Skummeslöv, Halland, seeds were found and dated to the Late Bronze Age/Early Iron Age (E.-L. Larsson, 1993). At Valtersberg, Bohuslän, flax seeds were found that were dated to the Pre-Roman Iron Age (E.-L. Larsson, 1989). In Denmark the oldest find of flax is represented by a seed imprint in pottery, dated to the Bronze Age (Helbæk, 1958, 1959). Flax found in the stomach contents of bog bodies, as well as other Late Bronze Age and Early Iron Age flax finds from Denmark have been summarised by Robinson (1993).

Overall, these finds indicate that flax was used in southern Scandinavia from the Late Bronze Age. Thus the flax found in Sallerup reflects the deposition of a newly introduced plant.

Bundles of flax are rare in archaeological contexts, and only five finds in Scandinavia have been published so far (Table II). One of these finds, the Bokarn find, is not satisfactorily dated. Isberg (in Lundholm, 1947) dated this find by pollen analytical correlation with a small bog 30 km south of Bokarn called Kungshamnsmossen (Granlund, 1931, 1932). As already pointed out by Granlund (1931), the Kungshamnsmossen diagram is too local to be used for establishing a regional chronology of the vegetation history and should not be used for detailed dating purposes. Furthermore, by means of radiocarbon-datings, Ekström (1993) has proved that several of Isberg's pollen analytical datings from other sites are incorrect. The dating of the Bokarn find may therefore be regarded as uncertain.

The finds of flax bundles presented in Table II were all made in wetlands and always in combination with pottery, bones or wooden implements. It is also worth mentioning the frequent association with stones, often in heaps.

TABLE II. FINDS OF SCANDINAVIAN PREHISTORIC FLAX BUNDLES DEPOSITED IN WETLANDS. PRIA = PRE-ROMAN IRON AGE, MP = MIGRATION PERIOD, BA = BRONZE AGE, IA = IRON AGE, RIA = ROMAN IRON AGE.

Site	Context	Dating	Reference
Førlev Nymølle, Jutland, Denmark	Anthropomorphic trunk, animal bones, potsherds and wood implements on stone heap	PRIA	Becker, 1972
Fjaltring, Jutland, Denmark	Pots around stone pavement	MP	Becker, 1972
Bokarn, Uppland, Sweden	Human and animal bones on wooden platform	BA(*)	Lundholm, 1947
Hedenstorp, Småland, Sweden	Wooden implements on stone heap	IA	Oldeberg, 1959
Käringsjön, Halland, Sweden	Pots, wooden implements and stones on wooden platform	RIA	Arbman, 1945

(*) Uncertain dating. See text for discussion.

Ritual deposition was regarded as the most plausible interpretation in all cases.

We may now add the Sallerup find to the five wetland finds of flax mentioned above. As in all cases where flax has been found in watery locations, this find may be interpreted as indicating intentional retting of flax stems, later to be further processed for their fibres. However, since capsules were found together with the bundles, the flax does not seem to have been rinsed before deposition. Also the relatively small size of the pit argues against retting. Ethnographic documentation, as well as « modern » traditions, imply that fresh circulating water is an important requirement when flax is retted, and a closed water hole is not suitable for this purpose (Körber-Grohne, 1988).

Opium poppy

From the European continent opium poppy is known from the Neolithic and onwards (*e.g.* Knörzer, 1971 ; Gluza and Wasylikowa, 1977 ; Küster, 1991). The oldest finds from Scandinavia are from Lodbjerg, northern Jutland, Denmark (Jensen, 1985), and from Skottorp, Halland, Sweden (Karin Viklund, pers. comm.), both dated to the Pre-Roman Iron Age. The find from Skottorp may be somewhat older but not younger. Except for these finds, opium poppy in Scandinavia has, so far, only been reported from Medieval times.

It has not been proved that the drug opium was used during prehistoric times. However, the Romans are known to have used it to induce sleep

(Renfrew, 1973). Besides being the well-known source of narcotic substances, opium poppy produces seeds which do not contain opiates but that have a very high oil content - over 50 %. The oil may be used for cooking or for fuel in oil lamps. Finds of opium poppy seeds lumped together as a cake in a lake-side settlement in Switzerland, may have been pressed for oil (Heer, 1866, in Renfrew, 1973). It is not possible to tell if the opium poppy seeds in the Sallerup find originated from nearby intentionally grown crops, or were accidentally harvested as a weed. Considering the very rare contemporary finds from Scandinavia, it is probable that opium poppy was imported and was not grown here at that time.

CONCLUSIONS

The Sallerup find, together with recent finds, clearly shows that flax was introduced to southern Scandinavia during the Late Bronze Age.

Several authors have discussed in detail how to decide whether a deposition is ritual or not, and a classification of ritual depositions and other religious acts has been presented by Hultkrantz (1973). To open this discussion is beyond the scope of this paper, but we would like to present a few arguments for the interpretation of the Sallerup find as a ritual deposition :

1. The deposition of pottery in wetlands is a well known phenomena of the Neolithic, Late Bronze Age and the Early Iron Age (Becker, 1972). The pottery may have served as containers for offerings and we can assume that the bark vessels in Sallerup were used in a similar way.
2. Two pits with two wood or bark vessels in each were found on the site. Therefore, the deposition must be seen as a repeated act.
3. No traces of stabilizing constructions like planks or wickerwork were found even though the preservation conditions for organic material were good. In spite of this, the edge between the loose sand in which the pit was dug, and the sediment deposited in the pit, was sharp and undisturbed. If the pit was a well, dug in the sand to ensure a daily supply of fresh water, some stabilizing constructions would probably have been necessary, and if it was a waterhole for animals the edges would have been trampled down.
4. Hammer- or millstones are commonly found in ritual contexts (Stjernquist, 1989 ; Svensson, 1993 ; Karsten, 1994). In feature 90 seven hammer- or millstones were found.
5. No carbonised grains or weeds, and only small amounts of flints and potsherds, were found in the pit. This, together with the fact that the wooden artefacts and the flax bundle seem to have been arranged in a special way (Fig. 2), contradicts a rubbish-pit interpretation.

6. The pit is regarded as too small to have been made for the retting of flax stems.
7. The flax and opium poppy found in the pit represent some of the earliest finds of these plants in southern Scandinavia. They can thus be considered as rather « exotic » at the time of deposition, and may have been used to provide an intentional uniqueness to a ritual act.
8. The flint dagger found in feature 90 I:A (typologically dated to Late Neolithic/Early Bronze Age) indicates that the waterlogged area has been used for ritual purposes for a long period of time.

To visualize feature 90 in the ritual landscape, we have to consider that remains of house constructions and cremation burials were found in its close vicinity and dated to approximately the same period (Fig. 1). When the palaeoenvironmental interpretation, based on pollen and macro-fossil analysis, is also considered this gives the impression of a local sacred place, an integrated part of a settlement.

Finally, we would like to emphasize the benefits of interdisciplinary collaboration for the investigation of waterlogged areas. The Sallerup example shows that much information can be gained even from one single feature with such an approach.

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Pact 50 - III.9 : Sven Karlsson, Jonas Björck, Bengt Elfstrand, Jan Risberg and Per Sandgren

Vegetational History and Human Impact as Recorded in the Bog Älgpussen, Eastern Sweden

Abstract

The bog Älgpussen is situated approximately 30 km southwest of Stockholm. It occupies a small depression, originally a kettle hole. The bog is surrounded by hilly glaciofluvial deposits. The isolation threshold has been levelled to 24.5 m a.s.l.

A 400 cm long core has been analysed with regard to pollen stratigraphy and siliceous microfossils, combined with measurements of organic carbon and mineral magnetic parameters. Also six tandem accelerator datings were carried out.

The results show that the sequence analysed covers the last 8000 radiocarbon years. A Litorina 4 transgression is detected around 3500 BP and the basin was isolated 2900 BP.

The vegetational development shows a forested area dominated by *Pinus* and *Betula* until 4300 BP. The first evidence of human impact is recorded around 4300 BP as a clearance of the forest combined with cattle breeding and at approximately 2900 BP the cultivation of *Hordeum* and *Triticum* starts. Single finds of flax pollen dated to 2800 BP, the oldest dated find in Sweden so far, and to 1800 BP indicate cultivation in the immediate surroundings of the bog. Archaeological excavations in the vicinity have revealed finds from the Late Neolithic onwards.

INTRODUCTION

Palaeoenvironmental investigations have been carried out at a small bog called Älgpussen, situated *c.* 30 km southwest of Stockholm, Sweden (Fig. 1). The site is located within a Nature Conservation area called « The River Moraån valley » (Fig. 2).

The aim has been to study the environmental changes and human impact in the surroundings of Älgpussen during the last 8000 years. Archaeological