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INDHOLD/CONTENTS

FORKULLET KORN FRA LINDEBJERG
En boplads fra ældre bronzealder

Af Peter Rowley-Conwy

I foråret 1975 blev der i en formodet hustomt ved Lindebjerg nær Bogense gjort et fund af forkullet korn, der er et af de største af sin art i Nordeuropa fra forhistorisk tid. Det omfatter 33 liter, og fundomstændighederne gør en datering til bronzealderens 1. periode sandsynlig (1). Størstedelen af det blev samlet af udgraveren (2) ved hjælp af slemning (3), mens forfatteren til samling af sin prøve benyttede et »skummeapparat« (froth flotation unit) (4). Det er denne prøve, der i det følgende skal gennemgås i detaljer.

For at kontrollere metodens brugbarhed blev der først udført et eksperiment: 200 frøkorn blev forkullet og blandet op med sand før skumningen. 197 af kornene kom uskadt igennem. Andre 200 korn blev blødt ud i 12 timer før processen, og her kom alle igennem. Endelig blev 200 korn blandet med vådt sand, og også de kunne alle tåle behandlingen, så eksperimentet viser, at metoden er yderst effektiv, i hvert fald når man har at gøre med lettere jordarter.

På Lindebjergpladsen er konstateret et system af stolpehuller, der af udgraveren tolkes som rester af et hus, nedbrændt til grunden. Hovedparten af kornet er samlet op inden for husets område, og i to gruber, der stødte op til det, blev der yderligere fundet små mængder korn. Fordelingen efter fundsted og art fremgår af fig. 1.

Forskellen i fundenes sammensætning er slående: emmer er kun sparsomt repræsenteret i selve huset, men dominerer helt i de to gruber. Det har da også længe været erkendt, at det volder problemer at drage slutninger om det reelle indbyrdes forhold mellem de oprindelige afgrøder på grundlag af forkullede planterester i et fund. Forkulning sker kun under særlige omstændigheder og behøver derfor ikke give noget repræsentativt udsagn om den daværende plantevækst. Jessen og Helbæk betragtede derfor kornaftryk i lerkar som den pålideligste indikator for afgrødefordelingen (5). I de senere år er der gjort væsentlige fremskridt i metoderne til at vurdere forkullede planterester, og der er gjort forsøg med at omvurdere flere fund (6). Det er indlysende, at hustomten og gruberne ved Lindebjerg ikke begge kan være repræsentative for det agerbrug, der har været drevet på stedet; de må bedømmes ud fra deres forskellige baggrund.

Om selve huset ved Lindebjerg mener udgraveren, at det er ødelagt ved en brandkatastrofe. Meget af det omgivende sand var rødbrændt, og det var tydeligt, at den store mængde ensartet korn, der centimetertykt

Anlæg	Materialets omfang	Emmer Triticum dicoccum		Nøgen 6 radet byg. Hordeum vulgare, var. nudum.		Brød- eller dværghvede. T. aestivum eller T. aestivum grex aestivo-comp.	
		Korn	%	Korn	%	Korn	%
Huset	0,33 l. 450 talte korn	113	25,1	332	73,8	5	1,1
Grube 1	17 cm^3 trækul med 61 korn	55	90,2	6	9,8	–	–
Grube 2	51 cm^3 trækul med 68 korn	56	82,4	12	17,6	–	–

Fig. 1: Indholdet af korn i hustomten og gruberne fra Lindebjerg.
Table of contents of the various features at Lindebjerg.

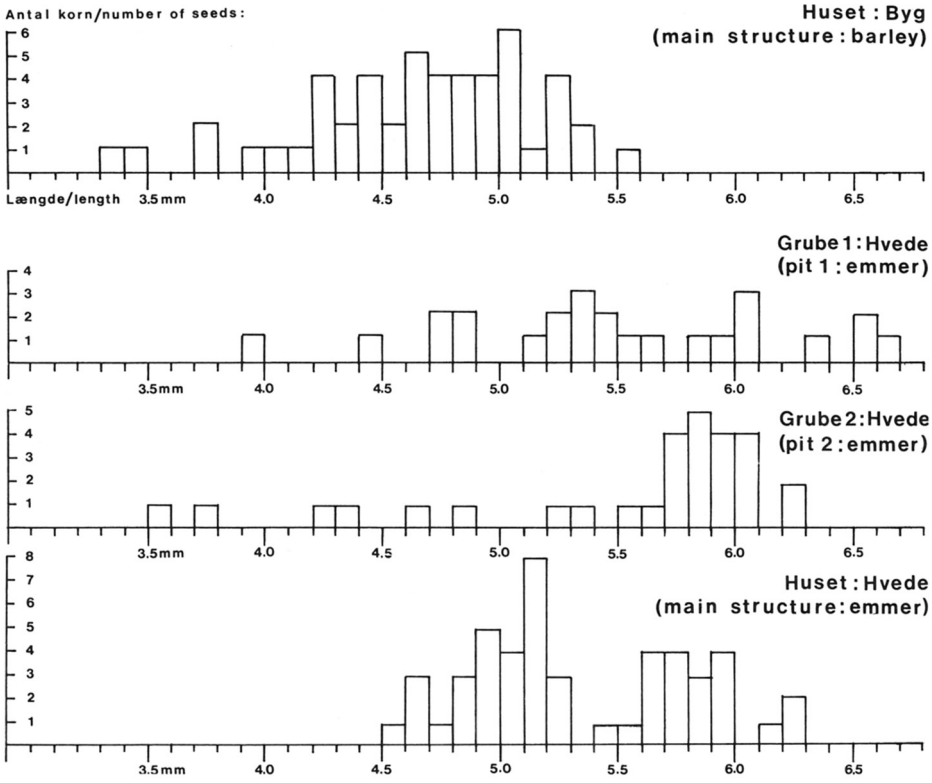

Fig. 2: Histogram over længden af kornene fra Lindebjerg.
Histogram of lengths of grains from Lindebjerg.

dækkede gulvet, ikke blot var tilfældigt spild, men må have været magasineret i huset på det tidspunkt, da branden opstod. Fundet falder derfor indenfor Dennell's type 1: ». . . tolket som afgrøde, der er færdigbehandlet til oplagring eller forbrug« (7). I hvert fald indeholdt det bogstavelig talt hverken ukrudt eller stumper af aks, og skønt dette kan skyldes, at de er gået til, så er det en kendsgerning, at forhistoriske kornfund ofte er påfaldende rene (8).

Hvis denne udlægning af Lindebjerghusets indhold er korrekt, må man antage, at kornet er resterne af en enkelt høst. Antager vi nu, at emmer- og bygforrådet blev brugt i samme takt (det behøver ikke være tilfældet, hvis fx. byg blev brugt som vinterfoder), så er det sandsynligt, at husfundet viser det faktiske forhold mellem afgrøderne: *Byg/emmer 3:1.*

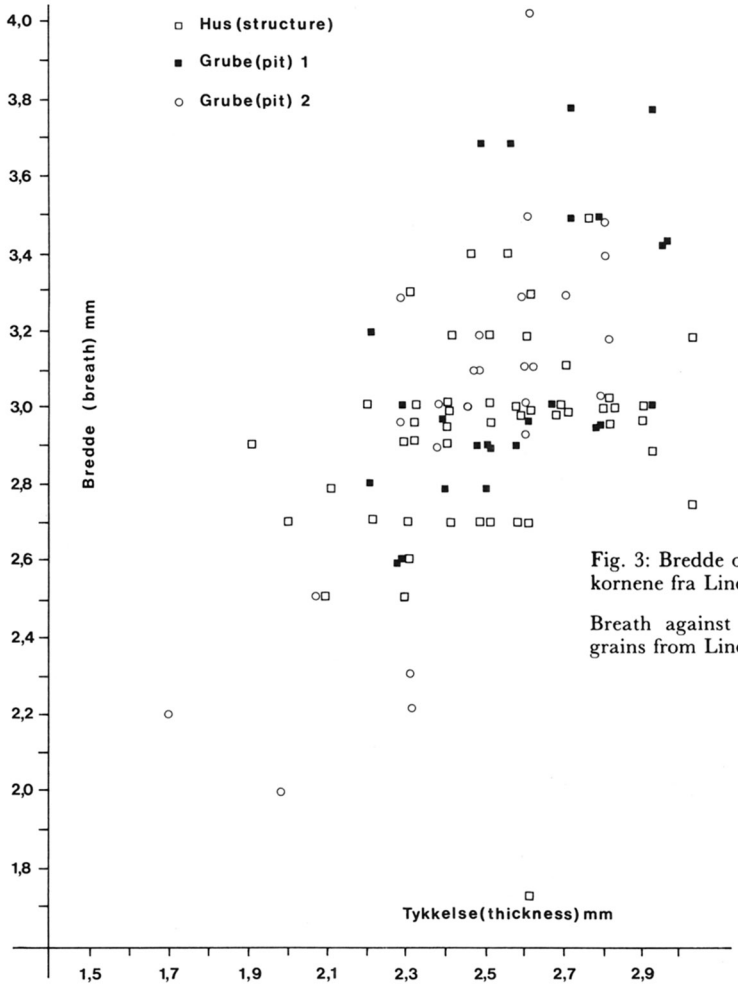

Fig. 3: Bredde og tykkelse af emmerkornene fra Lindebjerg.

Breath against thickness of emmer grains from Lindebjerg.

For grubernes vedkommende er sagen mere kompliceret. Hvis emmer kun udgør en fjerdedel af afgrøden, må særlige forhold have spillet ind for at frembringe proportionerne her, hvor emmer har stærk overvægt. Svaret skal formodentlig findes i afgrødernes forskellige reaktion på behandling: Nøgen byg skilles let fra sine avner ved tærskning i modsætning til avneklædt hvede (emmer, enkorn og spelt), som behøver kunstig tørring, før avner og korn kan adskilles. Gruberne kan derfor have været tørrerum for emmer. Under tørringsprocessen er noget af kornet uvægerlig blevet forbrændt, og det er så det, »skummeapparatet« har skilt ud. Manglen på avner i gruberne kan skyldes at de er mindre modstandsdygtige.

Manglen på ukrudt i gruberne tyder på, at afgrøden er sigtet andetsteds. Målingerne af kornene viser da også tydeligt, at emmer og byg i huset hver udgør en homogen gruppe, mens emmer fra gruberne varierer mere i kornstørrelsen (fig. 2). Det er ikke det resultat, man ville vente, hvis emmer var blevet sigtet – i så fald skulle histogrammet have vist to klare højdepunkter, det ene for huset, det andet for de mindre korn i gruberne (9). Fig. 3 er et forsøg på at løse dette problem. Den viser forholdet mellem bredde og tykkelse, da det, snarere end længden, er disse mål, der kunne

a: Nøgen 6 radet byg
Naked 6-rowed barley

Fundsted og antal målte korn	Længde	Max.	Min.	Bredde	Max.	Min.	Tykkelse	Max.	Min.
Sarup (23)	4.11	5.2	2.7	2.37	3.2	1.6	1.82	2.5	1.5
Bundsø (12)	4.9	5.7	2.2	2.4	3.3	1.4	1.8	2.7	1.0
Lindebjerg: Huset (50)	4.75±0.45	5.5	3.5	3.02±0.31	3.9	2.3	2.38±0.31	3.0	1.7
Birknæs	5.40	6.9	4.2	2.65	3.3	1.6	1.92	2.7	1.3

b: Emmer

Fundsted og antal målte korn	Længde	Max.	Min.	Bredde	Max.	Min.	Tykkelse	Max.	Min.
Sarup (200)	5.01	6.2	3.9	2.54	3.3	1.9	2.33	3.3	1.9
Bundsø (9)	5.5	7.7	4.1	2.1	2.7	1.6	2.1	2.1 (sic)	1.6
Lindebjerg: Huset (50)	5.33±0.42	6.2	4.6	2.94±0.29	3.5	1.8	2.49±0.24	3.0	1.9
Grube 1 (25)	5.49±0.62	6.5	4.0	3.11±0.37	3.8	2.6	2.58±0.21	2.9	2.2
Grube 2 (25)	5.41±0.68	6.2	3.7	3.02±0.45	4.0	2.0	2.47±0.25	2.8	1.6
Birknæs	5.29	5.9	4.2	2.62	2.9	2.0	2.20	2.7	1.6

Fig. 4: Kornstørrelserne i Lindebjerg sammenlignet med kornfund fra yngre stenalder nævnt i artiklen. Målene er angivet i m.m.

Grain measurements from Lindebjerg compared to other sites. References in text. Measurements in millimetres.

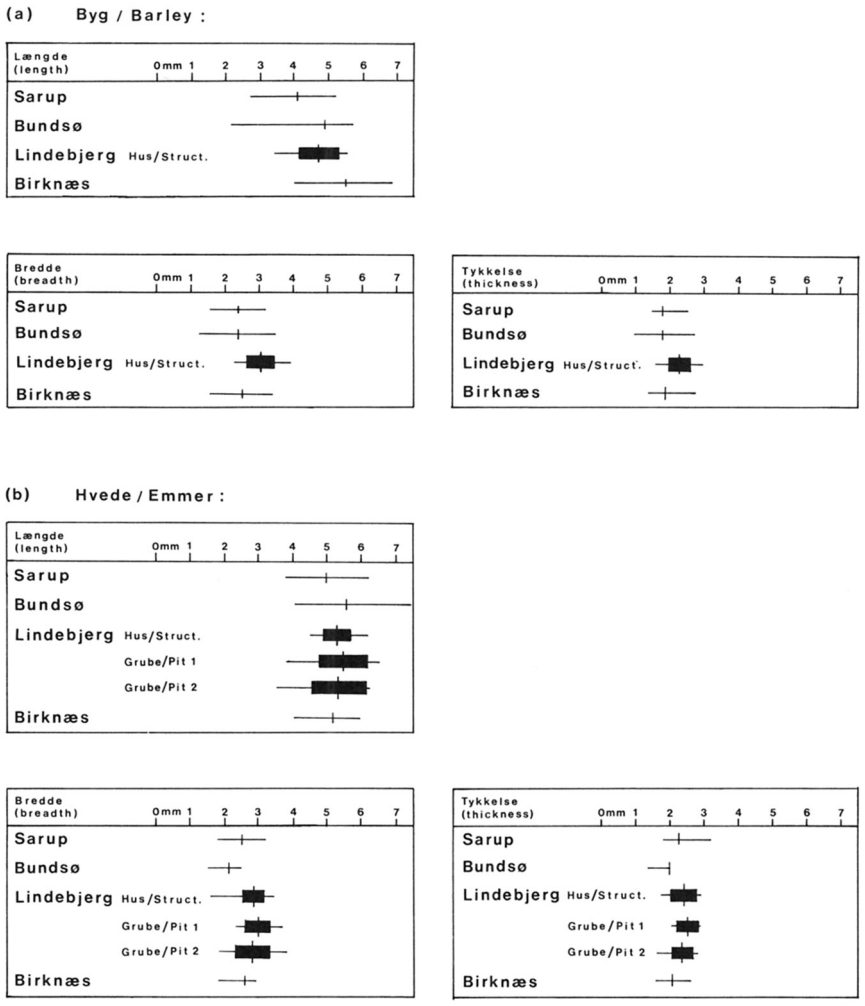

Fig. 5:Kornstørrelserne i Lindebjerg sammenlignet med fund fra yngre stenalder. De lodrette linier angiver det aritmetiske gennemsnitsmål, de vandrette: de ydre grænser for største og mindste mål, de fortykkede linier: standardafvigelserne.

Sizes of grains from Lindebjerg compared with those from other sites. Vertical lines: arithmetic means. Horizontal lines: total range. Thickened horizontal bars: 1 standard deviation.

ventes at vise forskellen mellem hus og gruber, hvis der var foretaget sigtning (10). Igen viser det sig, at der er større variation i gruberne end i huset, men stadigvæk er der ikke nogen egentlig forskel mellem de to grupper.

Det ser således ikke ud til, at kornet er blevet sigtet på pladsen – muligvis har det ikke været nødvendigt. Grethe Jørgensen (11) har fore-

Fundsted	Datering	Materialets art	% Hvede	% Byg
St. Valby	TN A/B	Aftryk i lerkar	ca. 97	ca. 3
Sarup	TN-MN overgang	Forkullet i lerkar	96,0	4,0
Troldebjerg	MN Ia	Aftryk	95,6	4,4
Blandebjerg	MN II	Aftryk	94,6	5,4
Bundsø	MN III	Aftryk og løse korn	91,0	9,0
Lindø	MN IV	Aftryk	78,2	21,8
Lindebjerg	Bronzealder P.I	Forkullet i hus	26,2	73,8

Fig. 6: Forholdet mellem mængden af hvede og byg i yngre stenalderfund fra Danmark.
Proportions of wheat to barley on Danish neolithic sites.

slået, at ukrudt blev fjernet allerede under selve høsten, hvis denne blev udført med segl, hvor der skæres en håndfuld ad gangen.

Den større variation i gruberne kræver imidlertid en nærmere undersøgelse. Efter al sandsynlighed er tørrestederne brugt gentagne gange gennem nogle år, så fundet i dem er næppe fra et enkelt års høst, i modsætning til husets. Den større kornstørrelse fremgår tydeligst af kornenes længde. J. Renfrew (12) har påvist, at længden »kryber« ved forkulning. Det er da tænkeligt, at det bredere målspektrum i gruberne kan skyldes forskelle under forkulningsprocessen – hvor stærk varmen var, hvor nær på varmekilden kornene var osv. Variationerne kan dog også skyldes forskelligt vejrlig i kornets modningstid i de år, gruberne har været benyttet. Huset derimod, som brændte ned på én gang, har frembudt mere ensartede omstændigheder for forkulning og udgør ét års høstudbytte, og indholdet er derfor også mere ensartet. Da emmer altså blev behandlet for sig, må den også være dyrket for sig og ikke som blandsæd med byg.

I fig. 4 og i stregdiagrammet fig. 5 er kornene fra Lindebjerg vist i sammenligning med andre fund: Sarup fra overgangen tidlig/mellemneolitisk tid (13), Bundsø fra MN III (14) og Birknæs, muligvis sen bronzealder (15). For Bundsøs vedkommende er kun de forkullede korn taget med. En prøve fra Nørre Sandegård på Bornholm (16) er ikke medtaget, da den er for langt mod øst i denne sammenhæng. For emmers vedkommende er der kun mindre ændringer, mens byggens korn synes at være blevet større i tidens løb. Det kan muligvis skyldes, at byg bedre end hvede har kunnet tilpasses de nordlige breddegrader og derfor har udviklet sig bedre ved avlernes bestræbelser på forbedring.

En sammenligning af forholdet hvede og byg fra forskellige neolitiske fund kaster lys over den tendens, som allerede Helbæk (17) var opmærksom på, nemlig at byg i løbet af yngre stenalder var ved at fortrænge hvede, hovedsagelig emmer (18). Gennem hele neolitikum kan der følges en

nedgang i emmer. Tendensen er ens, selv om omstændighederne er forskellige. Lindebjerg viser en brat stigning i tendensen, og for første gang synes byg mere vigtig end hvede. Lindebjergs datering ligger da også adskillige århundreder senere end Lindø.

Ved en grafisk fremstilling baseret på fundenes tidsforhold viser hvede en jævnt nedadgående kurve gennem hele neolitikum (fig. 7). Årsagen hertil kunne være en klimaforværring, der imidlertid ikke har kunnet påvises i dette tidsrum. Forandringen i plantevækst i begyndelsen af zone VIII kan ganske vist skyldes enten menneskelige eller klimatiske faktorer (19), men de fleste eksperter er enige om, at klimaet gennem hele perioden var varmere end i dag og næppe genstand for forandringer før overgangen til zone IX (20).

En anden årsag til emmers vigen kan være, at den trivedes ringere end byg på de nordlige breddegrader. Hvis blandet kornavl med emmer som hovedbestanddel vandt indpas til et område, der er mindre gunstigt for emmer end for byg, er det at vente, at emmer gradvis viger til fordel for byg. (21). Naturlige årsager kan således have medvirket til at ændre forholdet mellem afgrøderne. Baggrunden for rugens indførelse langt senere, i ældre jernalder, skyldes således dens overlegne evne til at tilpasse sig ringe vækstbetingelser. Skønt den oprindelig blot fulgte med som ukrudt, vandt den frem ved sin hårdførhed, som overgik dens ledsageres (22). Måske viser nedgangen i emmer den omvendte udvikling: den var kommet for langt bort fra de områder, hvor den trivedes godt.

Fig. 7: Den procentvise forekomst af hvede i kornfund fra yngre stenalder i Danmark.

Graph showing percentage of wheat on Danish neolithic sites plotted against the date of those sites.

Analyser

Byg. 50 frøkorn blev undersøgt i et forsøg på at finde ud af, om der var toradet byg tilstede. 32 af kornene var asymmetriske og var derfor sidekorn af seksradet byg. Dette tal (64%) svarer så nøje til de 66% i kornakset, at man tør regne de resterende 18 symmetriske korn for midterkorn i et småaks. Der var altså tilsyneladende ingen toradet byg i fundet. Der blev kun fundet ét akseled, der kommer fra huset. Det var 2,67 mm langt og falder således klart uden for de mål for opret byg, 1,7-2,1 mm, som Renfrew (23) giver og må derfor være af nikkende byg. Der blev ikke fundet spor af avneklædt byg (24).

Hvede. I almindelighed anses det for meget vanskeligt at skelne mellem emmer (Triticum dicoccum) og spelt (T. spelta) på kornenes morfologi alene, selv om det sædvanligvis hævdes (25). at kornene af spelt er mere flade end af emmer. Spelt kunne man ikke vente at finde på Lindebjerg – det tidligste publicerede fund fra Danmark er fra sen bronzealder (26), men et nyere fund fra Vadgård er fra tidlig bronzealders per. II (27). For en sikkerheds skyld er længde og tykkelse opstillet grafisk (fig. 8). Skemaet viser, at kornene udgør en ensartet gruppe, og der er ingen grund til at tro, at andet end emmer er repræsenteret.

Det var muligt at måle et akseled med påsiddende avnebasis og endnu to avnebaser, alle fra huset. Målene var hhv. 0,87, 0,96 og 1,01 mm. De

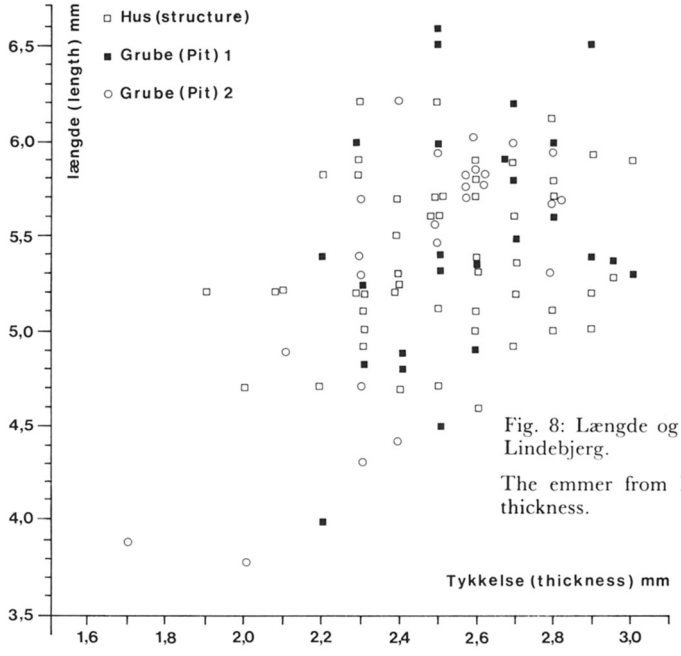

Fig. 8: Længde og tykkelse af emmerkorn fra Lindebjerg.

The emmer from Lindebjerg: length against thickness.

målgrænser, Helbæk giver (28) er: Spelt 0,91-1,52, emmer 0,84-1,25 mm. Et af Lindebjergfragmenterne falder uden for målene for spelt fra Birknæs, og de andre to lige over mindstemålet. Alle tre falder altså inden for emmers mål og tilhører derfor utvivlsomt denne art.

De 5 korn, der i fig. 1 er betegnet som brød- eller dværghvede, er taget med for at vise, at nogle få korn kan være af denne art. De kunne ikke måles, og det kan derfor ikke udelukkes, at også de kan være emmer.

Konklusion. Kornfundet fra Lindebjerg er vigtigt i to henseender. Dels er det det første direkte vidnesbyrd om systematisk landbrug i tidlig bronzealder og viser fortsættelse af en udvikling, der er begyndt langt tidligere i perioden. Dels maner fundet til forsigtighed med ukritisk at anse fund af forkullet korn som tidstypiske, når fundomstændighederne ikke belyses tilstrækkeligt.

THE CARBONIZED GRAIN FROM LINDEBJERG

By Peter Rowley-Conwy

The carbonized grain from Lindebjerg, near Bogense, on the north part of the island of Fyn, probably dates from period I of the bronze age (1) and is one of the largest samples known from any period of the prehistory of northern and western Europe, amounting to some 33 litres of grain. The bulk of it was collected by the excavator, Anders Jæger of Bogense, by means of a flotation system similar to that described by van Zeist (3). The writer also collected a sample with the help of a froth flotation unit such as that described by Jarman, Legge and Charles (4) and it is this sample which is discussed in detail below. Mention may be made at this point of an experiment designed to test the efficiency of the froth flotation unit used. Two hundred grains of wheat were carbonized, and put through the system mixed into sand; 197 grains were recovered. To simulate of variety a conditions, a further 200 grains were soaked in water for twelve hours before being put through the machine; in this case all 200 were recovered. Finally 200 grains were mixed into wet sand and processed, and again all seeds were recovered. This shows that the system used is clearly very effective, at least when dealing with lighter soils.

The site of Lindebjerg consists of a series of postholes interpreted by the excavator as a structure, which had apparently been burnt to the ground. The main part of the sample was recovered from within this structure. Besides this there were two pits adjacent to the structure, which also yielded small samples of grain. The contents of the various features are set out in figure 1.

Weed seeds were conspicuous by their absence – the only ones found came from the main structure, consisting of 5 seeds of *Stellaria media* and one of *Hypochoeris radicata.*

The differences in composition between the various features are marked. Whereas emmer plays only a subsidiary role in the main structure, it is overwhelmingly predominant in the two pits. It has long been recognised that there are problems in the interpretations of the

proportions of plant remains in carbonized finds: these finds are only carbonized under exceptional circumstances and need not, therefore, be representative of the plant foods consumed on the site. This consideration led Jessen and Helbæk (5) to regard the proportions of cereal impressions in pottery as being more reliable than carbonized finds as an indicator of the relative proportions in which crops were grown. Since then, techniques of recovery of material have vastly improved, and attempts have been made to reappraise the status of carbonized finds (6).

The structure and the pits at Lindebjerg obviously cannot both be representative of the agricultural regime practised; it is necessary to consider them against the backdrop of their differing origins.

The main structure at Lindebjerg is interpreted by the excavator as having been destroyed in a catastrophic conflagration. Much of the surrounding sand was burnt red; furthermore the deposit of pure grain, covering the floor to a depth of several centimetres, is evidently not merely the result of normal accidental wastage. Thus the sample probably represents grain stored in the building at the time of its destruction; it therefore falls into Dennell's Type 1, »interpreted as crops which had been fully prepared for storage or consumption« (7). Certainly the sample contained virtually no weed seeds or rachis fragments; although this might be due to conditions of preservation, it has been noted that prehistoric crops were often of remarkable purity (8).

If the above interpretation of the origins of the Lindebjerg main structure sample is correct, it may be surmised that the sample represents a single harvest. Assuming that the emmer and barley were utilized at the same rate (which theoretically need not have been the case if for example the barley was used for feeding stock in winter) then it seems probable that the contents of the structure reproduce the actual proportions in which the crops were grown – a barley: emmer ratio of about 3:1.

The pits are rather more problematic; if emmer amounted only to about one quarter of the cereal crop, some special process must have been in operation to produce the proportions in the pits where emmer is strongly predominant. The answer probably lies in the differences in the processing of the two crops. Naked barley threshes free from its glumes very easily, while the glumed wheats (emmer, einkorn and spelt) do not, and require parching to free the grain from the glume (17). The pits therefore probably represent the sites where emmer was parched; some grains would accidentally have been burnt during this process and it is these that the froth flotation unit has recovered. Thus there is here isolated one stage in the preparation of the emmer for storage. The absence of glume fragments in the pits might be explained by poor preservation; or possibly the parched grain was tossed into the air to allow the wind to blow the chaff away.

The absence of weeds in the pits suggests that sieving of the crop was carried out elsewhere. Measurements of the grains were taken, and it is clear that while the emmer and barley from the main structure each form a homogenous group, the emmer from the pits has a much wider size range (fig. 2). This is not the result one would expect had the emmer been sieved; had this been the case the histogram should show two distinct peaks, one representing the main structure, the other the smaller grains from the pits (9). In an effort to resolve this problem, a graph was plotted showing breadth against thickness of grains (fig. 3). These, rather than length, are the measurements which would be expected to show any size differences between the structure and the pits due to sieving (10). Again the pits show a rather wider scatter than does the structure but in no case is there a division between the two groups.

Thus there appears to be no evidence that sieving was carried out on the site. Sieving to remove weeds may not have been necessary – Jørgensen (11) has suggested that, in the case of crops being cut a handful at a time with a sickle, individual weed plants could have been removed actually during harvesting. However, the wider size range of the emmer in the pits

must be examined. In all probability the parching localities were used repeatedly over a period of years; the pit samples in contrast to that from the structure probably do not represent a single years crop. The greater size range is most evident in the length of the grains. J. Renfrew (12) has shown that length decreases during carbonization. It is possible that the wider size range in the pits was due to variations in the carbonization process – how hot the fire was, how close to the source of heat the grains fell etc. It could also be due to climatic conditions differing from year to year. The destruction of the building, being a single process, acting on grains from a single harvest, would have created more uniform conditions of carbonization, leading to a tighter distribution of grain size.

Thus it is concluded that while the structure contains the remains of stored grain from a single harvest, the pits are the sites where the emmer was parched, probably over a number of years. Because the emmer was processed seperately, it must have been grown separately, not as a mixed crop with barley.

The dimensions of the Lindebjerg grains are tabulated in figure 4, compared with other sites, and are plotted on the bar diagram, figure 5. The sites compared are Sarup (13), Bundsø (14), and Birknæs (15). In the case of Bundsø, only the carbonized grains are included. The sample from Nørre Sandegaard on Bornholm (16) is not included, being too far east to be of direct relevance. Emmer shows only minor fluctuations, while barley shows some evidence of an increase in size through time. This might possibly be due to barley being better adapted to more northerly latitudes, and thus being able to respond to attempts by the cultivators to improve their crop to a degree that emmer could not.

A comparison of the proportions of wheat and barley on various neolithic sites highlights the trend already noted by Helbæk (17), showing the replacement of wheat (principally emmer) by barley, (fig. 6) (18). A gradual decline in emmer is visible throughout the neolithic; despite the varying contexts, the trend is uniform. Lindebjerg shows a marked steepening of the trend, and for the first time barley is more important than wheat. However, Lindebjerg is dated several centuries after the site which precedes it on the list, Lindø; if plotted by date on a graph, the decline of wheat describes a uniform steepening curve throughout the neolithic. (fig. 7). A possible cause might be climatic deterioration, but no evidence has been put forward in support of a deterioration at this time. While changes in vegetation at the start of zone VIII may reflect either human or climatic factors (19), most authorities view the climate within zone VIII as rather warmer than today, and not apparently subject to change till the transition to Zone IX (20).

Another possible reason for the decline in emmer might well be that it was rather less well adapted to northerly latitudes than was barley. If a ccreal regime consisting predominantly of emmer were introduced into an area less favourable to emmer than to barley, it might be expected that emmer would gradually decline in favour of barley. This has been suggested as the cause of a similar decline in emmer noted in the neolithic of Scotland (21). Thus natural agencies might be at work in altering the proportions of the crops grown. The introduction of rye has been attributed to its superior adaptability to poor conditions; while initially present only as a weed of cultivation, it later increased due to its hardiness being greater than of the cereals with which it was associated (22). Perhaps the emmer decline represents the reverse process: being moved too far from areas to which it was well adapted.

Analyses:

The barley. Fifty grains were examined in an attempt to discover whether any 2-rowed barley was present. Thirtytwo proved to be asymmetrical, and were therefore lateral grains of 6-rowed barley. This figure (64%) corresponds so closely to the 66% in the living crop that it must be concluded that the remaining eighteen symmetrical grains were central grains in the spikelet. Apparently no 2-rowed barley is represented.

One internode only was found, and that was in the structure. This measured 2.67 mm in length, and is thus clearly outside the range for dense-eared barley of 1.7-2.1 mm quoted by Renfrew (23), and must therefore have come from the lax-eared variety.

No grains of hulled barley were found. While they are rare in the neolithic of Denmark they are not unknown; one impression occured at Stengade (Hjelmqvist 1975), and Jørgensen (in press) mentions another 14 imprints from other locations.

The wheat. It is generally regarded as difficult or impossible to distinguish between emmer (Triticum dicoccum) and spelt (T. spelta) on grain morphology alone, although it is usually stated (25), that spelt grains are flatter than emmer grains. Spelt would not be expected at Lindebjerg; the earliest published find from Denmark dates from the late bronze age (26), but a recent find from Vadgaard dates from the early bronze age period II (27). To test this a graph was plotted, giving length against thickness of grains (fig. 8). The grains form one group and there is no reason to suppose that any species except emmer is present.

It was possible to measure one spikelet fork with the glume base attached as well as two further glume bases, all from the main structure. They measured 0.87, 0.96 and 1.01 mm respectively. The ranges given by Helbæk (1952 a & b, measurement B) are; – spelt 0.91 to 1.52 mm, emmer 0.84 to 1.25 mm. One of the Lindebjerg fragments is outside the range of spelt from Birknaes, and the other two fall just inside the lower end. All three fall inside the emmer range and therefore almost certainly represent this species.

The five grains classified as ?bread or club wheat in figure 1 are included to make the point that a few fragmentary grains could have come from this species. None were measureable, and in no case could the possibility that they too were emmer be definitely excluded.

Conclusion

The grain sample from Lindebjerg is valuable in two ways. Firstly it gives the first real evidence of farming in the late neolithic, and proves to continue trends established much earlier in the neolithic. Secondly it warns against the uncritical acceptance of samples of carbonized grain as being typical of their period, when the nature of the deposit is not taken into account. The froth flotation unit, invaluable as it is, does highlight problems as well as help to solve them.

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NOTER

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25) Renfrew 1973, op.cit. Helbæk 1952b, op.cit.
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