From the borderland between two cultures

The Funnel Beaker culture and the Single Grave culture in central eastern Jutland

By Torsten Madsen

KUML 2020. Årbog for jysk Arkæologisk Selskab, p. 9-84.

The relationship between the Funnel Beaker culture and the Single Grave culture in South Scandinavia has been a central and much debated issue ever since P.V. Globs work on the Jutland Single Grave culture appeared in 1945. A detailed study of Neolithic material from a 640-km^2 area of central eastern Jutland in Denmark has made it possible to shed new light on this relationship.

The paper gives a general outline of the cultural development in the area during the Funnel Beaker culture, the Single Grave culture and into the Late Neolithic, including settlement pattern, economy and social structure. Further, it provides a detailed discussion of the background for and nature of the transition between the two cultures.

In the following, you will first find a digital copy of the paper as printed in Danish with endnotes, list of references and an English summary. Added to this you will find a page-by-page transcription of the Danish text into English. Notes referred to on the individual pages are found translated to English at the bottom of the pages. The page numbering of the transcribed pages equals the page numbering of the Danish text. You can therefore use these directly in references. For literature cited in the notes, you are referred to the "Litteratur" list in the Danish text.

The translation from Danish to English is mine. I apologize for the unavoidable mistakes.

KUML 2020

KUML 2020

Årbog for Jysk Arkæologisk Selskab

With summaries in English

I kommission hos Aarhus Universitetsforlag

Redaktion: Jesper Laursen

Artiklerne i Kuml fagfællebedømmes efter gældende regler
Tilrettelægning: Louise Hilmar
Omslag: Louise Hilmar
Korrektur: Anne Lise Hansen
Oversættelse og sproglig revision: Anne Bloch Jørgensen & David Earle Robinson
Tryk: Narayana Press
Skrift: Aldine 401 BT
Papir: Arctic Volume

ISBN 978-87-93423-50-3
ISSN 0454-6245

MIX
Papir fra ansvarlige kilder
FSC® C010651
FSC www.fsc.org

Indhold / Contents

Torsten Madsen
Fra grænselandet mellem to kulturer
Tragtbægerkultur og enkeltgravskultur i det centrale Østjylland 9
From the borderland between two cultures
The Funnel Beaker culture and the Single Grave culture in central eastern Jutland 75

Laura Ahlqvist
"Sol-guden" i nyt lys
Gensyn med en velkendt ragekniv 85
Shedding new light on the "Sun God"
The Vestrup Mark razor revisited 106

Morten Søvsø
Frie og ufrie bønder
Landsbyer, gårde og socialstruktur på den jyske vestkyst i *la longue durée* 109
Freemen and villeins
A longue durée perspective on villages, farmsteads and social structure in western Jutland 168

Frederik Callesen
By og grav
Status over 30 års arkæologi i det ældste Horsens 171
Town and ditch
Status after 30 years of archaeology in early Horsens 213

Esben Klinker Hansen
To østjyske smedjer fra middelalder og renæssance
Belyst gennem arkæologiske fund og arkæometallurgiske analyser 217
Archaeological and archaeometallurgical investigations of two smithies in eastern Jutland – one Medieval, the other Early Modern 257

Lene Mollerup
På munkenes bord
Cistercienserne mad og madkultur i middelalderens Danmark 259

On the monks' table
The food and culinary heritage of the Cistercians in Medieval Denmark 288

Helle W. Horsnæs
Klassifikation af mønter fra Valdemartiden
Tanker med udgangspunkt i en mønt fra Gudme Kirke 291

Classification of coins from the Valdemar era
Thoughts prompted by a coin from Gudme church 320

Anmeldelser

Rica Annaert, Tim Bellens, Pieterjan Deckers, Frans Theuws, Dries Tys, Robert van Dierendonck, Luc van Impe, Johan Veeckman og Laurent Verslype (red.):
Early medieval waterscapes. Risks and opportunities for (im)material cultural exchange
(Jens Ulriksen) 321

Adam Cieśliński og Bartosz Kontny (red.):
Interacting Barbarians. Contacts, Exchange and Migrations in the First Millennium AD.
(Rasmus Birch Iversen) 324

Thomas Søes Finderup:
Saga Oseberg. Rekonstruktion af et vikingeskib
(Otto Uldum) 327

Svein H. Gullbekk og Anette Sættem:
Norske Myntfunn 1050-1319, Penger, kommunikasjon og fromhetskultur
(Helle W. Horsnæs) 329

Ole Høiris og Peter K.A. Jensen (red.):
Evolutionens menneske – menneskets evolution. Om aben, der blev verdens herre
(Trine Kellberg Nielsen) 333

Mette Svart Kristiansen & Charlotte Boje H. Andersen (red.):
Bygning og bolig, gård og toft. Middelalderens Rurale Danmark
(Anna Severine Beck) 336

Marianne Rasmussen Lindegaard:
Danmarks oldtid i landskabet. Fra rensdyrjægere til vikingekongerne – 72 fortællinger om vores forfædre
(Lise Frost) 340

Eva Mortensen & Rubina Raja (red.):
Store danske arkæologer på jagt efter fortidens byer
(Christopher Prescott) 343

Tinna Møbjerg, Ulla Mannering, Hans Rostholm og Lise Ræder Knudsen (red.):
The Hammerum Burial Site. Customs and Clothing in the Roman Iron Age
(Lise Bender Jørgensen) 345

Sigmund Oehrl:
Die Bildsteine Gotlands. Probleme und neue Wege ihrer Dokumentation, Lesung und Deutung
(Peter Pentz) 347

Lis Helles Olesen, Esben Schlosser Mauritsen & Mathias Christiansen Broch:
Luftarkæologi 2. Luftfotos, droner, laser og geofysik
(Ole Risbøl) 349

Alexandra Pesch & Michaela Helmbrecht (eds.):
Gold foil figures in focus. A Scandinavian find group and related objects and images from ancient and medieval Europe. Advanced studies in ancient iconography I. Papers from an international and interdisciplinary workshop organized by the Centre for Baltic and Scandinavian Archaeology (ZBSA) in Schleswig, Schloss Gottorf, October 23rd-25th 2017
(Kent Otte Laursen) 352

Linda Qviström:
Rum utan utsikt. Fönster och ljus i medeltida byggnader
(Jes Wienberg) 360

Lotte Reedtz Sparrewohn, Otto Thomas Kastholm & Poul Otto Nielsen (eds.):
Houses for the Living. Two-aisled houses from the Neolithic and Early Bronze Age in Denmark
(Mats Larsson) 362

Claus Frederik Sørensen:
Nyborg fæstning. Middelalder & renæssance
(Bjørn Westerbeek Dahl) 363

Jens Ulriksen: *Vester Egesborg. En anløbs- og togtsamlingsplads fra yngre germansk jernalder og vikingetid på Sydsjælland*
(Torben Sarauw) 365

Jeanette Varberg:
Viking. Ran, ild og sværd
(Søren M. Sindbæk) 370

Fra grænselandet mellem to kulturer

Tragtbægerkultur og enkeltgravskultur i det centrale Østjylland

Af TORSTEN MADSEN

"Et nyt Folk vandrer ind i Jylland! (…) Det har været en flokkevis Indvandring af Fremmede, som til at begynde med har slaaet sig ned hist og her spredt i Jylland, som er blevet stoppet i Øst af en tilstrækkelig stærk og tæt Befolkning, i Nord og Vest af Fjord og Hav. For Indlandsfolk, ukendt med Hav, har ikke blot Oceanet men ogsaa en saa forholdsvis beskeden Ting som Limfjorden været en Hindring, indtil videre da. Længere kunne man altsaa ikke komme, og saa blev man, hvor man nu var havnet, i den jyske Halvø, der som en Blindsæk eller en Ruse opfangede og fastholdt sin Del af de europæiske Indlandsvandrere".[1]

Med denne malende beskrivelse tegnede Johannes Brøndsted i 1938 et billede af den jyske enkeltgravskultur, som i udstrakt grad kom til at præge opfattelsen af kulturen, og som blev yderligere forstærket gennem P.V. Globs ikke mindre farverige betragtninger fra 1945:

"Sydfra indvandrede de beredne, øksesvingende Nomadestammer til Jylland, hvor de hurtigt blev Herre over den centrale og vestlige Del af Halvøen. (…) Midt- og Vestjyllands brede, løvrige Aadale var de Fremmedes første Tilholdssteder. Her var der rigeligt med Føde til deres Dyr. De urgamle Fisker- og Jægerfolk, der holdt til ved Søer og Vandløb, blev de fleste steder hurtigt undertvunget, og samme Skæbne ramte utvivlsomt de spredte Bondesamfund, hvis det ikke lykkedes dem at naa over til Østjylland, hvor deres Frænder Megalitfolket sad tæt".[2]

Hvorvidt den jyske enkeltgravskultur (EGK) kan tilskrives et indvandret folk, eller den er opstået lokalt under indflydelser sydfra, er sidenhen blevet debatteret, vendt og drejet i en uendelighed. Der var dog også et andet emne, der i årtierne efter P.V. Globs publikation optog sindene – de tidsmæssige relationer mellem tragtbægerkulturen og den jyske enkeltgravskultur. Glob selv

kom til følgende konklusioner om dette: "Ældre Undergravstid maa begynde i Slutningen af ældre Jættestuetid (Troldebjergtid) samt fortsætte ind i yngre Jættestuetid, der i Jylland er samtidig med yngre Undergravstid. Bundgravstid er delvis samtidig med yngre Jættestuetids Slutning"; og: "at der mellem yngre Jættestuetid og Dolktid for hele Landets Vedkommende maa indskydes en Periode, der omfatter Slutningen af Bundgravstid og Overgravstid".[3]

Det blev dog ikke Globs udlægning af forholdene, der blev god latin, men derimod en artikel af C.J. Becker fra 1954 – Die Mittel-Neolithischen Kulturen in Südskandinavien, der må være en af de mest læste artikler om dansk neolitikum. I denne artikel opstillede han et kronologiskema med fem mellemneolitiske hovedperioder (MN I-V) baseret på tragtbægerkulturens keramik. Gennem komparative studier og forskellige kontaktfund, som han fandt pålidelige, fastslog han, at den jyske enkeltgravskultur og den svenske bådøksekultur dukkede op midt i MN III og fortsatte op til slutningen af MN V, medens den ø-danske enkeltgravskultur kun udgjorde et kort mellemspil fra midt i MN IV til midt i MN V.[4]

Denne autoritative udlægning kom til at stå i 20 år, inden Becker under indtryk af et stigende antal C14-dateringer selv begyndte at vakle, og Karsten Davidsen i midten af 1970'erne satte en streg over den ved dels at fremlægge fund af keramik fra MN V i og under høje med grave fra undergravstid, og dels at fremlægge C14-dateringer, der viste, at MN V var delvist ældre og delvist samtidig med undergravstid. Dette fik C.J. Becker til efterfølgende at kapitulere og konkludere, at enkeltgravskulturen fulgte efter tragtbægerkulturen med et mindre overlap mellem MN V og undergravstid.[5]

Karsten Davidsen gik imidlertid videre og betonede: "Udgangspunktet bør være udbredelsen af den tidlige EGK (undergravstid) og den sene TRB-kultur. Disse to grupper udelukker i stort omfang hinanden. Forholdene i Jylland fremgår af fig. 7, og på øerne kendes der først EGK i bundgravtid. Dette udbredelsesmønster kan ikke skyldes, at MN V har forskellig varighed i Jylland og på øerne. Det må anses for meget usandsynligt, at der har eksisteret en kortere folketom periode på øerne og i de mest frugtbare dele af Jylland, så man bliver nødt til at antage, at hele undergravstid er samtidig med MN V."[6]

I dag giver C14-dateringerne os en ret sikker kronologisk ramme at arbejde ud fra. Den sidste del af tragtbægerkulturen – herefter St. Valby-fasen – begynder omkring 3000 f.Kr. og slutter omkring 2600 f.Kr., medens den jyske enkeltgravskultur starter omkring 2850 f.Kr. og slutter omkring 2350 f.Kr. Afslutningen af tragtbægerkulturen er samtidig med overgangen fra Eva Hübners periode 1 til periode 2 af den jyske enkeltgravskultur, hvilket svarer til et tidspunkt lidt ind i bundgravstid, som Glob i sin tid antog.[7]

Østjyllandsprojektet

Jeg har i en årrække indsamlet et omfattende materiale fra et 640 km^2 stort område i det centrale Østjylland, der kan belyse kulturudviklingen gennem neolitikum. Undersøgelsesområdet, hvor Horsens Fjord er det centrale udgangspunkt, er vist på figur 1.[8] Den jyske enkeltgravskultur holdt sig i periode 1 til de centrale og vestlige dele af Jylland syd for Limfjorden, som et udbredelseskort over fasens grave baseret på Eva Hübners undersøgelser viser (fig. 2).

De samtidige fund fra tragtbægerkulturen er udpræget kystbundne, og når man studerer udbredelsen af dem sammenholdt med udbredelsen af den tidlige enkeltgravskulturs materiale i undersøgelsesområdet, får man indtrykket af et klart defineret grænseområde, der nærmest har karakter af et ingenmands-

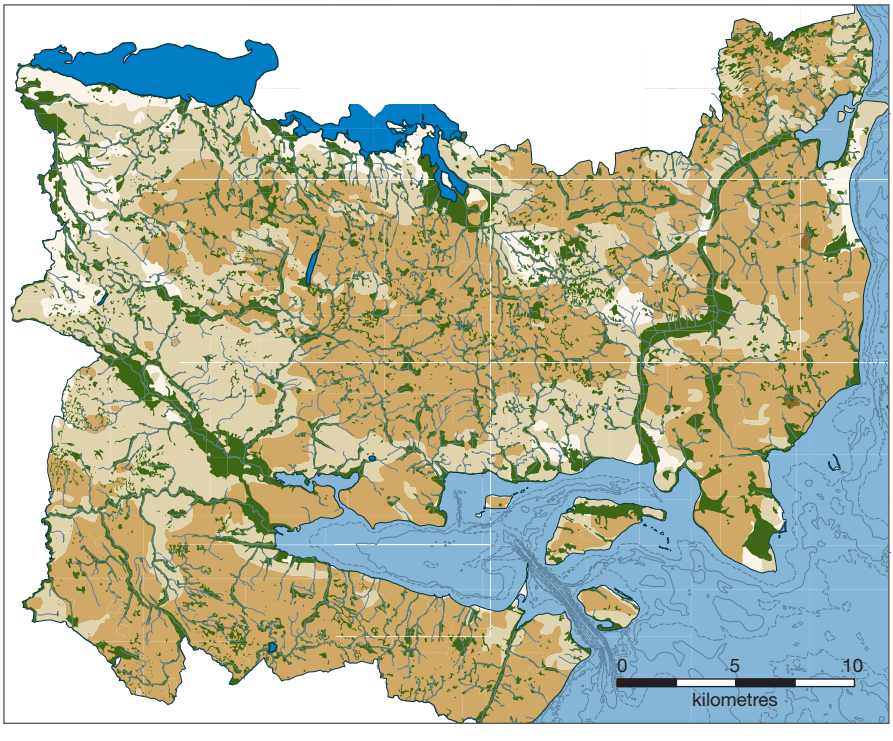

Fig. 1. Kort over undersøgelsesområdet. Grønt angiver vådområder registreret på kort fra 1800-tallet. Farverne fra hvidgult til brunt viser jordbundsforholdene fra sand til ler. Afgrænsningen mod havet følger de nuværende kystlinjer. På alle efterfølgende udbredelseskort vises havets udbredelse i stenalderen.

Map of the study area. Green marks wetland areas recorded on maps from the 19th century. The colours from light yellow to brown show the soil conditions from sand to clay. The map shows the current coastline, while all other maps of the study area presented below show the Stone Age coastline.

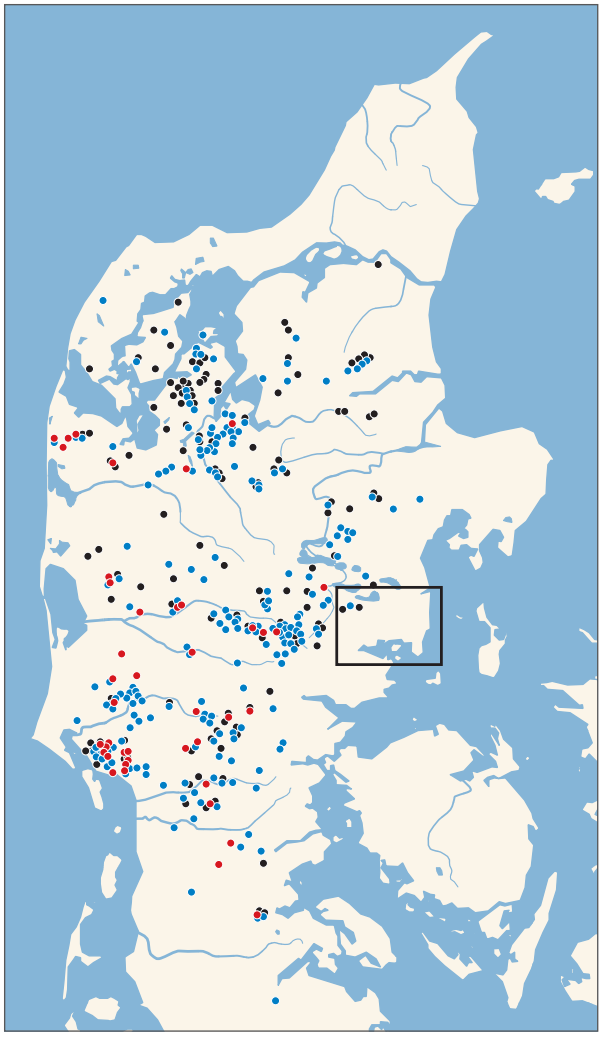

Fig. 2. Udbredelsen af grave fra periode 1 af den jyske enkeltgravskultur (efter E. Hübner 2005, Abb. 470, Abb. 471 og Abb. 472). Fase 1a er vist øverst (rødt) fulgt af fase 1b (blåt) og fase 1c nederst (sort). Gravene fra fase 1b og 1c ligger i udstrakt grad i de samme områder, og mange sorte markeringer er dækket af blå. Undersøgelsesområdet er indtegnet med et rektangel på kortet.

The distribution of graves from period 1 of the SGC with phase 1a shown on top (red), followed by phase 1b (blue) and phase 1c at the bottom (black). The graves from phase 1b and 1c co-occur in many areas, and blue dots therefore often cover black ones. The rectangle marks the position of the study area.

land. Samtidig er der dog genstande, der bryder dette mønster. Disse og ikke mindst deres kontekster er væsentlige for en forståelse af forholdet mellem de to kulturer.

Formålet med denne artikel er dels at belyse forholdet mellem enkeltgravskulturen og tragtbægerkulturen inden for undersøgelsesområdet i den periode, de eksisterede side om side, og dels at se på, hvad der skete, da tragtbægerkulturen gik i opløsning og forsvandt. Jeg vil også se på udviklingen i tragtbægerkulturen forud for enkeltgravskulturens fremkomst. Dette er nødvendigt for at forstå, hvorfor tragtbægerkulturen blev udpræget kystbunden, og hvorfor den brød sammen[9].

Landskabet

Den tragtformede Horsens Fjord er, bortset fra nogle dybe strøm-render, præget af lavt vand og markante øer. Inderst i fjorden, lige øst for Horsens, danner det meget smalle Stensballe Sund en forbindelse til Horsens Nørrestrand, der udgør en brakvandsholdig fjordarm. I stenalderen var denne en del af en meget større inderfjord, der strakte sig 4-5 km ind i landet. I forbindelse med anlæggelsen af den østjyske motorvej E45 vest for Horsens viste boreprøver, at fjorden her havde en dybde på op til 13 m. Den er siden blevet fyldt op og overlejret i en tykkelse på op til 3 m af sedimenter tilført gennem å-løbene.[10]

Horsens Fjord er placeret noget nord for "vippelinjen", den linje hvor landhævning og vandstandsstigning siden atlantisk tid har været i nogenlunde balance. Langs fjorden er der registreret en højeste kystlinje omkring 1,4 m over nuværende havniveau, hvilket kun er lidt under det forventede, men der er dog en væsentlig uoverensstemmelse i forhold til de omkringliggende områder. I Norsminde Fjord, 20 km mod nord, er den højeste kystlinje på 2,5 m over nuværende havniveau dateret til slutningen af ældre stenalder, medens den på samme tid i Horsens Fjord lå omkring 1 m under nuværende havniveau. Den højeste kystlinje i Horsens Fjord indtraf derfor senere, og måske meget senere end i Norsminde Fjord. Forskellen mellem de to fjorde skyldes, at Horsens Fjord ligger i et geologisk sænkningsområde, der har været aktivt i millioner af år og stadig er det.[11] Vandstanden i fjorden har gennem de sidste 6.000 år bevæget sig op og ned i takt med transgressioner og regressioner uden at ændre sig væsentligt fra den, der herskede ved begyndelsen af yngre stenalder. Fjorden er dog blevet mindre som følge af sedimentationen med materiale fra å-løbene.

På trods af den nogenlunde uændrede vandstand var Horsens Fjord i stenalderen en anden, end den er i dag. Der var en kraftigere tidevandsstrøm med større forskel mellem ebbe og flod, køligere vand om sommeren, varmere vand om vinteren og en væsentlig større saltholdighed.[12] Både fisk og skaldyr stortrivedes i fjorden, og ved det smalle Stensballe Sund, hvor der var en evig malstrøm af vand mellem den ydre og indre fjord, dannedes store skalbanker, medens fiskene har stået tæt i det strømmende næringsrige vand. Det var et ressource-grundlag, der ikke kun blev udnyttet i ældre stenalder, men også senere hvor det bl.a. satte sig tydelige spor i det neolitiske samfund i form af omfattende ofringer i fjorden, ikke mindst i Stensballe Sund.

Nord for fjorden finder vi yderst mod Kattegat det relativt flade, frugtbare Hads herred adskilt mod vest fra den øvrige del af undersøgelsesområdet af et udstrakt mosedrag, der fra Horsens Fjord når næsten op til Norsminde Fjord. Langs fjorden mod vest følger de stærkt kuperede og sandede Sondrup Bakker, der er præget af mange dødishuller. De afløses af fladere, afrundede

bakker, der ind mod Horsens tiltager i højde for at ende i "Stensballe Bjerge", et 80 m højt bakkedrag, der ligger lige ud til fjorden. Det er grundlæggende tertiære aflejringer af Søvind-mergel, der har formet denne del af landskabet, men overfladen er præget af kvartære istidsaflejringer. Langs fjordens sydside er terrænet fladt og specielt mod øst leret, og meget frugtbart. Mod syd stiger det gradvist for at ende i nogle bakkedrag ved grænsen af undersøgelsesområdet.

Mod vest i forlængelse af Horsens Fjord ligger nogle markante dalstrøg, der danner grundlaget for et udstrakt afvandingssystem. Mellem dalene er der et jævnt bakket, sandet og veldrænet område. Mod nord hæver landet sig gradvist, for mod nordvest at nå "Danmarks tag", området omkring Ejer Bavnehøj i godt 170 m's højde. Også her er der en sandet og veldrænet jordbund. Den nordlige afgrænsning af undersøgelsesområdet udgøres af Mossø og i forlængelse heraf mod øst Skanderborg Sø. Bevæger vi os østpå gennem det indre af undersøgelsesområdet, bliver jordbunden mere leret og dårligere drænet. I et område omkring Hovedgård og øst derfor er landskabet så vandlidende, at det i udrænet tilstand reelt er uanvendeligt til landbrug. Der er stort set ingen fund fra dette område, hverken fra yngre stenalder, bronzealder eller jernalder.

De indsamlede data

Jeg har medtaget alle fund med tilknytning til yngre stenalder i undersøgelsesområdet. Fokus i registreringen har været på typologisk daterbare genstande, medens jeg f.eks. ikke har medtaget flintaffald og gængse flintredskaber fra bopladserne. Kilderne til fundmaterialet har dels været museernes magasiner og arkiver og dels privatsamlinger. For museernes vedkommende er der dels tale om ældre fund med ingen eller begrænsede oplysninger om fundsammenhænge og dels om nyere udgravninger, hvor fundsammenhængene naturligvis indgår i registreringen. For privatsamlingernes vedkommende er der næsten udelukkende tale om overfladeopsamlinger. Her har et grundlæggende kriterie for at medtage en genstand været, at fundstedet har kunnet godtgøres. Samlet har jeg detailregistreret godt 2.600 genstande af flint eller sten og omkring 6.000 stykker keramik. Alt materiale er samlet i et katalog, som er udgivet digitalt.[13]

Jeg skal her ikke komme ind på typologierne anvendt i registreringen af materialet, men blot kommentere en enkelt af dem. Den vedrører de tyknakkede økser, der udgør en stor og for denne artikel vigtig gruppe. Poul Otto Nielsen foreslog i 1979 en opdeling af de mellemneolitiske tyknakkede økser i en type A og en type B. Opdelingen er dels baseret på, om vinklen mellem sidekanterne er over (A-økser) eller under (B-økser) 8°, og dels på forskellige supplerende træk, som kan forekomme på B-økserne (skrå nakke, slibning af sidekanterne, uregelmæssige konkav/konvekse eller regulært konvekse forløb af

sidekanterne samt hængende æg), men aldrig på A-økserne. Brugen af vinklen mellem sidekanterne til at udskille de to typer har været meget debatteret,[14] men selvom det er åbenlyst, at skellet ved 8° ligger midt i en-toppet fordelingskurve, så er der alligevel en klar sammenhæng mellem de lave vinkelværdier og forekomsten af de supplerende karakteristiske elementer på økserne. Der er imidlertid ikke tale om to tidsmæssigt adskilte typer, men derimod om en glidende tidsmæssig udvikling, hvor der i de ældste fundsammenhænge er flest A-økser og i de yngste flest B-økser.

Poul Otto Nielsen arbejdede ud fra et kontekstbelagt datamateriale, først og fremmest depotfund, hvor det var uproblematisk at sikre sig, at økserne tilhørte mellemneolitikum. I et heterogent fundmateriale, som det aktuelle, opstår imidlertid et stort problem. Hvordan skelner man mellem A- og B-økserne på den ene side og de tyknakkede økser fra senneolitikum på den anden? Fraset de såkaldte bredæggede økser, der er kopier af metaløkser, findes løsningen i det mål, der benævnes det relative nakkeindeks, dvs. det procentvise forhold mellem tykkelsen ved nakken og øksens største tykkelse. Typisk har senneolitiske økser et V-formet længdesnit,[15] hvor det relative nakkeindeks ligger over 90 %, medens alle sikre type-A og type B-økser, jeg har set, har et indeks på under 90 %. Jeg opererer derfor med kategori A-, B- og C-økser, hvor sidstnævnte, der udskilles først, er karakteriseret ved et relativt nakkeindeks på over 90 %. Derefter udskilles A- og B-økserne, hvor de supplerende karakteristika for B-økserne er prioriteret i udskillelsen før vinklen mellem sidekanterne. Det er dog meget sjældent, at man på dette grundlag ender op med en B-økse, der har en sidekantvinkel på over 8°. Inden for kategori A- og B-økserne forekommer forskellige typer. Ud over A-økser af Bundsø-, Lindø- og St. Valby-type, drejer det sig for B-øksernes vedkommende om økser af Vedbæk-, Brogård- og EGK-type.[16]

Udskillelsesgrundlaget for EGK-typen er ret subjektivt. Den har til overflod de samme særtræk som de andre B-typer i form af skrå nakke, smalsideslibning, konkav-konvekse smalsider og hængende æg, men yderligere har den nogle karakteristika, som adskiller den fra både disse og fra A-økserne. Den præcise retvinklede tilhugning af kanterne mellem siderne forekommer således ikke. I stedet er afslagssporene grovere og mere uregelmæssige, og de løber ofte over kanterne, så smalsiderne får et let afrundet udseende. Samtidig bruges knusning ofte til at fjerne fremspringende punkter, der er resultatet af den grove tilhugning. Yderligere er slibningen ofte begrænset til området ved æggen, hvor den på de andre B-økser og på A-økserne konsekvent er gennemført på hele bredsiden. Smalsidevinklen overtræder også oftere de 8°, end det er tilfældet ved de andre B-økser, men den gennemsnitlige smalsidevinkel på 6,6° er dog kun 0,3° højere end på disse.[17]

Tragtbægerkulturen i Østjylland før 3000 f.Kr.

Den første periode af tidligneolitikum (TN I – 3900 til 3600 f.Kr.) er sparsomt belagt med fund i undersøgelsesområdet (fig. 3), som det også er tilfældet de fleste andre steder i Sydskandinavien. Vi kender dog relativt mange sikre bopladser, nogle i direkte kontakt med kysten, andre inde i landet med varierende afstand til kysten. Fire af fem pladser ved kysten er skaldynger med fiskeri og kystjagt, heriblandt den fuldt udgravede skaldynge ved Norsminde. Af 17 indlandspladser har en fra Ringkloster også været en jagtplads, mens de øvrige formodentlig alle har været landbrugspladser.[18] De fleste af disse kendes kun i form af spredte gruber tilfældigt fremkommet ved udgravninger rettet mod andre objekter. Der er dog undtagelser, som den velbevarede og fuldt udgravede plads ved Mosegården.[19] Her fandtes centralt på den kun 100 m^2 store plads et stensat ildsted med stolpehuller fra en eller flere bygninger til den ene side

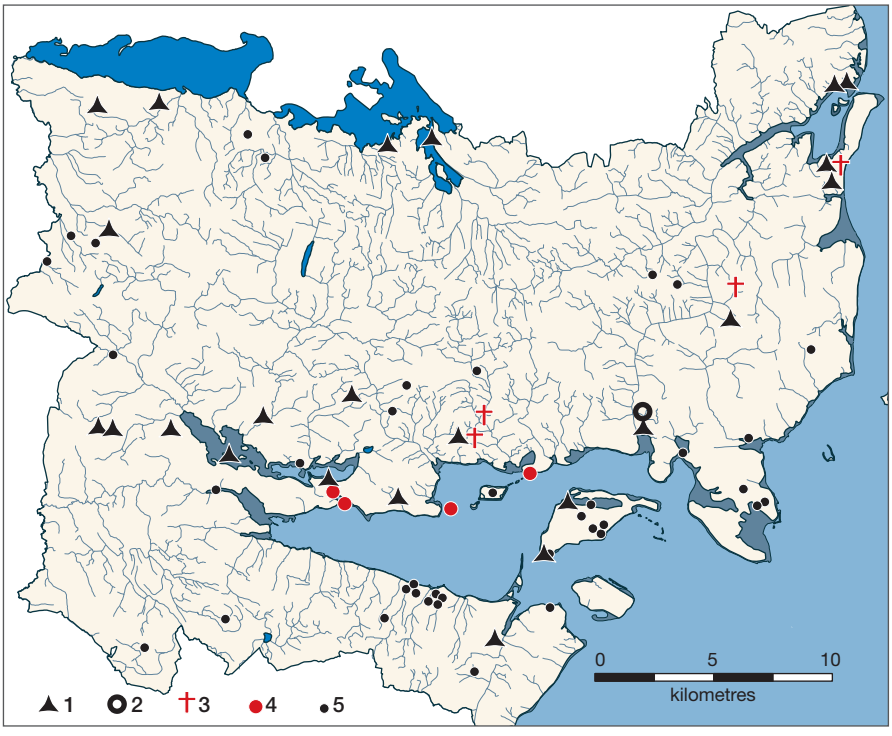

Fig. 3. Udbredelsen af fund fra undersøgelsesområdet mellem 3900 og 3600 f.Kr.: 1, bopladser; 2, systemgravsanlæg; 3, grave; 4, nedlægninger i saltvand; 5, løsfund af spidsnakkede flintøkser og tyndnakkede flintøkser af type I-II.

The distribution of finds from the study area dated to between 3900 and 3600 BC: 1, settlements; 2, causewayed enclosure; 3, graves; 4, depositions in marine environments; 5, stray finds of pointed-butted flint axes and thin-butted flint axes of types I-II.

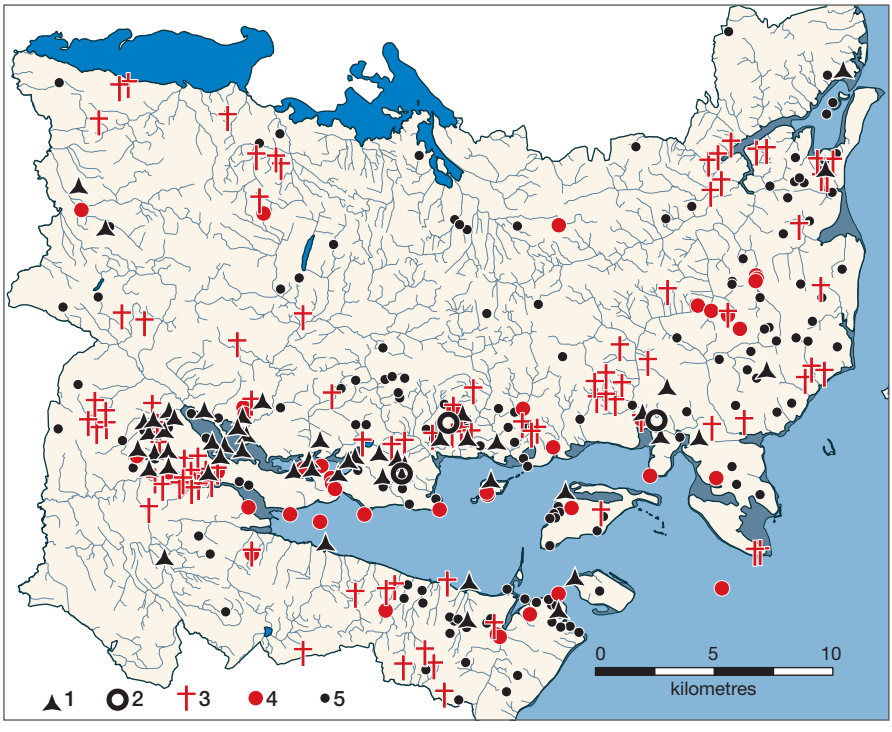

Fig. 4. Udbredelsen af fund fra undersøgelsesområdet mellem 3600 og 3000 f.Kr.: 1, bopladser; 2, systemgravsanlæg; 3, grave; 4, nedlægninger i ferskvand og saltvand; 5, løsfund af tyndnakkede flintøkser af type IV-VIII.

The distribution of finds from the study area dated to between 3600 and 3000 BC: 1, settlements; 2, causewayed enclosures; 3, graves; 4, depositions in freshwater and marine environments; 5, stray finds of thin-butted flint axes of types IV-VIII.

og et kulturlag i en forsænkning til den anden. Pladsen var bevaret under en høj, uden hvilken kun dele af kulturlaget i forsænkningen ville have overlevet pløjningen. Også et systemgravsanlæg ved Aalstrup kan med sikkerhed dateres til denne periode.[20] Ud over bopladserne og løsfund af spidsnakkede og tyndnakkede flintøkser af type I-II er der fire grave og fire nedlæggelser i saltvand.

I slutningen af tidligneolitikum og op gennem den ældre del af mellemneolitisk tragtbægerkultur (TN II-MNA II (III/IV) – 3600 til 3000 f.Kr.) øges mængden af fund fra undersøgelsesområdet drastisk (fig. 4).[21] Specielt ved bunden og langs nordsiden af Horsens Fjord er antallet af bopladser stort, og heraf er mange dokumenteret gennem udgravninger. Dertil kommer tre udgravede systemgravsanlæg. Mængden af grave, primært i form af storstensgrave, er også stor, ligesom nedlægninger i ferskvand og saltvand er talrige.[22] Løsfund af tyndnakkede økser supplerer udbredelsesbilledet.

Den store mængde fund muliggør et detaljeret billede af bebyggelsens placering og struktur. Den er åbenlyst stærkt kystbunden og specielt ved Horsens Fjord meget tæt, medens den op langs Kattegats kyst mod øst forekommer mere spredt. Betragter man fundfordelingen nærmere, er der en tydelig tendens til grupperinger, der langs nordsiden af fjorden knytter sig til de tre kendte systemgravsanlæg. Fra øst mod vest er det Aalstrup, Toftum og Bjerggård. I forbindelse med den meget markante klynge af fund ved den inderste del af Horsens Fjord ligger en plads – Aarupgård – som formodentlig også har været et systemgravsanlæg.[23] Inde i landet mod både nord og syd er fundmængden stærkt begrænset. Mod nordvest findes dog to bopladser og syv grave. Bopladserne kan begge placeres omkring overgangen mellem TN og MNA, og af de syv grave er to langhøje, der kan dateres til TN II, medens resten er megalitgrave. Tre af disse har haft simple kamre fra TN II, medens kamrenes form for de resterende fire er ukendt. Tilsyneladende var bebyggelsen i området begrænset til TN og muligvis den tidligste del af MNA.

Udgravningerne af bopladser langs Horsens Fjord viser, at mange af disse var permanente og af anseelig størrelse. Det gælder ikke mindst bopladser i tilknytning til systemgravsanlæggene. Således har udgravningerne ved Toftum og Aalstrup fastslået bopladser med minimum-størrelser på henholdsvis 1,5 og 2 ha. Fra gruppen af bopladser ved den inderste del af Horsens Fjord har udgravninger endvidere dokumenteret størrelser på mindst 0,3 til 0,7 ha, men i alle tilfælde kan pladserne have været større.[24] Bebyggelsens permanente karakter understreges også af megalitgravenes tendens til at danne tætte grupperinger. I grupperne er der både tidlige og sene gravtyper, og en løbende hensættelse af keramik foran kamrene frem gennem MNA I og II understreger stedskontinuiteten. Vi finder også pladser direkte ved kysten, hvorfra der i fem tilfælde er dokumenteret forekomst af skaller. Det viser, at indsamling og fiskeri fortsat har spillet en rolle. På alle tre udgravede systemgravsanlæg, specielt Toftum, finder vi også skaller i genopgravninger i systemgravene. Baggrunden for dette er dog snarere rituelt end økonomisk betinget.[25]

Landbrug

Tragtbægerkulturens landbrug er tydeligt afspejlet i pollendiagrammer fra søbassiner som beskrevet af Johannes Iversen i et banebrydende arbejde om "Landnam i Danmarks Stenalder" fra 1941. Her opdeler han landnammet i tre faser, som han fortolker som følger: Den indledende fase repræsenterer selve skovrydningen; den anden fase, karakteriseret ved et birkemaksimum, repræsenterer en dyrkningsfase baseret på afbrænding af de ryddede arealer – et svedjebrug; den tredje fase, domineret af hassel, repræsenterer en tilgronings-

fase af de ryddede arealer. Iversen opfattede således forløbet i pollendiagrammerne som resultatet af en gruppe menneskers indgreb over for skoven, deres udnyttelse af de ryddede arealer i en periode, og den efterfølgende tilgroning af skoven, dog med den tilføjelse at tilgroningsfasen var reguleret for at bevare de opståede hassellunde.[26]

Sidenhen har C14-dateringer knyttet til pollendiagrammer samt en øget viden om pollens spredning ændret denne opfattelse. Landnammet, som det optræder i pollendiagrammerne, afspejler ikke lokale indgreb over for skoven, men derimod langvarige kulturbetingede ændringer i udnyttelsen af det skovdækkede landskab. Således dateres groft set den indledende fase til 3900-3600 f.Kr., den anden fase til 3600-3000 f.Kr. og den tredje fase til 3000-2600 f.Kr.[27]

Det er påfaldende, at den første fase, der dækker et 300-årigt tidsrum, alene afspejler spredte indgreb overfor skoven og ikke en systematisk udnyttelse. Dette stemmer imidlertid godt overens med det bebyggelsesmønster, vi ser i undersøgelsesområdet, med små bopladser af kort varighed. Selvom der givetvis har været et organiseret landbrug, har mobiliteten i det været så stor, at det ikke slår igennem i de overordnede pollendiagrammer. Den anden fase, der dækker de næste 600 år, afspejler et systematisk udnyttelsesmønster med en svedjebrugsrotation mellem rydning, afbrænding, dyrkning, græsning og gentilgroning med primært birk på permanent etablerede marksystemer. Det passer med, at vi i undersøgelsesområdet i lighed med andre områder finder koncentrerede bebyggelser. Det har været betvivlet, at svedjebrug overhovedet var i anvendelse, og ud fra sporene efter ardpløjning under høje blev det antaget, at man udelukkende havde permanent dyrkede marker. Ud fra pollendiagrammer, ligeledes under høje, kan der dog ikke herske tvivl om anvendelsen af svedjebrug.[28]

To andre kilder til belysning af landbrugets karakter er bevarede plantemakrofossiler og dyreknogler på bopladserne. Figur 5 viser fordelingen af kornarter baseret på bestemmelse af plante-makrofossiler gennem yngre stenalder frem til og med LN II, medens figur 6 viser fordelingen af tamdyrarter og jagede pattedyr indenfor tragtbægerkulturen. For både korn og dyr gælder, at mængden af bevarede og/eller indsamlede dele fra de enkelte lokaliteter er stærkt varierende. Hvis diagrammerne blev baseret på de samlede absolutte optællinger, ville en mindre gruppe fundenheder med store forekomster få en helt dominerende indflydelse, medens omvendt, hvis man baserede dem på de procentvise forekomster fra de enkelte lokaliteter, ville den statistiske usikkerhed i de små fund fuldstændig skævvride resultatet. Jeg har derfor valgt at bruge en mellemløsning ved fremstillingen af de to diagrammer. Ved fund med en totalsum på mindre end 100 benyttes de konkret optalte værdier, medens procenttal anvendes ved fund med en totalsum på mere end 100.[29]

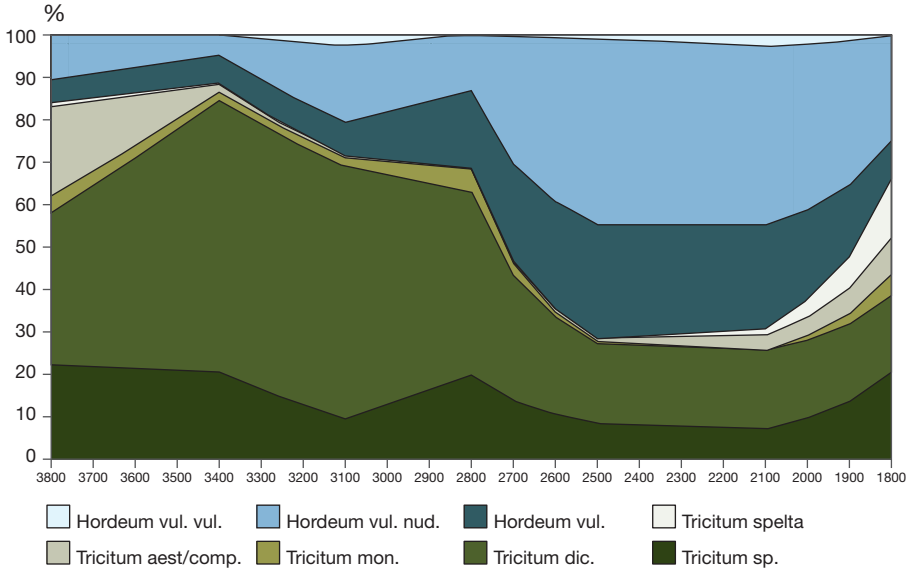

Fig. 5. Den procentvise fordeling af korntyper i yngre stenalder i Sydskandinavien ud fra optælling af makrofossiler fra 91 fundenheder.

The percentage distribution of cereal types during the Neolithic of southern Scandinavia based on counts of macrofossils in 91 sample units.

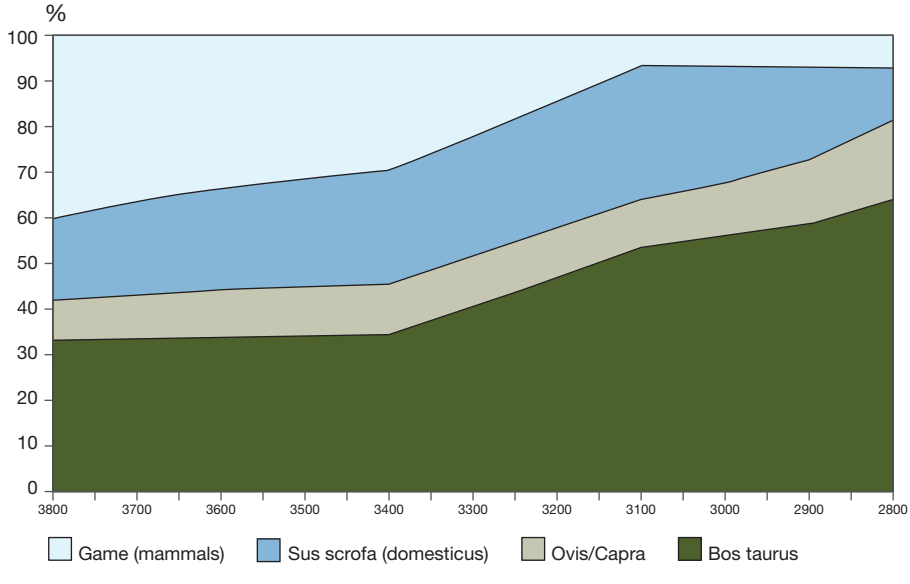

Fig. 6. Den procentvise fordeling af tamdyrarter og jagede pattedyr i tragtbægerkulturen i Sydskandinavien ud fra optælling af knogler fra 74 fundenheder.

The percentage distribution of domestic species and hunted mammals during the FBC in southern Scandinavia based on counts of bones in 74 sample units.

Hvede var totalt dominerende i TN og begyndelsen af MNA, men i løbet af MNA steg byggens andel til omkring en tredjedel (fig. 5). Den alt dominerende hvedeart var Emmer (Triticum dicoccum), medens Enkorn (Triticum monococcum) kun forekom i meget små mængder. I TN I forekom også en begrænset mængde af Brød- og Dværghvede (Triticum aestivum/compactum), der var en del af den oprindelige "landbrugspakke" fra syd, men den forsvandt stort set i TN II og MNA. For byggens vedkommende var der næsten udelukkende tale om Nøgenbyg (Hordeum vulgare nudum). Selvom svedjebrug er dokumenteret gennem pollendiagrammerne, er der også indikationer på mere intensive agerdyrkningsformer. Dels er der spor efter pløjning med ard allerede omkring 3700 f.Kr., og dels er der indikationer i TN II for gødskning af kornmarkerne.[30]

Ved begyndelsen af tidligneolitikum dominerede "skovens dyr" – jagtvildtet og svinene – over "markens dyr" – kvæget og får/ged (fig. 6). Jagtvildtet udgjorde med op til 40% en meget markant andel af dyrene, men tallene kan være behæftet med fejl. Pladser med mange knogler fra jagtvildt har ofte gode bevaringsforhold som f.eks. på kystpladser med skaller, medens de meget mere talrige indlandspladser stort set ikke har knogler bevaret. Ser vi på tamdyrene alene, dominerede kvæget med 55%, fulgt af svin med 30% og får/ged med 15%.

I løbet af MNA frem til 3000 f.Kr. steg andelen af kvæg, medens andelen af jagtvildt samtidig faldt. Andelen af svin og får/ged synes derimod stabil. Hvorvidt kvæget primært eller udelukkende blev holdt for kødets skyld, eller om det også blev anvendt som malkekvæg, er der delte meninger om. At det blev anvendt som trækdyr til ardpløjning og transport er derimod uden for al tvivl.[31]

Samfundsstruktur

Ud over bebyggelsen og landudnyttelsen er vores viden om samfundsstrukturen inden for tragtbægerkulturen uløseligt knyttet til to anlægskategorier – de monumentale grave og systemgravsanlæggene. Begge blev introduceret i TN I og spillede en central rolle i samfundets organisation frem til midt i MNA. Ud fra C14-dateringerne dukkede langhøje med træbyggede kamre formodentlig op omkring 3800 og senest omkring 3700 f.Kr. Systemgravsanlæggene blev længe anset for at begynde i TN II og dermed tidligst omkring 3600 f.Kr.; men også de har vist sig at begynde senest mellem 3800 og 3700 f.Kr.[32]

Mange tidligneolitiske langhøje blev opført direkte oven på tidligere bopladser, som f.eks. ved Mosegården i undersøgelsesområdet, hvilket må afspejle en meget direkte sammenhæng mellem boplads og grav. I forbindelse med de hyppige flytninger af bopladserne i begyndelsen af TN blev de forladte pladser det foretrukne "hjem" for de døde.[33] Generelt ser begravelserne i langhøjenes

trækamre ikke ud til at afspejle betydningsfulde personers død. Den døde i den primære grav i Bygholm Nørremark-højen fra undersøgelsesområdet var ud fra tandemalje kun 13-15 år, og i samme langhøj var fire voksne personer begravet samtidigt i et trækammer. En anden fællesbegravelse finder vi i Skibshøj i Salling. Her lå en voksen og fire børn side om side i et nedbrændt trækammer. Man fornemmer, at det måske mere var omstændighederne omkring dødsfaldene, end det var personernes status, der afstedkom begravelserne, noget der også antydes af, at omfanget af gravgaver i adskillige grave er begrænset. Der er dog undtagelser, som en grav fra Rokær i undersøgelsesområdet viser. Graven, der er C14-dateret til mellem 3400 og 3300 f.Kr. på overgangen fra TN til MNA, indeholdt to tyndnakkede flintøkser, en meget speciel slebet flækkedolk og en stor mængde ravperler. Graven ligger kun 1 km fra Aarupgård, et sandsynligt systemgravsanlæg, hvorfra vi har et nedsat lerkar indeholdende kobbersmykker og en mængde ravperler af nøjagtig de samme typer som i Rokær-graven. Lægger vi hertil, at der i tre trækammergrave er fundet kobbersmykker, så har der åbenbart været tendenser mod en stratificering i samfundet.[34]

Mod slutningen af tidligneolitikum erstattes træet med sten i både høje og kamre. Der var i første omgang tale om en arkitektonisk ændring mere end en funktionel ændring, men der skete også andet. I løbet af TN II tiltog opførelsen af dysser, og samtidig blev de mere monumentale. I MNA I voksede kamrene yderligere i størrelse, og jættestuerne kom til. Samtidig ændredes de enkle adgangsforhold til smalle gange, der kunne blokeres med dørsten. Derefter ophørte byggeaktiviteterne fuldstændig. Medens der gennem TN blev hensat et begrænset antal lerkar ved langhøjenes østender, begyndte man ved starten af MNA at hensætte keramik foran indgangene til megalitgravene, en skik der fortsatte, efter at megalitgravsbyggeriet ophørte. Ved Stenhøj-dyssen nær Toftum og Nørremarksgård-jættestuen umiddelbart vest for Horsens har hensættelserne kunnet studeres i detaljer. Den hensatte keramik blev enten slået i stykker på stedet ved hensættelsen, eller inden den blev bragt til stedet, og kun dele af de enkelte kar blev efterladt foran gravene. Efter hensættelsen blev keramikken dækket til med sand, uanset om den var anbragt på overfladen eller i gruber foran randstenene. I Stenhøj-dyssekammeret lå et enkelt helt lerkar tildækket med sand, der indeholdt skår fra ituslåede kar. Kammeret i Nørremarksgård-jættestuen var ødelagt, men i den nærliggende Grønhøj-jættestue blev der ved udgravningen af det velbevarede kammer fundet seks lerkar med en tidsmæssig spredning, der svarer til keramikhensættelserne uden for gangen. Alle var de tilsyneladende blevet dækket med sand.[35]

Ved det øgede megalitgravsbyggeri i slutningen af TN II og ind i MNA ses en tydelig tendens til klyngedannelse (fig. 4). Specielt ved den inderste del af

Horsens Fjord vest for Horsens er der en meget kraftig gruppering med en klar tendens til, at bopladser og grave er placeret adskilt. Det er her, vi finder Nørremarksgård- og Grønhøj-jættestuerne. De blev bygget på nogenlunde samme tidspunkt og var i brug samtidigt i den forstand, at der med mellemrum foregik hensættelser foran indgangene og aktiviteter i kamrene. Ud fra antallet af separate hensættelser ved Nørremarksgård-jættestuen og tidsforskellen på disse skete det i gennemsnit med 10-20 års mellemrum. Jeg har for nylig fortolket forholdene således, at hver megalitgrav tilhørte en slægt, og at de tilbagevendende hensættelser var knyttet til fester og ceremonier, som slægten afholdt for at forstærke båndene til anerne og legitimere sig selv. Aktiviteterne har samtidigt været en manifestation over for konkurrerende slægter.[36]

Med hensyn til begravelserne i kamrene har vi desværre meget få oplysninger. Det skyldes dels, at der i Jylland meget sjældent er knogler bevaret, og dels at der på øerne, hvor knogler er velbevarede, meget sjældent er sikre dateringer af dem. I de få tilfælde, hvor vi i de tidligneolitiske dysser har skeletter, der kan tilskrives de oprindelige begravelser i kamrene, viser disse sig at være manipuleret eller skeletteret på forhånd med anatomisk uorden og manglende knogler til følge. Denne skik synes i udstrakt grad at fortsætte ind i mellemneolitikum.[37]

Vender vi os mod systemgravsanlæggene, er det almene billede af disse præget af Sarup I med dets komplekse palisadesystem, og dobbelte rækker af systemgrave tilpasset palisadeforløbet. Det er imidlertid et billede, som ikke genfindes i ret mange andre anlæg. Langt de fleste har ingen palisader og består kun af en eller to rækker af systemgrave. Toftum fra undersøgelsesområdet, udgravet i 1976 ganske kort tid efter Sarup, er et af dem. Ved den første fremlæggelse blev Toftum opfattet som et samlet anlæg med en dobbelt række af systemgrave. En reevaluering i forbindelse med senere undersøgelser på pladsen viser et meget mere komplekst og langvarigt forløb.[38] Som det tegner sig i dag, bestod anlægget oprindeligt af en enkelt række systemgrave, der løb hele vejen rundt om den bakke, det ligger på, og hvor de enkelte systemgrave havde et forskelligartet hændelsesforløb. Denne række blev siden suppleret på den vestlige side af bakken med en indre række af systemgrave, der havde et nogenlunde ensartet hændelsesforløb. Dette er bedst dokumenteret i den nordligste af de udgravede systemgrave, hvor der kunne konstateres fem genopgravningsfaser. I den oprindelige grøft og de første par genopgravninger sås naturlige aflejringer på bunden efterfulgt af en tildækning med trækulsfarvet sand, medens de seneste genopgravninger var udfyldt med mørke kulturlag indeholdende mængder af flint og keramik. Det omfattende kulturmateriale i de sene genopgravninger i den indre række af systemgrave og mere begrænset

i toppen af enkelte af de ydre grøfter er samtidigt med en mindst 1,5 ha stor boplads, der lå på den østlige side af bakken i samme område, hvor den ydre række af systemgrave lå tidligere.

Det er åbenlyst, at Sarup I var designet fra starten, men det er lige så åbenlyst, at anlæg som Toftum og Aalstrup ikke var det. Det er ikke sandsynligt, at systemgravene blev anlagt samtidigt, og de har tilsyneladende stået åbne kortvarigt i forbindelse med aktiviteter i dem, hvilket meget vel kan være med årtiers mellemrum, som det var tilfældet senere med aktiviteterne foran megalitgravene. På både Toftum og Aalstrup er det dokumenteret, at systemgravene var markeret på overfladen med store sten, ligesom stolper placeret i systemgravenes fyld ses på Aalstrup. Det er en udbredt antagelse, at systemgravsanlæggene udgjorde samlingspladser, hvor store befolkningsgrupper regelmæssigt mødtes med henblik på social interaktion, handel etc. Det er imidlertid en fortolkning, jeg har svært ved at få til at hænge sammen med de aktivitetsmønstre, vi ser i forbindelse med systemgravene. Jeg er mere tilbøjelig til at se systemgravsanlæggene som rituelt betinget, formodentlig i tilknytning til en dødekult, som antydet af forekomsten af menneskeknogler i systemgrave på nogle anlæg og den generelle hensættelse af keramik i systemgravene, der kan ses som en parallel til de tidsmæssigt efterfølgende hensættelser ved megalitgravene. Her vil et anlæg kunne opstå gradvist hos en større eller mindre gruppe af mennesker og vokse i omfang med tiden.

Overordnet tror jeg, som også andre har givet udtryk for, at vi skal se systemgravsrækken og en evt. palisade som grænselinjen mellem to verdener – de levendes ydre verden og de dødes indre afsondrede verden – "de døde sjæles landsby", som det har været udtrykt. At en palisade kan opfattes som en grænselinje er selvklart, medens det måske ikke er så åbenlyst med en række af nedgravninger, der for det meste henligger tildækkede. I mange systemgrave er der imidlertid konstateret konstruktionsmæssige træk, der styrker fortolkningen som en grænselinje. Ved Aalstrup havde de fleste af systemgravene en stejl sten- og lerforet inderside (mod næsset) og en mere skrånende yderside. Specielt iøjnefaldende var en næsten randstenslignende opbygning i en af systemgravene. Ved Toftum havde den systemgrav, der blev registreret gennem et snit på østsiden af bakken, også en lodret lerforet inderside, og ved Bjerggård var indersiden i en af systemgravene også forstærket med ler.[39]

Fra sent i tidligneolitikum og ind i mellemneolitikum blev de "dødes" landsbyer gradvist til de "levendes", som det bl.a. ses ved Toftum. Nedlæggelserne i systemgravene blev i stigende grad præget af bopladslignende materialer, dog stadigt med et tydeligt rituelt præg i form af brandlag, omfattende skallag og store sammenhængende dele af lerkar. I forlængelse, og sandsynligvis sammenhæng,

med denne udvikling bredte hensættelserne af keramik foran megalitgravene sig samtidig med, at nedlæggelserne i systemgravene aftog og forsvandt.[40]

Tragtbægerkultur og enkeltgravskultur i Østjylland mellem 3000 og 2600 f.Kr.

Tragtbægerkulturen

Med den afsluttende St. Valby-fase mellem 3000 og 2600 f.Kr. skete der store ændringer af tragtbægerkulturen i undersøgelsesområdet. Mest synligt er, at den afvekslende og rigt dekorerede keramik afløstes af en meget grov ensartet keramik med et stærkt begrænset udvalg af former og dekorationer. Der skete dog meget andet end det, som det kan ses af figur 7. Bopladserne blev betrag-

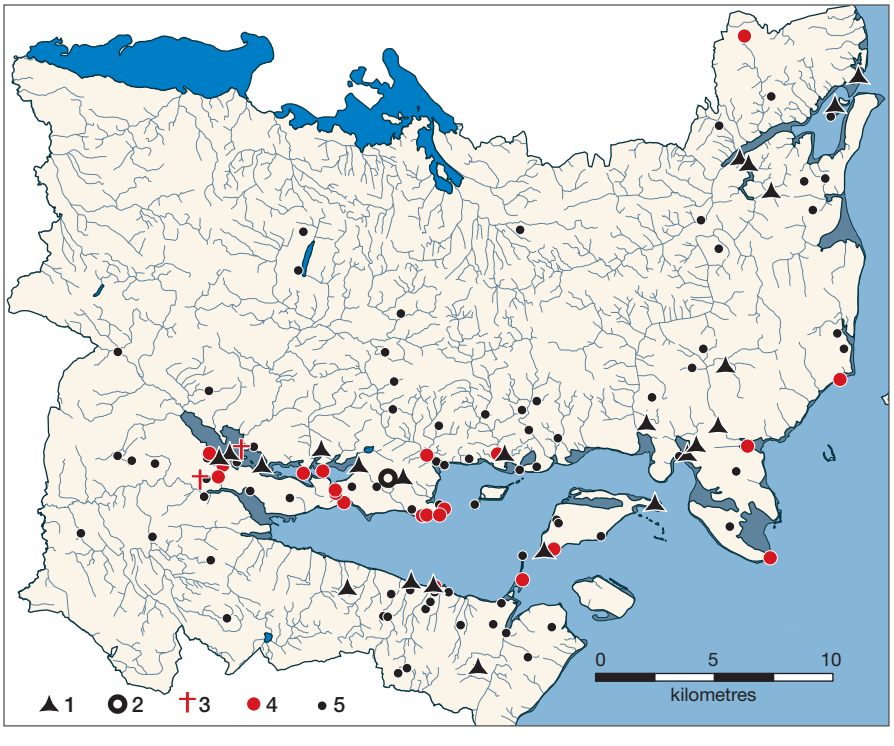

Fig. 7. Udbredelsen af fund fra tragtbægerkulturen i undersøgelsesområdet mellem 3000 og 2600 f.Kr.: 1, bopladser; 2, systemgravsanlæg; 3, grave; 4, nedlægninger i ferskvand og saltvand; 5, løsfund af tyknakkede flintøkser af: kategori A; kategori B af Vedbæk- og Brogård-type; spidsnakkede hulslebne økser.

The distribution of finds from the FBC in the study area dated to between 3000 and 2600 BC: 1, settlements; 2, causewayed enclosure; 3, graves; 4, depositions in freshwater and marine environments; 5, stray finds of thick-butted flint axes of: category A; category B of Vedbæk- and Brogård-type; pointed-butted hollow-ground flint axes.

teligt færre og rykkede nærmere til kysten, og samtidig er begravelser blevet næsten usynlige. Kun to er registreret inden for undersøgelsesområdet, den ene en genbegravelse i en megalitgrav, og den anden en simpel jordgrav på en boplads. Nedlægninger er der derimod mange af, og i langt de fleste tilfælde er de placeret i saltvand.

Hvad bopladserne mistede i antal, vandt de til gengæld i omfang og tidsmæssig udtrækning. Overfladeopsamlinger fra mange af pladserne har resulteret i store mænger af økser spredt over arealer af anseelig størrelse. Toppetbjerg syd for Horsens Fjord har gennem systematisk opsamling, hvor alle genstande er blevet nummereret og afsat på kort, vist sig at være 3 ha stor. Tilsvarende har overfladeopsamlinger ved Bjerggård vist et areal på minimum 2,5 ha. Her afdækkede prøvegrøfter i forbindelse med udgravningerne af systemgravsanlægget et område med udbredte kulturlag, og i toppen af systemgravene fandtes tykke kulturaflejringer fra St. Valby-fasen. Også på Aalstrup-pladsen er der en udbredt forekomst af St. Valby-keramik, men her synes bosættelsen ikke at have været så intensiv. Ved Egehoved på Alrø i Horsens Fjord og på Kalvø i Norsminde Fjord finder vi også et par store bopladser fra St. Valby-fasen liggende direkte ud til kysten og med skaller i kulturlagene.[41]

Landbrug

De store permanent beboede bopladser betød, at ressourcegrundlaget omkring pladserne i forhold til befolkningsstørrelsen var begrænset, og det krævede derfor en mere intensiv drift af både dyrehold og agerbrug. I den tredje fase af landnammet, der er samtidig med denne del af tragtbægerkulturen, ses en kraftigt stigende kurve for hassel, en udvikling der allerede var undervejs i fase 2. Det afspejler en øget brug af skovgræsningsarealer. Skovenge kendes i dag fra f.eks. Östergötland og på Gotland, hvor de sidste nu bliver fredet. En beskrivelse af en årscyklus på en gotlandsk skoveng giver et godt indblik i, hvordan systemet har fungeret i historisk tid: I det sene efterår og vintermånederne ryddes småbuske af vejen, større overhængende grene skæres af træerne og stævningen af træer, først og fremmest hassel, vedligeholdes ved fjernelse af de ældste stammer. Ved forårets begyndelse brændes grene og vissent løv og græs fra forrige år af (svedjebrand uden efterfølgende korndyrkning), hvilket fremmer den nye græsvækst. Midt på sommeren høstes græsset, og træerne bliver stynet (stynings-cyklus 3-7 år). Både hø og afskårne grene bruges som vinterfoder. Efter høsten slippes kvæget ind på engene, hvor de går til vinterens komme.[42]

Denne beskrivelse kan naturligvis ikke overføres direkte til stenalderen. Det er ikke sandsynligt, at man høstede græs, og vinterfodring må alene

have været baseret på "løvhø". Kvæget har derfor opholdt sig på skovengene en større del af året, og de har givetvis også skullet dele dem med svinene, som det var tilfældet i England i middelalderen.[43] Et sandsynligt scenarie er, at man har anvendt et rotationssystem for de enkelte løvenge, således at afbrænding om foråret er sket på nogle enge, medens kvæget har græsset på det visne græs på andre, inden de blev flyttet til det nye græs på de brændte arealer. Tilsvarende kan svinene have gået på skovengene om vinteren, medens kvæget var "opstaldet". Denne opstaldning kunne være foregået på indmarker tæt ved bopladserne for at lette fodringen med løvhø. Disse kunne have været helt ryddede arealer, som, efter at kvæget var flyttet til skovengene, blev pløjet og brugt til korndyrkning, hvorved gødningseffekten blev udnyttet. Nye undersøgelser af kulstof- og kvælstof-isotoper i forkullede kerner fra tragtbægerkulturen viser, som nævnt tidligere, at noget af det dyrkede korn har været påvirket af gødning. Det er dog for nuværende umuligt at sige noget om omfanget af gødskningen.[44]

Diagrammet over fordelingen af dyrearter på bopladserne (fig. 6) viser, at mængden af kvæg øges frem mod slutningen af tragtbægerkulturen, medens andelen af svin falder, og andelen af får/ged øges en smule. For kornets vedkommende er der nogenlunde balance mellem byg- og hvedearter, efter at byggen og ikke mindst Nøgenbyg er gået stærkt frem i forhold til den tidlige del af tragtbægerkulturen (fig. 5). Det er ikke muligt at sige noget sikkert om betydningen af korndyrkningen i forhold til kvægdriften. I et studie af menneskeknogler fra Falbygden i Sverige har det kunnet dokumenteres, at diæten på dette tidspunkt overvejende var baseret på planteføde,[45] men den økologiske forskel på de to områder og den geografiske afstand mellem dem er så stor, at det ikke har direkte implikationer for Østjylland. Der er imidlertid andre undersøgelser, der indikerer en mulig intensivering af korndyrkningen og også en markant ændring i høstmetoderne. Slidspors-analyser af flintsegl har vist, at den traditionelle segltype med en skærende bevægelse mod slutningen af tragtbægerkulturen viser tegn på øget slitage, der kan antages at afspejle en øget korndyrkning. Dertil kommer, at der i St. Valby-fasen dukker en helt ny type segl op, som har været anvendt med en tværgående bevægelse af æggen. Typen tolkes som en "tærskekniv" til at skære hovederne af Nøgenbyg, efter at denne har været høstet i umoden tilstand for at undgå tab af kerner, som vil opstå ved traditionel høstning og transport, hvis det sker, efter at kornet er blevet modent. Disse tærskeknive udviser ofte en ekstrem polering, der minder om et regulært lag af lak. Nyere forsøg har vist, at denne type polering opstår ved skæring i umodne strå, hvilket passer med den foreslåede tolkning.[46]

Samfundsstruktur

I MNA II aftager hensættelserne af keramik foran megalitgravene gradvist. En analyse af keramikken fra undersøgelsesområdet viser, at medens den i de tidlige hensættelser var stilistisk sammenfaldende med keramikken på bopladserne, så afveg den i de sene hensættelser klart fra bopladskeramikken, hvor udviklingen mod en mere udekoreret keramik allerede var i gang. I den sidste ende gav symbolikken i hverken hensættelserne eller keramikdekorationerne mening, og de forsvandt. På et tidspunkt hen mod slutningen af tragtbægerkulturen ser vi en generel tildækning af hensættelsesområderne foran megalitgravene med kraftige stenlag. Folk flyttede sammen på store bopladser i et fællesskab, hvor det arkæologisk er vanskeligt at få øje på individuelle eller gruppebaserede markeringer. Ikke alle riter stoppede dog. Nedlæggelser i saltvand fortsatte og blev nærmest forstærket, og lidt overraskende foretog man stadig genopgravninger i toppen af systemgrave. Ved Bjerggård ses således regulære genopgravninger indeholdende affaldslag med flint og keramik, uden at der er specielt udvalgte genstande imellem. Iblandet kulturmaterialet er der også en del skaller, men i modsætning til tidligere aflejringer i systemgrave er der ikke tale om hele skaller, men derimod om skaller i alle stadier af nedbrydning. Uanset hvor omfattende de kulturelle ændringer i den sene tragtbægerkultur var, har der stadig været en indbygget respekt for systemgravenes betydning, inklusivt skallernes symbolik. Så meget, at man har slæbt skalsmuld op i en højde af 80 m over havet fra en kyst 1,5 km væk for at deponere det sammen med, hvad der har været helt almindeligt bopladsaffald.[47]

Enkeltgravskulturen

Skønt sparsomt udviser fundmaterialet fra periode 1 af den jyske enkeltgravskultur i undersøgelsesområdet et tydeligt spredningsmønster (fig. 8). I det nordvestlige hjørne er der indenfor et afgrænset område tre bopladser, 13 grave[48] og fem løsfund af stridsøkser, der sikkert også stammer fra grave. I området langs kysten, hvor vi på dette tidspunkt har den sene tragtbægerkultur, er der tre nedlæggelser i ferskvand (to stridsøkser og en ravperle) og fem løsfundne stridsøkser. I det mellemliggende område er der ingen fund.

Grundlaget for, at vi kan tale om bopladser, er tyndt. I to af tilfældene er der fundet spredt flint og keramik i og under højfyld, og i det tredje fandtes flint og keramik i tynde kulturlag bevaret i mindre lokale sænkninger. Så spinkelt grundlaget end er, så er det den typiske fremtoning af enkeltgravskulturens bopladser. Allerede Glob bemærkede det, og for den ældre del af enkeltgravskulturen har det ikke ændret sig. Kun for den yngre del finder vi

i dag mere håndfaste vidnesbyrd.[49] Dateringen af de tre bopladser hviler på keramik, og den er i to af tilfældene meget sikker, medens den i det tredje er sandsynlig.

Landbrug

Vores faktuelle viden om landbruget i den tidlige enkeltgravskultur er næsten ikke-eksisterende. Ud fra de svage bopladsspor kan vi antage, at der har været tale om meget små beboelsesenheder, der ofte blev flyttet. Pollendiagrammer fra det centrale Jylland udgør den mest informative kilde. Det drejer sig dels om pollendiagrammer fra søer, og dels om analyser af pollen fra gamle overflader under høje. Specielt i et diagram fra Solsø ses en kraftig reduktion i skovvæksten fra omkring 3000 f.Kr. kombineret med afbrændinger og en øget hededannelse. Et tilsvarende billede med skovreduktion, afbrænding og hededannelse ses i analyser af pollen fra et par enkeltgravshøje ved Skarrild og Harreskov. Pollendiagrammerne fra højene og delvist fra søerne afspejler klart en omfattende kvæggræsning på åbne arealer præget af lyng. Sidstnævnte er i den sammenhæng vigtig, fordi det er muligt for kvæg at vintergræsse på lyng, så det ikke er nødvendigt med en separat vinterfodring. I pollendiagrammet fra Skarrild er der endvidere tegn på skovrydning og begyndende hededannelse fra et lidt dybereliggende lag, der sandsynligvis er samtidig med sen tragtbægerkultur.[50] Alt i alt er det karaktertræk, der peger på omfattende kvægavl. Der er dog også fundet kornaftryk af både hvede og byg i lerkar fra tidlig enkeltgravskultur i det centrale Jylland, og rykker vi ud til det østjyske område, finder vi yderligere vidnesbyrd om agerbrug. I et lerkar fra Refshøjgård-graven nord for Aarhus er der dels fundet pollen af byg og dels en skorpe på indersiden af karret, der kan stamme fra øl, og i samme grav er en kværnsten placeret i den omgivende stenramme. Ved Hinnerup godt tre km mod øst viser pollenanalyser under en tidlig enkeltgravshøj spor efter dyrkning af byg. Både ved Refshøjgård og Hinnerup er mængden af bygpollen så stor, at det har været foreslået, at højene var anbragt på tærskepladser. Yderligere vidnesbyrd om agerbrug fra den tidlige fase kommer fra ardspor under høje, f.eks. under Kikhøj nord for Aarhus og ved Gantrupgraven i undersøgelsesområdet. Sidstnævnte sted er der også foretaget en pollenanalyse, der dog ikke viste spor af agerbrug, men derimod udstrakt kvæggræsning.[51] Med de nuværende vidnesbyrd er det ikke muligt at sige noget om vægtningen mellem kvægavl og agerbrug, og den har næppe heller været ens overalt. Pollenanalyserne fra det centrale Jylland indikerer klart, at kvægavlen har været vigtigst, men med de væsentligt bedre jorder i Østjylland er det sandsynligt, at agerbruget her har spillet en større rolle end vestpå.

Samfundsstruktur

Det mest iøjnefaldende ved enkeltgravskulturen, set ud fra en sen tragtbægerkultur-baggrund, er individets genetablering i det sociale univers. Ved begravelserne blev individet sat i centrum med et gravudstyr, som viser et samfund, hvor kønsdifferentiering var en mærkesag. Ved første øjekast ser det ud som et samfund med ligestilling mellem kønnene og uden social stratificering mellem personer og familier. Helt så enkelt er det dog næppe. For det første er der i de første par århundreder samtidigt med tragtbægerkulturen meget få kvinder repræsenteret i begravelserne i forhold til mænd (1:17), medens det udlignes noget i den senere del (1:4), hvilket kan tyde på et stærkt patriarkalsk samfund. For det andet er billedet af de tidlige begravelser som simple kistebegravelser i et hul i jorden dækket af en lav høj langt fra korrekt. Tværtimod ses ofte supplerende konstruktioner i form af ringgrøfter med tilhørende palisader, der indhegnede begravelsesområdet, og i nogle tilfælde også dødehuse over selve graven. De fleste af sidstnævnte var opbygget i en større cirkelformet grube, hvori trækisten lå centralt placeret, medens andre var bygget direkte på jordoverfladen. Et eksempel på det sidste udgør Gantrupgraven fra undersøgelsesområdet, der også var omgivet af ringgrøft og palisade. Det er også værd at bemærke, at ud af i alt syv grave fra den tidlige del af enkeltgravskulturen udgravet i nyere tid i undersøgelsesområdet var de seks forsynet med ringgrøfter.[52]

Både ringgrøfter med palisader og specielt dødehuse over gravene øger kompleksiteten i begravelserne. Der er åbenlyst ikke tale om en stille bisættelse af afdøde i en trækiste under lav høj i et hjørne af en mark nær ved hjemmet. Der har været en større arbejdsindsats forbundet med begravelserne, og dødehusene tyder på længerevarende ritualer. Man kunne forestille sig, at størrelsen af arbejdsindsatsen og omfanget af ritualerne afspejlede status, men så ville man også forvente, at gravgaverne tilsvarende var mere ekstravagante. Det er dog ikke altid tilfældet. I Gantrupgraven var der ganske vist både en stridsøkse og to flintøkser, men tager vi en anden markant grav med dødehus – cirkelgraven fra Sjørup mellem Holstebro og Viborg (fig. 15c) – så var den eneste gravgave en flintkniv.[53] Det kan således være vanskeligt at pege på entydige statusmarkeringer i forbindelse med enkeltgravskulturens grave.

Grænselandet

Gennem en 200 år lang periode fra 2800 til 2600 f.Kr. var der i undersøgelsesområdet en tæt og stabil bebyggelse fra tragtbægerkulturen langs kysterne, specielt ved Horsens Fjord (fig. 7), og i det nordvestre hjørne af området en bebyggelse fra enkeltgravskulturen (fig. 8). Sidstnævnte udgjorde den yderste

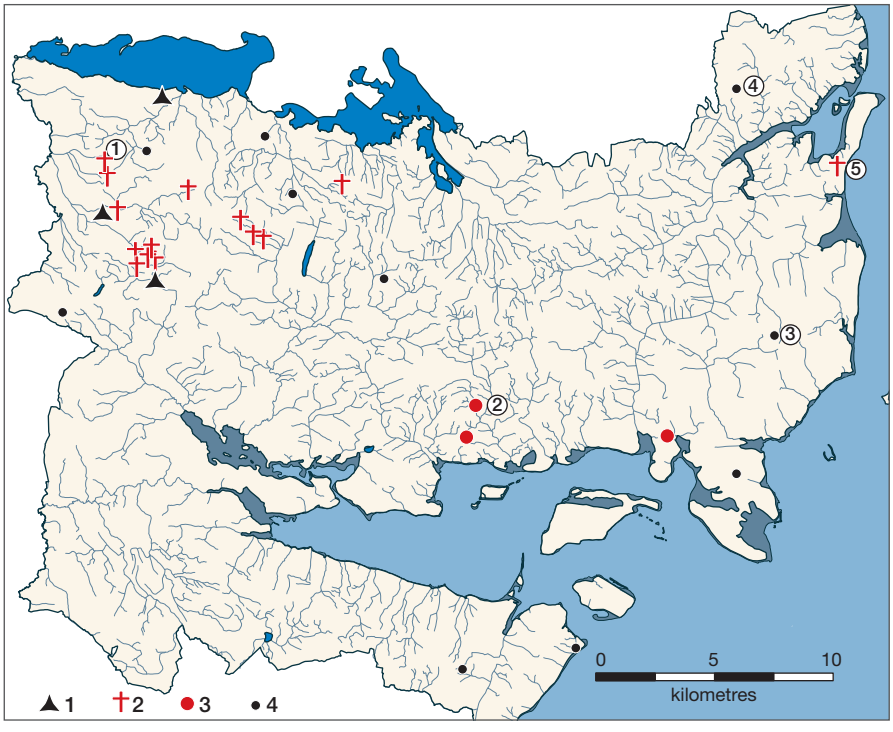

Fig. 8. Udbredelsen af fund fra enkeltgravskulturen i undersøgelsesområdet mellem 2800 og 2600 f.Kr.: 1, bopladser; 2, grave; 3, nedlægninger i ferskvand; 4, løsfundne stridsøkser. For fund med numre, se afsnittet "Grænselandet".

The distribution of finds from the SGC in the study area dated to between 2800 and 2600 BC: 1, settlements; 2, graves; 3, depositions in freshwater environments; 5, stray finds of battle-axes. For numbered finds see "The borderland" section.

forpost mod øst af denne kultur (fig. 2), medens der mellem de to kulturer lå et fundtomt område. Enkeltgravskulturen fortrængte ikke og var ikke i potentiel konflikt med tragtbægerkulturen i forbindelse med bosættelsen. Som vist i det foregående rykkede tragtbægerkulturen ud mod kysten i begyndelsen af mellemneolitikum, efter en spredt bebyggelse i tidligneolitikum, og i St. Valby-fasen har vi ingen vidnesbyrd om, at den var til stede inde i landet.

Forholdet mellem de to kulturer – fredeligt eller konfliktfyldt – kender vi ikke noget til, men at der har været en aktiv kontakt, er der sikre vidnesbyrd om. I en enkeltgrav fra Højvang er der genstande, der stammer fra tragtbægerkulturen, og i kystområdet finder vi genstande, der stammer fra enkeltgravskulturen. Den nævnte grav var en typisk tidlig enkeltgrav (nr. 1 på fig. 8).[54] Selve graven bestod af en let nedsænket trækiste omgivet af en støttepakning af sten fulgt af en cirkelformet 5 meter stor indhegning af nedbankede, tynde

pæle. Umiddelbart uden for denne fulgte en 0,7 m dyb cirkelformet grøft. I graven lå en stridsøkse, to flintøkser og en flintmejsel (fig. 9). Stridsøksen er af Hübners type B4 (alternativt F3) (fig. 9a), hvilket placerer den i periode 1b (eller begyndelsen af 1c). Den ene af flintøkserne (fig. 9d) er en tyknakket, tykbladet kategori B-økse med slebne bredsider og skrå nakke. Den anden flintøkse er tyknakket, tyndbladet med fuldt slebne bredsider og sporadisk slebne smalsider (fig. 9c). Mejslen (fig. 9b), der har kvadratisk tværsnit, er omhyggeligt tilhugget, men usleben. Den tyknakkede økse er et helt igennem typisk eksemplar af Brogård/Falster-typen fra sen tragtbægerkultur, som der er mange af ved kysten, og både den elegante tyndbladede økse med den gennemførte slibning og den omhyggeligt tilhuggede mejsel er også typisk for tragtbægerkulturens flintteknologi.

Fra Refshøjgård nordvest for Aarhus har vi også et eksempel på en flintøkse fra tragtbægerkulturen i en enkeltgrav. Det er en tyknakket, tykbladet kategori A-økse af St. Valby-type, der i graven var placeret foran ansigtet på den døde, hvor man normalt finder en stridsøkse. Graven indeholdt også et svajet A-bæger, som hører til i periode 1, men det konkrete bæger er vanskeligt at placere nærmere.[55] De tyknakkede, tykbladede flintøkser af EGK-type er teknisk af en betragtelig dårligere kvalitet end tragtbægerkulturens, men de ældste af økserne er generelt større og bedre lavet end de senere, og kigger man nærmere på de publicerede fund, kan man finde flere eksempler på økser fra tidlige grave, der med stor sandsynlighed har en baggrund i tragtbægerkulturen på samme måde som økserne fra Højvang og Refshøjgård.[56]

I kystzonen finder vi omvendt genstande, der stammer fra enkeltgravskulturen. Tre af disse kommer fra nedlæggelser i ferskvand. Det drejer sig om to fragmenter af stridsøkser af Hübners type F1 og G2 og en ravskive med en central gennemboring (fig. 10a; nr. 2 på fig. 8). Specielt sidstnævnte er bemærkelsesværdig. Den er af Hübners type 2B med en datering til periode 1c. Den forekommer primært i mandsgrave, overvejende omkring bæltestedet,[57] men ses her i en helt anden type fundsammenhæng, der er almindelig i tragtbægerkulturen, men ikke i den jyske enkeltgravskultur. De fem øvrige fund i kystzonen er alle løsfundne stridsøkser.[58] Af disse er specielt to iøjnefaldende. De er begge af Hübners type A3 med en datering til periode 1a. Dermed udgør de, sammen med en løsfunden økse af samme type fra gruppen af enkeltgravsfund inde i landet, de ældst daterede fund fra enkeltgravskulturen i undersøgelsesområdet. Øksen fra Præstholm Mark (fig. 10b; nr.3 på kortet fig. 8) er et udsøgt og fejlfrit eksemplar af typen. Den blev fundet under pløjning og kan evt. stamme fra en grav, men der er ingen informationer, der kan tale hverken for eller imod. Øksen fra Krekær (fig. 10c; nr. 4 på kortet fig. 8) blev

Fig. 9. Fund fra en enkeltgrav ved Højvang (nr. 1 på fig. 8). – Foto: T. Madsen. 1:2.
Finds from an Early SGC grave at Højvang (no. 1 on fig. 8).

Fig. 10. Et mosefund (a) og to løsfund (b, c) af genstande fra tidlig enkeltgravskultur i kystzonen af undersøgelsesområdet (nr. 2, 3 og 4 på fig. 8). – Foto: T. Madsen. 1:2.

A find from a bog (a) and two stray finds (b, c) of artefacts from the Early SGC in the coastal zone of the study area (nos. 2, 3 and 4 on fig. 8).

fundet ved gravning i en grus-banke. Også den kan evt. stamme fra en grav, men heller ikke her er der informationer, der kan af- eller bekræfte dette. I modsætning til øksen fra Præstholm Mark er der tale om et ramponeret, omdannet eksemplar. Således er den ene skulder fjernet ved prikhugning ef-

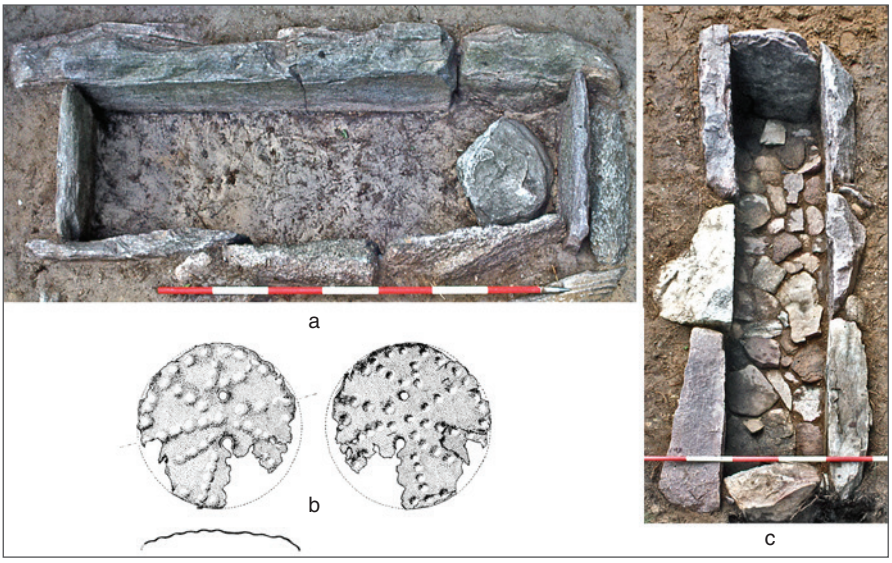

Fig. 11. Stenkister og kobberskive fra Rude (nr. 5 på fig. 8). – a, c: Foto: T. Madsen; b: gengivet efter K. Randsborg 1970. 1:2.

Stone cists and a copper disc from Rude (no. 5 on fig. 8).

terladende en svag hulning, medens den anden formodentlig er blevet rundet af og gjort mindre ved slibning.

Det sidste fund i kystzonen er af en helt anden karakter (nr. 5 på fig. 8). Det drejer sig om kobberskiven fra Rude. Kobberskiven (fig. 11b) blev fundet i 1894 i en stenkiste (fig. 11a) fæstnet med en kobbertråd til venstre håndled af et individ, der lå på ryggen med hovedet i øst formodentlig hvilende på den sten, der ses på kistens bund. Lidt derfra blev fundet en anden kiste (fig. 11c), hvori der også lå et individ, dog uden oldsager. I 1970 publicerede Klavs Randsborg kobberskiven, som han havde fundet blandt bronzealderens genstande på Moesgaard, og knyttede den til kobberfundene fra tidlig tragtbægerkultur. I 1976 kom jeg over et par fredede stenkister i Saxild sogn, som viste sig at være identiske med de to kister nævnt i museets protokol, og i de følgende par år undersøgte jeg derefter kisterne og området omkring dem.[59] De to kister er ikke af en type, vi umiddelbart vil forvente i tidligneolitikum, men da de viste sig at ligge i en langhøj, der i den østlige ende havde en tidligneolitisk facade, og da snit gennem højen ind til kisterne angav, at disse var primære i forhold til den omgivende høj, var sagen klar: Kobberskiven måtte være tidligneolitisk. Konklusionen holdt, lige indtil der forelå en C14-datering af knoglerester fra kisten. Den angav en datering mellem 3000 og 2600 f.Kr. Kobberskiven måtte

således tilhøre en efterbegravelse i en tidligneolitisk stenkiste, eller stenkisten måtte være en senere tilføjelse til anlægget.[60]

Med den nye datering måtte der søges en ny baggrund for kobberskiven. Jeg pegede på en stor kobberskive fra et depotfund fra Nieder-Kräning i Polen og i den sammenhæng på ravskiver fra kugleamforakulturen, alle dekoreret med radiale, dobbelte punktrækker i et kors. Klavs Randsborg foreslog med henvisning til en skive fra et gravfund ved Hřivice Bøhmen, at skiven havde en baggrund i de snorekeramiske grupper. Senest har også Lutz Klassen peget på snorekeramiske grupper fra det vestlige Schweiz. Skiverne fra snorekeramisk kultur, med dobbeltgennemboringer og et mere fladedækkende mønster af radiale punktrækker, udgør for øjeblikket de nærmeste paralleller til Rudeskiven.[61]

Men hvad med kisterne? Er det helt sikkert, at de er tidligneolitiske, eller kan de være samtidige med kobberskiven? Registreringerne på gravningen viste, at de var samtidige med den omgivende jordhøj, og de er også blevet anset for at være "dyssekister" – en overgangsform mellem træbyggede og stenbyggede grave i tidligneolitikum.[62] En renovering af højen i forbindelse med en senere tilføjelse af kisterne er også en mulighed, som dog indtil videre må stå ubesvaret.

En kultur går i opløsning

I en op mod 400 år lang periode mellem 3000 og 2600 f.Kr. fremstår tragtbægerkulturen i undersøgelsesområdet som en stillestående kultur, der groft set kun tegner sig gennem store bopladser med et øksemateriale af høj kvalitet ved siden af en simpel, grov brugskeramik. Ser vi på denne periode i et større sydskandinavisk perspektiv, er billedet imidlertid meget mere komplekst, præget af store regionale forskelle. Med forsimplingen og opløsningen af de basale kulturelle strukturer i løbet af mellemneolitisk tragtbægerkultur åbnes der for kulturelle påvirkninger udefra. I første omgang er det to vidt forskellige kulturer, der øger indflydelse – kugleamforakulturen i det nordlige Tyskland og Polen og den grubekeramiske kultur i det centrale Sverige. I anden omgang kommer påvirkningerne fra de snorekeramiske grupper i samme område som kugleamforakulturen og fra stridsøksekulturen i Sverige.

Mod øst på Fyn og Sjælland med tilliggende øer aftager brugen af megalitgravene ikke i samme omfang som i det østjyske. Her er der frem gennem mellemneolitikum omfattende begravelsesaktiviteter i kamrene, samtidig med at forenklingen af keramikken sker langsommere. På Lolland-Falster bliver keramikken stærkt præget af kugleamforakulturens keramik, samtidig med at

den bliver hensat i store mængder i megalitgravenes kamre, på samme måde som det sker syd for Østersøen.[63]

På Bornholm forbliver keramikken i højere grad dekoreret, hvilket muliggør en udskillelse af to tidsmæssige faser i den afsluttende del af tragtbægerkulturen. Samtidig fortsætter udadvendte rituelle aktiviteter i udstrakt grad ind i den sene tragtbægerkultur. Det sker i tilknytning til nogle cirkelformede træbygninger, der bl.a. er placeret i palisadeomkransede områder, som må opfattes som en fortsættelse af systemgravsanlæggene.[64] Udviklingen i sen tragtbægerkultur i Sydsverige har naturligt nok mange lighedspunkter med udviklingen på Bornholm – eller måske snarere omvendt – både med hensyn til keramikken og til de rituelle aktiviteter på palisadeomkransede pladser. Forholdene kompliceres dog af, at palisadeanlæggene i Sydsverige er knyttet til den tidlige stridsøksekultur og ikke til tragtbægerkulturen som på Bornholm og på Sjælland, hvor de også forekommer. Dertil kommer et større indslag af grubekeramiske kulturelementer, der af nogle ses som optaget og integreret i tragtbægerkulturen, og af andre opfattes som udtryk for en selvstændig tilstedeværelse af denne kultur. Op langs den svenske vest- og østkyst forekommer den grubekeramiske kultur dog i en mere utvetydig selvstændig udformning.[65] I det østlige Sydskandinavien synes forholdene mellem tragtbægerkultur, grubekeramisk kultur og svensk-norsk stridsøksekultur som helhed at være ganske flydende.

Hvis man alene går ud fra forekomsten af skafttungepile og cylindriske flækkeblokke, har den grubekeramiske kultur en stor udbredelse og indflydelse i det sydskandinaviske område på dette tidspunkt.[66] Man skal dog være meget forsigtig med at bruge omfanget af disse genstandstyper til alene at kortlægge den grubekeramiske kultur al den stund, at de i lighed med f.eks. flintøkser er objekter, der typisk vil være genstand for omfattende handel. Bopladser langs Kattegats kyster og ind i Limfjorden med regulær grubekeramisk indflydelse er der dog mange af, og specielt på Djursland er situationen interessant. Her ser vi samme udvikling gennem mellemneolitisk tragtbægerkultur som andre steder med større bopladser og tiltagende forenkling af keramikken, som f.eks. på Fannerup-bopladsen, hvor der også forekommer enkelte eksempler på, hvad der angiveligt er typisk St. Valby-keramik.[67] Som helhed er slutfasen af tragtbægerkulturen imidlertid ikke til stede på Djursland. I stedet finder vi en kultur, der som i Sydsverige fremstår som en blandingsform mellem tragtbægerkultur og grubekeramisk kultur. Spektret af flintøkser er det samme som i tragtbægerkulturen, lerkarrene er fladbundede og ikke spidsbundede, som de typisk er i grubekeramisk kultur. Endvidere er lerskiver, dekoreret fuldstændig som tragtbægerkulturens, en integreret del af keramikinventaret, og selvom størstedelen af dekorationerne har en baggrund i grubekeramisk kultur, er der

andre dele, som vi normalt forbinder med tragtbægerkultur. I lighed med tragtbægerkulturen og grubekeramisk kultur i Sverige finder vi bosættelser på store bopladser. Kainsbakke er her nøgleeksemplet. Den 15 ha store plads overgår i omfang de samtidige sene tragtbægerkultur-bopladser i det meste af landet, og samtidig er den som mange af disse placeret på et tidligere systemgravsanlæg. Der er også sket nedlæggelser i genopgravningerne i systemgravene, men de tegner sig anderledes end på Bjerggård. Medens vi der ser affald tilsat lidt skalsmuld afspejlende gamle traditioner, er der på Kainsbakke omfattende rituelle nedlæggelser, der afspejler en nyfunden ideologi med ritualer fra grubekeramisk kultur kombineret med ældre ritualer fra tragtbægerkulturen knyttet til systemgrave.[68] I Fuglsø Mose viser et pollendiagram – som andre steder i det østlige Danmark – et "landnamsforløb" med et birke-maksimum og et efterfølgende hassel-maksimum. Angiveligt forsvinder sidstnævnte allerede mellem 3000 og 2800 f.Kr., hvilket er tidligere end i andre diagrammer, hvor det først sker hen mod 2600 (se note 30). Analyserne hviler imidlertid på en ældre dateringsserie med ikke ret mange dateringer, så man skal nok være varsom med at lægge alt for megen vægt på det tidsmæssige aspekt. Knoglefundene viser, at tamdyr har været vigtigst – først og fremmest kvæg – medens jagtvildt har spillet en klar, men langt fra dominerende rolle. Agerbrug har også spillet en rolle, men fundene tillader ikke at uddybe dette.[69]

I det nordvestlige Jylland syd for Limfjorden er tragtbægerkulturen rigt repræsenteret, og gennem tidligneolitikum og tidlig mellemneolitikum ses samme udvikling som i det øvrige Sydskandinavien med keramikhensættelser foran megalitgravene, der toner ud i løbet af MNA for i sidste ende at blive tildækket med lag af sten.[70] I modsætning til de øvrige dele af Sydskandinavien erstatter en ny gravtype – stendyngegravene – brugen af megalitgravene. Disse, der som standard består af et firkantet "dødehus" med et eller flere par ovale "grave" foran, ligger i lange rækker, der markerer vejforløb. Når der er anvendt anførselstegn, skyldes det, at stendyngegravene nu overbevisende er tolket som vognbegravelser, hvor trækokserne var placeret i de parvise "grave" og vognen – i hvert fald symbolsk – var placeret i "dødehuset". Denne fortolkning har også ført til erkendelsen af en kontakt mellem det nordvestlige Jylland og Elb-Saale-området i det nordlige Centraltyskland, hvor rituelle begravelser af kvæg har været anvendt i kugleamforakulturen. Området ligger syd for den del af kugleamforakulturen i Mechlenburg, der har haft forbindelser til det sydøstlige Danmark, og hvor der ikke er kvægbegravelser. Det er derfor overvejende sandsynligt, at kontakten og kulturindflydelserne er kørt den direkte vej mod nordvest og op gennem det centrale Jylland.[71] En markant gruppe af stridsøkser med nakkekam i Nordvestjylland udgør en yderligere bekræftelse

af kontakten til kugleamforakulturen. En speciel type stridsøkse med nakkekam og lige sidekanter mod æggen er karakteristisk for denne kultur. Den spredtes til Sydskandinavien, hvor dens karakteristiske nakkekam efterfølgende blev overført til tragtbægerkulturens stridsøkser med udsvajet nakke og æg.[72]

Dateringen af de fleste stendyngegrave falder i St. Valby-fasen, men der er også stendyngegrave, som på basis af keramik, primært hængekar med høj cylindrisk hals, skal dateres forud for denne.[73] Dekorationerne er i sen Ferslevstil (MNA III/IV), og karrene er formodentlig tidligst fra 3100 f.Kr. Fase 1a af den jyske enkeltgravskultur er ikke konstateret i Nordvestjylland, men fase 1b er massivt til stede (figur 2). Det giver en slutdatering for tragtbægerkulturen til 2800 f.Kr. og dermed formodentlig også på brugen af stendyngegrave.

Med hensyn til landbruget i Nordvestjylland viser et pollendiagram fra Skånsø mellem Skive og Struer, et område hvor tragtbægerkulturen er velrepræsenteret, at det klassiske landnamsforløb ikke er til stede. Skovsammensætningen forbliver uændret, men der er indikationer på et mere åbent landskab, og øgede forekomster af Lancetvejbred og pollen fra byg viser både græsning og korndyrkning. Yderligere information kommer fra pollen i og under høje, der afspejler landbruget i de umiddelbare omgivelser. I slutningen af tidligneolitikum ses en vekslen mellem kratskov domineret af birk og åbne arealer. Der er indikationer på fældning og afbrænding af birk samtidig med. at Lancetvejbred viser et højt græsningstryk på de åbne arealer. I begyndelsen af mellemneolitikum ses en kraftig forøgelse af de åbne arealer samtidig med en fortsat afbrænding af skov. Åbne græsarealer og nu også heder dominerer i højenes omgivelser, medens græsningstrykket på de enkelte arealer falder. Det er en udvikling, der topper i forbindelse med enkeltgravskulturens høje. Vi har desværre ingen pollenanalyser knyttet til den sene tragtbægerkultur, men i modsætning til det østlige Danmark er bopladserne fra sen tragtbægerkultur i området meget små, hvilket peger på en ekstensiv udnyttelse af et åbent landskab.[74]

Sammenfattende kan vi konstatere, at der ved overgangen fra TN til MNA var en ensartet kultur i Sydskandinavien, struktureret ideologisk og socialt omkring først systemgravsanlæg og derefter i stigende grad megalitgrave. I løbet af MNA skete der en gradvis opløsning af den rituelt kontrollerede strukturering af samfundet med en øget regional differentiering til følge, hvor folk lokalt blev påvirket og inspireret af kulturformationer i andre områder. Det skete primært i periferien af det oprindelige kulturområde i Sydskandinavien, medens de centrale dele var mindre påvirkede. Undersøgelsesområdet i Østjylland er et godt eksempel på dette. Her skete der i de sidste fire århundreder af tragtbægerkulturen kun marginale ændringer i den materielle kultur og intet, så vidt

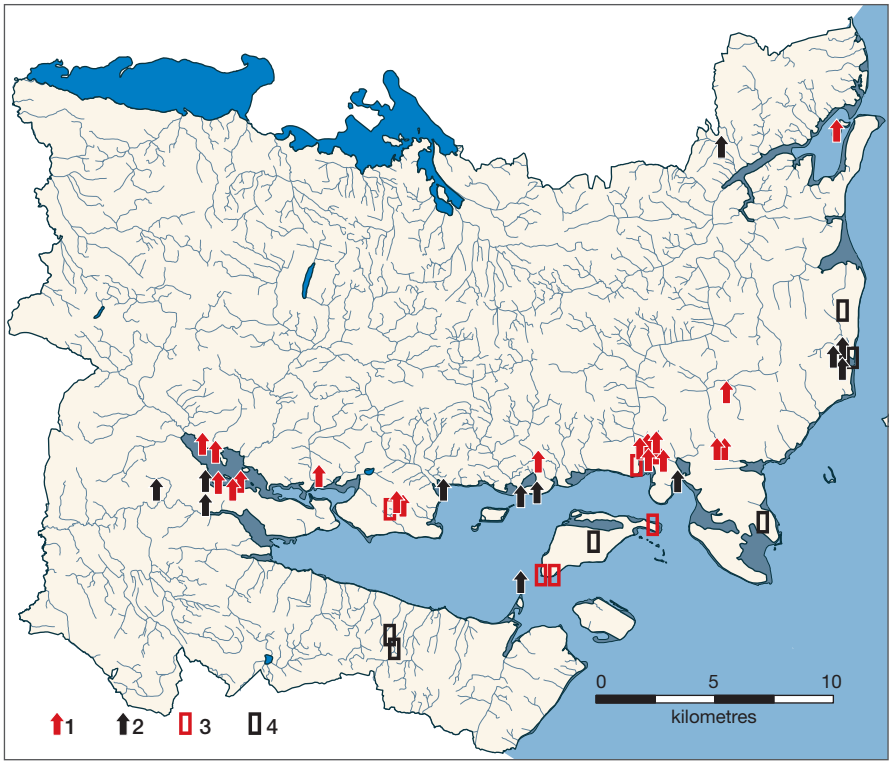

Fig. 12. Udbredelsen af skafttungepile af type A og B og cylindriske flækkeblokke i undersøgelsesområdet: 1, skafttungepile fra bopladser; 2, løsfund af skafttungepile; 3, flækkeblokke fra bopladser; 4, løsfund af flækkeblokke.

The distribution of tanged arrowheads of types A and B and cylindrical blade cores from the study area: 1, tanged arrowheads from settlements; 2, stray finds of tanged arrowheads; 3, blade cores from settlements; 4, stray finds of blade cores.

det kan ses, på det ideologiske og sociale plan. Kun omkring økonomien skete der tilsyneladende en øget intensivering af landudnyttelsen.

Det betyder imidlertid ikke, at man ikke havde forbindelse til andre kulturer, end den man fik til den tidlige enkeltgravskultur, da denne dukkede op. På figur 12 ses udbredelsen af type A- og B-skafttungepile samt cylindriske flækkeblokke i undersøgelsesområdet. De 31 pile og 11 blokke viser en klar kontakt til den grubekeramiske kultur, men der er ingen indikationer på, at denne kultur øvede nogen indflydelse i øvrigt. Det er derimod sandsynligt, at der har været en omfattende handel med flint fra Djursland, hvor der kendes regulære produktionspladser for både økser og cylindriske flækkeblokke.[75]

Også spor efter kontakter med kugleamforakulturen er til stede. En strids-

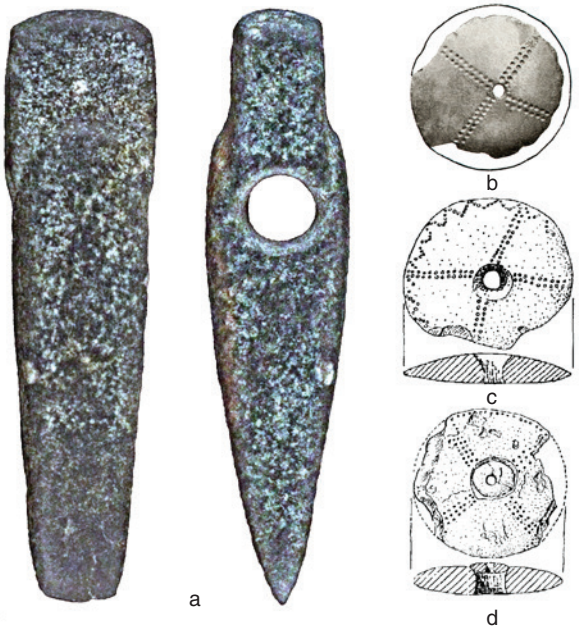

Fig. 13. Stridsøkse (a) og ravskive (b) fra kugleamforakulturen fundet i undersøgelsesområdet og ravskiver (c og d) fra kugleamforakulturen i Polen. – a: foto: T. Madsen; b: gengivet efter P.V. Glob 1952, no. 405; c, d: gengivet efter A. Pollex 1999, fig. 4. 1:2.

Battle-axe (a) and amber disc (b) from the GAC found in the study area and amber discs (c, d) from the GAC in Poland.

økse med nakkekam og ret æg kommer fra nordsiden af Horsens Fjord ved dennes udmunding i Kattegat, hvor den var nedlagt på lavt vand (fig. 13a). Øksetypen, der som omtalt ovenfor, er typisk for kugleamforakulturen, havde rester af skaftet bevaret. En C14-analyse angiver en datering til mellem 2870 og 2470 f.Kr. Siderne af nakkekammen er sekundært fjernet, hvilket har ændret dens oprindelige udseende væsentligt. En anden genstand fra undersøgelsesområdet, der er særdeles karakteristisk for kugleamforakulturen, er en centralt gennemboret ravskive dekoreret med fire radiale dobbeltrækker af små gruber placeret i et kors (fig. 13b). Skiven stammer fra "Horsensegnen" uden nærmere fundoplysninger. Den er så tæt på ravskiverne fra kugleamforakulturen (fig. 13c-d), at der efter al sandsynlighed er tale om en direkte import.[76]

En ny kultur kommer til

Som nævnt i indledningen blev P.V. Globs udlægning af enkeltgravskulturens oprindelse – som båret af et indvandrende øksesvingende, nomadefolk fra øst – ivrigt debatteret i årene frem. I stigende grad blev det dog foreslået, at den jyske enkeltgravskultur var opstået i Jylland under påvirkning udefra, eller hvis den var kommet til sydfra, så skete den videre spredning gennem en kulturproces, der involverede tragtbægerkulturen.[77] Enkelte har dog fastholdt Globs udlægning i fuldt omfang, på det seneste med henvisning til, at DNA

undersøgelser har dokumenteret en invasion fra øst ind i Centraleuropa af mennesker knyttet til Yamnaya-kulturen på stepperne nord for Sortehavet og det Kaspiske Hav.[78] De nyeste undersøgelser viser imidlertid, at der er et markant fald i Yamnaya-generne i de snorekeramiske grupper fra øst mod vest frem til det sydlige Centraltyskland. Der er ingen analyser mod nord og nordvest i retning mod Danmark og Holland, men selv om det er højst sandsynligt, at Yamnaya-gener også vil være til stede her, er det ikke ensbetydende med en massiv folkevandring. Der er på det seneste dukket en del artikler op, der advarer mod en omsiggribende ukritisk anvendelse af DNA data.[79]

Parallelt med ideerne om, at den jyske enkeltgravskultur var baseret på indvandring af etniske grupper fra øst, blev dens udgangspunkt arkæologisk beskrevet som en overregional enhed – "en fælleseuropæisk horisont" eller A-horisonten. De bærende elementer i denne var stridsøkser, snoreornamenterede bægre og amforaer af A-type samt grave under høje med kønsopdelte enkeltbegravelser i sideleje. Definitionen af denne horisont blev baseret på Globs arbejde og herfra overført til det øvrige Europa, hvor man fandt tilsvarende elementer, men uden nævneværdige kontekstoplysninger. I takt med, at de vidt spredte snorekeramiske grupper i Europa blev bedre belyst, er det mere og mere usandsynligt, at en ældste fælleseuropæisk horisont har eksisteret. De forskellige elementer forekommer flere steder, men de indgår enkeltvist i lokale kontekster, der afviger fra det, vi ser i den jyske enkeltgravskultur. Hvad der måske er mere overraskende er, at E. Hübners studie af den jyske enkeltgravskultur viser, at den fælleseuropæiske horisont heller ikke fandtes på den jyske halvø. I den ældste fase 1a finder vi de mere "udviklede" lokale typer af stridsøkser (A2-3, og B1-3) og ikke den simplere paneuropæiske A1 type, der først dukker op i fase 1b.[80]

Der kan ikke være tvivl om, at stærke udefra kommende kulturpåvirkninger, fremmet gennem migration, udgjorde en væsentlig del af grundlaget for skabelsen af den jyske enkeltgravskultur. Den eksisterende befolkning i det centraljyske område, som vi bl.a. har dokumenteret gennem bopladser fra sen tragtbægerkultur under tidlige enkeltgravshøje, befandt sig ved den samme hovedfærdselsåre langs den jyske højderyg, som forbandt tragtbægerkulturen i Nordvestjylland med kugleamforakulturen i sydøst og resulterede i de innovative vognbegravelser. Kontakterne og påvirkningerne gennem denne korridor var tilgængelig for alle, der boede langs den, men resultatet i det centrale Jylland blev ikke det samme som mod nordvest. Det blev væsentligt mere radikalt, koncentreret om sociale normer og givetvis også religiøse tanker. Individet sattes i centrum, hvor det i den traditionelle tragtbægerkultur var fokuseret på slægten og forfædrene. Samtidigt institutionaliseredes forskellen

mellem mænd og kvinder gennem kønsdifferentierede riter og normbetingede personlige ejendele, således som vi får kendskab til det gennem begravelserne.

Hvordan tegnede den tidligste enkeltgravskultur sig, og hvilken baggrund kan vi tilskrive dens forskellige elementer? Vi kan som eksempel tage udgangspunkt i en tidlig grav fra Fasterkjær i Vestjylland ikke langt fra Skjern.[81] Selve graven var en plankekiste, hvor sidekanterne fortsatte ud over endestykkerne. I graven var der spor efter den døde, der lå på højre side i sammenkrøbet stilling med hovedet mod sydvest. Foran ansigtet lå en type A3-stridsøkse, og tæt derved en tyknakket flintøkse. Ved hoften lå to ravskiver og ikke langt derfra en flintflække.

A3-Stridsøksen (fig. 14c) tilhører, som påvist af E. Hübner, en af de tidligste typer i den jyske enkeltgravskultur. Disse typer er fåtallige og forekommer primært i Jylland og Slesvig-Holsten, men det er usikkert, hvor de er produceret. I de centrale og vestlige dele af den jyske halvø var det i hvert fald ikke, for her findes de anvendte stenarter ikke, og dertil kommer at deres udførelse vidner om en højt specialiseret produktion. E. Hübner anser dem for at være kopier af kobberøkser fra Centraleuropa, hvilket gør produktionsstedet endnu mere

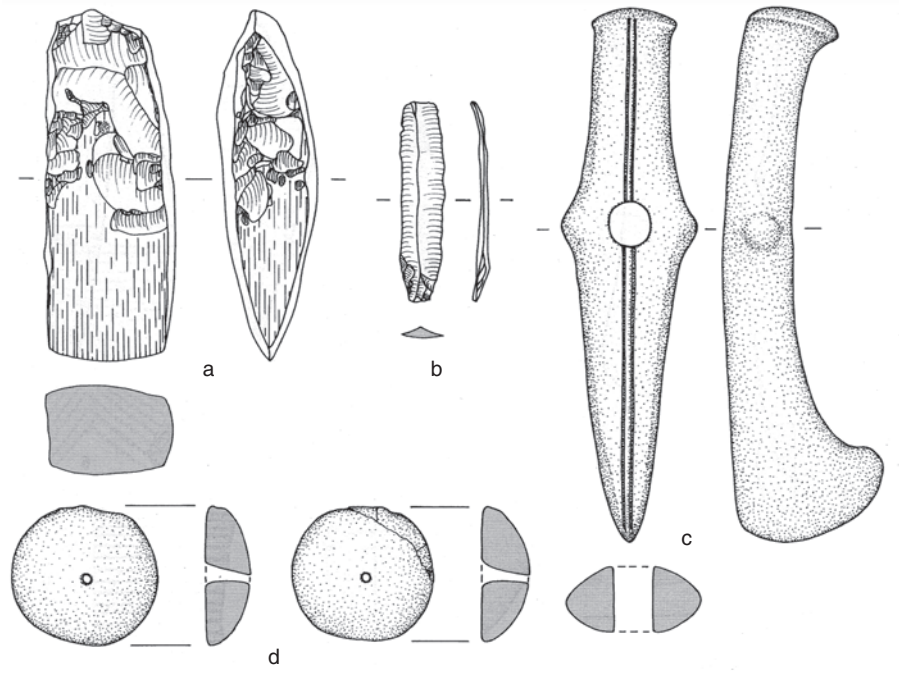

Fig. 14. Indholdet af en tidlig enkeltgrav ved Fasterkjær nær Skjern. – Gengivet efter E. Hübner 2005, tafel 154. 1:3.

The contents of an Early SGC grave at Fasterkjær in western Jutland.

usikkert. Det rejser spørgsmålet om, hvorvidt stridsøkser som disse overhovedet var et grundelement i etableringen af den jyske enkeltgravskultur. Det er i den forbindelse ikke uvæsentligt, at to ud af de tre A3-stridsøkser, vi har fra undersøgelsesområdet, ligger i tragtbægerkulturområdet, hvilket vidner om, at de har været et handelsobjekt. Det er også værd at bemærke, at manden i mangel af en stridsøkse kunne få en flintøkse placeret foran ansigtet i graven. Symbolikken har givetvis været den samme.[82]

Nakken på den tyknakkede flintøkse i graven er meget kluntet omhugget formodentligt for at tilpasse den til et skaft, men den oprindelige økse, der var fuldsleben på både bred- og smalsider, er omhyggeligt fabrikeret med næsten parallelle sidekanter og med et svagt konkav-konvekst forløb (fig. 14a). Det er en typisk tyknakket B-økse, der må komme fra tragtbægerkulturen i øst eller mod nord. Den tynde, rette flintflække med et parallelt forløb af ryg- og sidekanter syner måske ikke af meget, men ud over at det kræver håndværksmæssig kunnen at lave den, kræver det også flint af en kvalitet, som ikke findes i det vestjyske område (fig. 14b). Denne type flækker er ganske almindelige i de tidlige enkeltgrave, og som minimum må flinten til dem have været importeret, men det er mere sandsynligt, at færdige flækker har været importeret fra østdanske eller nordjyske områder. De to ravskiver med central gennemboring er typisk inventar i tidlige grave i den jyske enkeltgravskultur, hvor de tilsyneladende udgør en helt igennem lokal tradition (fig. 14d). De er som hovedregel placeret ved bæltestedet på mænd, og ofte forekommer de som i dette tilfælde parvist. De anses derfor i almindelighed for at udgøre endedupper på et bælte omkring livet. Det er selvfølgelig fristende at jævnføre dem med ravskiverne fra kugleamforakulturen, men det er nok usikkert. Dels er de altid udekorerede, og dels er den tidligste variant af dem ofte meget tyk med en stærkt konveks overside. Dertil kommer, at undersiden kan være konkavt udformet.[83]

Selve graven fra Fasterkjær var som nævnt en plankekiste med sider, der fortsatte ud over enderne. Dette er et konstruktionstræk, der forekommer almindeligt blandt de tidlige trækister i enkeltgravskulturen (fig. 15c, d). Plankerne er som regel ganske tynde, kløvet fra større stammer, og ofte er de delvist forkullede formodentlig for at forøge holdbarheden. Nogle gange krydser sider og ender hinanden, så træet må have været skaret sammen, andre gange støder siderne blot op til endestykkerne evt. holdt på plads af sten på ydersiden. Umiddelbart er der ingen paralleller til denne type trækister, men i Elb-Saale-området anvendtes kister bygget af tynde stenplader, hvor siderne også overlapper endestykkerne (fig. 15a, b). Anvendelsen af denne kisteform var udbredt i kugleamforakulturen og nåede sin største popularitet i den snorekeramiske kultur. Også mod øst, ind i Polen, anvendtes denne grav-

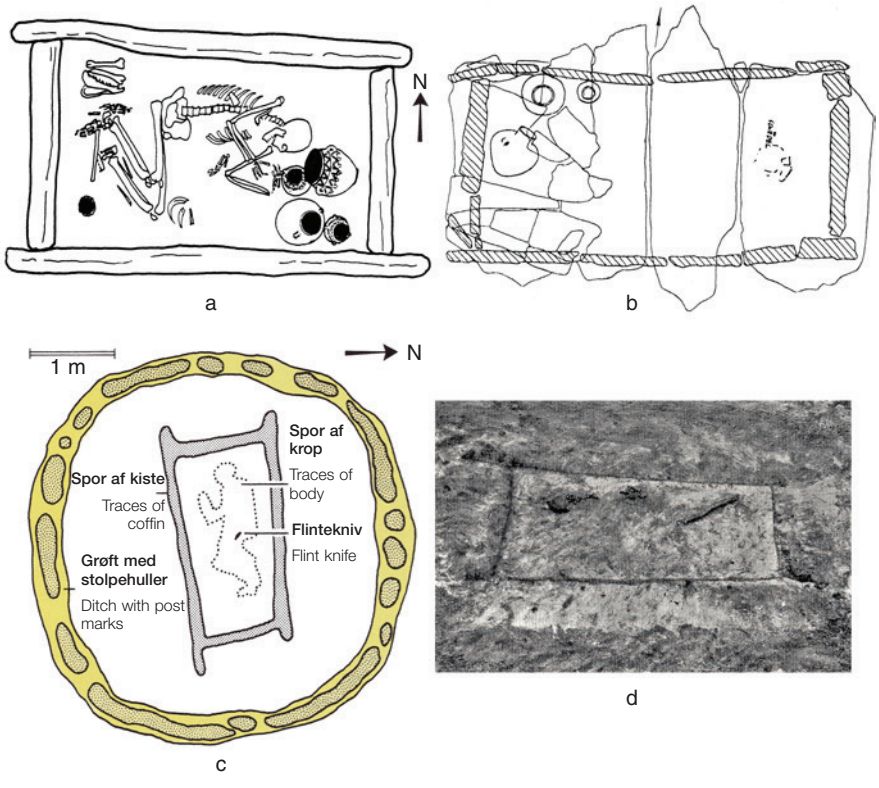

Fig. 15. Kister af stenplader fra kugleamforakulturen (a) og den snorekeramiske kultur (b) i Elb-Saale-området. Cirkelgrav med kiste af træplanker fra Sjørup (c) og kiste af træplanker fra Hastrup (d). – a gengivet efter H.J. Beier 1988, abb. 4.9; b gengivet efter U. Fischer 1956, tafel 35; c gengivet efter E. Jørgensen 1981; d gengivet efter P.V. Glob 1944, fig. 97.

Cists made with stone slabs from the GAC (a) and the Corded Ware culture (b) in the Elb-Saale area. Circle grave with a coffin of wooden planks at Sjørup (c) and a coffin of wooden planks at Hastrup (d).

form. Eksemplerne vist på figur 15 er fra henholdsvis kugleamforakulturen (a) og den snorekeramiske kultur (b), begge med begravelser i sideliggende stilling.[84] I det vest- og centraljyske område er stenheller, der kan anvendes til bygning af sådanne kister, ikke til stede, og vi står formodentlig over for en kreativ kopiering og omformning af en gravform i sten til en gravform i træ.

Graven fra Fasterkjær er ikke en gennemsnitlig grav, men den afspejler essensen af den tidlige enkeltgravskultur. Genstandsmaterialet, sammensat af overvejende importerede genstande, danner rammen om en fuldstændig ny ideologisk og social struktur, der har en baggrund mod syd. Principielt er det den samme type udvikling, vi ser i andre områder med sen tragtbægerkultur, hvor den almindelige opløsning resulterer i kulturel innovation, men

i modsætning til hvad der skete på f.eks. Djursland og i Nordvestjylland, var ændringen til enkeltgravskulturen i de centrale og vestlige dele af Jylland og Slesvig-Holsten holdbar, og den medførte i sidste ende en radikal kulturændring i hele tragtbægerkulturens område.

Enkeltgravskulturen i Østjylland mellem 2600 og 2250 f.Kr.

Omkring 2600 f.Kr. ophørte tragtbægerkulturen med at eksistere i undersøgelsesområdet. I stedet erstattedes den af enkeltgravskulturen, men stik mod hvad man måske kunne forvente, er det kystområdet og ikke de indre dele af landet, der dominerer udbredelsesbilledet (fig. 16). Næsten alt, hvad der er registreret af bopladser, over halvdelen af gravene, alle nedlæggelser og næsten alle tyknakkede, hulslebne økser af Horneby-type, findes her. Af det afbildede i figur 16 er det kun de tyknakkede flintøkser af EGK-type, der er mere jævnt fordelt, og de kan kun dateres til enkeltgravskulturen i sin helhed. Når de er medtaget, er det fordi, vi for kystområdet med rimelighed kan antage, at de ikke er fra før 2600 f.Kr.

Der er registreret 14 mulige bopladser – mulige fordi det er meget vanskeligt at godtgøre, at der er tale om egentlige bopladser. Mest sikker er skaldyngen fra Kalvø i Norsminde Fjord med både keramik, skafttungepile af D-type og brudstykker af EGK-stridsøkser. Ikke langt derfra ved Saxild er fundet en lille flad grube med et skår, der kan dateres til enkeltgravskulturen. Af ti pladser ved Horsens Fjord er fire af dem fra tragtbægerkulturen, hvor mindre indslag af enkeltgravskeramik samt i et enkelt tilfælde en skafttungepil af D-type antyder en beboelse fra enkeltgravskulturen. De øvrige seks pladser er overfladeopsamlinger dateret ud fra skafttungepile af D-type, samt i et tilfælde også keramik, i et andet en stridsøkse og i et tredje en tapkile. Inde i landet er registreret to bopladser. I det ene tilfælde er der tale om keramik i og under højfyld, medens det andet er en regulær grube med keramik.[85]

Af 33 registrerede grave ligger de 19 i kystzonen, og af disse er fem sekundærbegravelser i megalitgrave, medens de øvrige 14 ligesom de 14 grave inde i landet er "traditionelle" trækistebegravelser i høj. Der er endvidere registreret fem ferskvandsnedlæggelser med ni genstande og 11 nedlæggelsesområder i saltvand med i alt 25 genstande. De 34 genstande i nedlæggelserne består af 16 stridsøkser, syv skafttap-kiler, seks tyknakkede, hulslebne flintøkser af Horneby-type og fem tyknakkede flintøkser af EGK-type.

De nye gravformer, stridsøkserne og keramikken, der alle er en del af definitionen af enkeltgravskulturen, viser selvfølgelig klart nybruddet i forhold til tragtbægerkulturen, men det mest betydningsfulde brud sker dog helt klart

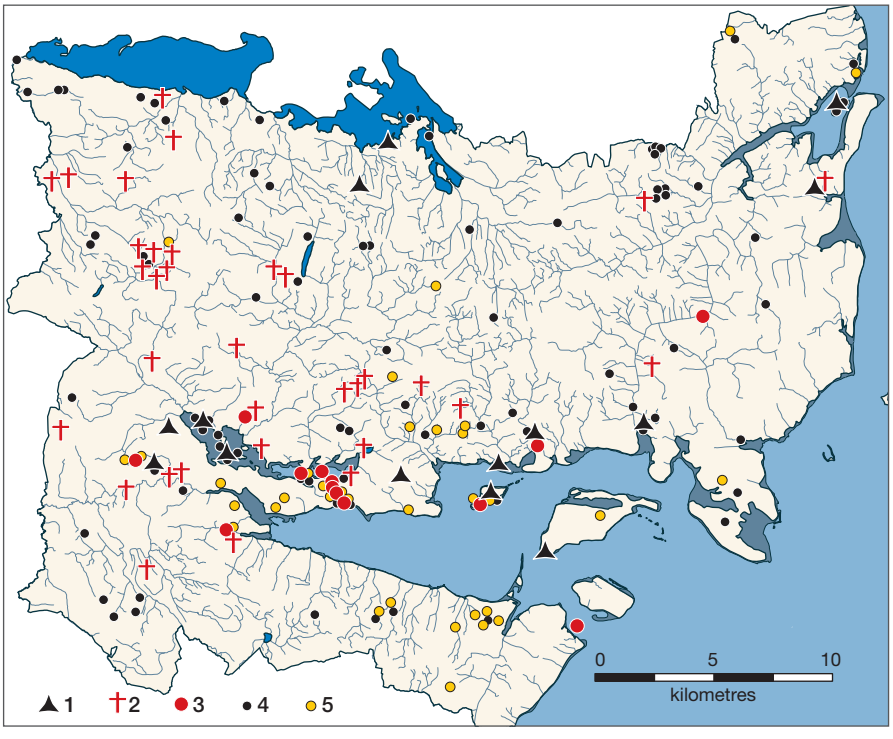

Fig. 16. Udbredelsen af fund fra enkeltgravskulturen i undersøgelsesområdet mellem 2600 og 2250 f.Kr.: 1, bopladser; 2, grave; 3, nedlægninger i ferskvand og saltvand; 4, tyknakkede flintøkser af EGK-type; 5, tyknakkede hulslebne flintøkser af Horneby-type.

The distribution of finds from the SGC in study area dated to between 2600 and 2250 BC: 1, settlements; 2, graves; 3, depositions in freshwater and marine environments; 4, thick-butted flint axes of SGC type; 5, thick-butted hollow-ground flint axes of Horneby type.

i forbindelse med bosættelsernes karakter. Vi får en ændring fra meget store bopladsenheder, der har været kontinuert beboet i århundreder, til bopladsenheder vi knap nok kan registrere i det arkæologiske materiale. Vi får en overgang fra grupper på mange hundrede mennesker, der boede permanent sammen på et enkelt sted, til grupper i formodentlig familiestørrelse, der hyppigt skiftede bosted, og som kun i ringe grad efterlod sig registrerbare spor. Enkeltgravskulturen betød en radikal ændring af den sociale struktur, men samtidig også et ændret landbrugsmønster. Den intensive, komplicerede udnyttelse af skovenge i et begrænset område omkring de store permanente bopladser ophørte og blev afløst af et system af åbne permanente marksystemer spredt ud over landskabet.

I pollendiagrammet fra Dallund Sø på Nordfyn kan vi se, at det høje niveau af hassel, der var et resultat af skovengsdriften, stopper på dette tidspunkt,

men det følges ikke umiddelbart op af indikatorer på åbne arealer. Det betyder dog kun, at åbne marker ikke var til stede i direkte tilknytning til søen. Lå de omgivet af skov selv et lille stykke fra søen, ville pollen fra dem blive siet fra af skoven og ikke sætte sig væsentlige spor i diagrammerne. Fra undersøgelsesområdet i Østjylland har vi til gengæld en klar indikation på dannelsen af åbne marksystemer. Her er der i en boreprøve fra Norsminde Fjord taget ud for udmundingen af Rævs Å konstateret en kraftig vækst i mængden af organiske og mineralske stoffer samt kulstof i sedimenterne fra omkring 2700 f.Kr. og frem. Det kan kun være et resultat af rydning og øget erosion på arealerne langs åen og dens sideløb.[86]

I pollendiagrammerne fra Central- og Vestjylland så vi, at der fra sen tragtbægerkultur og videre frem i enkeltgravskulturen dannedes omfattende overdrev og hedearealer egnet for vintergræsning. Det kan sammen med en mangel på vidnesbyrd om systematisk korndyrkning ses som en indikation på, at kvægavl havde en altdominerende rolle i landbruget i disse områder. Med spredningen af enkeltgravskulturen til landskaber med en helt anden jordbund, mere velegnet for korndyrkning, er det langt fra givet og heller ikke særligt sandsynligt, at kvægavlen fortsat var den dominerende faktor. I modsætning til den tidlige del af enkeltgravskulturen har vi fra den sene del adskillige fund af makrofossiler af korn alle beliggende uden for hedeområderne i Jylland. På figur 5 ses, at de passer smukt ind i det samlede udviklingsbillede med en fortsat nedgang i dyrkningen af hvede og en fremgang i dyrkningen af specielt Nøgenbyg. Vi har desværre ikke tilsvarende oplysninger om sammensætningen af dyrearterne, ud over skaldyngen fra Kalvø, og slet ingen konkrete oplysninger om balancen mellem kornavl og dyrehold.

Fra tragtbægerkultur til enkeltgravskultur

Det er ikke uvæsentligt, hvordan skiftet fra tragtbægerkultur til enkeltgravskultur foregik. Fra et materielt synspunkt var det naturligvis et enten eller, betinget af vores formelle definitioner af de to kulturer, men fra et adfærdsmæssigt synspunkt var det så også et enten eller? Er skiftet sket fra den ene dag til den anden, eller skete det gradvist og måske med tidsmæssige forskydninger mellem forskellige lokale områder? Jeg vil begynde med de af tragtbægerkulturens bopladser, der viser spor af beboelse i enkeltgravskulturen, og her dels se på pladser, der ligger i direkte kontakt med kysten, og dels på pladser, der ligger lidt inde i landet. Af de sidstnævnte er der tre, der er udgravet. På en boplads ved Provstlund i nærheden af Lund vest for Horsens blev der i et udbredt kulturlag fra mellemneolitisk tragtbægerkultur fundet en skafttungepil af type D

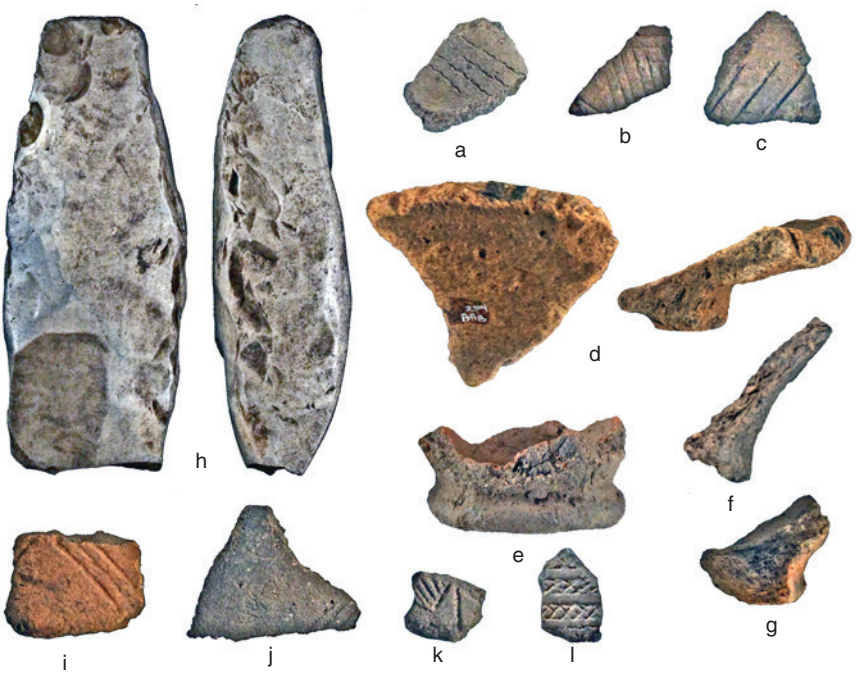

Fig. 17. Enkeltgravs- og tragtbægerkeramik fra Bjerggård (a-g) samt en tyknakket flintøkse af EGK-type og enkeltgravskeramik fra Aalstrup (h-l). – Foto: T. Madsen. 1:2.

SGC and FBC pottery from Bjerggård (a-g), and a thick-butted flint axe of SGC type and SGC pottery from Aalstrup (h-l).

og to skår fra enkeltgravskultur i nærheden af hinanden og tæt ved sporene af et mindre to-skibet hus, der dog ikke kunne dateres nærmere end til tidligst MNA II ud fra skår i fylden af stolpehullerne. På Bjerggårde er der i forbindelse med aflejringerne i toppen af systemgraven A5 fundet en skafttungepil af type D og tre skår med et sandet gods og dekorationer, der tydeligt viser, at de stammer fra enkeltgravskulturen (fig. 17, a-c). Alle ligger de imidlertid så højt, at de næppe var en del af den nedlægning af affald inklusivt skalsmuld, der skete øverst i systemgraven i den sene tragtbægerkultur. I sidstnævnte lag finder vi til gengæld bundskår fra kar med afsat fod (fig. 17, d-g). Ud fra godset hører disse med sikkerhed hjemme i sen tragtbægerkultur, men den afsatte fod er et element, der må være tilført gennem påvirkning udefra. Det er her nærliggende at tænke på enkeltgravskulturen, men det kan også være fra kugleamforakulturen. På Aalstrup-bopladsen blev fundet et 2x4 m stort og op til 15 cm tykt lag af gråsort sand indeholdende store mængder af ildskørnede sten dækkende et dybereliggende kulturlag fra mellemneolitisk tragtbægerkultur. I forbindelse med stenlaget fremkom en kategori B-økse af enkeltgravstype og

fire skår med et sandet gods stammende fra enkeltgravskulturen (fig. 17, h-l). Øksen og et af skårene (fig. 17, k) lå umiddelbart under stenlaget, medens to af skårene (fig. 17, i, l) lå over det. Laget med ildskørnede sten kan således med sikkerhed dateres til enkeltgravskulturen og må afspejle en regulær bosættelse på stedet.[87]

På Kalvø i Norsminde Fjord lå en skaldynge benyttet i enkeltgravskulturen ovenpå en større boplads fra den seneste del af tragtbægerkulturen. "Udgravningerne viste, at der på holmens flade top og nordøst-skråning fandtes et kulturlag med oldsager, der overvejende stammede fra St. Valby-fasen (MN V), men som også indeholdt spredte fund fra mellemste enkeltgravskultur, senneolitisk kultur og førromersk jernalder. (…) Ved holmens fod havde kulturlaget forbindelse med en lille og velafgrænset køkkenmødding med oldsager tilhørende enkeltgravskulturen. (…) Skaldyngen hvilede direkte oven på et sandet, sortfarvet kulturlag med oldsager (dyreknogler, flint og keramik) fra tragtbægerkulturens St. Valby-fase MN V."[88] Fra køkkenmøddingen, der målte 8x8 m og var 40 cm tyk, foreligger skår fra enkeltgravskeramik, skafttungepile af type D og fragmenter af stridsøkser, der kan dateres til periode 2 og 3 af enkeltgravskulturen. Dertil kommer en tyknakket hulsleben flintøkse af Kregme-type og to C14-dateringer af østersskaller, der viser, at skaldyngen fortsætter ind i senneolitikum. Skaldyngen er således aflejret over længere tid og må, den begrænsede størrelse taget i betragtning, afspejle en lejlighedsvis udnyttelse af lokaliteten. Det vigtige er her, at den udgør en direkte fortsættelse af en større boplads på stedet fra den seneste tragtbægerkultur. Bevarede knogler fra aflejringerne viser en klar dominans af kvæg, svin og får. Dertil kommer knogler, der afspejler jagt og fiskeri på stedet. Her er kronhjort, sæl, svane og torsk de vigtigste arter. Ud over, at det må have været jagt og fiskeri, der har betinget de tilbagevendende besøg på stedet, gør den lange brugstid det svært at evaluere knoglefordelingen, men for tamdyrenes vedkommende kan vi dog notere, at kvæg, svin og får/ged forekommer i nogenlunde samme indbyrdes forhold, som vi ser i den sene tragtbægerkultur (fig. 6).[89]

Ved Lindskov Knude, der i stenalderen var en ø i Horsens inderfjord (Nørrestrand) med en større bebyggelse i sen tragtbægerkultur, blev der i et tyndt kulturlag dækkende over en grube fundet en tyknakket B-økse af enkeltgravstype. I hverken gruben eller kulturlaget var der yderligere daterende materiale. Længere inde i Horsens Inderfjord, ved Horsens Golfbane, er der på overfladen opsamlet både tyknakkede kategori B-flintøkser af enkeltgravstype og skår fra et svajet og et retvægget bæger. På pladsen, der udgjorde en ø i stenalderen, har der også været en omfattende bebyggelse fra tragtbægerkulturen. På sydspidsen

af Alrø, ved Egehoved, lå også en stor boplads fra slutningen af tragtbægerkulturen. Her viser overfladeopsamlinger, at stedet også var bebygget i både enkeltgravskultur og senneolitikum.[90]

Nord for undersøgelsesområdet, ved Gåsemosen umiddelbart vest for Aarhus, finder vi en tæt parallel til Kalvø. Her lå en boplads fra slutningen af tragtbægerkulturen ved kysten af, hvad der i stenalderen var en fjord. Direkte oven på aflejringer fra St. Valby-fasen fulgte keramik fra enkeltgravskulturen. Bevarede knogler viser den samme blanding af tamdyr, jagtvildt og fisk som ved Kalvø, tilsyneladende med en speciel vægt på ålefiskeri. Knoglerne stammer fra begge faser på bopladsen, men der synes at være en øget vægt på jagt og fiskeri i laget med fund fra enkeltgravskultur.[91]

Der er således på både indlandspladser og kystpladser fra tragtbægerkulturen en fortsat bebyggelse i enkeltgravskulturen, men der synes at være væsentlige forskelle på de to typer pladser. På indlandspladserne forekommer bebyggelsen at være meget sporadisk og tilfældig, når man tager udgravningernes omfang i betragtning. Bebyggelsen her kan ikke opfattes som en fortsættelse af den tidligere bebyggelse, men snarere et resultat af det nye labile landbrugssystem. På kystbopladserne derimod ser vi, som vist ved Kalvø og Gåsemosen, en direkte kontinuitet i bebyggelse og økonomi knyttet til jagt og fiskeri i en afgrænset biotop.

På andre områder finder vi også klare vidnesbyrd om kontinuitet. Det drejer sig ikke mindst om nedlæggelser på vådbund. I tragtbægerkulturen udgjorde disse et meget centralt aspekt af den rituelle sfære, og for undersøgelsesområdet var det i udstrakt grad præget af nedlæggelser i saltvand. I enkeltgravskulturen fortsatte disse nedlæggelser med uformindsket styrke, og det var fortsat Stensballe Sund og Horsens Nørrestrand, der var fokuspunktet for nedlæggelserne. I figur 18 er vist to stridsøkser, der har ligget i organisk slam og en tyknakket, hulsleben flintøkse af Horneby-type, der har ligget i skallag. Alle tre er fra Stensballe Sund, og de demonstrerer klart den høje kvalitet af de nedlagte genstande. Et andet punkt, der vidner om kontinuitet, er begravelser placeret i megalitgravskamre. I modsætning til på øerne er det dog begrænset, hvor udbredt denne skik har været. I kystzonen er det fem ud af 19 grave, og ved en af dem, der stammer fra en nyere udgravning, har det kunnet vises, at begravelsen foregik i en trækiste inde i kammeret.[92]

Også omkring flintøksernes udbredelsesmønster er der ting, der peger tilbage mod tragtbægerkulturen. De tyknakkede økser af enkeltgravstype, fabrikeret ved grov tilhugning og delvis knusning, findes over hele undersøgelsesområdet, medens de tyknakkede huløkser af Horneby-type med en perfekt fremstillingsteknologi næsten udelukkende forekommer i kystområdet,

Fig. 18. Stridsøkser og en tyknakket hulsleben flintøkse af Horneby-type fra Stensballe Sund ved Horsens. – Foto: T. Madsen. 1:2.

Battle-axes and a thick-butted hollow-ground flint axe of Horneby type from Stensballe Sund near Horsens.

og endda begrænset til dele af dette (fig. 16). Medens de tyknakkede flintøkser af enkeltgravstype klart var lokalt produceret, så var Horneby-økserne med stor sikkerhed importeret. Dette rejser et spørgsmål omkring B-økserne af Vedbæk- og Brogård-type. Disse, der har en tilsvarende perfekt fremstillingsteknologi, dominerede i slutningen af tragtbægerkulturen. Antagelsen er, at de ophørte sammen med tragtbægerkulturen, men vi ved det reelt ikke, for manglen på sikre bopladskontekster gør det umuligt at bevise. Det er muligt, at der også efter 2600 f.Kr. var en import af B-økser af Vedbæk- og Brogårdtype sammen med Horneby-økserne, men at spredningen af dem som for sidstnævnte var begrænset. I tragtbægerkulturen blev økserne, hvad enten importeret til undersøgelsesområdet eller lavet mere lokalt, effektivt spredt gennem udveksling og handel indenfor de etablerede sociale netværk. Med skiftet til enkeltgravskulturen blev den sociale struktur brudt op, og selv om der fortsat har været udvekslingsforbindelser til enkelte områder langs kysten, så var man i udstrakt grad henvist til at lave sine egne økser. Hvis man ser på spredningen af Horneby-økserne, så er de koncentreret omkring Horsens i netop det område, hvor tragtbægerkulturen var stærkest funderet. Det var et centrum for udvekslingsforbindelserne i tragtbægerkulturen og har fortsat

været det i enkeltgravskulturen. Det er også muligt, at tragtbægerkulturen her fortsatte længere end nordpå i undersøgelsesområdet. Således har to af stridsøksefragmenterne fra Kalvø formtræk, der peger på typer, der senest kan være fra periode 1c, og dertil kommer dateringen på 2700 f.Kr. fra borekærnen ved mundingen af Rævs Å med indikationer på en ændret landudnyttelse.

Undersøgelserne viser, at tragtbægerkulturen i undersøgelsesområdet afløstes af en periode med en egentlig enkeltgravskultur, men med træk der var nedarvet fra tragtbægerkulturen. Skiftet var betinget af en radikal ændring i landbrugsformen koblet med en ny ideologi og social struktur i samfundet. Ser man på andre områder i Central- og Østdanmark, ses en lignende tendens, men åbenlyst med store variationer. Man kan således ikke blot overføre resultaterne fra Østjylland til andre områder. Det er nødvendigt at analysere områderne individuelt ud fra lokale data, som det tidligere er sket på Langeland med et resultat, der på nogle, men ikke alle punkter, minder om det østjyske.[93]

Mod nye tider

Medens overgangen fra tragtbægerkultur til enkeltgravskultur var brat, var det samme ikke tilfældet med overgangen fra enkeltgravskultur til senneolitikum. Groft forenklet bestod den kun i, at manden blev udstyret med en flintdolk i graven i stedet for en stridsøkse. De to genstandsformer, der udgør grundstammen i den kronologiske opdeling af henholdsvis enkeltgravskulturen og senneolitikum, udgjorde samtidigt de centrale mandssymboler, og som sådan udelukkede de hinanden i fundkonteksterne, først og fremmest gravene. Resultatet er, at den sidste fase af enkeltgravskulturen (periode 3b) stort set er samtidig med den tidligste del af senneolitikum. Følger vi det vedtagne typologisk-kronologiske dateringssystem, bliver resultatet derfor paradoksalt, at enkeltgravskulturen sluttede omkring 2250 f.Kr., medens senneolitikum begyndte omkring 2350 f.Kr.[94] Formelt må overgangen fra mellemneolitikum til senneolitikum naturligvis sættes til 2350 f.Kr.

Kontinuiteten afspejles bl.a. i den del af keramikken, som stilistisk var præget af de samme indflydelser fra klokkebægerkulturen, der medførte skiftet fra stridsøkser til dolke. Da keramikken imidlertid overvejende forekommer på det hastigt voksende antal registrerbare bopladser fra begyndelsen af senneolitikum, og i stigende grad forsvinder ud af gravene hen imod slutningen af enkeltgravskulturen, er den vanskelig at anvende til en detaljeret belysning af overgangen. Ydermere forekommer den klokkebægerinspirerede keramik fortrinsvist i det nordlige Jylland, medens den i andre områder er sparsom eller helt fraværende. Den er derfor dårligt egnet til kronologiske studier.

For undersøgelsesområdet betyder det, at det tidlige senneolitiske materiale er klart adskilleligt fra det sene enkeltgravsmateriale, selv om vi reelt ikke ved i hvilket omfang, der kan være samtidighed mellem dele af materialet fra de to faser. Figur 19 viser udbredelsen af bopladser, grave og nedlæggelser, der kan dateres til SN I, samt løsfundne dolke af type I-III og løsfundne tyknakkede flintøkser med V-formet længdesnit. Sidstnævnte hører overvejende til den tidlige del af senneolitikum, men kan også være senere. Der er registreret 24 bopladser, 15 grave og otte nedlæggelser – fire i ferskvand og fire i saltvand. Af gravene er seks fra kamre i megalitgrave og tre fra trækister i høje, medens gravtypen for de resterende seks ikke er kendt. Ud fra fundstedet er det dog overvejende sandsynligt, at de alle er fra trækister i høje. Tolv af de 24 bopladser ligger ud til eller i umiddelbar nærhed af kysten, og for tre af dem med tilknytning til skalaflejringer. De øvrige 12 ligger i vekslende afstand fra kysten. Ser vi på den generelle spredning, minder den meget om den, der herskede i sen enkeltgravskultur (fig. 16) med en massiv koncentration omkring Horsens Fjord og en mindre, men tydelig gruppering mod nordvest i undersøgelsesområdet. Der er dog bemærkelsesværdigt få fund mod nordøst i undersøgelsesområdet, en tendens der fortsætter ind i SN II. Årsagen er ikke umiddelbart klar.

En markant forskel mellem sen enkeltgravskultur og SN I er omfanget og karakteren af bopladserne, der nu bliver veldokumenterede gennem både overfladeopsamlinger og udgravninger. Der er syv udgravede pladser, hvoraf der på fem af dem er registreret i alt seks hustomter ud fra stolpehuller og i to tilfælde forsænkede gulve. På fire af pladserne er der derudover fundet bopladsgruber. Alle de udgravede huse stammer fra to områder med omfattende, systematiske udgravninger over større arealer – det ene vest for Horsens og det andet ved Østbirk i den nordvestlige del af undersøgelsesområdet. I begge områder danner husene sammen med huse fra SN II og den tidligste bronzealder et større bebygget areal. Der er dog ikke tale om en landsbybebyggelse, men derimod om et område med spredte langhuse evt. med tilhørende udhuse, hvor hvert hus anvendes i et begrænset tidsrum, inden det opgives, og bostedet flyttes til et andet sted. Vi får dermed et indtryk af et system af enkeltgårde med tilliggende landbrugsarealer.[95]

Langs kysten er der bopladser af en klart anderledes karakter. Det gælder naturligvis først og fremmest dem, der ligger i forbindelse med skalaflejringer, hvor skaldyngen på Kalvø udgør et godt eksempel på en direkte fortsættelse af kystpladser til jagt og fiskeri. Der er imidlertid også andre typer af bopladser langs kysten. Det gælder f.eks. en boplads på Vorsø, en lille ø i Horsens Fjord. Her er der opsamlet en stor mængde oldsager fra senneolitikum, hvortil også

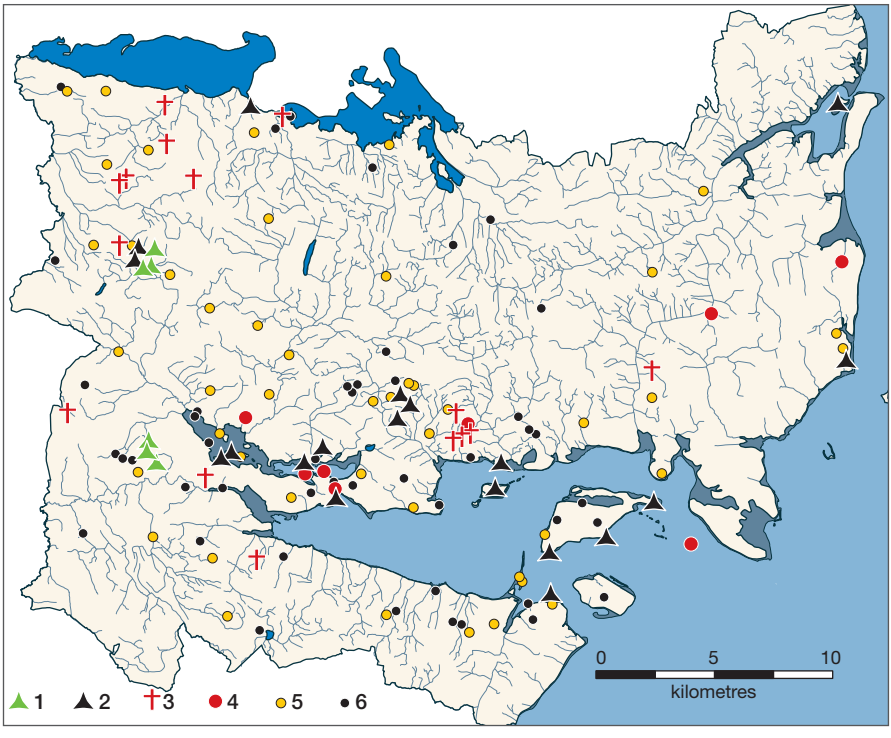

Fig. 19. Udbredelsen af fund fra undersøgelsesområdet mellem 2350 og 1950 f.Kr.: 1, hustomter; 2, beboelse registreret ud fra andet end huse; 3, grave; 4, nedlægninger i ferskvand og saltvand; 5, løsfundne fladehuggede flintdolke af type I-III; 6, løsfundne tyknakkede flintøkser med V-formet længdesnit.

The distribution of finds from the study area dated to between 2350 and 1950 BC: 1, house remains; 2, settlements based on evidence other than houses; 3, graves; 4, depositions in freshwater and marine environments; 5, stray finds of pressure-flaked flint daggers of types I-III; 6, stray finds of thick-butted flint axes with a V-shaped longitudinal cross-section.

kommer oldsager fra den sene del af enkeltgravskulturen. Der er desværre kun overfladeopsamlinger fra lokaliteten, men man får indtryk af en større permanent beboet plads. En tilsvarende stor plads med en længerevarende permanent beboelse har vi ved Smidstrup Kær inde i landet helt mod nord i undersøgelsesområdet. Også her er der desværre kun overfladeopsamlinger til rådighed.[96]

Med den ændrede social- og bebyggelsesstruktur, der blev introduceret i enkeltgravskulturen og fortsatte ind i senneolitikum, var vejen banet for et landbrugssamfund baseret på agerbrug. Ironisk nok var bebyggelsesstrukturen et resultat af indgreb over for skoven på de sandede vest- og centraljyske jorder, der begyndte allerede i tragtbægerkulturen, og som resulterede i store

åbne områder velegnet til kvægavl, men i mindre grad til agerbrug på grund af den ringe jordkvalitet. Kombineret med en nytilkommet social struktur var der imidlertid skabt et system, som ved overførslen til områder med en højere bonitet, dannede det ideelle grundlag for et effektivt agerbrug. Dyrkningen af korn i SN I foregik tilsyneladende stort set uændret i forhold til sen enkeltgravskultur, men den nedadgående kurve for hvede gennem 1000 år stoppede (fig. 5), og i SN II begyndte der at ske markante ændringer. Mængden af hvede øgedes betydeligt på bekostning af byggen, samtidig med at nye hvedesorter (gen)indførtes. Det drejer sig om Brød-/Dværghvede og Spelt. Samtidig synes dyrkningsformerne også at blive mere komplicerede. Ved Østbirk er der således i et hus fra SN II fundet tre opbevaringsgruber med korn. I beholdere af træ blev der her adskilt opbevaret tre forskellige kornsorter – Nøgenbyg, Emmer og Spelt – dog med en lille urenhed i hver beholder af korn af en anden type. Kornet i opbevaringsgruberne må have været udsæd, og urenhederne må afspejle det foregående års afgrøde på marken. De tre gruber viser således et trevangsskifte med rækkefølgen Nøgenbyg>Emmer>Spelt>Nøgenbyg etc.[97]

Uanset hvordan man opfatter baggrunden for og oprindelsen til den jyske enkeltgravskultur, og det sidste ord er bestemt ikke sagt i den diskussion, så resulterede spredningen mod øst af dens ideologi og sociale struktur i et radikalt brud med den herskende kultur. Når man ser på forholdene i undersøgelsesområdet, kan der imidlertid ikke være tvivl om, at fundamentet for den nye struktur efter bruddet udgjordes af den eksisterende befolkning. Med baggrund i en åbenlys svækket ideologisk struktur i sen tragtbægerkultur har overgangen formodentlig været relativ udramatisk. Folk forlod gruppevis de store tætpakkede bopladser og slog sig ned spredt, ikke nødvendigvis samtidigt og ikke fra alle områder på samme tid. Dermed forlod man en landbrugsform, der gennem 1.300 år på forskellig vis havde været tilpasset skovmiljøet, og optog en "moderne" landbrugsform, der i det store hele gik ud på at destruere skovmiljøet.

NOTER

1. J. Brøndsted 1938, s. 215, 230.
2. P.V. Glob 1945, s. 242.
3. P.V. Glob 1945, s. 208.
4. C.J. Becker 1954, s. 124-fig. 36.
5. C.J. Becker 1973, s. 180; K. Davidsen 1975; K. Davidsen 1977; C.J. Becker 1981; C.J. Becker 1982, s. 24-26.
6. K. Davidsen 1977, s. 66.

7. For C14- dateringer, se f.eks. E. Hübner 2005, s. 660-674. E. Hübners kronologisystem for enkeltgravskulturen (2005, s. 6-64), som anvendes her, er baseret på seriation via en korrespondensanalyse af genstandsmaterialet i grave.
8. Undersøgelsen har baggrund i et tidligere formuleret projekt fra slutningen af 1970'erne, hvor undersøgelsesområdet strakte sig fra Horsens Fjord i syd til nord for Aarhus (T. Madsen 1982). Dette projekt "strandede" dog, fordi jeg fuldstændig havde undervurderet omfanget af data, og ikke mindst fordi jeg savnede en effektiv måde at registrere og analysere dem på. Jeg savnede noget, jeg kunne se var på vej, men som på det tidspunkt langt fra var brugbart, den moderne informationsteknologi.
9. Artiklen (afsluttet i december 2019) udgør en foreløbig sammenfattende oversigt over det igangværende analyse- og syntesearbejde i forbindelse med afslutningen af Østjyllandsprojektet. Der kan gå en rum tid endnu, før dette arbejde er afsluttet, og herværende artikel vil formodentlig ikke afspejle slutresultatet i fuldt omfang. I forbindelse med udarbejdelsen af artiklen har jeg modtaget nyttige kommentarer fra Per Borup og Lutz Klassen, som jeg her gerne vil takke.
10. P. Borup 2003, s. 274.
11. Vippelinjen og et kort over de højeste kystlinjer blev oprindelig introduceret af E.L. Mertz (1924). For en nyere version med dateringer af de højeste kystlinjer i forskellige dele af Danmark, se C. Christensen 2001, fig. 1. For højeste kystlinje i Norsminde Fjord, se S.H. Andersen 1994, s. 18-20. For den højeste kystlinje i Horsens Fjord, se P. Borup 2003, og for kystlinjen i sen ældre stenalder, se P. Borup 2015 og C. Skriver et al. 2018. For indsynkningen af Horsens Fjord, se H. Lykke-Andersen 1979.
12. Tidevandsstrømmen, der udgår fra Atlanterhavet, følger den engelske kyst mod syd og derefter den kontinentale kyst mod nord og har gjort det siden Atlantisk tid (K. Uehara et al. 2006). I takt med dens vandring aftager forskellen mellem ebbe og flod. I dag er den 1,5 m ved Esbjerg, 0,5 m ved Hanstholm og 0,3 m ved Skagen, en forskel der derefter holdes ned gennem Kattegat. I stenalderen var området nord for Limfjorden opløst i øer, og tidevandsstrømmen kunne passere igennem, hvor Limfjorden er nu. Det har givet en forskel på ebbe og flod på op mod 0,5 m i Kattegat. Yderligere synes de klimatiske ændringer ved begyndelsen af Subboreal tid at have øget indstrømningen i Kattegat (K. Conradsen & S. Heier-Nielsen 1995). En højere saltholdighed er dokumenteret gennem undersøgelser i både Horsens og Norsminde Fjord (J.P. Lewis et al. 2016).
13. T. Madsen 2019a. Kataloget er udgivet digitalt som Open Access. Det er i første omgang tilgængeligt via min hjemmeside (https://www.archaeoinfo.dk/), men vil efter planen blive tilgængeligt fra andre mere permanente platforme.
14. P.O. Nielsen 1979; K. Fabricius & C.J. Becker 1996, s. 193-94; R. Iversen 1915, s. 35.
15. P.V. Petersen 1999, s. 112.
16. Udover grundformen af B-økser, som ikke fik noget specifikt navn, udskilte P.O. Nielsen (1979) kun Brogård/Falster varianten med skrå nakke, medens han ikke beskæftigede sig nærmere med enkeltgravskulturens tyknakkede økser. Af referencehensyn har jeg fundet det nødvendigt at tilføje et typenavn til hans grundform af B-økser og har valgt Vedbæk efter et af de depotfund, han bruger (1979, s. 41, fund 18 – uheldigt valg desværre, da der også er en økse med skrå nakke i fundet).
17. E. Hübner (2005, s. 327) angiver meget højere smalsidevinkler for sit materiale med et maksimum på 19° og et gennemsnit på 9,8°. Det rejser spørgsmålet, om

der i hendes materiale er involveret økser, som tilhører kategori C, da disse ofte er karakteriseret ved at have store smalsidevinkler. Hvis der er, rejser det yderligere spørgsmålet, om C-økserne begynder allerede i enkeltgravskulturen. I materialet fra undersøgelsesområdet har jeg ikke kontekstbelagte fund, der kan afgøre dette spørgsmål.

18. For Norsminde, se S.H. Andersen 1991 og 1994 og for Ringkloster S.H. Andersen 1998.
19. T. Madsen & H.J. Jensen 1982; T. Madsen & J.E. Petersen 1984; T. Madsen 2019a, 160508-9.
20. T. Madsen 2009; T. Madsen 2019a, 150203-2.
21. Når faserne III og IV er sat i parentes, skyldes det, at de ikke kan udskilles i det keramiske materiale. De udgør reelt ikke kronologiske faser, men sene regionale stilarter i den sydskandinaviske keramik.
22. Detaljeret information om de udgravede bopladser, grave og systemgravsanlæg kan findes i kataloget over Østjyllandsundersøgelsen (T. Madsen 2019a). Der er dog også andre publikationer, der behandler udgravningerne af bopladserne (P. Eriksen & T. Madsen 1984; T. Madsen 2009), gravene (T. Madsen 2018; T. Madsen 2019b; K. Thorvildsen 1946) og systemgravsanlæggene (T. Madsen 1978; T. Madsen 1988; T. Madsen 2009).
23. T. Madsen 2019a, 160306-10.
24. Det drejer sig om pladser som Hanstedgård (P. Eriksen & T. Madsen 1984; T. Madsen 2019a, 160502-7); Tudkær (T. Madsen 2019a, 160306-17); Kørup (T. Madsen 2019a, 160306-37); Provstlund (T. Madsen 2019a, 160306-47); Bygholm Nørremark (T. Madsen 2019a, 170403-21).
25. L. Klassen & B. Knoche 2019.
26. Udover den oprindelige publikation fra 1941 har J. Iversen beskrevet landnammet i et kapitel af første bind i et større værk om Danmarks natur (1967). Senere blev dette kapitel genudgivet på engelsk (1973). Det udgør den mest autoritative udgave af hans egen fortolkning af landnammet.
27. P. Rowley-Conwy 1981, s. 86; T. Madsen 1990, s. 29; S.Th. Andersen 1993, s. 155-56. De konkrete dateringer af de to første faser er fastlagt af A.J. Kalis & J. Meurers-Balke (1998), medens man i et diagram fra Dallund Sø kan følge hele forløbet med kulminationen af hassel dateret til 3000-2600 f.Kr. (P. Rasmussen 2005).
28. For et andet eksempel på permanente bebyggelsesområder, se f.eks. N.H. Andersen 2009. Med hensyn til svedjebrug er det først og fremmest P. Rowley-Conwy (1981), der har været kritisk, medens S.Th. Andersen (1990; 1993) gennem pollenanalyser fra høje klart har demonstreret dets eksistens.
29. Oplysninger til figur 5 er hentet fra N.H. Andersen 1999; M. Andersson 2004; M.H. Andreassen 2009a; 2009b; 2009c; 2016; 2017a; 2017b; 2017c; N.A. Boas 1993; J.P. Brozio et al. 2013; H. Göransson 1995; H. Helbæk 1953; 1955; P.S. Henriksen 2000; 2001; 2016a; 2016b; H. Hjelmqvist 1975; 1998; P.M. Jensen 2012; 2013a; 2013b; 2013c; 2015; P.M. Jensen & P.H. Mikkelsen 2007; P.M. Jensen & M.B. Thastrup 2014; K. Jessen 1940; E. Jørgensen 2000; G. Jørgensen 1977; 1982; G. Jørgensen & B. Fredskil 1978; W. Kirleis & S. Kloss 2014; W. Kirleis et al. 2012; M. Larsson 1984; P.H. Mikkelsen 2002; A.S.A. Moltsen 2013; P.O. Nielsen 1984; M.Regnell & K-G. Sjögren 2006; D.E. Robinson 1992; 1998; 2003; D.E. Robinson & I Boldsen 2000; D.E. Robinson & J. Harrild 1994; D.E. Robinson & D. Kempfner 1988; H. Rostholm 1986; 1987; E. Rudebeck 2010; E. Schiemann 1958; M.B. Thastrup 2015; L. Sørensen & S. Karg 2014.

Oplysninger til figur 6 er hentet fra N.H. Andersen 1999; A. Boethius 2009; 2011; B. Bratlund 1993; H. Browall 1986; K. Davidsen 1978; I.B. Enghoff 2011; T. Hatting 1978; D. Heinrich 1999; F. Johansson 1979; E. Koch 1998; J. Kveiborg 2008; L. Larsson 1994; M. Larsson 1984; S. Macheridis 2011; A.P. Madsen et al. 1900; T. Madsen 1978; O. Magnell 2007; U. Møhl 1975; P.O. Nielsen 1984; M.-L. Nilsson & L. Nilsson 2003; G. Nobis 1983, 1987; G. Nyegaard 1985; P. Rowley-Conwy 1985a; U. Sandén et al. 2010; K-G. Sjögren et al. 2019; J. Skaarup 1973; H. Skousen 2008; S. Welinder et al. 2009.

30. Med hensyn til ændringen fra hvede mod byg så falder både januar- og julitemperaturerne med omkring 1° celsius fra omkring 3500 til 2500 f.Kr. (K.J. Brown et al. 2011, fig. 4), men det er usikkert, om dette kan danne basis for en forklaring på balancen mellem hvede og byg. Med hensyn til Brød- og Dværghvede som del af den oprindelige "landbrugspakke", se W. Kierleis & E. Fischer 2014. For tidlige ardspor, se M.R. Beck 2013, og for indikationer for gødskning i TN II, se A. Brogaard et al. 2013.
31. For modstridende opfattelser af kød- versus malkekvæg, se C. Andersson 2013 og K.J. Gron et al. 2015. For kvæget som trækdyr, se N.N. Johannsen 2017.
32. For C14-dateringer fra langhøjene, se: Rude (T. Madsen 1980; T. Madsen 2019a, 150212-3); Mosegården (T. Madsen og J.E. Petersen 1984; T. Madsen 2019a, 160508-9); Rustrup (K. Fischer 1976); Højensvej (M.R. Beck 2013). Af systemgravsanlæg er Aalstrup dateret til TN I gennem nedlægninger af keramik i Vollingstil (T. Madsen 2009; T. Madsen 2019a, 150203-2); Kildevang II er i sin seneste fase ligeledes dateret til TN I gennem nedlægninger af keramik i Volling-stil, men et par dateringer mellem 3900 og 3700 f.Kr. antyder, at de tidligste faser i anlægget er en del ældre (H. Skousen 2008, s 172-177). Ved Liselund er de ældste lag i systemgravene, hvor der også forekommer keramik i Volling-stil, dateret til mellem 3700 og 3600 f.Kr. (T. Torfing 2016), og ved Højensvej er systemgrave uden daterende indhold overlejret af en langhøj med en datering til mellem 3700 og 3600 f.Kr. (M.R. Beck 2013). Endelig er den ældste fase af systemgravsanlægget Albersdorf-Dieksknöll C14-dateret til mellem 3800 og 3700 f.Kr. (H. Dibbern 2016).
33. Ud over Mosegården (T. Madsen og J.E. Petersen 1984; T. Madsen 2019a, 160508-9) kan som eksempler også nævnes langhøjene fra Barkær (D. Liversage 1992), Lindebjerg (D. Liversage 1981), Rustrup (C. Fischer 1976), Bjørnsholm (S.H. Andersen & E. Johansen 1992) og Frydenlund (N.H. Andersen 2015; N.H. Andersen 2019).
34. For Bygholm Nørremark, se P. Rønne 1979, for Skibshøj, se E. Jørgensen 1977b, for Rokær, se A.M. Kristiansen 2000; A.M. Kristiansen & B.V. Eriksen under udgivelse; T. Madsen 2019a, 160306-14 og for Aarupgård T. Madsen 2019a, 160306-10. For trækammergrave med kobber, se L. Klassen 2000, s. 354-356.
35. For Stenhøj, se T. Madsen 2018; 2019a, 160508-13, for Nørremarksgård, se T. Madsen 2019a, 170403-4; T. Madsen 2019b og for Grønhøj, se K. Thorvildsen 1946; T. Madsen 2019a, 170403-18; T. Madsen 2019b.
36. Se T. Madsen 2019b, s. 915-918.
37. For tidligneolitikum, se P. Eriksen & N.H. Andersen 2014, s. 273-285 og for mellemneolitikum T Madsen 2019b: s. 913.
38. For Sarup, se N.H. Andersen 1997, og for beskrivelser og diskussion af Toftum og Aalstrup, se T. Madsen 1978; T. Madsen 2009; T. Madsen 2019a: 150203-2, 160508-34 og 35.

39. T. Madsen 2009, s. 129-32; L. Klassen & B. Knoche 2019; N.H. Andersen 1997, s. 309. Udtrykket "de døde sjæles landsbyer" er hentet fra sidstnævnte. For opbygningen af systemgravenes indersider i undersøgelsesområdet, se T. Madsen 2009; T. Madsen 2019 a, 150203-2 AU-AY; 160508-35, fig. 41; 160512-1, fig. 7.
40. For det generelle skift til bopladser på systemgravsanlæg, se P.O. Nielsen 2004, Tab. 2. For sammenhængen mellem hensættelser i systemgrave og foran megalitgrave, se T. Madsen 2019b.
41. For Toppetbjerg, se T. Madsen 2019a, 170104-59, for Bjerggård, se T. Madsen 2019a, 160512-1, for Aalstrup, se T. Madsen 2019a, 150203-2, for Egehoved, se T. Madsen 2019a, 150201-2 og for Kalvø, se S.H. Andersen 1982; S.H. Andersen 1983; T. Madsen 2019a, 150212-13.
42 Kilde: Gotländska Ängskommittén, http://www.gotlandsangar.se/. At landnammet i sin helhed ikke primært afspejler agerbrug, men derimod skovgræsning for kvæg har længe stået klart (H. Göransson 1982; B. Aaby 1985; S.Th. Andersen 1985; S.Th. Andersen 1993). Dermed være ikke sagt, at agerbruget ikke spillede en stor rolle i landbruget.
43. D. Jørgensen 2013.
44. K. J. Gron et al. 2017.
45. K-J. Sjögren 2017.
46. For slidsporsanalyserne af segltyperne, se H.J. Jensen 1994 og 1998. For forsøgene med skæring i umodne strå, se J.J. Dubois 2015. I plantefossiler fra en sen enkeltgravskultur-boplads ved Mortens Sande er der klare indikationer på, at Nøgenbyg har været høstet og hjembragt i umoden tilstand (Robinson & Kempfner 1988).
47. For tildækningen af hensættelserne med stenlag, se T. Madsen 2019b, s. 907-909. Om betydningen af skaller i systemgrave, se L. Klassen & B. Knoche 2019, og om genopgravninger med skaller på Bjerggård, se T. Madsen 2019a, 160512-1
48. Størstedelen af disse grave er fremkommet ved nyere undersøgelser. Således er der på kortet figur 2 kun tre grave fra periode 1 inden for undersøgelsesområdet. Det skal dog siges, at et par af gravene er ringgrøftgrave, hvori der kun er fundet en flintøkse og ingen stridsøkser. Tilhørsforholdet til periode 1 er dog meget sikkert.
49. P.V. Glob 1945, s. 245-6. De mere håndfaste vidnesbyrd, vi har fra den sene del af enkeltgravskulturen, peger bl.a. i retning af huse med forsænket gulv (J.A. Jensen 1973, s. 106-7; S. Hvass 1977; M. Hansen 1986, s. 286-7), en husform der er almindelig i senneolitikum.
50. Se B.V. Odgård 1994, s. 154-55 for pollendiagrammer fra moser; B.V. Odgård 1985, B.V. Odgård & H. Rostholm 1988, Rostholm 1987 for pollendiagrammer under enkeltgravshøje; B.V. Odgård 1994, s. 161 for vintergræsning baseret på lyng; B.V. Odgård 1985 for begyndende hededannelse i tragtbægerkulturen.
51. For kornaftryk i lerkar, se H. Rostholm 1986, s. 231. For pollenanalyser fra Refshøjgårdgraven, se L. Klassen 2005a og 2005b. For Hinnerup (J. Jeppesen 1995) og Gantrupgravene, se S.Th. Andersen 1996, og om mulig placering på tærskepladser, se L. Klassen 2005b, s. 34-38. For ardspor under Kikhøj, se B. Madsen 1987 og E. Hübner 2005 Kat. Nr. 547 og under Gantrupgraven, se O. Madsen 1990, s. 91. For ardspor under enkeltgravshøje i almindelighed, se L. Klassen 2005a; E. Hübner 2005, s. 474-478. For forekomsten af kværnsten i enkeltgravskulturen, se L. Klassen 2005a.
52. For forholdet mellem mands- og kvindegrave, se E. Hübner 2005, s. 632. For Gantrup graven, se O. Madsen 1990 og T. Madsen 2019a, 160411-6A. For de seks grave

med ringrøft fra undersøgelsesområdet, se T. Madsen 2019a, 160411-6A og 8A samt 160515-17E, F, G og 160515-36F.

53. E. Jørgensen 1981.
54. A.H. Nielsen 1998, s. 178; E. Hübner 2005, s. 490-91; T. Madsen 2019a, 160411-8.
55. Refshøjgård er udgravet og publiceret af Lutz Klassen (2005b). Flintøksen i den nedre grav er en typisk St. Valby-type økse med en smalsidevinkel på 9° (ikke 14° som der står i publikationen), men der er dog sket en lettere sekundær tilhugning af nakkeenden, hvad man sjældent ser i en tragtbægerkultursammenhæng.
56. Se F. Højlund (1975) for den tekniske udvikling i enkeltgravskulturens økser. Eksempler på flintøkser af åbenlys tragtbægerkulturoprindelse finder vi f.eks. i E. Hübners katalog (2005) Nr. 748 (s. 1112) – grav med D2 stridsøkse (periode 1b) og en tyknakket, tykbladet kategori B-økse af Brogård/Falster-type; Nr. 763 (s. 1117-8) – grav med B1-stridsøkse (periode 1b) og en tyknakket, tykbladet kategori B-økse af Vedbæk-type med slibning på bred- og smalsider; Nr. 1025 (s. 1232) – G7-stridsøkse (periode 2a) og tyknakket, mellembladet flintøkse med fuldt slebne bred- og smalsider angiveligt fra samme grav (se også C.J. Becker 1973, s. 182, D5); Nr. 1479 (s. 1394-5) – grav med bl.a. en type B-stridsøkse (periode 1a-b), en fuldt slebet tyknakket, tykbladet kategori B-økse af Vedbæk-type, en fuldt slebet tyknakket, tyndbladet flintøkse, og en tyknakket flintøkse med kvadratisk tværsnit slebet på alle fire sider. Fra Hinnerup ikke langt fra den ovennævnte grav ved Refshøjgård kommer også en grav med et type A5c-bæger (periode 1b) og en tyknakket, tyndbladet flintøkse med en tilhugning og slibning, der også peger i retning af tragtbægerkulturen (J. Jeppesen 1995).
57. For stridsøkserne, se T. Madsen 2019a, 150203-Amstrup A og 160508-33. For ravskiven, se T. Madsen 2019a, 160508-29 og for dens datering og anvendelse E. Hübner 2005, s. 618-19.
58. T. Madsen 2019a, 150204-17-Præstholm mark (Hübner type A3); 160508-Krekær (Hübner type A3); 150205-32 (Glob type C); 170104-25 (Hübner type F); 170104-58 (Hübner type F1).
59. Se K. Randsborg 1970 for publiceringen af kobberskiven og T. Madsen 1980 for undersøgelsen af stenkisterne.
60. T. Madsen 1980, s. 99.
61. K. Randsborg 1988; L. Klassen 2000, s. 203-06.
62. P. Eriksen og N.H. Andersen 2014, s. 111-113.
63. Se Ebbesen 1975 for fundmaterialet i megalitgravene på øerne, og f.eks. E. Nagel 1985 og J.P. Brozio 2016, s. 123 ff. for det sene fundmateriale fra megalitgrave syd for Østersøen knyttet til kugleamforakulturen.
64. Se F.O. Nielsen & P.O. Nielsen 1991, P.O. Nielsen & F.O. Nielsen 2014 og P.O. Nielsen et al. 2014.
65. Se K. Brink 2009 for palisadeanlæg og R. Edenmo et al. 1997 for forholdet mellem tragtbægerkultur og grubekeramisk kultur, samt begge for en udførlig diskussion af de komplicerede kulturforhold i det sydlige Sverige.
66. Se R. Iversen 2010 for en detaljeret kortlægning af den grubekeramiske kultur baseret på skafttungespidser og cylindriske blokke.
67. P. Eriksen 1985, s. 21.
68. L. Wincentz 2020; L. Klassen et al. 2020.

69. For landnammet i diagrammet fra Fuglsø Mose, se B. Aaby 1985, Tabel 3 og fig. 5. For Analyser af knogler, se C.A. Makarewicz & S. Pleuger 2020 og for plante makrofossiler, se M.H. Andreassen 2020.
70. E. Jørgensen 1977a; A.B. Gebauer 1988.
71. For stendyngegravene, se K. Fabricius & C.J. Becker 1996 og N. Johannsen & S. Laursen 2010. Endvidere sidstnævnte og N. Johannsen & M. Kieldsen 2014 for fortolkningen som vognbegravelser med videre henvisninger til kvægbegravelser i kugleamforakulturen.
72. K. Ebbesen 1975, s. 182-85; M. Zápotocký 1992, s. 120-143.
73. K. Fabricius & C.J. Becker 1996, s. 272-73. O. Faber 1977, fig. 14.
74. Se B.V. Odgaard 1994 for pollenanalyserne fra Solsø, S.Th. Andersen 1998 for pollenanalyser fra høje og N. Johannsen et al. 2016 for forekomsten af små bopladser i slutningen af tragtbægerkulturen.
75. U. Rasmussen 2020.
76. For øksen fra Horsens Fjord, se T. Madsen 2019a: 150206-17. C14-dateringen er 4085±45 BC (AAR-5735). Skiven fra Horsens er publiceret af P.V. Glob 1952, No. 405. Se også L. Klassen 1999, fig. 6.
77. De nye tendenser i fortolkningerne ses f.eks. hos K. Ebbesen 1982; K. Ebbesen 1997; K. Ebbesen 2005; H. Rostholm 1982; J. Skaarup 1985; C. Damm 1991; E. Hübner 2005. Hos sidstnævnte findes en omfattende, alsidig og afbalanceret diskussion (s. 694-719).
78. K. Kristiansen 1991 og K. Kristiansen et al. 2017.
79. A. Juras et al. 2018. Af artikler, der advarer mod ukritisk anvendelse af DNA data, kan nævnes V. Heyd 2017; N.N. Johannsen et al. 2017; M. Furholt 2018.
80. E. Hübner 2005. For en meget overskuelig fremstilling af forholdene, se M. Furholt 2014.
81. E. Hübner 2005, Kat Nr. 904 og Tafel 154.
82. For placeringen af flintøkser, se E. Hübner 2005, s. 608 ff. Et godt eksempel findes også i L. Klassen 2005b. For baggrunden af de tidlige stridsøkser, se E. Hübner 2005, s. 699-700.
83. For detaljer om ravskiverne, se E. Hübner 2005, s. 377 ff.
84. For plankekistegrave, se E. Hübner 2005, s. 500 ff. For stenkisterne i Elb-Saale-området, se U. Fischer 1956, s. 109 ff. og H.-J. Beier 1988, s. 49 ff.
85. For Kalvø, se S.H. Andersen 1982; S.H. Andersen 1983. Bopladserne har i kataloget (T. Madsen 2019a) følgende numre: Kalvø – 150212-13D; Gruben ved Saxild – 150212-32A; Udgravede TBK-pladser ved Horsens Fjord – 150203-2L, 160306-17U, 160306-47A, 160512-1J; Overfladeopsamlinger ved Horsens Fjord – 150201-2E, 150207-28A, 160303-9A, 160502-6A, 160508-15A, 160508-24A; Indlandspladser – 160503-3B, 160503-9B. Ved Egehoved på Alrø (150201-2B) forekommer i sen tragtbægerkulturkontekst et randskår med tosnoet snor, der muligvis er af EGK-oprindelse. Det kan dog også være tidligneolitisk.
86. For Dallund Sø, se P. Rasmussen 2005 og for boreprøven i Norsminde Fjord, J.P. Lewis 2011.
87. For fund af enkeltgravskultur på Provstlund, Bjerggård og Aalstrup, se T. Madsen 2019a, 160306-47, 160512-1, I-J og 150203-2 L.
88. S.H. Andersen 1982, s. 94-95.

89. For beskrivelsen af fundforhold og oldsager på Kalvø, se S.H. Andersen 1982; S.H. Andersen 1983, K. Davidsen 1978 og T. Madsen 2019a, 150212-13. For dyreknoglerne fra Kalvø, se P. Rowley-Conwy 1985b. De to C14-dateringer lyder på 3850 ±65 BP (K-2508) og 3510 ±55 BP (K-2507).
90. For Lindskov Knude, Horsens Golfbane og Egehoved, se T. Madsen 2019a: henholdsvis 160303-2, 160303-9 og 150201-2.
91. U. Rasmussen 2016.
92. T. Madsen 2019a,160509-9B; For genbegravelser i megalitgravkamre på øerne, se R. Iversen 2016.
93. J. Skaarup 1985, s. 379-386. For en oversigt over forholdene øst for Storebælt, se R. Iversen 2015
94. E. Hübner 2005, s. 666; R. Iversen 2015, s. 29.
95. I området vest for Horsens er 16 huse afdækket på fire større udgravninger (T. Madsen 2019a, 160306-17, 160306-23, 160306-37, 160306-41), hvoraf tre er dateret til SN I. Ved Østbirk er 13 huse afdækket på fire udgravninger (T. Madsen 2019a, 160501-12, 160501-17, 160501-20, 160501-36;), hvoraf tre er dateret til SN I. Per Borup, der har stået for alle fire udgravninger, har publiceret en oversigt over resultaterne af gravningerne, hvor enkeltgårdsbebyggelsen klart dokumenteres (P. Borup 1918).
96. For Vorsø og Smidstrup Kær, se T. Madsen 2019a henholdsvis 160508-15 og 160510-19.
97. P.M. Jensen & P.M. Mikkelsen 2007. P. Borup 2018, s. 111-12.

LITTERATUR

Andersen, N.H. 1997: *The Sarup Enclosures*. Højbjerg.

Andersen, N.H. 1999: *Sarupladsen.* Højbjerg.

Andersen, N.H. 2009: Sarupområdet på Sydvestfyn i slutningen af 4. Årtusinde f.Kr. I: A. Schülke (red.): *Plads og rum i tragtbægerkulturen. Bidrag fra Arbejdsmødet på Nationalmuseet*, 22. september 2005. København, s. 25-43.

Andersen, N.H. 2015: Frydenlund – Early Neolithic settlement and "barkaer" structures in the Sarup area. I: K. Brink, S. Hydén, K. Jennbert, L. Larsson and D. Olausson (eds.): *Neolithic Diversities. Perspectives from a conference in Lund, Sweden.* Värnamo, s. 117-27.

Andersen, N.H. 2019. House sites under burial monuments in the Sarup area of South-West Funen. I: L.R. Sparrevohn, O.T. Kastholm & P.O. Nielsen (eds.) *Houses for the Living. Two-aisled houses from the Neolithic and Early Bronze Age in Denmark*. Copenhagen, s. 123-134.

Andersen, S.H. 1982: Østjyske køkkenmøddinger med enkeltgravskultur. I: H. Thrane (red.): *Om yngre stenalders bebyggelseshistorie*. Odense, 94-106.

Andersen, S.H. 1983: Kalvø – A Coastal Site of the Single Grave Culture. *Journal of Danish Archaeology* 2, s. 71-80.

Andersen, S.H. 1991: Norsminde. A "Køkkenmødding" with Late Mesolithic and Early Neolithic occupation. *Journal of Danish Archaeology* 8, 1989, s. 13-40.

Andersen, S.H. 1994: Norsminde, ein Muschelhaufen mit später Ertebølle- und Früher Tricheterbecherkultur. I: J. Hoika & J. Meures-Balke (red.) *Beiträge zur frühneolithi-*

schen Trichterbecherkultur im westlichen Ostseegebiet. 1. Internationales Trichterbechersymposium in Schleswig vom 4. bis 7. März 1985. Neumünster, s. 11-49.

Andersen, S.H. 1998: Ringkloster. Ertebølle trappers and wild boar hunters in eastern Jutland. *Journal of Danish Archaeology* 12, 1994-95, s. 13-59.

Andersen, S.H. & E. Johansen 1992: An Early Neolithic Grave at Bjørnsholm, North Jutland. *Journal of Danish Archaeology* 9, 1990, s. 38-58.

Andersen, S.Th. 1985: Natur- og kulturlandskaber i Næsbyholm Storskov siden istiden. *Antikvariske Studier* 7, s. 85-107.

Andersen, S.Th. 1990: Pollen Spectra from the Double Passage-Grave, Klekkendehøj, on Møn. Evidence of Swidden Cultivation in the Neolithic of Denmark. *Journal of Danish Archaeology* 7, s. 77-92.

Andersen, S.Th. 1993: Early- and Middle-Neolithic agriculture in Denmark: Pollen spectra from soils in burial mounds of the Funnel Beaker Culture. *Journal of European Archaeology* 1, s. 153-80.

Andersen, S.Th. 1996: Pollenanalyser fra enkeltgravshøje i Østjylland. I: S.Th. Andersen & P. Rasmussen. *Geobotaniske undersøgelser af Kulturlandskabets Historie. Pollenanalyser fra gravhøje og søer i 1995*. København, s. 16-23.

Andersen, S.Th. 1998: Pollen analytical investigation of barrows from the Funnel Beaker and Single Grave Cultures in the Vroue area, West Jutland, Denmark. *Journal of Danish Archaeology* 12, 1994-95, s. 107-132.

Andersson, C. 2013: *Biff, lamm och fläsk. En osteologisk analys av djurhållningen vid den neolitiska lokalen Rävgrav*. Lund.

Andersson, M. 2004: *Making place in the Landscape. Early and Middle Neolithic societies in two west Scanian valleys*. Malmø.

Andreasen, M.H. 2009a: Agerbruget i enkeltgravskultur, senneolitikum og ældre bronzealder i Jylland – belyst ud fra plantemakrofossiler. *Kuml*, s. 9-55.

Andreasen, M.H. 2009b: *Makrofossilfund fra et langhus fra sen enkeltgravskultur. Arkæobotanisk analyse fra VMÅ 2405 Tandrupgaard (FHM 4296/94)*. Moesgård Museum, Højbjerg.

Andreassen, M.H. 2009c: *Makrofossilfund fra to hustomter fra enkeltgravskultur og senneolitikum. Arkæobotanisk analyse ESM 1658 Uglviggård (FHM 4296/450) & ESM 2428 Måde Slam (FHM 4296/451)*. Moesgård Museum, Højbjerg.

Andreasen, M.H. 2016: *FHM 5432, Robert Fultonsvej (FHM 4296/1530). Arkæobotanisk analyse af materiale fra kulturlag og grube fra tidlig neolitisk tragtbægerkultur A*. Moesgård Museum, Højbjerg.

Andreasen, M.H. 2017a: *FSM 6973, Frydenlund (FHM 4296/1119). Makrofossilanalyse af anlæg fra tidligneolitikum*. Moesgård Museum, Højbjerg.

Andreasen, M.H. 2017b: Å*HM 6499, Kronhjorten, etape 1 (FHM 4296/2037). Makrofossilanalyse af en prøve fra en forsænkning i et langhus fra Klokkebægerkulturen*. Moesgård Museum, Højbjerg.

Andreasen, M.H. 2017c: *KNV 00415, Turebylille Vindmøllepark (FHM 4296/2415). Makrofossilanalyse af prøver fra to tidlig neolitiske gruber*. Moesgård Museum, Højbjerg.

Andreasen, M.H. 2020: Agriculture during the Pitted Ware culture in the Kattegat region? I: L. Klassen (ed.): *The Pitted Ware Culture on Djursland. Supra-regional significance and contacts in the Middle Neolithic of Southern Scandinavia*. Aarhus, s. 371-384.

Beck, M.R. 2013: Højensvej Høj 7 – en tidligneolitisk langhøj med flere faser. *Aarbøger for Nordisk Oldkyndighed og Historie 2011-2012*, s. 33-117.

Becker C.J. 1954: Die Mittel-Neolithischen Kulturen in Südsskandinavien. *Acta Archaeologica* 25, s. 49-150.

Becker, C.J. 1973: Studien zu Neolithischen Flintbeile. Methodische Probleme – Neue formen und varianten der Dicknakigen Beile innerhalb der Trichterbecherkultur – Chronologische Probleme. *Acta Archaeologica* 44, s. 125-186.

Becker C.J. 1981: Probleme der ältesten Phase der Einzelgrabkultur in Dänemark. *Jahresschrift für Mitteldeutsche Vorgeschichte*. Band 64, s. 109-116.

Becker, C.J. 1982: Om grubekeramisk kultur i Danmark. Korte bidrag til en lang diskussion (1950-1980). *Aarbøger for Nordisk Oldkyndighed og Historie 1980*, s. 13-33.

Beier, H.-J. 1988: *Die Kugelamphorenkultur im Mittelelbe-Saale-Gebiet und in der Altmark*. Berlin.

Boas, N.A. 1993: Late Neolithic and Bronze Age Settlements at Hemmed Church and Hemmed Plantation, East Jutland. *Journal of Danish Archaeology* 10, s. 119-135.

Boethius, A. 2009: Lindängelund – en osteologisk analys om offer och gropar. *Reports in osteology* 2009: 1.

Boethius, A. 2011: Benen från Dösemarken, Limhamn, Malmö – en osteologisk undersökning av djurben från neolitikum och äldre järnåldern. *Reports in osteology* 2011: 4.

Borup, P. 2003: Havet i Horsens Fjord i forhistorisk tid. *Horsens – Ren Fjord. Nyhedsbrev,* nr. 11, s. 271-277.

Borup, P. 2015: Ålegræssets betydning for de submarine bopladser. *Horsens – Ren Fjord. Nyhedsbrev* nr. 16, s. 466-471.

Borup, P. 2018: Østbirk – a strategic settlement at the end of the Neolithic. *Journal of Neolithic Archaeology* 20, s. 83-130.

Bratlund, B. 1993: The Bone Remains of Mammals and Birds from the Bjørnsholm Shell-Mound. A Preliminary Report. *Journal of Danish Archaeology* 10, s. 97-104.

Brink, K. 2009: *I palissadernas tid. Om stolphål och skärvor och sociala relationer under yngre mellanneolitikum*. Malmø.

Brogaard, A., R. Frasera, T.H.E. Heatonb, M. Wallacec, P. Vaiglovaa, M. Charlesa, G. Jonesc, R.P. Evershedd, A.K. Styringa, N.H. Andersen, R-M. Arbogastf, L. Bartosiewiczg, A. Gardeisenh, M. Kanstrup, U. Maierj, E. Marinovak, L. Ninovl, M. Schäferm & E. Stephann 2013: Crop manuring and intensive land management by Europe's first farmers. *PNAS* 110 no. 31, s. 12589–12594.

Browall, H. 1986: *Alvastra pålbyggnad. Social och ekonomisk bas*. Stockholm.

Brown, K.J., H. Seppä, G. Schoups, R.S. Fausto, P. Rasmussen and H.J.B. Birks 2011: A spatio-temporal reconstruction of Holocene temperature change in southern Scandinavia. *The Holocene* 22(2), s. 165-177.

Brozio, J.P. 2016: *Megalithanlagen und Siedlungsmuster im trichterbecherzeitlichen Osholstein*. Bonn.

Brozio, J.P., W. Dörfler, I. Feeser, W. Kirleis, S. Klooß & J. Müller 2013: A Middle Neolithic Well from Northern Germany: A Precise Source to Reconstruct Water Supply Management, Subsistence Economy, and Deposition Practices. *Journal of Archaeological Science*. doi: 10.1016/j.jas.2013.03.029.

Brøndsted, J. 1938: *Danmarks Oldtid. I. Stenalderen*. København.

Christensen, C. 2001: Kystbosættelse og havniveaustigninger i stenalderen. I: O.L. Jensen, S.A. Sørensen & K.M. Hansen (red.): *Danmarks jægerstenalder – status og perspektiver*. Hørsholm, s. 183-193

Conradsen, K. & S. Heier-Nielsen 1995: Holocene paleocenography and paleoenvironments of the Skagerrak-Kattegat, Scandinavia. *Paleocanography* 10 (4), s. 801-813.

Damm, C. 1991: *Continuity and Change. An analysis of social and material patterns in the Danish Neolithic.* Cambridge.

Davidsen, K. 1975: Tragtbægerkulturens slutfase. Nye C 14 dateringer. *Kuml 1973-74*, s. 42-77.

Davidsen, K. 1977: Relativ kronologi i mellemneolitisk tid. En diskussion af C.J. Beckers kronologisystem på baggrund af nye og gamle stratigrafiske fund. *Årbøger for Nordisk Oldkyndighed og Historie* 1975, s. 165-178.

Davidsen, K. 1978: *The Final TRB Culture in Denmark. A Settlement Study*. Copenhagen.

Dibbern, H. 2016: *Das Trichterbecherzeitliche Westholstein. Eine Studie zur neolithischen Entwicklung von Landschaft und Gesellschaft*. Bonn.

Dubois, J.J. 2015: *Differential Development of Sickle Polish Due to Moisture Content of Herbaceous Plant Material*. Theses and Dissertations. 1160. http://scholarworks.uark.edu/etd/1160.

Ebbesen, K. 1975: *Die jüngere Trichterbecherkultur auf den dänischen Inseln*. København.

Ebbesen, K. 1982: Enkeltgravskulturen – 100 år efter opdagelsen. *Årbøger for Nordisk Oldkyndighed og Historie* 1980, s. 52-72.

Ebbesen, K. 1997: Der Beginn der Streitaxtzeit. I: P. Siemen (ed.): *Early Corded Ware Culture. The A-Horizon – fiction or fact*? Esbjerg, s. 75-91.

Ebbesen, K. 2005: *The battle axe period – Stridsøksetid*. København.

Edenmo, R., M. Larsson, B. Nordqvist & E. Olsson 1997: Gropkeramikerna – fanns de? Materiell kultur och ideologisk förändring. Neolitiseringen i syd- väst- och Mellansverige – social och ideologisk förandring. I: M. Larsson & E. Olsson (red.): *Regionalt och Interregionalt. Stenålderundersökningar I Syd- och Mellansverige*. Stockholm, s. 135-213.

Enghoff, I.B. 2011: *Regionality and biotope exploitation in Danish Ertebølle and adjoining periods*. København.

Eriksen, P. 1985: Det neolitiske bopladskompleks ved Fannerup. *Kuml 1984*, s. 9-76.

Eriksen, P. & N.H. Andersen 2014: *Stendysser. Arkitektur og funktion*. Højbjerg.

Eriksen, P. & T. Madsen 1984: Hanstedgård. A settlement site from the Funnel Beaker Culture. *Journal of Danish Archaeology* 3, s. 62-82.

Faber, O. 1977: Endnu et kulthus. Et stenaldertempel ved Engedal i Midtjylland. *Antikvariske studier tilegnet Knud Thorvildsen på 70-årsdagen 18. december 1977*, s. 35-46.

Fabricius, K. & C.J. Becker 1996: *Stendyngegrave og Kulthuse. Studier over Tragtbægerkulturen i Nord- og Vestjylland*. København.

Fischer, C. 1976: Tidlig-neolitiske anlæg ved Rustrup. *Kuml 1975*, s. 29-71.

Fischer, U. 1956: *Die Gräber der Steinzeit im Saalegebiet*. Berlin.

Furholt, M. 2014: Upending a 'Totality': Re-evaluating Corded Ware Variability in Late Neolithic Europe. *Proceedings of the Prehistoric Society* 80, 67-86.

Furholt, M. 2018: Massive Migrations? The Impact of Recent aDNA Studies on our View of Third Millennium Europe. *European Journal of Archaeology* 21 (2), s. 159–191.

Gebauer, A.B. 1988: Stylistic variation in the pottery of the Funnel Beaker Culture. I: T. Madsen (ed.): *Multivariate Archaeology. Numerical Approaches in Scandinavian Archaeology*. Højbjerg, s. 91-117.

Glob, P.V. 1945: Studier over den jyske Enkeltgravskultur. *Aarbøger for Nordisk Oldkyndighed og Historie 1944*, s. 5-283.

Glob, P.V. 1952: *Danske Oldsager II. Yngre Stenalder*, København.

Gron, K.J., J. Montgomery & P. Rowley-Conwy 2015: Cattle Management for Dairying in Scandinavia's Earliest Neolithic. *PLoS ONE 10(7): e0131267. doi:10.1371/journal. pone.0131267*.

Göransson, H. 1982: The utilization of the forest in North-west Europe during Early and Middle Neolithic. I: V. Mejdahl (ed.): *Second Nordic Conference on the Application of Scientific Methods in Archaeology*. PACT 7, Part I, s. 207-221.

Göransson, H. 1995: *Alvastra Pile Dwelling, Palaeoethnobotanical Studies*. Lund.

Hansen, M. 1986: Enkeltgravskulturens bopladsfund fra Vesthimmerland og Ribe-området. I: C. Adamsen & K. Ebbesen (red.): *Stridsøksetid i Sydskandinavien. Beretning fra et symposium 28.-30.okt.1985 i Vejle*. København, s. 286-291.

Hatting, T. 1978: Lidsø. Zoological Remains from a Neolithic Settlement. I: K. Davidsen: *The Final TRB Culture in Denmark. A Settlement Study.* København, s. 193-207

Heinrich, D. 1999: Die Tierknochen des frühneolithischen Wohnplatzes Wangels LA 505. Ein Vorbericht. *Offa Band 54/55* 1997/98, s. 43-48.

Helbæk, H. 1953: Early Crops in Southern England. *Proceedings of the Prehistoric Society* 18, 1952, s. 194-233.

Helbæk, H. 1955: Store Valby – kornavl i Danmarks første neolitiske fase. *Aarbøger for Nordisk Oldkyndighed og Historie 1954*, s. 198-204.

Henriksen, P.S. 2000: *Agerbrug i senneolitikum og bronzealderen på Djursland*. NNU Rapport nr. 7.

Henriksen, P.S. 2001: Arkæobotanisk undersøgelse af materiale fra fire bopladser fra dolktid til ældre bronzealder ved Skive. *NNU Rapport nr. 11*.

Henriksen, P.S. 2016a: Arkæobotaniske undersøgelser af prøver fra neolitiske anlæg, Gokartbanen MLF 01333. *NNU Rapport 2/2016*.

Henriksen, P.S. 2016b: Arkæobotaniske undersøgelser af prøver fra neolitiske anlæg fra Vasagård vest på Bornholm. *NNU Rapport 3/2016*.

Heyd, V. 2017: Kossinna's smile. *Antiquity* 91, s. 348-359.

Hjelmqvist, H. 1975: Getreidearten und andere Nutzpflanzen aus det Frühneolithischen Zeit von Langeland. I: J. Skaarup: *Stengade. Ein langeländischer Wohnplatz mit Hausresten aus der frühneolithischen Zeit.* Rudkøbing, s. 211-219.

Hjelmqvist, H. 1998: Kornavtryck i stenålderskeramikken från Spodsbjerg. I: H.H. Sørensen (red.): *Spodsbjerg – en yngre stenalders boplads på Langeland*. Rudkøbing, s. 190-197.

Hvass, S. 1977: A House of the Single-Grave Culture excavated at Vorbasse in Central Jutland. *Acta Archaeologica* 48, s. 219-232.

Hübner, E. 2005: *Jungneolithische Gräber auf der Jütischen Halbinsel. Typologische und chronologische Studien zur Einzelgrabkultur*. København.

Højlund, F. 1975: Stridsøksekulturens flintøkser og -mejsler. *Kuml 1973-74*, s. 179-196.

Iversen, J. 1941: Landnam i Danmarks Stenalder. *DGU II række, nr. 66*, s. 7-68.

Iversen, J. 1967: Naturens udvikling siden sidste istid. *Danmarks Natur I. Landskabernes opståen*. København, s. 345-445.

Iversen, J. 1973: *The development of Denmarks Nature since the Last Glacial*. København.

Iversen, R. 2010: In a World of Worlds. The pitted ware complex in a large-scale perspective. *Acta Archaeologica* 81, s. 5-43.

Iversen, R. 2015: *The Transformation of Neolithic Societies: An Eastern Danish perspective on the 3rd Millennium BC*. Højbjerg.

Iversen, R. 2016: Was there ever a single grave culture in east Denmark? Traditions and transformations in the 3rd millennium BC. I: M. Furholt, R. Großmann & M. Szmyt (eds.): *Transitional landscapes? The 3rd millennium BC in Europe.* Bonn, s. 160-169.

Jensen, H.J. 1994: *Flint tools and plant working. Hidden traces of Stone Age technology*. Aarhus.

Jensen, H.J. 1998: Flintseglene på Spodsbjergbopladsen – en slidsporsanalyse. I: H.H. Sørensen (red.): *Spodsbjerg – en yngre stenalders boplads på Langeland*. Rudkøbing, s. 165-173.

Jensen, J. Aa. 1973: Bopladsen Myrhøj. 3 hustomter med klokkebægerkeramik. *Kuml 1972*, s. 61-122.

Jensen, P.M. 2012: *SBN 1194, Vrold. Arkæobotnisk analyse af kornprøver fra senneolitikum og ældre bronzealder.* Moesgård Museum, Højbjerg.

Jensen, P.M. 2013a: *Makrofossilanalyse fra SBM 1271, Hestehaven (FHM 4296/1059). Arkæobotanisk analyse af to neolitiske huse fra Skanderborg*. Moesgård Museum, Højbjerg.

Jensen, P.M. 2013b: *Makrofossilanalyse fra TAK 1449, Jasonminde. Arkæobotaniske analyser af fem to-skibede huse fra senneolitikum/ældre bronzealder*. Moesgård Museum, Højbjerg.

Jensen, P.M. 2013c: *Makrofossilanalyse fra OBM 4914, Skrillinge Sydøst II. Analyse af arkæobotanisk materiale fra senneolitikum og ældre jernalder.* Moesgård, Museum, Højbjerg.

Jensen, P.M. 2015: *HBV 1454, Holsted Åmark II. Analyse af arkæobotanisk materiale fra jordfæstegrav og gruber fra yngre neolitikum*. Moesgård Museum, Højbjerg.

Jensen, P.M. & M.B. Thastrup 2014: *OBM 1613, Skovgård. Arkæobotaniske analyser af senneolitiske gruber samt hustomter fra romersk/germansk jernalder*. Moesgård Museum, Højbjerg.

Jensen, P.M. & P. H. Mikkelsen 2007: *Tre kældergruber i et senneolitisk hus fra Petersborg Vest, HOM 1509.* Moesgård Museum, Højbjerg.

Jeppesen, J. 1995: Stenalderhøje ved Hinnerup. Østjysk Hjemstavn 60, s. 47-53.

Jessen, K. 1940: Bundsø. En yngre stenalder boplads på Als III. Kornfund. *Aarbøger for Nordisk Oldkyndighed og Historie* 1939, s. 65-84.

Johannsen, N.N. 2017: Appropriating Draught Cattle Technology in Southern Scandinavia: Roles, Context and Consequences. I: J. Maran and P.W. Stockhammer (eds.): *Appropriating innovations. Entangled knowledge in Europe, 5000–1500 BCE*. Oxford, s. 122-135.

Johannsen, N.N., S.K. Nielsen and S.T. Jensen 2016: Northwestern Jutland at the dawn of the 3rd millennium: navigating life and death in a new socioeconomic landscape? I: M. Furholt, R. Großmann, M. Szmyt (eds.): *Transitional landscapes? The 3rd millennium BC in Europe.* Bonn, s. 36-51.

Johannsen, N.N. & M. Kieldsen 2014: En stendyngegrav ved Kvorning. Fund, kontekst og betydning. *Kuml, s.* 9-28.

Johannsen, N.N., G. Larson, D.J. Meltzer & M.V. Linden 2017: A composite window into human history. Better integration of ancient DNA studies with archaeology promises deeper insights. *Science* Vol. 356, Issue 6343, s. 1118-1120.

Johannsen, N.N. & S. Laursen 2010: Routes and Wheeled Transport in Late 4th–Early 3rd Millennium Funerary Customs of the Jutland Peninsula: Regional Evidence and European Context. *Prähistorische Zeitschrift*, 85, s. 15-58.

Johansson, F. 1979. Die Knochenfund von Säugetieren und Vögeln von Bistoft LA 11. Appendix A. I: L. Johansson: *Socio-ekonomiska strukturer i tidigt Neolitikum och deras förutsätningar. Studier över Bistoft LA 11 – ett boplatsfynd från Schleswig-Holstein*. Göteborg.

Juras, A., M.j Chyleński, E. Ehler, H.a Malmström, D. Żurkiewicz, P. Włodarczak, S. Wilk, J. Peška, P. Fojtík, M. Králík, J. Libera, J. Bagińska, K. Tunia, V.I. Klochko1, M. Dabert, M. Jakobsson & A. Kośko 2018: Mitochondrial genomes reveal an east to west cline of steppe ancestry in Corded Ware populations. *Nature, Scientific Reports* 8:11603, s. 1-10.

Jørgensen, D. 2013. Pigs and Pollards: Medieval Insights for UK Wood Pasture Restoration. *Sustainability* 5, s. 387-399.

Jørgensen, E. 1977a: *Hagebrogård – Vroue – Koldkur. Neolithische Gräberfelder aus Nordwest-Jütland*. København.

Jørgensen, E. 1977b: Brændende dysser. *Skalk* 5, s. 7-13.

Jørgensen, E. 1981: Gravhusenes problem. *Skalk* 3, s. 4-9.

Jørgensen, E 2000: Yngre stenalder. I: L.S. Madsen & O. Madsen (red.): *Det Sønderjyske Landbrugs Historie. Sten- og Bronzealder*. Haderslev, s. 63-133.

Jørgensen, G. 1977: Acorns as a food-source in the later Stone Age. *Acta Archaeologica* 48, s. 233-238.

Jørgensen, G. 1982: Korn fra Sarup. Med nogle bemærkninger om agerbruget i yngre stenalder i Danmark. *Kuml 1981*, s. 221-231.

Jørgensen, G. & B. Fredskild 1978: Plant Remains from the TRB Culture, Period MN V. I: K. Davidsen: *The Final TRB Culture in Denmark. A Settlement Study*. Copenhagen, s. 189-192.

Kalis, A.J. & J. Meurers-Balke 1998: Die „Landnam"-Modelle von Iversen und Troels-Smith zur Neolithisierung des westlichen Ostseegebietes — ein Versuch ihrer Aktualisierung. *Prähistorische Zeitschrift* 73, s. 1-24.

Kirleis, W. & E. Fischer 2014: Neolithic cultivation of tetraploid free threshing wheat in Denmark and Northern Germany: implications for crop diversity and societal dynamics of the Funnel Beaker Culture. *Vegetation History and Archaeobotany.* DOI 10.1007/s00334-014-0440-8.

Kirleis, W. & S. Kloss 2014: More than simply fallback food? Social context of plant use in the Northern German Neolithic. I: A. Chevalier, E. Marinova & L. Peña-Chocarro (eds.): *Plants and People. Choices and Diversity through time*. Oxford, s. 428-438.

Kirleis, W., S. Klooß, H. Kroll, & J. Müller 2012: Crop growing and gathering in the northern German Neolithic: a review supplemented by new results. *Vegetation History and Archaeobotany* 21, s. 221-242.

Klassen, L. 1999: Eksotika. Fjernkontakt i stenalderens Europa. I: O. Høiris, H.J. Madsen, T. Madsen & J. Vellev (red.): *Menneskelivets mangfoldighed. Arkæologisk og antropologisk forskning på Moesgård*. Højbjerg, s. 393-400.

Klassen, L. 2000: *Frühes Kupfer im Norden. Untersuchungen zu Chronologie, Herkunft und Bedeutung der Kupferfunde der Nordgruppe der Trichterbecherkultur*. Højbjerg.

Klassen, L. 2005a: Zur Bedeutung von Getreide in der Einzelgrabkultur Jütlands. www.jungsteinSITE.de.

Klassen, L. 2005b: Refshøjgård. Et bemærkelsesværdigt gravfund fra enkeltgravskulturen. *Kuml,* s. 17-59.

Klassen, L. & B. Knoche 2019: Kerbstones, causewayed enclosures and protective circles in Southern Scandinavia and beyond. I: J. Müller, M. Hinz, & M. Wunderlich (eds.): *Megaliths – Societies – Landscapes. Early Monumentality and Social Differentiation in Neolithic Europe*. Bonn, s. 81-101.

Klassen, L., R. Iversen, N.N. Johannsen, U. Rasmussen & O.B. Poulsen 2020: The Pitted Ware culture on Djursland in the Neolithic world. I: L. Klassen (ed.): *The Pitted Ware Culture on Djursland. Supra-regional significance and contacts in the Middle Neolithic of Southern Scandinavia*. Aarhus, s. 451-489.

Koch, E. 1998: *Neolithic Bog Pots from Zealand, Møn, Lolland and Falster*. København.

Kristiansen, A.M. 2000: Langhøjen ved Rokær – variation over et tema. I: S. Hvass (red.): *Vor skjulte kulturarv. Arkæologien under overfladen. Til Hendes Majestæt Dronning Margrethe II 16. april 2000*. København, Højbjerg, s. 44-45.

Kristiansen, A.M. & B.V. Eriksen under udgivelse: Rokær – an Early Neolithic long barrow from East Jutland.

Kristiansen, K. 1991: Prehistoric Migrations – the Case of the Single Grave and Corded Ware Cultures. *Journal of Danish Archaeology* 8, s. 209-225.

Kristiansen, K., M.E. Allentoft, K.M. Frei, R. Iversen, N.N. Johannsen, G. Kroonen, Ł. Pospieszny, T.D. Price, S. Rasmussen, K-G. Sjögren, M. Sikora & E. Willerslev 2017: Re-theorising mobility and the formation of culture and language among the Corded Ware Culture in Europe. *Antiquity* 91 356, s. 334–347.

Kveiborg, J. 2008: *Knogler fra mellemneolitisk tid ved OBM 4087 Skaghorn. En zooarkæologisk analyse af knogler fra den mellemste del af tragtbægerkulturen.* Moesgård Museum, Højbjerg.

Larsson, L. 1994: Eine Küstensiedlung der frühen Trichterbecherkultur bei Rävgrav in Südschonen, Schweden. I: J. Hoika & J. Meures-Balke (red.): *Beiträge zur frühneolithischen Trichterbecherkultur im westlichen Ostseegebiet. 1. Internationales Trichterbechersymposium in Schleswig vom 4. bis 7. März 1985.* Neumünster, s. 195-207.

Larsson, M. 1984: *Tidigneolitikum I Sydvästskåne. Kronolgi och bosätningsmönster*. Lund.

Lewis, J.P. 2011: *Holocene environmental change in coastal Denmark: interactions between land, sea and society*. Loughborough.

Lewis, J.P., D.B. Ryves, P. Rasmussen, J. Olsen, K.-L. Knudsen, S.H. Andersen, K. Weckström, A.L. Clarke, E. Andrén and S. Juggins 2016: The shellfish enigma across the Mesolithic-Neolithic transition in southern Scandinavia. *Quaternary Science Review* 151, s. 315-320.

Liversage, D. 1981: Neolithic Monuments at Lindebjerg, Northwest Zealand. *Acta Archaeologica* 51, s. 85-152.

Liversage, D. 1992: *Barkær. Long Barrows and Settlements*. Copenhagen.

Lykke-Andersen, H. 1979: Nogle undergrundstektoniske elementer i det danske Kvartær. *Dansk geologisk Forening, Årsskrift for 1978*, s. 1-6.

Macheridis, S. 2011: *Animal i Dual? Det osteologiska materialets fördeling i pargroparna på tidigneolitiska Almhov, Skåne*. Lund

Madsen, A.P., S.Müller, C.Neergaard, C.G.J. Petersen, E.Rostrup, K.J.V. Steenstrup & H.Winge 1900: *Affaldsdynger fra Stenalderen i Danmark. Undersøgte for Nationalmuseet*. København.

Madsen, B. 1987: Kikhøj i Røved. *Arkæologiske fund. Kulturhistorisk Museum, Randers. Virksomhed og resultater 1986*, s. 48-52.

Madsen, O. 1990: Gantrup. En enkeltgravshøj med ringgrøft og grav med dødehus. *Kuml 1988-89*, s. 77-118.

Madsen T. 1978: Toftum ved Horsens. Et "befæstet" anlæg tilhørende tragtbægerkulturen. *Kuml 1977*, s. 161-184.

Madsen, T. 1980: En tidligneolitisk langhøj ved Rude i Midtjylland. *Kuml 1979*, s. 79-108.

Madsen, T. 1982: Settlement Systems of Early Agricultural Societies in East Jutland, Denmark: A Regional Study of Change. *Journal of Anthropological Archaeology* 1, s. 197-236.

Madsen, T. 1988: Causewayed enclosures in South Scandinavia. I: C. Burgess, P. Topping, C. Mordant & M. Maddison (eds.): *Enclosures and Defences in the Neolithic of Western Europe*. Oxford, s. 301-336.

Madsen, T. 1990: Changing patterns of land use in the TRB culture of South Scandinavia. I: D. Jankowska (red.): *Die Trichterbecherkultur. Neue Forchungen und Hypothsen. Material des Internationalen Symposiums Dymaczewo, 20-24 September 1988*. Poznan, s. 27-41.

Madsen, T. 2009: Aalstrup – en boplads og systemgravsanlæg ved Horsens Fjord. I: A. Schülke (red.): *Plads og rum i tragbægerkulturen. Bidrag fra Arbejdsmødet på Nationalmuseet, 22 september 2005*. København, s. 105-138.

Madsen, T. 2018: Stenhøj. En langdysse ved Horsens Fjord. *Kuml*, s. 31-74.

Madsen, T. 2019a: *Continuity and Change. The development of Neolithic societies in central East Jutland, Denmark. Vol. I – Catalogue of finds*. Currently available from https://www.archaeoinfo.dk/

Madsen, T. 2019b: Pots for the ancestors. The structure and meaning of pottery depositions at passage graves. I: J. Müller, M. Hinz & M. Wunderlich (eds.): *Megaliths – Societies – Landscapes Early Monumentality and Social Differentiation in Neolithic Europe*. Volume 3. Bonn, s. 893-920.

Madsen, T. & H.J. Jensen 1982: Settlement and Land Use in Early Neolithic Denmark. *Analecta Praehistorica Leidensia* 15, s. 63-86.

Madsen, T. & J.E. Petersen 1984: Tidligneolitiske anlæg ved Mosegården. Regionale og kronologiske forskelle i tidligneolitikum. *Kuml 1982-83*, s. 61-120.

Magnell, O. 2007: Djuren och Människan. I: Magnus Anderson (red.): *Kustlättens mötesplatser*. Lund, 52-86.

Makarewicz, C.A. & S. Pleuger 2020: Herder-hunter-fishers and agricultural contacts. Zooarchaeological perspectives on Pitted Ware animal exploitation strategies from Djursland. I: L. Klassen (ed.): *The Pitted Ware Culture on Djursland. Supra-regional significance and contacts in the Middle Neolithic of Southern Scandinavia*. Aarhus, s. 279-339.

Mertz, E.L. 1924: Oversigt over de sen- og postglaciale Niveau-forandringer i Danmark. *Danmarks Geologiske Undersøgelser*. II Rk., 41, s. 2–40.

Mikkelsen, P.H. 2002: THY 3759, Grydehøj. Forkullet materiale i gravhøj fra Enkeltgravskulturen. Moesgård Museum, Højbjerg.

Moltsen, A.S.A. 2013: Makrofossilanalyser fra Strandsegård II, *NFHA 3023*.

Møhl, U. 1975: Die ältesten Haustierspuren in Dänemark. Knochenfunde aus dem frühen Neolitthikum auf Langeland. I: J. Skaarup: *Stengade. Ein langeländischer Wohnplatz mit Hausresten der frühneolithischen Zeit*. Rudkøbing, s. 207-210.

Nagel, E. 1985: Die *Erscheinungen der Kugelamphorenkultur im Norden der DDR*. Berlin.

Nielsen, A.H. 1998: *Arkæologiske udgravninger i Danmark* 1997, s. 178-9.

Nielsen, F.O. & P.O. Nielsen 1991: The Middle Neolithic Settlement at Grødbygård, Bornholm. I: K. Jennbert, L. Larsson, R. Petré & B. Wyszomirska-Werbart (eds.): *Regions and Reflections. In Honour of Märta Strömberg.* Lund, s. 51-65.

Nielsen, P.O. 1979: De tyknakkede flintøksers kronologi. *Aarbøger for Nordisk Oldkyndighed og Historie 1977*, s. 5-71.

Nielsen, P.O. 1984: De første bønder. Nye fund fra den tidligste Tragtbægerkultur ved Sigersted. *Aarbøger for Nordisk Oldkyndighed og Historie*, s. 96-126.

Nielsen, P.O. 2004: Causewayed camps, palisade enclosures and central settlements of the Middle Neolithic in Denmark. *Journal of Nordic Archaeological Science* 14, s. 19-33.

Nielsen, P.O. & F.O. Nielsen 2014: Grødby, toskibede huse og runde anlæg. I: P.O. Nielsen, F.O. Nielsen, S.I. Hansen, H. Poulsen & M.S. Thorsen. *Solstensøen. På sporet af Bornholms bondestenalder.* Rønne, s. 119-150.

Nielsen, P.O., F.O. Nielsen & M.S. Thorsen 2014: Rispebjerg, en centralplads fra sen tragtbægerkultur. I: P.O. Nielsen, F.O. Nielsen, S.I. Hansen, H. Poulsen & M.S. Thorsen. *Solstensøen. På sporet af Bornholms bondestenalder*. Rønne, s. 107-118.

Nilsson, M.-L. & L. Nilsson 2003: Et källsprång i Saxtorp. I: M. Svensson (red.): *Det Neolitiska Rummet. Skånska spor – arkeologi längs Västkustbanen.* Stokholm, s. 242-295.

Nobis, G. 1983: Wild- und Haustierknochen des Fundplatzes Siggeneben-Süd. I: J. Meurers-Balke: *Siggeneben-Süd. Ein Fundplatz der frühen Trichterbecherkultur and der holsteinischen Ostseeküster*. Neumünster, s. 115-123.

Nobis, G. 1987: Die Tierreste der prähistorischen Siedlung Heringsdorf-Süssau. I: J. Hoika: *Das Mittelneolithikum zur Zeit det Trichterbecherkultur in Nordostholstein. Untersuchungen zu Archäologi und Landshaftsgeschichte*. Neumünster, s. 257-264.

Nyegaard, G. 1985: Faunalevn fra yngre stenalder på øerne syd for Fyn. I: J. Skaarup. *Yngre Stenalder på øerne syd for Fyn*. Rudkøbing, s. 426-466.

Odgaard, B.V. 1985: Kulturlandskabets historie i Vestjylland. Foreløbige resultater af nye pollenanalytiske undersøgelser. *Fortidsminder. Antikvariske Studier* 7, s. 48-59.

Odgård, B.V. 1994: *The Holocene vegetation history of northern West Jutland, Denmark*. København.

Odgård B.V. & H. Rostholm 1988: A Single Grave Barrow at Harreskov, Jutland. Excavation and Pollen Analysis of a Fossil Soil. *Journal of Danish Archaeology* 6, 1987, s. 87-100.

Petersen, P.V. 1999: *Flint fra Danmarks Oldtid*. København.

Randsborg, K. 1970: Eine kupferne schmuckscheibe aus einem dolmen in Jüland. *Acta Archaeologica* 61, s. 181-190.

Randsborg, K. 1988: The Neolithic copper discs from Rude, Jutland and Hřivice, Bohemia. *Acta Archaeologica* 58, s. 234-236.

Rasmussen, P. 2005: Mid- to late-Holocene land-use change and lake development at Dallund Sø, Denmark: vegetation and land-use history inferred from pollen data. *The Holocene* 15-8, s. 1116-1129.

Rasmussen, U. 2016: Gaasemosen. A contribution to the study of the economic strategy of the Single Grave Culture. I: M. Furholt, R. Großmann & M. Szmyt (eds.): *Transitional Landscapes? The 3rd millennium BC in Europe*. Bonn, s. 143-157.

Rasmussen, U. 2020: Four minor Pitted Ware culture sites on Djursland. Their individual character and function. I: L. Klassen (ed.): *The Pitted Ware Culture on Djursland. Supra-regional significance and contacts in the Middle Neolithic of Southern Scandinavia*. Aarhus, s. 141-242.

Regnell, M. & K-G. Sjögren 2006: Introduction and development of agriculture. I: K-G. Sjögren (ed.): *Ecology and Economy in Stone Age and Bronze Age Scania. Lund*, s. 107-169.

Robinson, D.E. 1992: Analyse af planterester fra Lodbjerg – en "sæter" boplads fra klokkebægerkultur i Vestthy. *NNU rapport nr. 28. 1992.*

Robinson, D.E. 1998: Plantemakrofossiler fra Spodsbjergbopladsen. I: H.H. Sørensen (red.): *Spodsbjerg – en yngre stenalders boplads på Langeland*. Rudkøbing, s. 175-189.

Robinson, D.E. 2003: Neolithic and Bronze Age Agriculture in Southern Scandinavia – Recent Archaeobotanical Evidence from Denmark. *Environmental Archaeology* 8:2, s. 145-165, DOI: 10.1179/env.2003.8.2.145.

Robinson, D.E. & I. Boldsen 2000: Arkæobotaniske undersøgelser af materiale fra enkeltgravshustomter ved Strandet Hovedgaard. *NNU Rapport nr. 5 2000*.

Robinson, D.E. & J. Harrild 1994: *Arkæobotaniske analyser af mareriale fra Vasagård, Bornholm, NM A7227*. Nationalmuseet, København.

Robinson, D.E. & D. Kempfner 1988: Carbonized grain from Mortens Sande 2 – A single Grave Site in Northwest Jutland. *Journal of Danish Archaeology* 6, s. 125-129.

Rostholm, H. 1982. *Oldtiden på Herning-egnen*. Herning.

Rostholm, H. 1986: Kornaftryk fra enkeltgravskulturen. I: C. Adamsen & K. Ebbesen (red.): *Stridsøksetid i Sydskandinavien. Beretning fra et symposium 28.-30. X. 1985 i Vejle*. København, s. 230-237.

Rostholm, H. 1987: De første bønder. Landbrug I Danmarks bondestenalder og bronzealder. *FRAM. Fra Rinkøbing Amts Museer*, s. 39-60.

Rowley-Conwy, P. 1981: Slash and Burn in the Temperate European Neolithic. I: R. Mercer (ed.): *Farming Practice in British Prehistory.* Edinburgh, 85-96.

Rowley-Conwy, P. 1985a: Mellemneolitisk økonomi i Danmark og Sydengland. Knoglefundene fra Fannerup. *Kuml 1984*, s. 77-111.

Rowley-Conwy, P. 1985b: The Single Grave (Corded Ware) Economy at Kalvø. *Journal of Danish Archaeology* 4, s. 79-86.

Rudebeck, E. 2010: I trästodernas skugga – monumentala möten i neoliseringens tid. I: B. Nilsson & E. Rudebeck (red.): *Arkeologiska och förhistoriska världar. Fäl, erfarenheter och stenålderplatser i sydvästra Skåne*. Malmö, s. 85-251.

Rønne, P. 1979: Høj over høj. *Skalk* 5, s. 3-8.

Sandén, U., K. Brink, A. Högberg, L. Nilsson & P. Skoglund 2010: Fester och festande vid Hyllie Nya tolkningar av mellanneolitiska platser och bebyggelsemönster i sydvästra Skåne. *Fornvännen. Journal of Swedish Antiquarian Research* 105:3, s. 169-186.

Schiemann, E.H. 1958: Die Pflanzenfunde in den neolithischen Siedlungen Mogetorp, Ö. Vrå und Bokvarn. I: Sten Florin: *Vråkulturen. Stenåldersboplatserna vid Mogetorp, Östra Vrå och Bokvarn*. Stockholm, s. 253-300.

K.-G. Sjögren 2017: Modeling middle Neolithic funnel beaker diet on Falbygden, Sweden. *Journal of Archaeological Science reports* 12, s. 295-306.

Sjögren, K-G., T. Axelsson & M. Vretemark 2019: Middle Neolithic economy in Falbygden, Sweden. Preliminary results from Karleby Logården. I: J. Müller, M. Hinz& M. Wunderlich (eds.): *Megaliths – Societies – Landscapes. Early Monumentality and Social Differentiation in Neolithic Europe*. Bonn, s. 705-718.

Skaarup, J. 1973: *Hesselø – Sølager. Jagdstationen der südskandinavischen Trichterbecherkultur*. København.

Skaarup, J. 1985: *Yngre stenalder på øerne syd for Fyn*. Rudkøbing.

Skriver, C., P.M. Astrup & P. Borup 2018: Hjarnø Sund – all year, all inclusive. A submerged Late coastal site with organic remains. *Danish Journal of Archaeology 2018*, s. 2-23.

Skousen, H. 2008: *Arkæologi i lange baner. Undersøgelser forud for anlæggelsen af motorvejen nord om Aarhus 1998-2007*. Højbjerg.

Sørensen, L. & S. Karg 2014: The expansion of agrarian societies towards the north – new evidence for agriculture during the Mesolithic/Neolithic transition in Southern Scandinavia. *Journal of Archaeological Science* 51, s. 98-114.

Thastrup, M.B. 2015: *VMÅ 2714, Årupgård 2012,1 (FHM 4296/1455). Arkæobotanisk analyse af fem prøver fra et toskibet hus fra senneolitikum*. Moesgård Museum, Højbjerg.

Thorvildsen, K. 1946: Grønhøj ved Horsens. En jættestue med offerplads. *Aarbøger for Nordisk Oldkyndighed og Historie*, s. 74-94.

Torfing, T. 2016: A new time: Bayesian models of an Early Neolithic enclosure in North-Western Denmark, *Danish Journal of Archaeology, DOI: 10.1080/21662282.2016.1190187*.

Uehara, K., J.D. Scourse, K.J. Horsburgh, K. Lambeck, and A.P. Purcell 2006: Tidal evolution of the northwest European shelf seas from the Last Glacial Maximum to the present. *Journal of Geophysical research* 111, s. 1-15.

Welinder, S., C. Hadevik, K. Gidlöf & E. Rudebeck 2009: Grismönster i gropkaos – en korrespondensanalys av djurben i tidgneolitiska gropar. I: C. Hadevik & M. Steineke (red.): *Tematisk rapportering av Citytunnelprojektet*. Malmö, s. 137-156.

Wincentz, L. 2020: Kainsbakke and Kirial Bro. The two main sites of the Pitted Ware culture on Djursland. I: L. Klassen (ed.): *The Pitted Ware Culture on Djursland. Supraregional significance and contacts in the Middle Neolithic of Southern Scandinavia*. Aarhus, s. 35-140.

Zápotochý, M. 1992: *Streitäxte des mitteleuropäischen Äneolithikums*. Viernheim.

Aaby, B. 1985: Norddjurslands landskabsudvikling gennem 7000 år. Belyst ved pollenanalyse og bestemmelse af støvindhold i højmosetørv. *Antikvariske studier* 7, s. 60-84.

From the borderland between two cultures

The Funnel Beaker culture and the Single Grave culture in central eastern Jutland

Eighty years ago, J. Brøndsted and especially P.V. Glob painted colourful pictures of invading "axe-swinging" nomads from the south who conquered the central and western parts of Jutland. The Jutland Single Grave culture (SGC) was indeed different from the established Funnel Beaker culture (FBC) in southern Scandinavia and part of its background obviously lay in central Europe.

The chronological relationship between the FBC and the SGC has been intensely debated and viewed very differently over the years. ^{14}C dates now provide us with a reliable temporal correlation between the two cultures. The latest part of the FBC – MNA V or the Store Valby phase – roughly dates to between 3000 and 2600 BC, while the SGC began around 2800 BC and lasted until 2350 BC, at the transition to the Late Neolithic. The end of the FBC corresponds to the transition from E. Hübner's SGC period 1 to period 2, or the earlier part of the Bottom Grave period in P.V. Glob's system.

Through several years, I have collected a comprehensive set of data about the Neolithic from a 640 km area in central eastern Jutland, around and north of Horsens Fjord (fig. 1). During period 1 of the SGC, the culture existed exclusively in central and western Jutland, as evident from a distribution map of its graves based on E. Hübner's investigations (fig. 2). Within the study area, the SGC was only present in the northwest corner, while the contemporary parts of the FBC were bound to the coast.

The aim of this article is partly to elucidate the relationship between the SGC and the FBC within the study area during the period when they existed side by side, and partly to look at what happened when the FBC disappeared. To understand why the FBC became bound to the coast, and why it finally collapsed, I will also examine the internal development of this culture prior to the appearance of the SGC.

The large, shallow, funnel-shaped Horsens Fjord with its characteristic islands is central to the study area. In its innermost part, a narrow passage – Stensballe Sund – connects the main fjord with a minor, brackish inner fjord. During the Stone Age this was part of a much larger inner fjord with a depth around 13 m and extending 4-5 km inland, but sediments from the rivers have now filled it in. Following the general pattern of sea-level rise and land upheaval after the Ice Age, we would expect to find the Late Mesolithic Ertebølle settlements 1-2 m above current sea level, but they actually lie 1 m below. The reason is that Horsens Fjord is a geological subsidence area, which has been active for millions of years. This has caused the sea level to remain stable since the Mesolithic, though it has fluctuated in connection with the various transgressions and regressions.

The FBC in eastern Jutland prior to 3000 BC

There are relatively few finds from the study area dating from the earliest part of the Neolithic (EN I – 3900 to 3600 BC), but we do have shell middens along

the coast, most notably at Norsminde, as well as a number of small short-term settlements located away from the coast. One of the latter is the well-preserved and fully excavated site at Mosegården. A causewayed enclosure at Aalstrup, four graves and four depositions in marine environments also date from the period.

Towards the end of the Early Neolithic and through the earlier part of the Middle Neolithic FBC (EN II-MNA II (II/IV) – 3600 to 3000 BC), the quantity of finds increases radically (fig. 4). Especially at the head and along the north side of Horsens Fjord the number of settlements is significant, many of them well documented through excavations. In addition, there are three causewayed enclosures, numerous graves – mostly megalithic tombs – and many depositions in freshwater and, especially, marine environments.

The numerous finds give us a detailed picture of the settlement location and structure. The settlements were clearly bound to the coastal zone, especially by Horsens Fjord. On the north side of the fjord, the finds tend to cluster around the three known causewayed enclosures – from east to west: Aalstrup, Toftum and Bjerggård – and given the major cluster at the head of the fjord, the site of Aarupgård was probably a causewayed enclosure too. The number of inland finds is limited, and those occurring in the northwest part of the study area all appear to be of an early date. The magnitude and dates of the settlements along the coast, the mixture of both early and late tombs in the clusters around them and the repeated depositions evident in front of the tombs emphasise the permanency of the occupation.

In 1941, J. Iversen suggested that pollen diagrams reflected the introduction of agriculture – "landnam" or land taking – in southern Scandinavia. He identified three phases: forest clearance, slash-and-burn agriculture in the clearings and forest regeneration. ^{14}C dates now show that the three phases represent three different forms of forest-based agriculture, with the first phase dating to between 3900-3600 BC, the second phase to between 3600-3000 BC and the third phase to between 3000-2600 BC. The first, almost invisible, phase in the pollen diagrams fits well with the small, scattered short-time settlements we find during EN I. The same is true of the second phase, when the clusters of settlements through EN II – MNA II formed the basis for a permanent slash-and-burn rotation with clearance, burning, cultivation, grazing and forest regeneration, primarily by birch.

Two other sources that highlight the land-use patterns are plant macrofossils and animal bones recovered from the settlements. Figure 5 shows the relative distribution of the various types of cereals through the Neolithic, based on the macrofossil evidence, while figure 6 shows the relative distribution of cattle, sheep/goat, pigs and hunted mammals throughout the FBC, based on the archaeozoological evidence. We find that wheat, particularly emmer, totally dominated during the EN and the beginning of MNA, although during the latter the proportion of barley, almost exclusively naked barley, grew to a third. At the beginning of the Neolithic the "forest feeders" – pigs and hunted mammals – dominated over the "meadow animals" – cattle and sheep/goat. During MNA, the proportion of cattle grew considerably, while that of hunted mammals decreased.

In addition to the settlement and land-use patterns, our knowledge of the structure of society relies on monumental tombs and causewayed enclosures, both of which appeared around 3800-3700 BC. The earliest burial structures were long barrows with wooden chambers, many of which lay on former settlements. Judged from the unfortunately few bones

preserved from wooden chambers, these tombs appear not to have been reserved for high-ranking individuals. We find examples of multiple burials in a couple of chambers and burials of children are also evident in a larger number of cases. In some of the wooden chambers, however, the nature of the grave goods does imply a form of social stratification. This is clearly evident in the case of the Rokær tomb, located within the study area, which is ^{14}C dated to between 3400-3300, at the transition from EN to MNA. The chamber contained two thin-butted flint axes, a very special polished blade knife and numerous amber beads. The latter are of the same types as those deposited in a pot, together with copper ornaments, at the presumed causewayed enclosure at Aarupgård, only 1 km from Rokær.

During EN II, stone replaced wood and dolmens were built in ever-increasing numbers and monumentality. In MNA I, the chambers grew in size, and narrow passages, which could be blocked with door stones, were added. But then, at the end of this period, the building of new tombs ceased. Whereas a few pots were deposited at the eastern end of the long barrows during the EN, at the beginning of MN A the deposition of large numbers of pots in front of the entrances to the tombs became the rule; a custom that continued after the building of new tombs had ceased. The excavations of three megalithic tombs in the study area, Stenhøj, Nørremarksgård and Grønhøj, have revealed new interesting details of the customs of deposition.

With the increased building of monumental tombs, we find that these tended to cluster around the settlements (fig. 4). This is especially true at the head of Horsens Fjord, where we also find that settlements and tombs were placed in separate areas. The graves were in contemporary use, in the sense that activities in the chambers and at the entrances occurred at intervals of 10-20 years, as suggested by the analysis of the depositions at Nørremarksgård.

The general view of a causewayed enclosure in southern Scandinavia is based on the Sarup I enclosure with its complex palisade system and double row of ditch segments aligned with the palisade. Very few causewayed enclosures were, however, like this. Most had one or two rows of often irregular ditch segments. Toftum, in the study area, is a good example of this. It originally consisted of a single row of ditch segments of varied shape and formation history. Some were short and deep, while others were long and shallow; some remained open, partially silting up before being backfilled, while others were backfilled shortly after they had been dug. There is no datable material from these early stages. Later, apparently after a large settlement was established in the eastern part of the enclosure in EN II, a second row of inner ditches was added along the western periphery of the enclosure. These ditches were backfilled and recut several times, with many of the recuts containing ritual depositions and increasingly large amounts of settlement debris too. Recuts occurred in a few of the ditches in the outer row at this time as well.

It is a widely held opinion that causewayed enclosures were permanent central sites for social interaction and trade. I have difficulty seeing this, given the pattern of activity we find associated with the ditch segments. I believe instead that the causewayed enclosures were probably ritually conditioned, most likely in connection with death rituals, as indicated by preserved human bones in ditch segments at some of these monuments. Furthermore, the numerous depositions of pottery in the ditch segments constitute a parallel to the depositions undertaken in front of the megalithic

tombs. These emerged at the same time as those in the ditch segments began to disappear. The causewayed enclosures were, as it has been expressed, "villages of the dead souls", and the row of ditches formed the borderline between the dead and the living. From late in the EN into the early MNA, the villages of the dead gradually became the villages of the living. The souls moved to the chambers of the megalithic tombs, while actual settlements began to appear inside the causewayed enclosures, as seen at Toftum.

The FBC and the SGC in eastern Jutland between 3000 and 2600 BC

The FBC

The FBC changed profoundly in its final phase between 3000 and 2600 BC. The settlements were fewer and moved closer to the coast, and we know of only two burials. Depositions in marine environments, on the other hand, proliferated (fig. 7). What the settlements lost in numbers, they gained in size and temporal extent as demonstrated by investigations at several sites. With large, permanent populations, exploitation of the resource area around the settlements became intensified. The importance of cattle (fig. 6) and barley (fig. 5) increased. A study of flint sickles has shown an increased use of these towards the end of the FBC, as well as the introduction of a new harvesting technique adapted to the handling of naked barley.

In the third phase of the "landnam", contemporary with this part of the FBC, we find a marked increase in the hazel curve, which reflects an increase in the use of wood pastures for cattle grazing. This practice is well known historically, where the idea was to find a balance between freestanding trees, especially hazel, and grass cover between the trees. The trees are kept at bay by shredding and coppicing, and the cut branches are stored for winter fodder. The high incidence of hazel was also advantageous for pigs. It is likely that cattle were kept and fed on permanently cleared fields close to the settlement during the winter. These fields could then have been used for cereal growing during the summer, taking advantage of the cattle dung. We know that manuring took place in the FBC, but currently it is not possible to qualify this.

The SGC

Despite their scarcity, the few finds from period 1 of the SGC in the study area show a clear distribution pattern (fig. 8). Within a limited area to the northwest, we find three probable settlements, 13 graves and five stray finds of battle-axes, probably all from graves. From the coastal region of the Late FBC, we have two battle-axes and an amber bead deposited in fresh water and five stray finds of battle-axes.

Our knowledge of early SGC land use is almost non-existent. Faint traces of settlements allow us to conclude that the settlement units were small and short-lived. Pollen diagrams from lakes and sediments below barrows in central Jutland constitute our best source. These show a marked reduction in forest from around 3000 BC, combined with burning and the formation of heathland. The diagrams from below barrows reflect heavy grazing in open areas dominated by heather. Imprints of cereal grains in pottery show that both wheat and barley were cultivated, and further east in Jutland we have pollen of barley associated with two barrows and ardmarks from ploughing below a further two barrows, one of which is in the study area.

The most eye-catching aspect of the SGC, seen from a FBC point of view, was the re-establishment of the individual in

the social universe. In burials, the individual was at the centre, and accompanied by grave goods that signalled a society where gender differentiation was a key issue. At first glance, you might think that it was a society with gender equality and without social ranking between individuals and families, but it was probably not so simple. The ratio between women and men in the early burials was 1:17, and the burials themselves were far from simple. We often see supplementary constructions, in the form of ring ditches and palisades, surrounding the coffins, and in some cases mortuary houses. Major efforts were associated with the burials, and the mortuary houses indicate prolonged rituals. You would expect the most complex burials also to contain the richest grave goods. In some instances, this was the case, as at the Gantrup grave in the study area. In others, however, the only gift in the grave was a flint blade, like the one from Sjørup between Holstebro and Viborg (fig. 15c).

The borderland

Through a 200-year period, from 2800 to 2600 BC, the FBC maintained dense and stable settlement along the coast in the study area, especially around Horsens Fjord (fig. 7). At the same time, we find the SGC in its northwest corner (fig. 8), where it constituted the culture's easternmost outpost in this part of Jutland during period 1 (fig. 2). We have no finds in between, suggesting the existence of a no-man's-land. Nevertheless, the finds recorded within the two settled areas give clear indications of mutual contact.

From a typical early SGC grave at Højvang (no. 1 in fig. 8), in addition to a battle-axe dating to period 1b (fig. 9a), we have two flint axes and a flint chisel (fig. 9b-d), all of which are typical FBC products, very different from those produced by the SGC. This presence of FBC flint axes in a SGC grave is not unique. Another good example further north in eastern Jutland is a grave at Refshøjgård, and a look at the finds listed in E. Hübner's catalogue shows many other examples.

In the coastal zone, we have three freshwater depositions, comprising two battle-axe fragments and an amber bead. Especially the latter is noteworthy (fig. 10a; no. 2 on the map fig. 8): It is a disk-shaped bead with a central perforation, exclusively found at the waist region in male burials of the SGC. Deposition in water was a standard ritual in the FBC, but unknown in the early SGC. In addition to these finds, there are five SGC battle-axes from the coastal zone, all stray finds. Two of these are of particular interest (fig. 10b-c; nos. 3 and 4 on fig. 8). They are both of type A3; one is in prime condition, while the other is battered and has been intentionally reshaped with one shoulder pecked away. Together with another stray find of a type A3 battle-axe to the northwest, these are the earliest datable SGC artefacts we have from the study area, yet two of them were found in FBC territory.

The last find from the coastal zone is of an entirely different kind (no. 5 on the map fig. 8). This is the copper disk from Rude (fig. 11 b). It was found in a stone cist in 1894, tied with copper wire to the wrist of the deceased (fig. 11a), and was published by K. Randsborg in 1970 as an Early Neolithic disk. In 1976, I realised that a couple of scheduled stone cists were identical to those mentioned in the museum registers, and over the next two years, I had them and their surroundings excavated. As the stone cists proved to lie in an Early Neolithic long barrow, the problem was solved and the case closed – until a ^{14}C sample from skeletal remains from the cist containing the copper disk indicated a date of between 3000 and 2600 BC. The copper disk was obviously

not Early Neolithic, and new origins were sought. Suggestions have ranged from the Globular Amphora culture to the Corded Ware cultures, first in Bohemia and later in western Switzerland.

A culture disintegrates

Over a 400-year period between 3000 and 2600 BC, the FBC has the appearance of a stagnant culture in the study area which, apart from the depositions in marine environments, was notable only for large settlements with very coarse pottery and high-quality flint axes. If we look at other parts of southern Scandinavia, we find a somewhat different picture, with cultural changes partly inspired by other cultures.

On the islands to the east, the use of the megalithic tombs did not decline to the same extent as in eastern Jutland, and decorated pottery, frequently found in the chambers, remained in use for longer. This is especially evident on the southern islands of Lolland and Falster, where the pottery, and its use in tombs, was strongly influenced by the Globular Amphora culture (GAC) south of the Baltic Sea. On the island of Bornholm, further east in the Baltic, the pottery also continued to be decorated, making it possible to divide the period into two phases. At the same time, outwardly directed ritual activities continued in association with circular wooden buildings placed within palisade-framed areas that appeared in continuation of the causewayed enclosures. Developments in Scania corresponded to those on Bornholm, with the addition of cultural elements from the Pitted Ware culture (PWC), seen by some as having been absorbed by the FBC and by others as evidence of an independent presence of this latter culture.

The impact of the PWC all around the Kattegat is obvious, but a map of the distribution of its characteristic tanged arrowheads and bipolar blade cores is not the same as a map of the area where it had settled. There are, however, many settlements with clear PWC associations along the Kattegat coast of northern Jutland and up into the Limfjord. This is especially true on Djursland, where the final Store Valby phase of the FBC was not present. We find instead settlements displaying a mixture of PWC and FBC elements similar to the situation in southernmost Sweden.

The FBC stood strong in northwestern Jutland, south of the Limfjord, and underwent the same developments as in the study area, with depositions of pottery in front of megalithic tombs gradually fading away, ultimately being covered by layers of stones. Contrary to other areas, a new form of grave – the stone-heap grave – appeared during the late part of the FBC. Originally seen as rows of graves in front of mortuary houses, these have now been convincingly interpreted as burials in "wagons" (the mortuary houses) with draught animals buried in the rows of graves. These graves probably reflect direct contact with the GAC, which practised ritual burial of cattle, a connection reinforced by finds of FBC battle-axes showing strong GAC influences in the area.

In most parts of southern Scandinavia, the FBC was strongly influenced by the PWC and/or the GAC in its final phase, and it is obvious that its days as a culture were numbered. These influences are not so obvious in the study area, but this was not due to ignorance. There are clear indications of contact with both the PWC and the GAC. Figure 12 shows the distribution of PWC tanged arrowheads and blade cores in the study area. But rather than the presence of the culture in the area, it reflects intensive trade, probably in high-quality flint from Djursland. The finds of a battle-axe deposited in Horsens

Fjord (fig. 13a) and an amber disk found near Horsens (fig. 13b) imply direct contacts with the GAC, from where they clearly originated as imports.

A new culture emerges

The idea of a common European "A-horizon" of the SGC emerged on the basis of P.V. Glob's study in 1944. Since then, studies of the various local Corded Ware groups in Europe have shown that such a horizon did not exist. More surprising perhaps, it did not exist in Jutland either. But there can be no doubt that major cultural influences, including migration from the south, shaped the ideological structure of the SGC. The contacts that bore these influences followed the same central route along the main watershed down through Jutland that also mediated contacts between the GAC and the FBC in northwestern Jutland.

How then did the earliest SGC appear in Jutland? We can exemplify it by an early grave at Fasterkjær in western Jutland. The grave itself was built of wooden planks, with the planks at the sides continuing beyond the ends. The deceased lay crouched on his right with his head to the southwest. In front of his face was a type A3 battle-axe and a thick-butted flint axe, and at his hip were two amber disks and a flint blade knife.

The battle-axe (fig. 14c) is of one of the earliest SGC types – the same as those from the FBC region in the study area. There are only a few examples of this type, and they are almost all from Jutland or Schleswig-Holstein. E. Hübner suggests that these early battle-axes were copies of copper axes and were as such not an integrated part of the earliest SGC, but rather commodities. The thick-butted flint axe is a typical category B axe of FBC origin, with fully polished cheeks and lateral edges, while the butt has been secondarily and clumsily reshaped (fig. 14a). The thin, straight flint blade may not look much, but it demanded a high level of craftsmanship to produce, and flint of the quality used is not available in western Jutland. As with the battle-axe, it must have been an import from the northern or eastern parts of Denmark (fig. 14b). The two amber disks, typical of the early SGC, are often found in pairs in the waist region in male graves, where they were probably attached to the end of a belt (fig. 14d). The supply of amber on the west coast of Jutland was unlimited and they were clearly local products.

The plank coffin with the sides continuing beyond the ends was typical of the Early SGC (fig. 15c, d). There are no immediate parallels to these coffins, but in the Elbe-Saale region we find cists made of thin stone slabs, where the side stones pass beyond the ends. This type of cist was common in the GAC (fig. 15a) and its use peaked during the Corded Ware culture (fig. 15b). In both cultures, the deceased was buried in a crouched position. Stone slabs are not available in western and central Jutland, and the wooden coffins appear to be the ingenious transformation of a grave type from one material to another.

The grave at Fasterkjær is not of average character but reflects the essence of the early SGC. The grave goods, comprised mainly of imported artefacts from northern or eastern Denmark as well as an unknown area of production (the battle-axe), constitute the frame for an entirely new ideological structure with deep roots to the southeast. We find a similar development in other areas of southern Scandinavia, with a cultural disintegration that led to changes, inspired or inflicted by other cultures. But in the case of the SGC, the changes remained and resulted in a radical cultural change across southern Scandinavia.

The SGC in eastern Jutland between 2600 and 2250 BC

Around 2600 BC, the SGC replaced the FBC in the study area, but contrary to what one might expect, the coastal area and not the interior dominates the distribution pattern (fig. 16). I have recorded 16 possible settlements – possible because the indications are often very faint. The clearest of these is the shell midden at Kalvø, while other finds come from isolated pits or features, or are artefacts found on earlier FBC settlements and by surface collecting, dated primarily by tanged arrowheads of type D.

Of the 33 burials recorded, 19 are in the coastal zone and five of these are secondary burials in megalithic tombs. The other 14 burials in the coastal zone, as well as the 14 inland examples, are all from non-megalithic graves in barrows. Of 34 artefacts deposited in water, nine are from fresh water and 25 are from marine environments – 16 battle-axes, seven tanged wedges, six thick-butted hollow-ground flint axes of Horneby type and five category B thick-butted flint axes of SGC type.

The burials and the material culture naturally constituted a break with the FBC, but the most profound change occurred in the settlement pattern: from large settlements inhabited by hundreds of people through centuries, to short-term settlements inhabited by small groups of people. This signalled a radical change in the land-use pattern. The use of wood pastures stopped abruptly, as shown by the pollen diagrams from lakes, and the land opened up instead. A core taken at the mouth of the river Rævs Å, where it meets Norsminde Fjord, in the study area shows an influx of organic and mineral material, as well as charcoal, from around 2700 BC, indicating increasing erosion along the river and its tributaries. In contrast to the early part of the SGC, we now have several sites with macrofossils from outside the heathlands of central Jutland. Figure 5 shows that they fit well into the picture of a continued decrease in the cultivation of wheat and an increase in barley.

From the FBC to the SGC

How did the change from the FBC to the SGC take place? Was it an actual "revolution" or a gradual, perhaps not even synchronous change? We have Late SGC material from three major, excavated FBC settlements. Most prominent of these is a layer of fire-cracked stones associated with SGC pottery and a typical SGC thick-butted flint axe at Aalstrup (fig. 17h-l). This clearly represents habitation on the site. Another site worth noting is Bjerggård, where a tanged arrowhead of type D and three SGC sherds were recovered in the deposits at the top of ditch segment A5 in the causewayed enclosure (fig. 17a-c). These lay above the actual FBC deposits at the top of the ditch, but among the potsherds from the latter were some with a protruding foot (fig. 17 d-g). The fabric of these sherds shows that they are of FBC origin, while the protruding foot is a typical element of the Early SGC. Altogether, this shows some degree of continuation.

On Kalvø, in Norsminde Fjord, a small shell midden (8 by 8 m) lay on top of a large settlement with layers of debris from the final part of the FBC. The midden, which was 40 cm thick, continued into the Late Neolithic as shown by a thick-butted flint axe with a hollow-ground edge of Kregme type and two ^{14}C dates. Considering its extended period of use, this must have been a site that was visited occasionally for hunting and fishing. The bones from the site reflect this situation, but cattle, pig and sheep/goat are also represented in approximately the same relative proportions as we find in the Late

FBC (fig. 6). Twenty kilometres north of the study area, a site at Gåsemosen west of Aarhus shows the same sequence as that seen at Kalvø, with deposits from the Late FBC Store Valby phase followed directly by deposits containing SGC pottery. Bones from the deposits of both cultures show the same mixture of domestic and wild animals as at Kalvø, but with more emphasis on hunted and fished species in the SGC layers than in the FBC layers.

We therefore see continued use at both inland and coastal sites, but there are huge differences between the two types of site. On the coastal sites, there is direct continuation in settlement and an economy associated with hunting and fishing in a restricted biotope. At the inland sites, the SGC appearance seems more sporadic and coincidental because of the new movable land-use system. We also see evidence of continuity in other aspects, not least in the case of the depositions in marine environments. These continue with undiminished intensity and the involvement of high-quality products, as shown in figure 18.

Towards a new era

While the change from the FBC to the SGC was abrupt, this was certainly not the case with the transition from the SGC to the subsequent Late Neolithic period. In simple terms, this only comprised the replacement of battle-axes with flint daggers in the male graves. Figure 19 shows the distribution of finds from LN I (2350-2050 BC) within the study area: These include 24 settlements, 15 graves and eight depositions, four in fresh water and four in marine environments. Half of the settlements lie on the coast or close by, while the other half lie at varying distances inland. In general, the distribution of the finds appears to be similar to that of the Late SGC (fig. 16). A marked difference between the two periods, however, is the extent and the nature of the settlements. We have six houses datable to LN I, all of which lie in two areas subjected to systematic large-scale excavations: one west of Horsens and one at Østbirk to the northwest. Here, together with houses from LN II and EBA, they formed a major settled area. This was not, however, a village, but rather a scattering of long houses, sometimes together with outhouses, with each house being in use for a limited period before it was moved to a new location. The impression gained is of a system of individual farmsteads with adjacent fields.

With the changed settlement pattern that was introduced during the SGC and continued into the LN, the way was paved for a farming community based on arable farming. Ironically, this began during the FBC in the sandy western and central parts of Jutland, where the farming activity resulted in large, open areas suitable for cattle breeding and, to a lesser extent, for arable agriculture, due to the poor soil quality. Combined with a new social structure, however, a system was created which, when transferred to areas with better soils, formed the ideal basis for efficient agriculture. The cultivation of cereals in LN I appears to have been largely unchanged from the Late SGC, but the 1000-year downward curve for wheat ended (fig. 5), and significant changes began in LN II. The amount of emmer increased significantly at the expense of barley, and bread wheat and spelt were (re)introduced. At the same time, cultivation methods became more advanced. At Østbirk, in the study area, three storage pits for grain were found in a house from LN II. Here, in containers of wood, three different types of grain were stored – naked barley, emmer and spelt – but each container had a minor impurity of one of the other types of grain. The grain in the storage pits must have been seed corn

and the impurities must therefore reflect the previous year's crop in the field. The three pits accordingly show a three-fold rotation with the order: naked barley> emmer> spelt> naked barley etc.

No matter how one perceives the background and origin of the SGC, the spread eastwards of its ideology and social structure resulted in a radical break with the existing culture. However, given the information available from the study area, there can be no doubt that the physical basis of the new structure, following this break, was to a major degree the existing population. Against the background of an obviously weakened ideological structure in the Late FBC, the transition probably was relatively straightforward. People left the large, densely packed settlements in groups and settled down in a scattered pattern with the new way of life, not necessarily everyone, or all settlements, at the same time. They therefore abandoned a way of agriculture that for 1300 years had been adapted in various ways to the forest environment and adopted a "modern" farming form that largely aimed to destroy the forest environment.

Torsten Madsen
Galten

From the borderland between two cultures

The Funnel Beaker culture and the Single Grave culture in central eastern Jutland

By Torsten Madsen

"A new People are migrating into Jutland! (…) It has been a flock of Immigrants, who at first settled here and there scattered in Jutland, who has been stopped in the East by a sufficiently strong and dense population, in the North and West of the Fjord and Sea. For inland people, unfamiliar with the sea, not only oceans but also such a relatively modest thing as the Limfjord has been an obstacle, so far. So you could not go any further, and then, where you had now ended up, you stayed in the Jutland Peninsula, which, like a blind sack or a ruse, intercepted and retained its share of the European inland migrants"[1)].

With this colorful description, Johannes Brøndsted in 1938 drew a picture of the Jutland Single Grave culture (SGC) that to a large extent came to influence the perception of the culture, and which was further reinforced through P. V. Globs no less colorful considerations from 1945: [2)]

"From the south, the prepared, axe-wielding nomadic tribes immigrated to Jutland, where they quickly became masters of the central and western part of the peninsula. (…) The broad, leafy river valleys of Central and Western Jutland were the first places of residence for the strangers. Here there was plenty of food for their animals. The ancient fishermen and hunters who lived by lakes and streams were quickly subdued in most places, and the same fate undoubtedly overcame the scattered peasant communities if they did not succeed in reaching East Jutland, where their relatives the Megalithic people lived densely".

Whether the Jutland SGC can be attributed to an immigrant people, or whether it originated locally under influences from the south, has since been debated and turned to infinity. However, also another topic occupied the minds - the chronological relationship between the Funnel Beaker Culture (FBC) and the SGC.

[1] J. Brøndsted 1938, p. 215, 230.
[2] P.V. Glob 1945, p. 242.

Glob himself came to the following conclusions: “The older lower-grave period must begin at the end of the older passage grave period (Troldebjerg period) and continue into the younger passage grave period, which in Jutland is at the same time as the younger lower-grave period. The bottom-grave period is partly at the same time as the end of the younger passage grave period”; and "that between the younger passage grave period and the dagger period for all of the country, a period must be inserted, which includes the end of the bottom-grave period and the upper-grave period".[3)]

However, it was not Glob's interpretation of the conditions that became dominant, but rather an article by C.J. Becker from 1954 – *Die Mittel-Neolithischen Kulturen in Südskandinavien* – that must be one of the most read papers about the Danish Neolithic. In this article, he set up a chronological scheme with five main Neolithic periods (MN I-V) based on the pottery of the FBC. Through comparative studies and contact finds that he considered reliable, he found that the Jutland SGC and the Swedish Boat-axe culture appeared in the middle of MN III and continued until the end of MN V. The East Danish SGC he saw as a short interlude from the middle of MN IV to the middle of MN V only.[4)]

This authoritative interpretation stood for 20 years, before Becker, under the impression of an increasing number of C14 dates, began to waver, and Karsten Davidsen in the mid-1970s drew a line over it. He partly presented finds of ceramics from MN V found in and below barrows with graves from the lower-grave period, and partly presented C14 dates that showed MN V to be in part older and in part simultaneous with this. This subsequently made C.J. Becker capitulate and conclude that the SGC followed the FBC with a minor overlap between MN V and the lower-grave period.[5)]

However, Karsten Davidsen went further and emphasized: “The starting point should be the spread of the early SGC (lower-grave period) and the late FBC culture. These two groups are largely mutually exclusive. The conditions in Jutland are shown in fig. 7, and on the islands, SGC is first known in the bottom grave period. This distribution pattern cannot be because MN V has different durations in Jutland and on the islands. It must be considered very unlikely that there has been a shorter uninhabited period on the islands and in the most fertile parts of Jutland, so one has to assume that the entire lower-grave period coincides with MN V."[6)]

Today, the C14 dates give us a safe chronological framework to work with. The last part of the FBC – hereafter the St. Valby phase – begins around 3000 BC and ends around 2600 BC, while the Jutland SGC starts around 2850 BC and ends around 2350 BC. The end of the FBC is contemporary with the transition from Eva Hübner's period 1 to period 2 of the Jutland SGC, which corresponds to a time a little into the bottom-grave period, as assumed by P. V. Glob.[7)]

[3] P.V. Glob 1945, p. 208.
[4] C.J. Becker 1954, p. 124 - fig. 36.
[5] C.J. Becker 1973, p. 180; K. Davidsen 1975; K. Davidsen 1977; C.J. Becker 1981; C.J. Becker 1982, p. 24-26.
[6] K. Davidsen 1977, p. 66.
[7] For C14 dates, see E. Hübner 2005, p. 660-674. E. Hübner’s chronology system (2005, p. 6-64), used here, is based on seriation by way of a correspondence analysis of the artefact material from graves.

The East Jutland project

For a number of years, I have collected an extensive material from a 640 km^2 area in central East Jutland that can shed light on the cultural development through the Neolithic. The study area, where Horsens Fjord is the central starting point, is shown in Figure 1.[8)] The Jutland SGC remained during period 1 in the central and western parts of Jutland south of the Limfjord, as a distribution map of the graves from the period based on Eva Hübner's studies shows (fig. 2).

The simultaneous finds from the FBC are coast bound and when you study their distribution and compare it to the distribution of the material from the early SGC in the study area, you gets the impression of a clearly defined border area that almost has the character of a no-man's land.

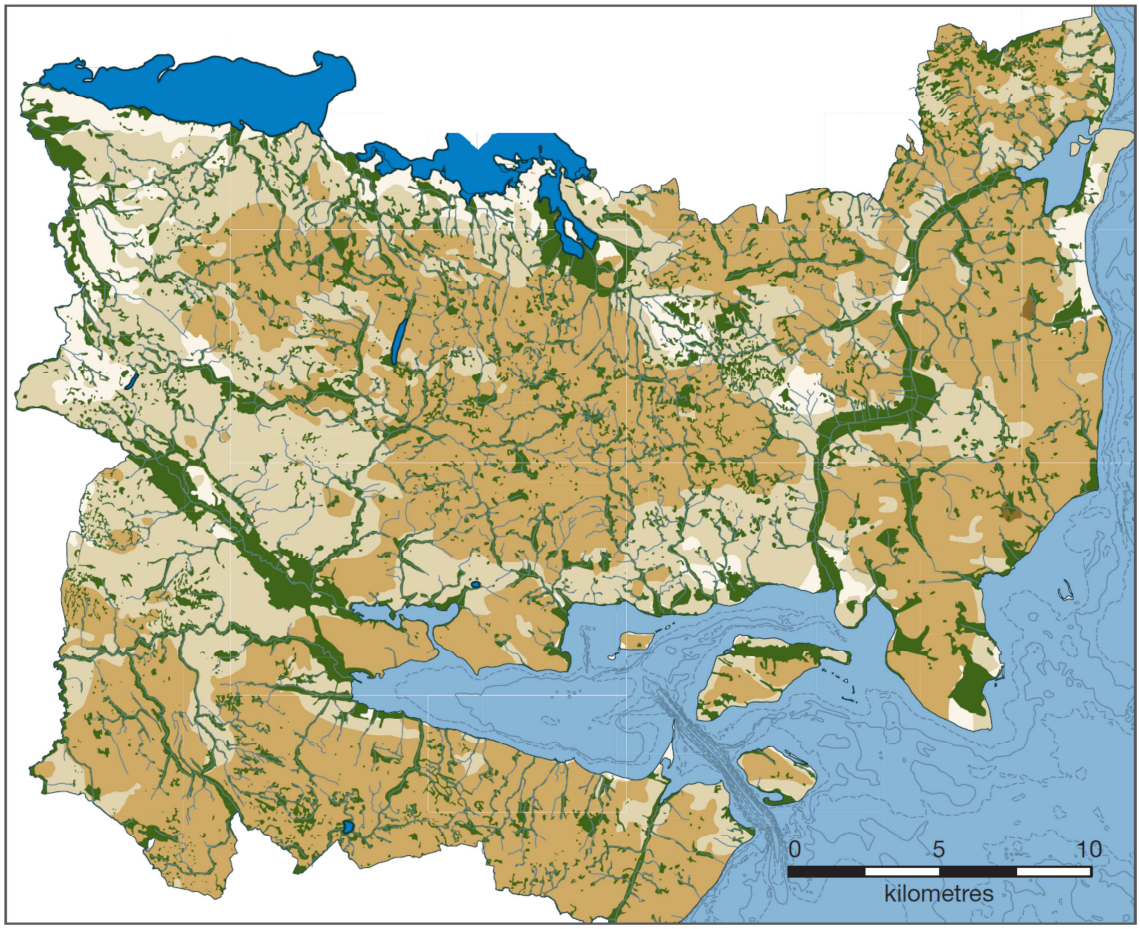

Fig. 1. Map of the study area. Green marks wetland areas recorded on maps from the 19th century. The colors from light yellow to brown show the soil conditions from sand to clay. The map shows the current coastline, while all other maps of the study area presented below show the Stone Age coastline.

[8] The study is based on a previously formulated project from the late 1970s, where the study area stretched from Horsens Fjord in the south to north of Aarhus (T. Madsen 1982). However, this project ”failed” because I had completely underestimated the scope of data and not least because I lacked an efficient way to record and analyze them. I missed something I could see was on its way, but which at the time was far from usable, the modern information technology.

Fig. 2. The distribution of graves from period 1 of the SGC with phase 1a shown on top (red), followed by phase 1b (blue) and phase 1c at the bottom (black) After E. Hübner 2005, Abb. 470, Abb471 and abb. 472). The graves from phase 1b and 1c co-occur in many areas, and blue dots therefore often cover black ones. The rectangle marks the position of the study area.

At the same time, however, there are objects that break this pattern. These and not least their contexts are essential for an understanding of the relationship between the two cultures. The purpose of this paper is partly to shed light on the relationship between the SGC and the FBC within the study area during the period they existed side by side, and partly to look at what happened when the FBC disintegrated and disappeared. I will also look at the development of the FBC prior to the emergence of the SGC. This is necessary to understand why the FBC became coastal and why it collapsed.[9)]

[9] The paper (completed in December 2019) constitutes a preliminary overview of the work on the ongoing analysis and synthesis work in connection with the completion of the East Jutland project. It may be some time before this work is completed, and this paper will probably not reflect the result of this in full. In connection with the preparation of the paper, I have received useful comments from Per Borup and Lutz Klassen, whom I would like to thank here.

The landscape

The funnel-shaped Horsens Fjord is, apart from some deep stream channels, characterized by shallow water and distinctive islands. In the heart of the fjord, just east of the town of Horsens, the very narrow Stensballe Sound forms a connection to Horsens Nørrestrand, which constitutes a small brackish inner fjord. In the Stone Age, this was part of a much larger inner fjord stretching 4-5 km inland. In connection with the construction of the East Jutland motorway E45 west of Horsens, cores showed that the fjord here had a depth of up to 13 m. It has since been filled up and superimposed up to 3 m above current sea level by sediments added through the river courses.[10)]

Horsens Fjord is located somewhat north of the "tilting line", the line where land uplift and water level rise since Atlantic times have been fairly balanced. Along the fjord, a highest coastline has been recorded at 1.4 m above current sea level, which is only slightly below expectations, but there is a significant discrepancy in relation to the surrounding areas. In Norsminde Fjord, 20 km to the north, the highest coastline of 2.5 m above current sea level is dated to the end of the Mesolithic, while at the same time it was about 1 m below current sea level in Horsens Fjord. The highest coastline in Horsens Fjord therefore occurred later and perhaps much later than in Norsminde Fjord. This difference between the two fjords is due to a geological depression area located below Horsens Fjord that has been active for millions of years and still is. [11)] The water level in the fjord has moved up and down over the last 6,000 years in step with transgressions and regressions without changing significantly from the level that prevailed at the beginning of the Neolithic. However, the fjord has become smaller because of the sedimentation with material from the river courses.

Despite the relatively unchanged water level, Horsens Fjord in the Stone Age was different from what it is today. There was a stronger tidal current with greater difference between ebb and flow, cooler water in summer, warmer water in winter and a significantly greater salinity.[12)] Both fish and shellfish thrived in the fjord, and at the narrow Stensballe Sound, where there was a perpetual maelstrom of water between the outer and inner fjord, large shell banks formed. It was a resource base exploited not only in the Mesolithic, but also during the Neolithic. Here it also left clear traces in the shape of extensive sacrifices in the fjord, not least in Stensballe Sound.

North of the fjord along the Kattegat coast, we find the relatively flat, fertile Hads district separated to the west from the rest of the study area by an extensive wetland area, which from Horsens Fjord reaches almost up to Norsminde Fjord. Along the fjord to the west, the sandy Sondrup Hills follows characterized by many dead-ice holes.

[10] P. Borup 2003, p. 274.

[11] The tilting line and a map of the highest coastline were originally published by E.L. Mertz (1924). For a newer map with the dates of the highest coastlines in various parts of Denmark, see C. Christensen 2001, fig. 1. For the highest coastline in Norsminde Fjord, see S.H. Andersen 1994, p. 18-20. For the highest coastline in Horsens Fjord, see P. Borup 2003, and for the coastline in late Mesolithic time, see P. Borup 2015 and C. Skriver et al. 2018. For the depression area below Horsens Fjord, see H. Lykke-Andersen 1979.

[12] The tidal current emanating from the Atlantic Ocean follows the English coast to the south and then the continental coast to the north and has done so since Atlantic times (K. Uehara et al. 2006). As it moves, the difference between ebb and flow decreases. Today it is 1.5 m at Esbjerg, 0.5 m at Hanstholm and 0.3 m at the Skaw, a difference that is then kept down through the Kattegat. In the Stone Age, the area north of the Limfjord was dissolved into islands, and the tidal current could pass through where the Limfjord now is. This has given a difference between ebb and flow of up to 0.5 m in the Kattegat. Furthermore, the climatic changes at the beginning of Subboreal time seem to have increased the inflow into the Kattegat (K. Conradsen & S. Heier-Nielsen 1995). A higher salinity has been documented through studies in both Horsens and Norsminde Fjord (J.P. Lewis et al. 2016).

Further to the east, they are replaced by flatter rounded hills, which increase in height towards Horsens to end in "Stensballe Bjerge", an 80 m high plateau that lies right next to the fjord. Tertiary deposits of Søvind marl shaped this part of the landscape, but the surface is characterized by Quaternary Ice Age deposits. Along the south side of the fjord, the terrain is flat and especially to the east clayey, and very fertile. To the south, it rises gradually to end in a row of hills along the border of the study area.

To the west, in continuation of Horsens Fjord, are some marked valley sections that form the basis for an extensive drainage system. Between the valleys, there is an evenly hilly, sandy and well-drained area. To the north, the country gradually rises, to reach "Denmark's roof" – the area around Ejer Bavnehøj at a height of just over 170 m in the northwest corner of the study area. Here, too, there are sandy and well-drained soils. The northern boundary of the study area consists of Mossø Lake and in extension thereof to the east Skanderborg Lake. If we move east through the interior of the study area, the soil becomes more clayey and less drained. Around Hovedgård and further to the east, the landscape is so waterlogged that in an un-drained state it is unsuitable for agriculture. There are virtually no finds from the Neolithic, the Bronze Age or the Iron Age in this area.

The data collected

I have included all finds related to the Neolithic from the study area. The focus of the registration has been on typologically dateable objects, while I e.g. have not included flint waste and common flint tools from the settlements. The sources for the finds have in part been the museum magazines and archives, and in part private collections. In the case of the museums, it is partly older finds with none or limited information on find contexts, and partly newer excavations, where the context information have of course been included in the registration. In the case of private collections, these consist almost exclusively of surface collected artefacts. Here, a basic criterion for including an object has been that the find spot could be verified. In total, I have recorded well over 2,600 objects of flint or stone and about 6,000 pieces of ceramic in detail. All material is assembled in a catalog, which has been published digitally.[13)]

I shall not go into the typologies used in the recording of the material here, but merely comment on one of them. It concerns the thick-butted flint axes that make up a large and important group for this paper. In 1979, Poul Otto Nielsen proposed a division of the Middle Neolithic thick-butted flint axes into a type A and a type B. The division is partly based on whether the angle between the lateral edges is above (A-axes) or below (B-axes) 8°, and partly on various additional features that may occur on the B-axes (oblique neck; grinding of the lateral edges; an irregular concave/convex or a regular convex course of the lateral edges; oblique cutting edge), but never on the A-axes.

[13] T. Madsen 2019a. The catalogue has been published digitally as Open Access. Currently it is available through my home page (https://www.archaeoinfo.dk/), but eventually, it will be available from other more permanent platforms.

The use of the angle between the lateral edges to separate the two types has been much debated,[14] but although it is obvious that the divide at 8° is in the middle of a one-peaked distribution curve, there is still a clear connection between the low angle values and the occurrence of the supplementary characteristic elements on the axes. However, they are not two types separated in time, but rather part of a gradual chronological development, where in the oldest contexts there are most A-axes and in the youngest most B-axes.

Poul Otto Nielsen worked from a context-based data material, primarily depositions, where it was unproblematic to ensure that the axes belonged to the Middle Neolithic. However, in a heterogeneous find material, such as the current one, a major problem arises. How do we distinguish between the A and B flint axes on the one hand and the Late Neolithic thick-butted flint axes on the other? Apart from flint axes with expanded cutting edged that are copies of metal axes, the solution is found in a measure called the relative neck index, i.e. the percentage ratio between the thickness at the neck and the maximum thickness of the axe. Typically, Late Neolithic flint axes have a V-shaped longitudinal section,[15] where the relative neck index is above 90%, while all definite Type A and Type B flint axes I have seen have an index below 90%. I therefore operate with category A, B and C flint axes, where the latter that are separated first, are characterized by a relative neck index above 90%. Next, the A and B flint axes are separated, where the additional characteristics of the B axes have priority over the lateral edge angle in the separation. However, it is very rare that on this basis one ends up with a B-axe that has a lateral edge angle above 8°. Within the category A and B flint axes, different types occur. In addition to A-axes of Bundsø, Lindø and St. Valby type, it is the Vedbæk, Brogård and EGK types for the B-axes. [16]

The basis for separating the EGK type is quite subjective. In abundance it has the same features as the other B-types in the form of an oblique butt, grinding of lateral sides, concave-convex lateral edges and a hanging cutting edge, but further it has some characteristics that distinguish it from both these and from the A-axes. Thus, the strict right-angled fabrication of the edges between the cheeks and lateral edges does not occur. Instead, the chopping scars are coarser and more irregular, and they often run over the edges, giving the lateral edges a slightly rounded appearance. At the same time, crushing have often been used to remove protruding points that was a result of the rough chopping. Furthermore, the polishing of the cheeks is often limited to the area near the cutting edge, where on the other B-axes and on the A-axes, it is consistently carried out on all of the cheeks. Also the lateral edge angle more often exceeds the 8° than is the case with the other B-axes, but the average lateral edge angle of 6.6° is only 0.3° higher than on the latter. [17]

[14] P.O. Nielsen 1979; K. Fabricius & C.J. Becker 1996, p. 193-94; R. Iversen 1915, p. 35.
[15] P.V. Petersen 1999, p. 112.
[16] In addition to the basic form of B-axes, which were not given a specific name, P.O. Nielsen (1979) only separated the Brogård/Falster variant with an oblique butt, while he did not deal more closely with the thick-butted axes from the SGC. For causes of reference, I have found it necessary to add a type name to his basic form of B-axes and have here chosen Vedbæk after one of the depositions he uses (1979, p. 41, find 18 – an unfortunate choice regrettably, as there is also an axe with an oblique butt in the find).
[17] E. Hübner (2005, p. 327) indicates much higher lateral edge angles for her material with a maximum of 19° and an average of 9.8°. This raises the question of whether axes belonging to category C are involved in her material, as these are often characterized by having large lateral edge angles. If there is, it further raises the question of whether the C-axes begin already in the SGC. In the material from the study area, I do not have find contexts that can elucidate this question.

The FBC in eastern Jutland Prior to 3000 BC

The finds

The first period of the Early Neolithic (EN I - 3900 to 3600 BC) is sparsely represented through finds in the study area (fig. 3), as is also the case in most other areas of southern Scandinavia. However, we know relatively many definite settlements, some in direct contact with the coast, others inland with varying distances to the coast. Four of the five sites on the coast are shell middens with fishing and coastal hunting, including the fully excavated shell midden at Norsminde. Of 17 inland sites, one from Ringkloster has also been a hunting station, while the others probably all were agricultural sites.[18)] Most of these are known only in the form of scattered settlement pits found during excavations aimed at other objects. However, there are exceptions, such as the well-preserved and fully excavated site at Mosegården.[19)] Central to the only 100-m^2 large site was a stone built fireplace with postholes from one or more buildings to one side and a cultural layer in a depression to the other.

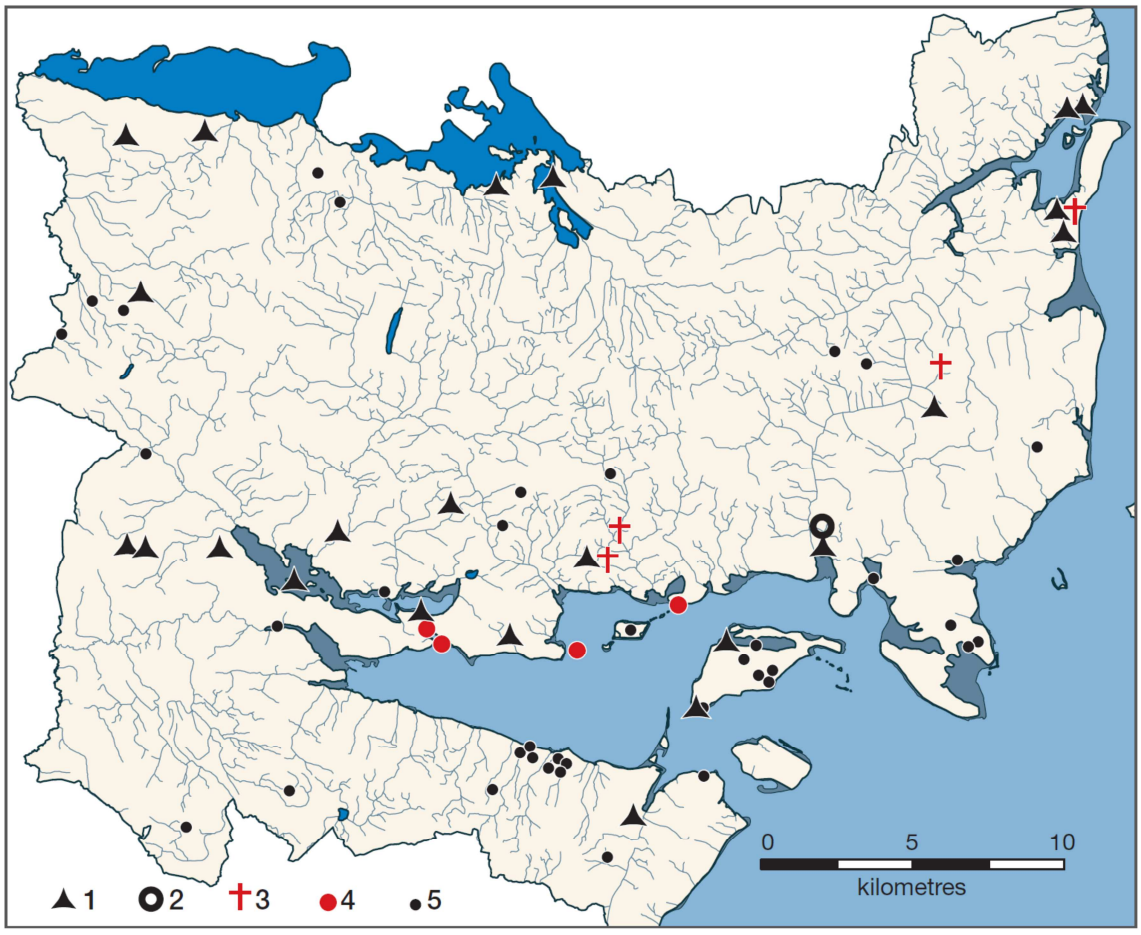

Fig. 3. The distribution of finds from the study area dated to between 3900 and 3600 BC: 1, settlements; 2, causewayed enclosure; 3, graves; 4, depositions in marine environments; 5, stray finds of pointed-butted flint axes and thin-butted flint axes of types I-II.

[18] For Norsminde, see S.H. Andersen 1991; 1994 and for Ringkloster S.H. Andersen 1998.

[19] T. Madsen & H.J. Jensen 1982; T. Madsen & J.E. Petersen 1984; T. Madsen 2019a, 160508-9.

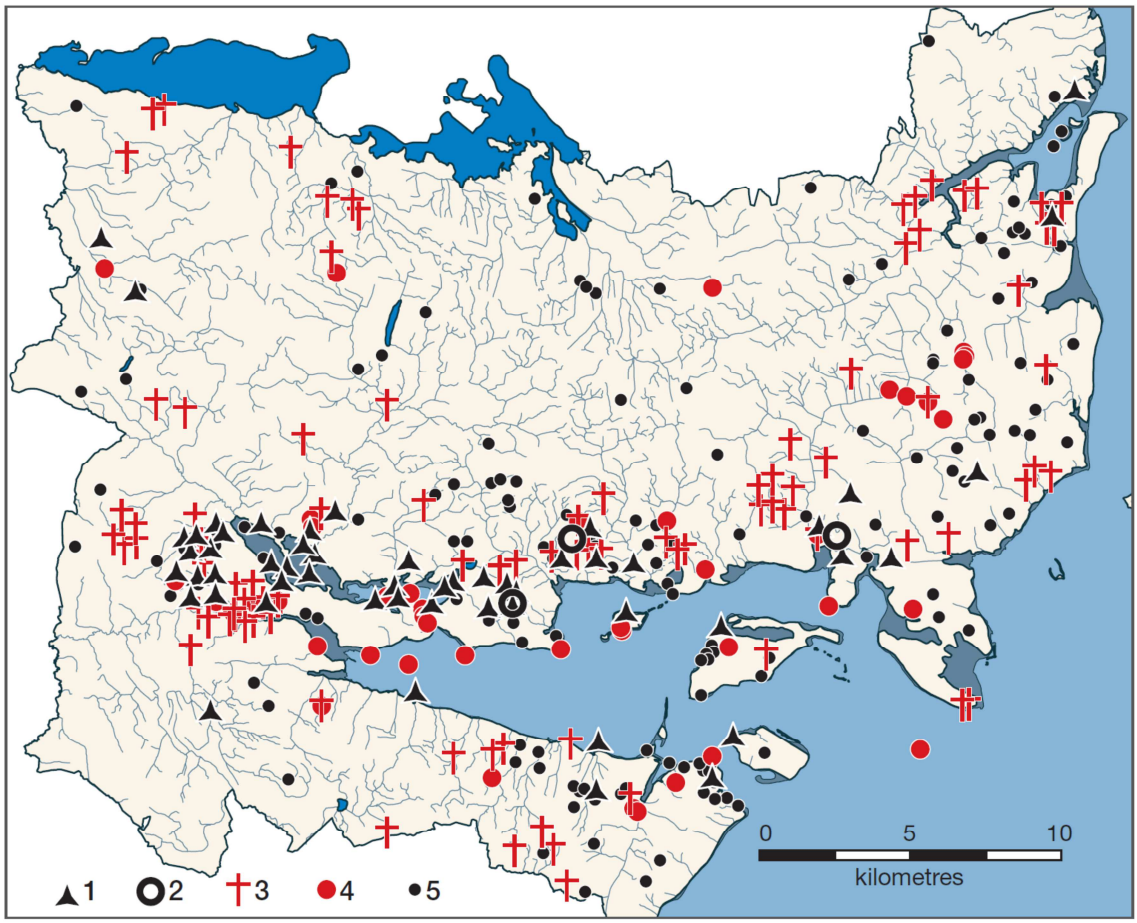

Fig. 4. The distribution of finds from the study area dated to between 3600 and 3000 BC: 1, settlements; 2, causewayed enclosures; 3, graves; 4, depositions in freshwater and marine environments; 5, stray finds of thin-butted flint axes of types IV-VIII.

The site was preserved below a barrow, without which only parts of the culture layer in the depression would have survived the plowing. A causewayed enclosure at Aalstrup can also be dated with certainty to this period.[20)] In addition to the settlements and stray finds of pointed and thin-butted flint axes of type I-II, there are four graves and four depositions in saltwater.

From late in the Early Neolithic and up through the older part of the Middle Neolithic FBC (EN II-MNA II (III / IV) - 3600 to 3000 BC) the number of finds from the study area increased drastically (Fig. 4). [21)] Especially at the bottom and along the north side of Horsens Fjord, the number of settlements is large, and many have been documented through excavations. In addition, there are three excavated causewayed enclosures. The number of graves, primarily megalithic tombs, is also considerable, just as depositions in freshwater and saltwater are numerous.[22)] Stray finds of thin-butted axes supplement the distribution pattern.

[20] T. Madsen 2009; T. Madsen 2019a, 150203-2.

[21] The reason for putting period III and IV in brackets is that they cannot be separated through statistical analysis in the pottery. In reality, they are not chronological phases, but regional styles in the late South Scandinavian pottery.

[22] Detailed information about the excavated settlements, graves and causewayed enclosures are available in the East Jutland Project catalogue (T. Madsen 2019a). There are other publications though, that deals with excavations of settlements (P. Eriksen & T. Madsen 1984; T. Madsen 2009), graves (T. Madsen 2018; T. Madsen 2019b; K. Thorvildsen 1946) and causewayed enclosures (T. Madsen 1978; T. Madsen 1988; T. Madsen 2009).

The large number of finds enables a detailed picture of the settlement's location and structure. Obviously, it is coastal bound and especially by Horsens Fjord very dense, while along the coast of Kattegat to the east it appears more scattered. If you look more closely at the distribution pattern, there is a clear tendency for groupings connected to the three known causewayed enclosures along the north side of the fjord. From east to west, it is Aalstrup, Toftum and Bjerggård. In connection with the marked cluster of finds at the inner part of Horsens Fjord is a site - Aarupgård - that has probably also been a causewayed enclosure.[23)] Inland to the north and south, the amount of finds is limited. To the northwest, however, there are two settlements and seven tombs. Both of the settlements can be dated around the turn from EN to MNA and of the seven tombs; two are long barrows that can be dated to EN II, while the rest are megalithic tombs. Three of these were with simple chambers dating to EN II, while the shape of the chambers for the remaining four is unknown. Apparently, the settling in the area was limited to EN and possibly the earliest part of MNA.

The excavations of settlements along Horsens Fjord show that many of these were of a permanent nature and of considerable size. This applies not least to settlements in connection with the causewayed enclosures. Thus, the excavations at Toftum and Aalstrup have established settlements with minimum sizes of 1.5 and 2 ha, respectively. From the group of settlements at the inner part of Horsens Fjord, excavations have also documented sizes of at least 0.3 to 0.7 ha, but in all cases, the sites may have been larger.[24)] The permanent character of the settlements is also stressed by the tendency for the megalithic tombs to form clusters. In the clusters, both early and late grave types are present, and a continuing deposition of ceramics in front of the chambers through MNA I and II emphasizes the site continuity. We also find sites placed directly on the coast, from which in five cases the presence of shells have been documented. It shows that collecting and fishing continued to play a role. At all three excavated causewayed enclosures, especially Toftum, we also find shells in recuts into the ditch segments. The background for this, however, is ritual rather than subsistence based.[25)]

Agriculture

The FBC's agriculture is clearly reflected in pollen diagrams from lake basins as described by Johannes Iversen in a groundbreaking work on "Landnam i Danmarks Stenalder" from 1941. Here he divides the “landnam” (land taking) into three stages, which he interprets as follows: The initial stage represents the deforestation itself; the second stage, characterized by a birch maximum, represents a cultivation phase based on burning of the cleared areas – slash-and-burn; the third stage, dominated by hazel, represents an overgrowth phase of the cleared areas.

[23] T. Madsen 2019a, 160306-10.
[24] It is sites like Hanstedgård (P. Eriksen & T. Madsen 1984; T. Madsen 2019a, 160502-7); Tudkær (T. Madsen 2019a, 160306-17); Kørup (T. Madsen 2019a, 160306-37); Provstlund (T. Madsen 2019a, 160306-47); Bygholm Nørremark (T. Madsen 2019a, 170403-21).
[25] L. Klassen & B. Knoche 2019.

Iversen thus perceived the course of the pollen diagrams as the result of a group of people's intervention with the forest, their utilization of the cleared areas for some time, and the subsequent regeneration of the forest, with the addition that the regeneration phase was regulated to preserve the hazel groves.[26)]

Since then, C14 dates associated with pollen diagrams as well as an increased knowledge of pollen dispersal patterns has changed this perception. The “landnam", as it appears in the pollen diagrams, does not reflect local short-term interventions, but rather long-term cultural changes in the utilization of the forested landscape. Thus, roughly the initial phase is dated to 3900-3600 BC, the second phase to 3600-3000 BC and the third phase to 3000-2600 BC.[27)] It is striking that the first phase, which covers a 300-year period, only reflects scattered interventions and not a systematic exploitation of the forested environment. However, this fits in well with the settlement pattern we see in the study area, with small settlements of short duration. Although there certainly was an organized agriculture, the mobility of it was such that it did not make an impact in the overall pollen diagrams. The second phase, which covers the next 600 years, reflects a systematic pattern of exploitation with a slash-and-burn rotation between clearing, burning, cultivation, grazing and regrowth with primarily birch on permanently established field systems. It fits with the concentrated settling we find in the study area, as well as in other areas. It has been doubted that slash-and-burn agriculture was in use at all, and from the traces of plowing below barrows, it was assumed that only permanently cultivated fields were in use. Based on pollen diagrams, also below barrows, however, there can be no doubt about the use of slash-and-burn.[28)]

Two other sources that throw light on the nature of agriculture are plant macrofossils and animal bones from settlements. Figure 5 shows the distribution of cereals based on the determination of plant macrofossils through the Neolithic up to and including LN II, while Figure 6 shows the distribution of domestic species and hunted mammals within the FBC. For both grain and animals, the number of preserved and/or collected components from the individual localities varies greatly. If the diagrams were based on absolute counts alone, a small group of find contexts with large deposits would have a completely dominant influence, while conversely, if they were based on the percentage occurrences from the individual contexts, the statistical uncertainty in contexts with a low number of elements would completely skew the result. I have therefore chosen to use an intermediate solution creating the two diagrams. For finds with a total sum of less than 100, the actual counts are used, while percentages are used for finds with a total sum of more than 100.[29)]

[26] In addition to the original publication from 1941, J. Iversen has described the ”landnam” in a chapter of the first volume of a major publication describing the nature in Denmark (1967). Later, this chapter was republished in English (1973). It contains the most authoritative version of his own interpretation of the ”landnam”.

[27] P. Rowley-Conwy 1981, 86; T. Madsen 1990, 29; S.Th. Andersen 1993, 155-56. The absolute dates for the first two phases have been determined by A.J. Kalis & J. Meurers-Balke (1998), while in a diagram from Dallund Sø you can follow the complete course of the “Landnam” with the culmination of hazel dated to 3000-2600 f.Kr. (P. Rasmussen 2005).

[28] For another example of permanently settled areas, see N.H. Andersen 2009. With respect to slash-and-burn, it has primarily been P. Rowley-Conwy (1981), who has been critical, while S.Th. Andersen (1990; 1993) through pollen analyses from below barrows clearly has demonstrated its presence.

[29] The data for figure 5 are taken from N.H. Andersen 1999; M. Andersson 2004; M.H. Andreassen 2009a; 2009b; 2009c; 2016; 2017a; 2017b; 2017c; N.A. Boas 1993; J.P. Brozio et al 2013; H. Göransson 1995; F. Hallgren 2008; H. Helbæk 1953; 1955; P.S. Henriksen 2000; 2001; 2016a; 2016b; H. Hjelmqvist 1975; 1998; P.M. Jensen 2012; 2013a; 2013b; 2013c; 2015; P.M. Jensen & P.H. Mikkelsen 2007; P.M. Jensen & M.B. Thastrup 2014; K. Jessen 1940; E. Jørgensen 2000; G. Jørgensen 1977; 1982; G. Jørgensen & B. Fredskil 1978; W. Kirleis & S. Kloss 2014; W. Kirleis et al 2012; L. Larsson & S-G. Broström 2011; M.

Larsson 1984: P.H. Mikkelsen 2002; A.S.A. Moltsen 2013; P.O. Nielsen 1984; M. Regnell & K-G. Sjögren 2006; D.E. Robinson 1992; 1998; 2003; D.E. Robinson & I. Boldsen 2000; D.E. Robinson & J. Harrild 1994; D.E. Robinson & D. Kempfner 1988; H. Rostholm 1986; 1987; E. Rudebeck 2010; E. Schiemann 1958; M.B. Thastrup 2015; L. Sørensen & S. Karg 2014.
The informations for figure 6 are taken from N.H. Andersen 1999; A. Boethius 2009; 2011; B. Bratlund 1993; H. Browall 1986; K. Davidsen 1978; I.B. Enghoff 2011; T. Hatting 1978; D. Heinrich 1999; F. Johansson 1979; E. Koch 1998; J. Kveiborg 2008; L. Larsson 1994; M. Larsson 1984; S. Macheridis 2011; A.P. Madsen et al 1900; T. Madsen 1978; O. Magnell 2007; U. Møhl 1975; P.O. Nielsen 1984; M.-L. Nilsson & L. Nilsson 2003; G. Nobis 1983, 1987; G. Nyegaard 1985; P. Rowley-Conwy 1985a; U. Sandén et al 2010; K-G. Sjögren et al 2019; J. Skaarup 1973; H. Skousen 2008; S. Welinder et al 2018.

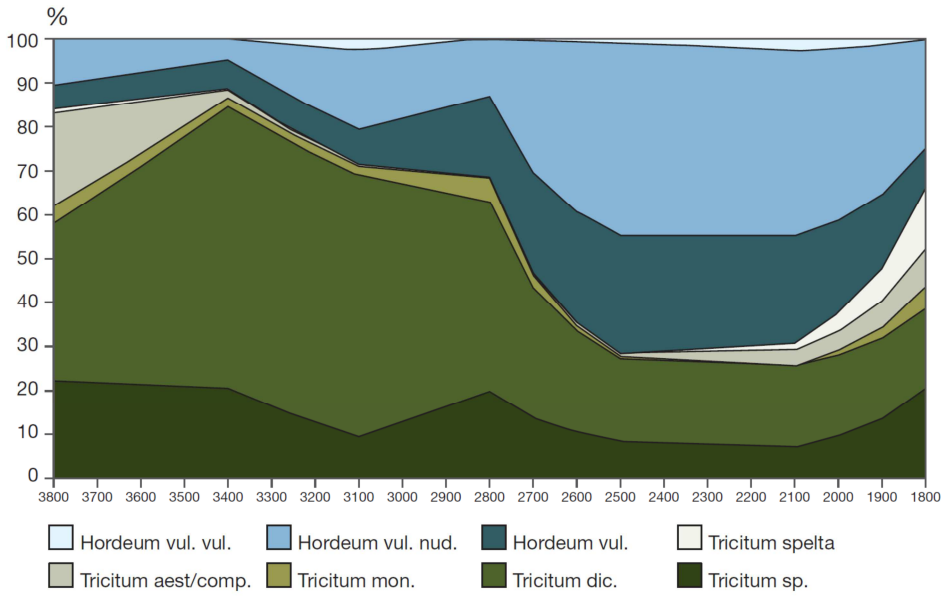

Fig. 5. The percentage distribution of cereal types during the Neolithic of southern Scandinavia based on counts of macrofossils in 91 sample units.

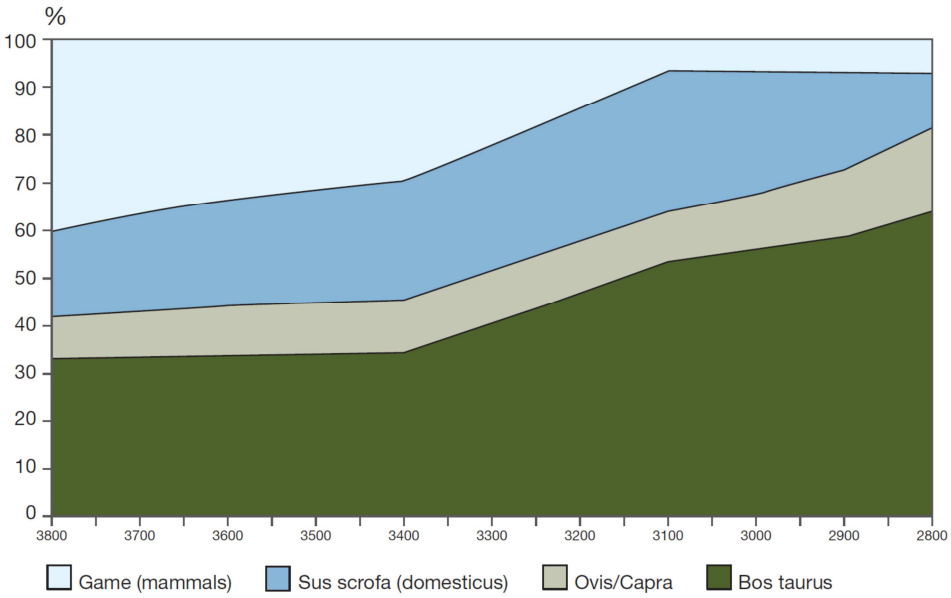

Fig. 65. The percentage distribution of domestic species and hunted mammals during the FBC in southern Scandinavia based on counts of bones in 74 sample units.

Wheat was very dominant in EN and the beginning of MNA, but during MNA, the share of barley increased to about a third (Fig. 5). The predominant wheat species was Emmer (Triticum dicoccum) while Eincorn (Triticum monocuccum) occurred only in very small amounts. In EN I, there was also a limited use of Bread and Club wheat (Triticum aestivum/compactum) that were part of the original "agricultural package" from the south, but they largely disappeared in EN II and MNA. In the case of barley, it was almost exclusively Naked barley (Hordeum vulgare nudum). Although slash-and-burn is documented through the pollen diagrams, there are also indications of more intensive forms of arable farming. Partly, there are traces of plowing with ard already around 3700 BC and partly there are indications in EN II for fertilization of the cereal fields.[30)]

At the beginning of the Early Neolithic, the "forest animals" - the game and the pigs - dominated over the "animals of the field" - cattle and sheep/goats (fig. 6). With hunted mammals accounting for up to 40% of the animals, they constituted a significant proportion, but the figures may be flawed. Sites with many bones from hunted mammals, like coastal sites with shells, often have good preservation conditions, while the much more numerous inland sites have largely no bones preserved. If we look at the domestic animals alone, the cattle dominated with 55%, followed by pigs with 30% and sheep/goat with 15%.

During the MNA until 3000 BC, the proportion of cattle increased, while the proportion of hunted mammals simultaneously decreased. The proportion of pigs and sheep/goats, on the other hand, seems stable. With respect to whether the cattle were kept primarily or exclusively for the sake of meat, or whether they were also used for dairy products, the opinions are divided. That they were used as draft animals for plowing and transport, on the other hand, is beyond doubt.[31)]

Social structure

In addition to the settlement and land use, our knowledge of the structure of society within the FBC is linked to two categories of monuments - the tombs and the causewayed enclosures. Both were introduced in EN I and played a central role in the organization of society up to the middle of MNA. Based on the C14 dates, long barrows with wooden-built chambers probably appeared around 3800 or at the latest 3700 BC. The causewayed enclosures were long considered to begin in EN II and thus at the earliest around 3600 BC; but they have now been shown to begin no later than between 3800 and 3700 BC.[32)]

Many EN long barrows were built directly on top of former settlements, such as at Mosegården in the study area, which must reflect a very direct connection between settlement and grave. In connection with the frequent relocations of the settlements at the beginning of EN, the abandoned places became the preferred "home" for the dead.[33)]

[30] With respect to the changes from wheat to barley then both the January and July temperatures drop with around 1° Celsius from 3500 to 2500 BC (K.J. Brown et al 2011, fig. 4), but it is uncertain if this can explain the balance between wheat and barley. For bread- and club-wheat as part of the original Neolithic ”package”, see W. Kierleis & E. Fischer 2014. For early traces of ard use, see M.R. Beck 2013, and for indication of fertilization in EN II, see A. Brogaard et al 2013.

[31] For conflicting views of beef- versus dairy cattle, see C. Andersson 2013 and K.J. Gron et al 2015. For cattle as draft animals, see N.N. Johannsen 2017.

[32] For C14-dates from long barrows, see: Rude (T. Madsen 1980; T. Madsen 2019a, 150212-3); Mosegården (T. Madsen & J.E. Petersen 1984; T. Madsen 2019a, 160508-9); Rustrup (K. Fischer 1976); Højensvej (M.R. Beck 2013). Of causewayed enclosures Aalstrup have been dated to EN I through pottery in Volling style (T. Madsen 2009; T. Madsen 2019a, 150203-2); Kildevang II in its latest phase is likewise dated to EN I through pottery in Volling style, but a couple of dates between 3900 and 3700 BC suggests an even earlier date (H. Skousen 2008: 172-177). At Liselund, the oldest layers in the ditch segments with pottery in Volling style are C-14 dated between 3700 and 3600 BC (T. Torfing 2016).

In general, the burials in the wooden chambers of the long barrows do not seem to reflect the death of significant persons. The deceased from the earliest grave in the Bygholm Nørremark long barrow from the study area was, based on tooth enamel, only 13-15 years old, and in the same long barrow, four adults were buried simultaneously in a wooden chamber without any burial gifts. Another example of a burial with more individuals comes from Skibhøj in Salling, northern Jutland. Here an adult and four children lay side by side in a burnt-down wooden chamber. One senses that it was perhaps more the circumstances surrounding the deaths that caused the burials, than it was the status of the persons. This is also suggested by the fact that the extent of burial gifts in several graves is limited. However, there are exceptions, as a grave from Rokær in the study area shows. The tomb, C14-dated to between 3400 and 3300 BC at the transition from EN to MNA, contained two thin-butted flint axes, a very special ground blade dagger and a large amount of amber beads. The tomb is only 1 km from Aarupgård, a probable causewayed enclosure, from which we have a deposited pot containing copper trinkets and a large quantity of amber beads of exactly the same types as in the Rokær tomb. If we add to this that copper trinkets have been found in three wooden chambers in South Scandinavia, then there has obviously been tendencies towards stratification in society.[34)]

Towards the end of the Early Neolithic, the wood was replaced by stones in both mounds and chambers. Initially, it was an architectural change more than a functional change, but something else happened as well. During EN II, the construction of dolmens increased and at the same time, they became more monumental. In MNA I, the chambers grew further in size and the passage graves were added. At the same time, access was changed from simple openings to narrow passages that could be blocked with a door stone. Thereafter, the construction activities ceased completely. While a limited number of pots were deposited through the EN at the eastern ends of the long mounds only, then at the beginning of the MNA, pottery in large quantities began to be deposited in front of the entrances to the megalithic tombs, a custom that continued after the megalithic tomb construction ceased. At the Stenhøj dolmen near Toftum and at the Nørremarksgård passage grave west of Horsens, both from the study area, the depositions have been studied in detail. The deposited pottery either was broken on location at the time of deposition or before it was brought to the tomb, and in general, only parts of the individual vessels were left in front of the tomb. Following the deposition, the pottery, whether placed on the surface or in pits in front of the kerbstones, was covered with sand. The Stenhøj dolmen chamber contained a single complete vessel covered by sand that also contained shards from broken vessels. The chamber of the Nørremarksgård passage grave was destroyed, but in the nearby Grønhøj passage grave, six pottery vessels with a dating range corresponding to the pottery depositions outside the entrance were uncovered during the excavation of the well-preserved chamber. All of them had apparently been covered with sand. [35)]

With the increased construction of megalithic tombs at the end of EN II and into the MNA, a clear tendency for clustering occurred (Fig. 4).

[33] In addition to Mosegården (T. Madsen & J.E. Petersen 1984; T. Madsen 2019a, 160508-9) examples as Barkær (D. Liversage 1992), Lindebjerg (D. Liversage 1981), Rustrup (C. Fischer 1976), Bjørnsholm (S.H. Andersen & E. Johansen 1992) and Frydenlund (N.H. Andersen 2015; N.H. Andersen 2019) can be mentioned.

[34] For Bygholm Nørremark, see P. Rønne 1979, for Skibhøj, see E. Jørgensen 1977b, for Rokær, see A.M. Kristiansen 2000; A.M. Kristiansen & B.V. Eriksen in preparation; T. Madsen 2019a, 160306-14 and for Aarupgård T. Madsen 2019a, 160306-10. For wooden chambers with copper, see L. Klassen 2000, 354-356.

[35] For Stenhøj, see T. Madsen 2018; 2019a, 160508-13, for Nørremarksgård, see T. Madsen 2019a, 170403-4; T. Madsen 2019b and for Grønhøj, see K. Thorvildsen 1946; T. Madsen 2019a, 170403-18; T. Madsen 2019b.

At the inner part of Horsens Fjord west of Horsens in particular, there is a marked cluster with a clear tendency for a separate location of settlements and graves. This is where we find the Nørremarksgård and Grønhøj passage graves. They were built at about the same time and were in contemporary use in the sense that there were occasional activities in the chambers and depositions in front of the entrances. Based on the number of separate depositions at the Nørremarksgård passage grave and the time difference between these, this happened on average at 10-20 year intervals. I have interpreted the circumstances in the way that each megalithic tomb belonged to a lineage and that the recurring depositions primarily were linked to feasts and ceremonies that the lineage held to strengthen the ties to the ancestors and legitimize themselves. At the same time, the activities were a manifestation to competing families.[36)]

Unfortunately, we have very little information about the burials in the chambers. This is partly because in Jutland bones are very rarely preserved, and partly because on the islands, where bones are well preserved, we seldom find them securely dated. In the few cases where in the Early Neolithic dolmens we have skeletons that can be attributed to the original burials in the chambers, these turn out to have been manipulated or disarticulated in advance with anatomical disorder and missing bones as the result. Largely, this custom seems to continue into the Middle Neolithic.[37)]

If we turn to the causewayed enclosures, the general view of these is characterized by Sarup I with its complex palisade system, and double rows of ditches adapted to the palisade course. However, it is a picture not found at many other sites. The vast majority has no palisades and consists of only one or two rows of ditches. Toftum from the study area, excavated in 1976 shortly after Sarup, is one of them. At the first presentation, Toftum was perceived as a short-term monument with a double row of ditch segments. A re-evaluation in connection with later investigations at the site shows a much more complex and lengthy process.[38)] As it stands today, the monument originally consisted of a single series of ditch segments that ran all the way around the hill on which it was placed, and where the individual ditch segment underwent a diverse series of events. This row was later supplemented on the western side of the hill with an inner row of ditch segments that went through a uniform sequence of events. This is best documented in the northernmost of the excavated ditch segments, where five phases of recuts were noted. In the original cut for the ditch and the first few recuts, natural deposits were seen on the bottom followed by refills of charcoal-colored sand, while the most recent recuts were filled with dark cultural layers containing quantities of flint and pottery.

[36] T. Madsen 2019b, p. 915-918.
[37] For EN, see P. Eriksen & N.H. Andersen 2014, p. 273-285 and for MN, see T. Madsen 2019b: P. 913.
[38] For Sarup, see N.H. Andersen 1997, and for descriptions and discussions of Toftum and Aalstrup, see T. Madsen 1978; 2009; 2019a: 150203-2, 160508-34 and 35.

The large amount of cultural material in the late recuts in the inner row of ditch segments, and more limited in the top of some of the outer ditches, is contemporary with a settlement covering at least 1.5 ha, located on the eastern side of the hill in the same area where the outer row of ditch segments lay previously.

It is obvious that Sarup I was designed from the start, but it is just as obvious that enclosures like Toftum and Aalstrup were not. It is unlikely that the ditch segments were built at the same time, and they have apparently been left open for short periods in connection with activities in them, which may well have happened with decades intervals, as was the case with the activities in front of the megalithic tombs. At both Toftum and Aalstrup, it is documented that the ditch segments were marked on the surface with large stones, as well as post placed in the fill of the ditches were noted at Aalstrus. It is a widespread assumption that the causewayed enclosures constituted gathering places where large parts of the population met regularly for social interaction, trade, etc. However, this is an interpretation that I find difficult to fit in with the activity patterns we see in connection with the ditch segments. I find it more likely that the causewayed enclosures were ritually conditioned, presumably in connection with a cult of the dead, as indicated by the presence of human bones in ditch segments at some sites and the general deposition of ceramics at the enclosures that can be seen as a parallel to the subsequent depositions at the megalithic tombs. Thus, a site may arise gradually in larger or smaller groups of people and grow in scope over time.

Overall, I believe, as others have also expressed, that we should see the lines of ditch segments and a possible palisade as the boundary line between two worlds - the outer world of the living and the inner secluded world of the dead - "the village of the dead souls", as it has been expressed. That a palisade can be perceived as a boundary line is self-evident, while it may not be so obvious with a series of ditches that mostly lie covered. In many ditch segments, however, structural features have been found that strengthen the interpretation as a boundary line. At Aalstrup, most of the ditch segments had a steep stone and clay-lined inside (towards the headland) and a more sloping outside. Particularly striking was an almost kerbstone like structure in one of the ditches. At Toftum, the ditch segment that was recorded through a section on the east side of the hill, also had a vertical clay-lined inside, and at Bjerggård, the inside of one of the ditch segments was also reinforced with clay.[39)]

From late in the Early Neolithic and into the Middle Neolithic, the villages of the "dead" gradually became the villages of the "living", as for instance at Toftum. The depositions in the ditch segments were increasingly marked by settlement-like materials, although still with a clear ritual imprint in the form of layers with traces of fire, extensive deposits of shells and large contiguous parts of pottery.

[39] T. Madsen 2009, p. 129-32; L. Klassen & B. Knoche 2019; N.H. Andersen 1997, p. 309. The expression ”the village of the dead souls” are due to the latter. For the lining of the inner sides of the ditch segments in the study area see T. Madsen 2009; 2019 a, 150203-2 AU-AY; 160508-35 fig. 41; 160512-1 fig. 7.

In connection with this development, the depositions of pottery in front of the megalithic tombs expanded at the same time as the depositions in the ditches of the causewayed enclosures declined and disappeared.[40)]

The FBC and SGC in East Jutland between 3000 and 2600 BC.

The FBC

With the final St. Valby phase between 3000 and 2600 BC, there were major changes in the FBC in the study area. Most noticeable is that the varied and richly decorated pottery was replaced by a uniform coarse ware characterized by a very limited selection of shapes and decorations. Much more than this happened, however, as Figure 7 show.

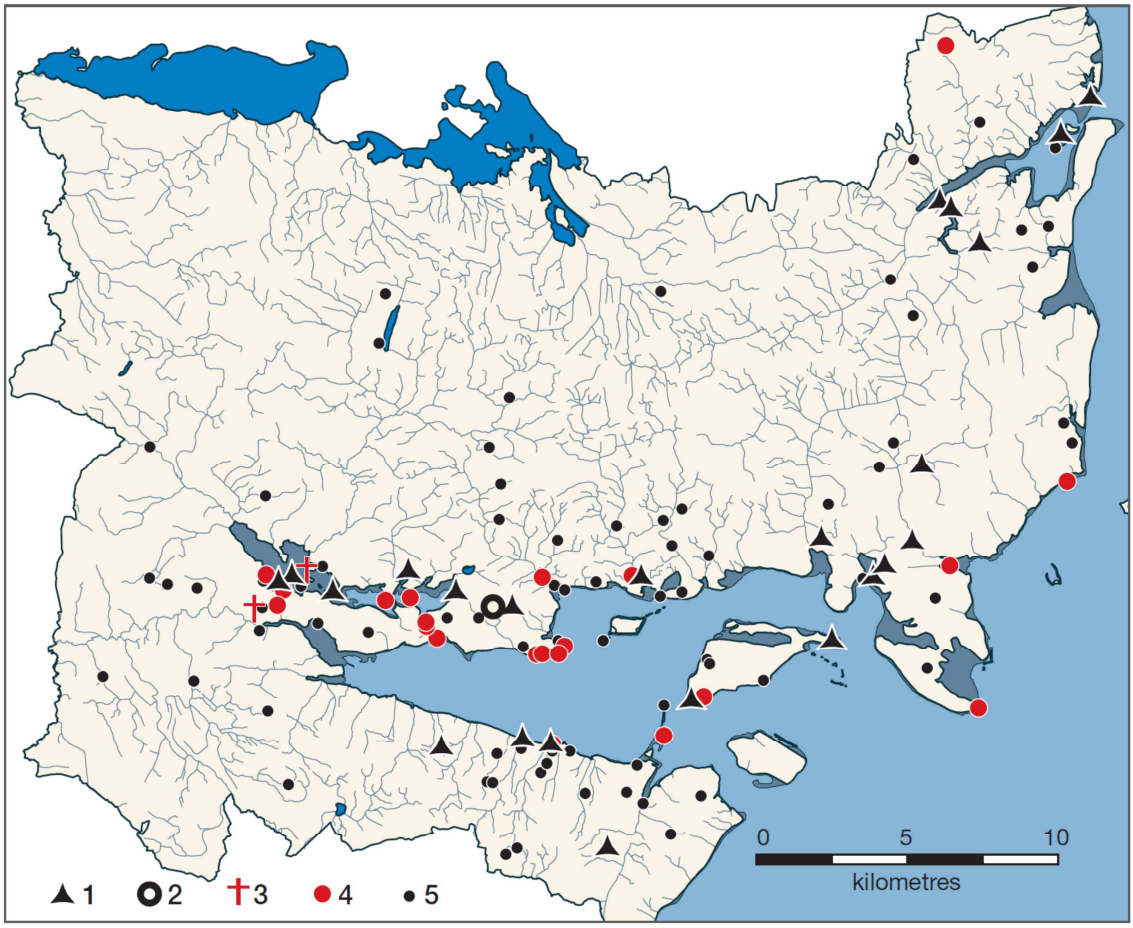

Fig. 7. The distribution of finds from the FBC in the study area dated to between 3000 and 2600 BC: 1, settlements; 2, causewayed enclosure; 3, graves; 4, depositions in freshwater and marine environments; 5, stray finds of thick-butted flint axes of: category A; category B of Vedbæk- and Brogård-type; pointed-butted hollow-ground flint axes.

[40] For the general introduction of settlements on causewayed enclosures, see P. O. Nielsen 2004: Tab. 2. For the connection between depositions in ditch sections on causewayed enclosures and in front of megalithic tombs, see T. Madsen 2019b

The settlements became considerably fewer and moved closer to the coast and at the same time, burials became almost invisible. Only two have been recorded within the study area, one a reburial in a megalithic tomb and the other a simple flat grave at a settlement. There are, on the other hand, many wetland depositions, the vast majority of which are located in saltwater.

What the settlements lost in number, they gained in size and duration. Surface collecting at many of the sites have resulted in large numbers of axes scattered across considerable areas. Toppetbjerg south of Horsens Fjord has through systematic collection, where all objects have been numbered and placed on maps, proved to be 3 ha large. Similarly, surface collections at Bjerggård have shown an area of at least 2.5 ha. Here, test trenches in connection with the excavations of the causewayed enclosure uncovered an area with widespread cultural deposits, and at the top of the ditch-segments from the enclosure were thick cultural deposits from the St. Valby phase. At the Aalstrup site, there was also a widespread occurrence of St. Valby pottery, but here the settling does not seem to have been as intensive. At Egehoved on Alrø in Horsens Fjord and on Kalvø in Norsminde Fjord, we also find a couple of large settlements from the St. Valby phase placed directly on the coast and with shells in the cultural deposits.[41)]

Agriculture

The large permanently inhabited settlements meant that the resource base around the settlements seen against the population size was limited, and it therefore required a more intensive animal husbandry and agriculture. In the third phase of the “landnam”, which is parallel to this part of the FBC, a sharply increasing curve for hazel is present, a development that was already underway in phase 2. This reflects an increased use of forest grazing areas. Forest meadows are known today from Östergötland and Gotland in Sweden, where on the latter Island they are now protected. A description of the annual cycle on a Gotland forest meadow provides a good insight into how the system worked in historical times. In the late autumn and winter months, small shrubs are cleared, larger overhanging branches are cut from the trees and coppicing of trees, first and foremost hazel, is maintained by removal of the oldest branches. At the beginning of spring, branches and withered leaves and grass from the previous year are burned off (slash-and-burn fire without subsequent grain cultivation), promoting the new grass growth. In the middle of summer, the grass is harvested and the trees are trimmed (trimming cycle 3-7 years). Both hay and cut branches are used as winter fodder. After the harvest, the cattle are let into the meadows, where they stay to the beginning of winter.[42)]

[41] For Toppetbjerg, see T. Madsen 2019a, 170104-59, for Bjerggård, see T. Madsen 2019a, 160512-1, for Aalstrup, see T. Madsen 2019a, 150203-2, for Egehoved, see T. Madsen 2019a, 150201-2 and for Kalvø, see S.H. Andersen 1982; S.H. Andersen 1983; T. Madsen 2019a, 150212-13.

[42] Source: Gotländska Ängskommittén, http://www.gotlandsangar.se/. That the ”Landnam” primarily reflect animal husbandry in a forest environment rather than agriculture has long been clear (H. Göransson 1982; B. Aaby 1985; S.Th. Andersen 1985; S.Th. Andersen 1993). This does not mean of course that crop growing did not play a significant role in farming.

Of course, this description cannot be transferred directly to the Stone Age. It is not likely that grass was harvested, and winter-feeding consequently must have been based on deciduous hay alone. For a large part of the year, the cattle therefore must have stayed on the forest meadows, which they also had to share with the pigs, as was the case in England in the Middle Ages. [43)] A probable scenario is that a rotation system was used for the individual forest meadows, so that burning in the spring took place on some meadows, while the cattle grazed on the withered grass on others before they were moved to the new grass on the burned areas. Similarly, the pigs probably stayed on the forest meadows in the winter, while the cattle were "housed". This housing could have taken place on in-fields close to the settlements to facilitate the feeding with deciduous hay. These could have been completely cleared areas, which, after the cattle were moved to the forest meadows, were plowed and used for grain cultivation, whereby the fertilizer effect was utilized. New studies of carbon and nitrogen isotopes in charred kernels from the funnel beaker culture show, as mentioned earlier, that some of the cultivated grain has been affected by fertilizer. However, at present it is impossible to say anything about the extent of the fertilization.[44)]

The diagram of the distribution of animal species in the settlements (Fig. 6) shows that the amount of cattle increases towards the end of the FBC, while the proportion of pigs decreases and the proportion of sheep/goat increases slightly. In the case of cereals, there is a fair balance between barley and wheat species after the barley, not least naked barley, had progressed strongly in relation to the early part of the FBC (Fig. 5). It is not possible to say anything definite about the importance of grain cultivation compared to cattle farming. In a study of human bones from Falbygden in Sweden, it has been documented that the diet at this time was predominantly based on plant food,[45)] but the ecological difference between the two areas and the geographical distance between them is such that it has no direct implications for East Jutland. However, other studies indicate a possible intensification of grain cultivation as well as a marked change in harvesting methods. Wear trace analyzes of flint sickles have shown that the traditional sickle type with a cutting movement shows signs of increased wear towards the end of the FBC that can be assumed to reflect an increased grain cultivation. In addition, in the St. Valby phase a completely new type of sickle appears that was used with a transverse movement of the edge. The type is interpreted as a "threshing knife" to cut off the heads of naked barley, after this had been harvested in an immature state. The latter was to avoid a loss of seeds that would occur during traditional harvesting and transport after the grain had matured. These threshing knives often exhibit an extreme polish reminiscent of a regular coat of varnish. Recent experiments have shown that this type of polishing occurs by cutting into immature straws, which fits with the proposed interpretation.[46)]

[43] D. Jørgensen 2013.
[44] K. J. Gron et al 2017.
[45] K-J. Sjögren 2017.
[46] For wear trace analyses of the sickles, see H.J. Jensen 1994 and 1998. For experiments with cutting immature straw, see J.J. Dubois 2015. Among macrofossils from a late SGC settlement at Mortens Sande, there are clear indications, that naked barley was harvested and brought home in an immature state (D.E. Robinson & D. Kempfner 1988).

Social structure

In MNA II, the deposits of pottery in front of the megalithic tombs gradually decrease. An analysis of the pottery from the study area shows that while in the early depositions it stylistically matched the pottery from the settlements; in the late depositions, it clearly differed from the settlement pottery, where a development towards a more undecorated pottery was already underway. In the end, the symbolism of neither the depositions nor the pottery decorations made sense, and they disappeared. At some point towards the end of the FBC, we see a general covering of the depositions in front of the megalithic tombs with layers of stone. At the same time people moved together in large communities where, archaeologically, it is difficult to spot individual or group-based markings. However, not all rites stopped. Depositions in saltwater continued and were even intensified, and somewhat surprisingly, recuts still occurred in the top of causewayed enclosure ditches. At Bjerggård, regular recuts are thus present containing layers of settlement debris with flint and potsherds, without there being specially selected objects included. The debris is also mixed with a number of seashells, but in contrast to previous depositions in causewayed enclosure ditches, these were not whole seashells, but rather shells in all stages of degradation. No matter how extensive the cultural changes in the late FBC were, there was still a built-in respect for the significance of the causewayed enclosures, including the symbolism of the seashells. So much so that shells were hauled up to an altitude of 80 m above sea level from a coast 1.5 km away to be deposited together with what has been quite ordinary settlement waste.[47)]

The SGC

Although sparse, the finds from period 1 of the Jutland SGC in the study area show a clear distribution pattern (Fig. 8). In the northwest corner, within a demarcated area, there are three settlements, 13 graves[48)] and five stray finds of battle-axes that probably also originate from graves. In the area along the coast, where we at this time have the late FBC, there are three depositions in freshwater (two battle-axes and an amber bead) and five stray finds of battle-axes. In the intermediate area, there are no finds.

The foundation for talking about settlements is weak. In two of the cases, scattered flint and ceramics were found in and below barrow fill, and in the third, flint and ceramics were found in thin cultural layers preserved in minor local depressions. As flimsy as this is, it is the typical appearance of the settlements from the SGC. Already Glob noticed this, and for the older part of the SGC, it has not changed. Only for the younger part do we have more solid evidence today.[49)]

[47] For the covering of depositions with stones, see T. Madsen 2019b, p. 907-909. On the meaning of shells in causewayed enclosure ditches see L. Klassen & B. Knoche 2019, and on recuts with shells at Bjerggård see T. Madsen 2019a, 160512-1

[48] The major part of these graves stem from newer investigations. Thus at the map figure 2, there are only three graves from period 1 within the study area. It should be added that a couple of the graves are ring ditch graves in which there are only a flint axe and no battle-axe. The date to period 1 is very certain though.

[49] P.V. Glob 1945, p. 245-6. The more solid evidence from the late part of the SGC that we now have points among other stings in the direction of houses with sunken floors (J.A. Jensen 1973, p. 106-7; S. Hvass 1977; M. Hansen 1986, p. 286-7), a type of house that is common in the Late Neolithic.

The dates of the three settlements rests on ceramics, and in two of the cases, it is very certain, while in the third it is probable.

Agriculture

Our factual knowledge of agriculture in the early SGC is almost non-existent. Based on the weak settlement traces, we can assume that only very small residential units existed and that they were often relocated. Pollen analyses from central Jutland constitute the most informative source. They consist of diagrams from lakes, and analyses of pollen from old surfaces below barrows. In a diagram from Solsø, a sharp reduction in forest growth is seen from around 3000 BC combined with burning and an increased heath formation. A similar picture with forest reduction, burning and heath formation is seen in analyzes of pollen from a couple of SGC barrows at Skarrild and Harreskov. The diagrams from the barrows and partly also the lakes clearly reflect an extensive cattle grazing on open land characterized by heather. The latter is important in this context because it is possible for cattle to winter graze on heather, making separate winter-feeding unnecessary. In the pollen diagram from Skarrild, there are also signs of deforestation and incipient heath formation from a slightly deeper lying layer, which is probably contemporary with late FBC.[50)] Overall, it is evidence that points to extensive cattle breeding. However, grain imprints of both wheat and barley have been found in pottery from the early SGC in central Jutland, and if we move to East Jutland, we find further evidence of grain growing. In a grave at Refshøjgård north of Aarhus, pollen of barley as well as a crust that may stem from beer have been found inside a clay vessel, and in the same grave, a quern stone is placed in the surrounding stone frame. At Hinnerup, just over three km to the east, pollen analyzes from below an early SGC barrow show traces of barley cultivation. At both Refshøjgård and Hinnerup, the amount of barley pollen is so large that it has been suggested that the barrows were placed on threshing grounds. Further evidence of early-stage grain cultivation comes from traces of ard ploughing below barrows, e.g. under Kikhøj north of Aarhus, and in connection with the Gantrup grave in the study area. At the latter, a pollen analysis has also been carried out, which, however, did not show traces of agriculture, but rather extensive cattle grazing.[51)] With the current evidence, it is not possible to say anything about the balance between cattle breeding and agriculture, and it has hardly been the same everywhere either. The pollen analyses from central Jutland clearly indicate that cattle breeding were the most important, but with the significantly better soils in East Jutland, it is likely that grain growing played a greater role here than to the west.

[50] See B.V. Odgård 1994, p. 154-55 for pollen diagrams from lakes; B.V. Odgård 1985, B.V. Odgård & H. Rostholm 1988 and H. Rostholm 1987 for pollen diagrams from SGC barrows; B.V. Odgård 1994, p. 161 for winter grazing based on heather; B.V. Odgård 1985 for initial heath formation in the FBC.

[51] For grain imprints in pottery, see H. Rostholm 1986, p. 231. For pollen analyses from the Refshøjgård grave, see L. Klassen 2005a and 2005b. For the Hinnerup (J. Jeppesen 1995) and Gantrup graves, see S.Th. Andersen 1996, and on the possible siting on threshing grounds, see L. Klassen 2005b, p. 34-38. For traces of ard ploughing below Kikhøj, see B. Madsen 1987 and E. Hübner 2005 Kat. Nr. 547 and below the Gantrup grave, see O. Madsen 1990, p. 91. For traces of ard ploughing below SGC barrows in general see L. Klassen 2005a; E. Hübner 2005, p. 474-478. For the occurrence of quern-stones in the SGC, see L. Klassen 2005a.

Social structure

The most striking about the SGC, seen from a late FBC point of view, is the individual's re-establishment in the social universe. At funerals, the individual was put at the center with burial gifts that shows a society, where gender differentiation was a key issue. At first glance, it looks like a society with gender equality and without social stratification between individuals and families. However, it is hardly that simple. Firstly, in the first few centuries, contemporary with the FBC, very few women are present in the burials compared to men (1:17), though it becomes more balanced in the later part (1: 4), probably indicating a strong patriarchal community. Secondly, the picture of the early graves as simple coffin burials in a hole in the ground covered by a low mound is far from correct. On the contrary, additional constructions are often seen in the form of ring ditches with associated palisades that enclosed the burial area, and in some cases also mortuary houses above the tomb itself. Most of the latter were built in a larger circular pit in which the wooden coffin was centrally located, while others were built directly on the ground surface. An example of the latter is the Gantrup tomb from the study area that was surrounded by a ring ditch and a palisade as well. It is also worth noting that out of seven graves from the early part of the SGC excavated in recent times in the study area, six had ring ditches.[52)]

Ring ditches with palisades and especially mortuary houses above the graves increase the complexity of the burials. It was obviously not a quiet funeral in a wooden coffin under a low barrow in a corner of a field near the home. There has been a greater work effort associated with the funerals, and the mortuary houses suggest lengthy rituals. You could imagine that the size of the work effort and the scope of the rituals reflected status, but then you would also expect the grave gifts to be correspondingly more extravagant. However, this is not always the case. In the Gantrup tomb, there was admittedly both a battle-axe and two flint axes, but if we take another distinctive grave with a mortuary house - the circular grave from Sjørup between Hostebro and Viborg (fig. 15c) - then the only grave gift was a flint knife. [53)] Thus, it can be difficult to point to unambiguous status markings in connection with the graves of the SGC.

The borderland

Through a 200-year period from 2800 to 2600 BC, there was a dense and stable settlement structure in the study area with the FBC located along the coasts, especially at Horsens Fjord (fig. 7), and with the SGC located in the northwestern corner of the area (fig. 8).

[52] For the balance between male and female graves, see E. Hübner 2005, p. 632. For the Gantrup grave, see O. Madsen 1990 and T. Madsen 2019a, 160411-6A. For the six graves with a ring ditch from the study area, see T. Madsen 2019a, 160411-6A and 8A, 160515-17E, F, G and 160515-36F.
[53] E. Jørgensen 1981.

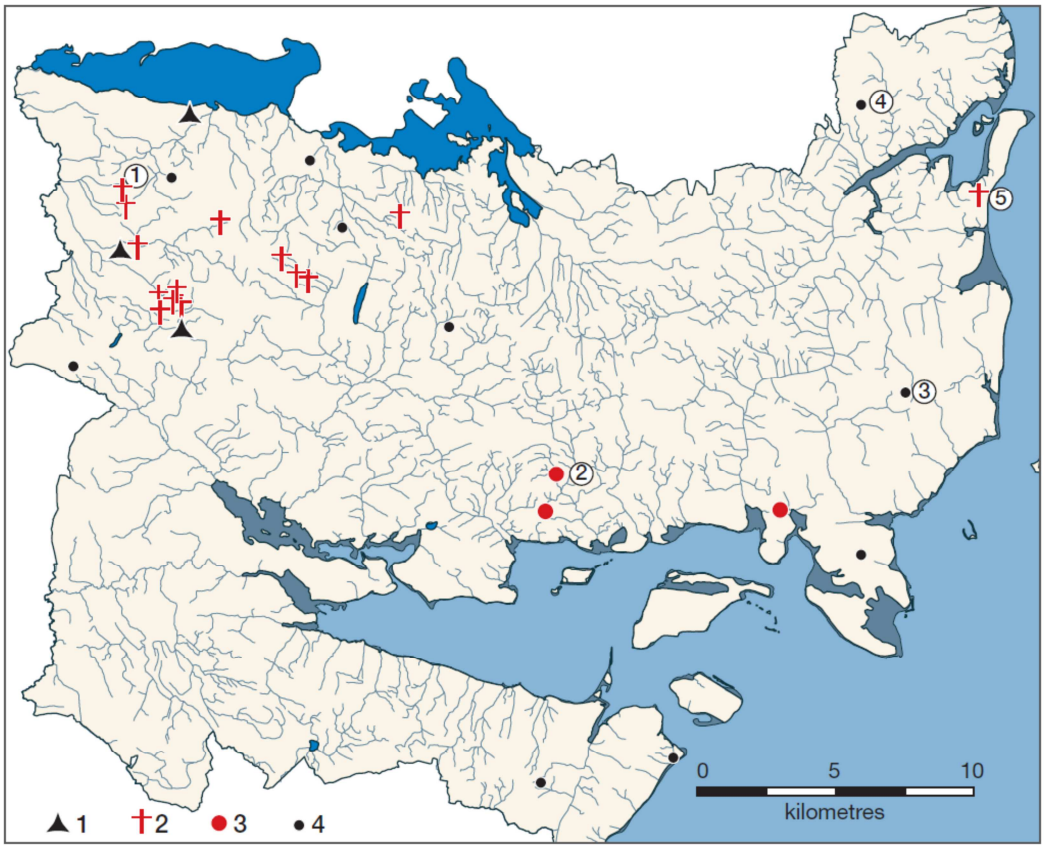

Fig. 8. The distribution of finds from the SGC in the study area dated to between 2800 and 2600 BC: 1, settlements; 2, graves; 3, depositions in freshwater environments; 5, stray finds of battle-axes. For numbered finds, see “The borderland” section.

The latter constituted the outermost outpost to the east of this culture (Fig. 2), while between the two cultures lay a mostly uninhabited area. The SGC did not repress and was not in potential conflict with the FBC in connection with the settlement. As shown above, the FBC moved towards the coast during the early Middle Neolithic, following a scattered settlement in the Early Neolithic, and in the St. Valby phase, we have no evidence that it was present inland to any significant degree.

We do not know anything about the relationship between the two cultures - peaceful or conflict-filled - but there is clear evidence that an active contact existed. In a SGC grave from Højvang, there are objects that originate from the FBC, and in the coastal area, we find objects that originate from the SGC. The grave from Højvang was a typical SGC grave (No. 1 in Fig. 8).[54)] The grave itself consisted of a slightly submerged wooden coffin surrounded by a supporting packing of stones followed by a circular, 5 m large enclosure of thin poles.

[54] A. H. Nielsen 1998, p. 178; E. Hübner 2005, p. 490-91; T. Madsen 2019a, 160411-8.

Immediately outside this, a 0.7 m deep circular ditch followed. In the grave were a battle-axe, two flint axes and a flint chisel (fig. 9). The battle-axe is of Hübner's type B4 (alternatively F3) (Fig. 9a), which places it in period 1b (or the beginning of 1c). One of the flint axes (Fig. 9d) is a thick-butted, thick bladed category B axe with polished cheeks and an oblique butt. The second flint axe is thick-butted, thin bladed with fully polished cheeks and sporadically ground lateral edges (Fig. 9c). The chisel (Fig. 9b), which has a square cross-section, is carefully hewn, but rough. The thick-butted, thick bladed axe is a typical specimen of the Brogård type from the late FBC, of which there are many in the coastal region, and both the elegant thin bladed axe with the thorough polishing and the carefully hewn chisel are typical of the FBC's flint technology as well.

From Refshøjgård northwest of Aarhus, there is also an example of a flint axe from the FBC in a SGC grave. It is a thick-butted, thick-bladed category A axe of St. Valby type placed in front of the face of the dead, where we usually find a battle-axe. The grave also contained a swayed A-beaker belonging to period 1, but the actual beaker is difficult to place more precisely.[55)] The thick-butted, thick-bladed flint axes of SGC type are technically of a considerably poorer quality than those from the FBC. The oldest of these axes are generally larger and better made than the later ones, however, and if you look closer at published axes, you can find more examples from early graves, that by all probability have a background in the FBC in the same way as the axes from Højvang and Refshøjgård.[56)]

In the coastal zone, conversely, we find objects that originate from the SGC. Three of these come from depositions in a freshwater environment. These are two fragments of Hübner's type F1 and G2 battle-axes and an amber disc with a central piercing (Fig. 10a; No. 2 in Fig. 8). Especially the latter is remarkable. It is of Hübner type 2B with a date to period 1c. It occurs primarily in male graves, predominantly at the waist,[57)] but here it occurs in a completely different context, common in the FBC, but not in the Jutland SGC. The other five finds from the coastal zone are all stray finds of battle-axes.[58)] Two of these are particularly conspicuous. They are both of Hübner type A3 with a dating to period 1a. Together with a stray found axe of the same type from inland to the northwest, they constitute the oldest dated finds from the SGC in the study area. The axe from Præstholm Mark (fig. 10b; no. 3 on the map fig. 8) is an exquisite and flawless specimen of the type. It was found during plowing and may originate from a grave, but there is no information either for or against this. The axe from Krekær (fig. 10c; no. 4 on the map fig. 8) was found by digging in a gravel bank.

[55] Refshøjgård was excavated and published by Lutz Klassen (2005b). The flint axe is a typical St. Valby type axe with a lateral edge angle of 9°, but there are minor secondary trimmings of the butt end, something you seldom see in a FBC context.

[56] See F. Højlund (1975) for the development of the SGC axes. Examples of flint axes of an evident FBC origin can be found in E. Hübner's catalogue (2005) Nr. 748 (s. 1112) – grave with D2 battle-axe (period 1b) and a thick-butted, thick bladed category B axe of Brogård/Falster-type; Nr. 763 (s. 1117-8) – grave with a B1 battle-axe (period 1b) and a thick-butted, thick bladed category B axe of Vedbæk type; Nr. 1025 (s. 1232) – grave with a G7 Battle-axe (period 2a) and a thick-butted middle-bladed fully polished flint axe (see also C.J. Becker 1973, p. 182, D5); Nr. 1479 (s. 1394-5) – grave with among other things a type B battle axe (period 1a-b), a fully polished thick-butted, thick bladed category B axe of Vedbæk type, a fully polished thick-butted, thin bladed flint axe, and a thick butted flint axe with a quadratic cross section polished on all four sides. From Hinnerup, not far from the above mentioned grave at Refshøjgård, comes a grave with a type A5c-beaker (period 1b) and a thick-butted, thin bladed flint axe knapped and polished in a way that points to the FBC (J. Jeppesen 1995).

[57] For the battle-axes, see T. Madsen 2019a, 150203-Amstrup A og 160508-33. For the amber disc, see T. Madsen 2019a, 160508-29 and for its date and use, see E. Hübner 2005, p. 618-19.

[58] T. Madsen 2019a, 150204-17-Præstholm mark (Hübner type A3); 160508-Krekær (Hübner type A3); 150205-32 (Glob type C); 170104-25 (Hübner type F); 170104-58 (Hübner type F1).

Fig. 9. Finds from an Early SGC grave at Højvang (no. 1 on fig. 8). Photo: T. Madsen. 1:2.

Fig. 10. A find from a bog (a) and two stray finds (b, c) of artefacts from the Early SGC in the coastal zone of the study area (nos. 2, 3 and 4 on fig. 8). Photo: T. Madsen. 1:2.

Possibly it can also originate from a grave, but there is no information here either that can disprove or confirm this. In contrast to the axe from Præstholm Mark, it is a battered, transformed specimen. Thus, one shoulder is removed by crushing leaving a weak cavity, while the other has presumably been rounded off and made smaller by grinding.

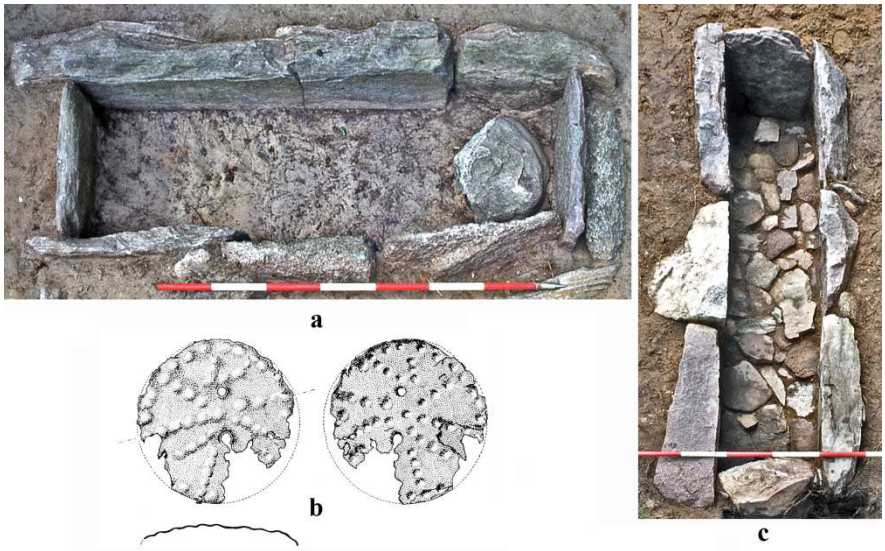

Fig. 11. Stone cists and a copper disc from Rude (no 5 on fig. 8). – a, c Photo: T. Madsen; b reproduced after K. Randsborg 1970. 1:2

The last find in the coastal zone is of a completely different nature (No. 5 in Fig. 8). This is the copper disc from Rude. The copper disc (Fig. 11b) was found in 1894 in a stone coffin (Fig. 11a) attached with a copper wire to the left wrist of an individual lying on his back with the head to the east, presumably resting on the stone seen in the coffin. A little further on, another coffin was found (Fig. 11c), in which also lay an individual, though without artefacts. In 1970, Klavs Randsborg published the copper disc, which he had found among Bronze Age objects at Moesgård Museum, and linked it to the copper finds from the early FBC. In 1976, I came across a couple of scheduled stone coffins in Saxild parish, which turned out to be those mentioned in the museum's protocol, and for the next few years I examined the coffins and the area around them. [59)] The two coffins are not of a type we would immediately expect from the Early Neolithic, but as they turned out to lie in a long barrow with an Early Neolithic façade at the eastern end, and as sections through the mound indicated that the coffins were primary in relation to this, the matter was clear: the copper disc had to be Early-Neolithic. The conclusion held, until C14 dates of bone remains from the coffin indicated a date between 3000 and 2600 BC.

[59] See K. Randsborg 1970 for the copper disc and T. Madsen 1980 for the stone cists.

The copper disc thus belonged to a secondary burial in an Early Neolithic stone coffin, or the stone coffin was a secondary addition to the monument.[60)]

With the new dating, a new background for the copper disc had to be sought. I pointed to a large copper disc from a deposition at Nieder-Kräning in Poland and in that context to amber discs from the Globular Amphora Culture (GAC), all decorated with radial, double dot rows in a cross. With reference to a disc from a grave at Hřivice in Bohemia, Klavs Randsborg suggested that the disc had a background in the corded ware groups. More recently, Lutz Klassen has pointed to corded ware groups from western Switzerland. The discs from the corded ware culture, with double piercings and a pattern of radial dot rows covering the surface, currently form the closest parallels to the disc from Rude.[61)]

But what about the coffins? Is it certain that they are Early Neolithic, or can they be contemporaneous with the copper disc? The recording at the excavation showed that they were contemporaneous with the surrounding mound, and they have also been considered "dolmen cist" - a transitional form between wooden and stone-built tombs in the Early Neolithic.[62)] A renovation of the barrow in connection with the cists is also a possibility, but we have no indications.

A culture disintegrates

For a period of up to 400 years between 3000 and 2600 BC the FBC in the study area appears as a stagnant culture that exclusively manifest itself through large settlements, high-quality flint axes and a simple, coarse pottery. If we look at the period in a wider South Scandinavian perspective, however, the picture is much more complex, characterized by large regional differences. With the simplification and dissolution of the basic cultural structuration during the Middle Neolithic FBC, the gates were opened for outside cultural influences. Initially, it was two very different cultures that exercised the influence - the GAC in northern Germany and Poland and the Pitted Ware Culture (PWC) in central Sweden. Secondly, the influences came from the corded ware groups in the same area as the GAC and from the Battle-axe Culture in Sweden.

To the east on Funen and Zealand with adjacent islands, the use of the megalithic tombs did not decrease to the same extent as in East Jutland. Throughout the Middle Neolithic, there were extensive burial activities in the chambers and at the same time, the simplification of the pottery took place more slowly.

[60] T. Madsen 1980, 99.
[61] K. Randsborg 1988; L. Klassen 2000, p. 203-06.
[62] P. Eriksen and N.H. Andersen 2014, p. 111-113.

On the isles of Lolland-Falster, the pottery became strongly influenced by the pottery of the GAC, while at the same time it was deposited in large quantities in the chambers of the megalithic tombs, in the same way as south of the Baltic Sea.[63)]

On the isle of Bornholm, the pottery largely remained decorated, which enables a separation of two chronological phases in the final part of the FBC. At the same time, extroverted ritual activities largely continued into the late FBC. This took place in connection with some circular wooden buildings that in some cases are found within palisade-encircled areas that must be seen as a continuation of the causewayed enclosures. [64)] The development in the late FBC in southern Sweden naturally has many similarities with the development on Bornholm - or perhaps rather the other way around - both with respect to the pottery and to the ritual activities in palisade-encircled areas. However, the conditions are complicated by the fact that the palisade enclosures in southern Sweden are linked to the early Battle-axe culture and not to the FBC as on Bornholm and on Zealand, where they also occur. In addition, there is a greater element of PWC elements, which are seen by some as absorbed and integrated into the FBC, and by others are perceived as the result of an independent presence of this culture. Up along the Swedish west and east coasts, however, the PWC appears in a more unambiguous independent form.[65)] In the eastern part of South Scandinavia, the relations between FBC, PWC and the Battle-axe culture as a whole seem to be quite fluid.

If you judge from the presence of tongued arrowheads and cylindrical blade cores alone, the PWC had a large distribution and influence in the South Scandinavian area at this time. [66)] However, we should be careful using the number of these types of objects to map the PWC as they like flint axes for instance are objects that typically are subject of extensive trade. There are many settlements along the shores of the Kattegat and into the Limfjord, however, with a regular influence from the PWC, and especially on Djursland, the situation is interesting. Here we find the same development through the MN FBC as elsewhere with larger settlements and an increasing simplification of the pottery, as for instance at the Fannerup settlement, where there also are a few examples of what allegedly are typical St. Valby pottery.[67)] As a whole, however, the final phase of the FBC is not present on Djursland. Instead, we find a culture that, as in southern Sweden, appears as a mixture of FBC and PWC. The spectrum of flint axes is the same as in the FBC and the clay vessels are flat-bottomed and not pointed-bottomed, as they typically are in the PWC. Furthermore, clay discs, decorated exactly as in the FBC, are an integral part of the pottery inventory, and although most of the decorations are typical of the PWC, others we would usually associate with the FBC.

[63] See K. Ebbesen 1975 for the finds in megalithic tombs on the isles and E. Nagel 1985 and J.P. Brozio 2016, p. 123 ff. for finds from the GAC in megalithic tombs south of the Baltic Sea.
[64] See F.O. Nielsen & P.O. Nielsen 1991, P.O. Nielsen & F.O. Nielsen 2014 and P.O. Nielsen et al 2014.
[65] See K. Brink 2009 for palisade enclosures and R. Edenmo et al 1997 for the relationship between the FBC and the PWC, and both for an in-depth discussion of the complicated cultural relationships in south Sweden.
[66] See R. Iversen 2010 for a detailed mapping of the PWC based on tanged arrowheads and cylindrical blade cores.
[67] P. Eriksen 1985, p. 21.

Similar to the FBC and PWC in Sweden, we find large settlement units. Kainsbakke is the key example here. The 15-hectare site surpasses in scope the contemporary late FBC settlements in most of the country, and at the same time, like many of these, it is located on a former causewayed enclosure. There were also depositions in recuts in the ditches, but they appear different from those at Bjerggård. While in the latter we find settlement debris with a few seashells reflecting old traditions, there are extensive ritual depositions at Kainsbakke that reflect a newfound ideology with rituals from PWC combined with older rituals from the FBC associated with causewayed enclosures. [68)] In Fuglsø Mose, a pollen diagram - as elsewhere in eastern Denmark - shows a "Landnam" with a birch maximum and a subsequent hazel maximum. Allegedly, the latter disappears already between 3000 and 2800 BC, which is earlier than in other diagrams, where it first happens towards 2600 (see note 30). However, the date of the diagram is based on an older series of a few C14 dates only, so we should probably not place too much emphasis on the temporal aspect. The bones from Kainsbakke show that domestic animals were the more important - primarily cattle - while game played a clear but far from dominant role. Grain growing has also played a role, but the findings do not allow ut to elaborate on this.[69)]

In northwestern Jutland south of the Limfjord, the FBC is richly represented, and through the Early Neolithic and Early Middle Neolithic, the same development is seen here as in the rest of Southern Scandinavia with ceramic depositions in front of the megalithic tombs that gradually stops during the MNA eventually to be covered with layers of stone. [70)] Contrary to other parts of southern Scandinavia, a new type of grave - the stone packing graves - replaces the use of the megalithic tombs. These that by default consist of a square "mortuary house" with one or more pairs of oval "graves" in front, are placed in long rows that follows the course of roads. When I use quotation marks, it is because the stone packing graves are now convincingly interpreted as wagon burials, where the draft oxen were placed in the paired "graves" and the wagon - at least symbolically - was placed in the "mortuary house". This interpretation has also led to the recognition of a contact between northwestern Jutland and the Elbe-Saale area of northern Central Germany, where ritual burials of cattle have been used in the GAC. The area is located south of the part of the GAC in Mecklenburg that had connections to southeastern Denmark, and where there were no cattle burials. It is therefore highly probable that the contacts and cultural influences were driven the direct route to the northwest and up through central Jutland.[71)] A significant group of battle-axes with neck ridges in Northwest Jutland constitutes a further confirmation of the contact with the GAC.

[68] L. Wincentz 2020; L. Klassen et al 2020.
[69] For the landnam in the diagram from Fuglsø bog, see B. Aaby 1985: Tabel 3 and fig. 5. For analyses of bone, see C.A. Makarewicz & S. Pleuger 2020 and for plant macrofossils, see M.H. Andreassen 2020.
[70] E. Jørgensen 1977a; A.B. Gebauer 1988.
[71] For stone packing graves, see K. Fabricius & C.J. Becker 1996 and N.N. Johannsen & S. Laursen 2010. Further, see the latter and N.N. Johannsen & M. Kieldsen 2014 for the interpretation as wagon burials and for references to cattle burials in the GAC.

A special type of battle-axe with a neck ridge and straight lateral edges towards the cutting edge is characteristic of this culture. It spread to southern Scandinavia, where its characteristic neck ridge was subsequently transferred to the battle-axes with swayed necks and cutting edges of the FBC. [72)]

The dates of most of the stone packing graves falls in the St. Valby phase, but there are also stone packing graves, which on the basis of pottery, primarily suspended vessels with a high cylindrical neck, must date earlier than this. [73)] The decorations are in late Ferslev style (MNA III/IV) and the vessels are probably from 3100 BC at the earliest. Phase 1a of the Jutland SGC has not been found in Northwest Jutland, but phase 1b is massively present (Figure 2). It provides an end date for the FBC to 2800 BC and thus presumably for the use of stone packing graves.

With regard to agriculture in Northwest Jutland, a pollen diagram from Skånsø between Skive and Struer, an area where the FBC was well represented, shows that the classic "landnam" is not present. The forest composition remains unchanged, but there are indications of a more open landscape and an increased occurrence of ribwort and pollen from barley show both grazing and grain cultivation. Further information comes from pollen in and below barrows reflecting agriculture in the immediate vicinity. At the end of the Early Neolithic, an alternation between scrubland dominated by birch and open areas is seen. There are indications of felling and burning of birch at the same time as ribwort shows a high grazing pressure on the open areas. At the beginning of the Middle Neolithic, a sharp increase in the open areas is seen parallel to a continued burning of forest. Open grasslands and now heaths dominate in the surroundings of the barrows, while the grazing pressure on the individual areas decreases – a development that peaks in connection with the barrows of the SGC. Unfortunately, we have no pollen analyses linked to the late FBC, but in contrast to eastern Denmark, the settlements from late FBC in the area are very small, indicating an extensive use of an open landscape.[74)]

In summary, we can state that at the transition from TN to MNA, there was a uniform culture in southern Scandinavia, structured ideologically around first causewayed enclosures and then increasingly megalithic tombs. During the MNA, there was a gradual dissolution of the ritually controlled structuring of society with an increased regional differentiation as a result, where people were locally influenced and inspired by cultural formations in other areas. This happened primarily in the periphery of the FBC cultural area in South Scandinavia, while the central parts were less affected. The study area in East Jutland is a good example of this. Here, in the last four centuries of the FBC, only marginal changes took place in the material culture and nothing, as far as can be seen so far, at the ideological and social level. Only around the economy there appeared to be an increased intensification of land use.

[72] K. Ebbesen 1975, p. 182-85; M. Zápotocký 1992, p. 120-143.
[73] K. Fabricius & C.J. Becker 1996, p. 272-73. O. Faber 1977, fig. 14.
[74] See B.V. Odgaard 1994 for pollen analyses from Solsø, S.Th. Andersen 1998 for pollen analyses from barrows and N.N. Johannsen et al 2016 for small settlements at the end of the FBC.

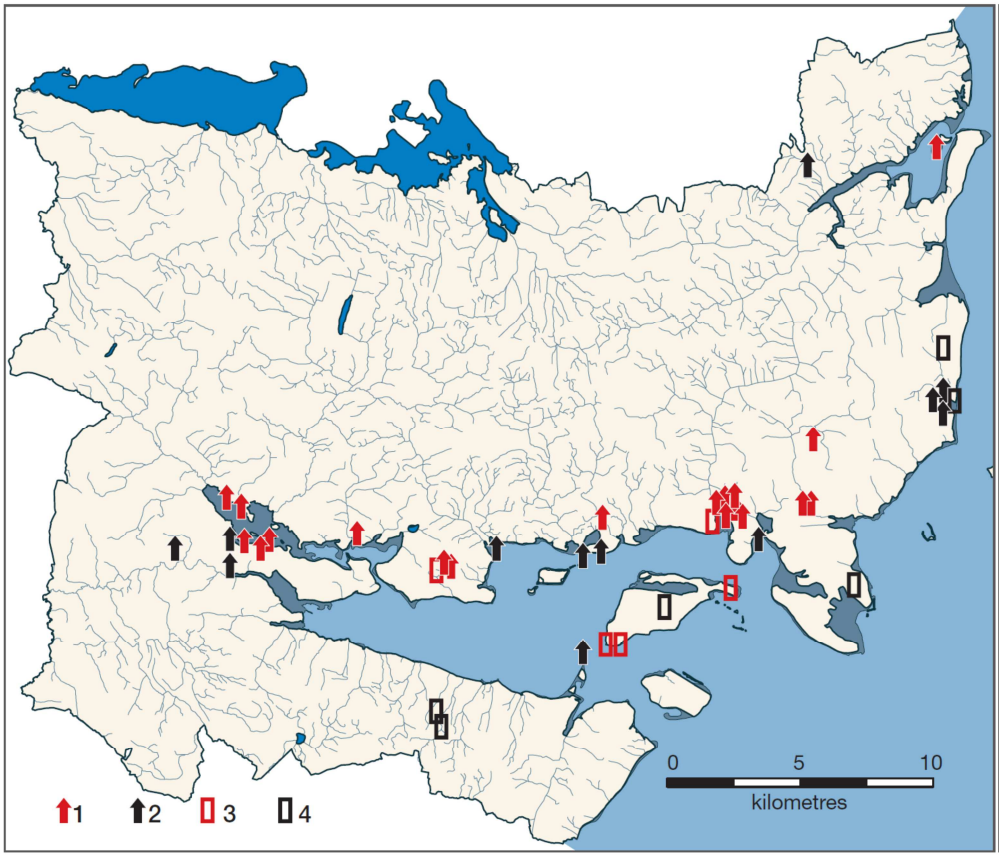

Fig. 12. The distribution of tanged arrowheads of types A and B and cylindrical blade cores from the study area: 1, tanged arrowheads from settlements; 2, stray finds of tanged arrowheads; 3, blade cores from settlements; 4, stray finds of blade cores.

This does not mean, however, that there was no connection to other cultures than the one with the early SGC when this emerged. Figure 12 show the distribution of type A and B tongued arrowheads and cylindrical blade cores in the study area. The 31 arrows and 11 cores show a clear contact with the PWC, but there are no indications that this culture exercised any influence otherwise. On the other hand, it is probable that there has been an extensive trade in flint from Djursland, where regular production sites are known for both axes and cylindrical blade cores.[75)]

[75] U. Rasmussen 2020.

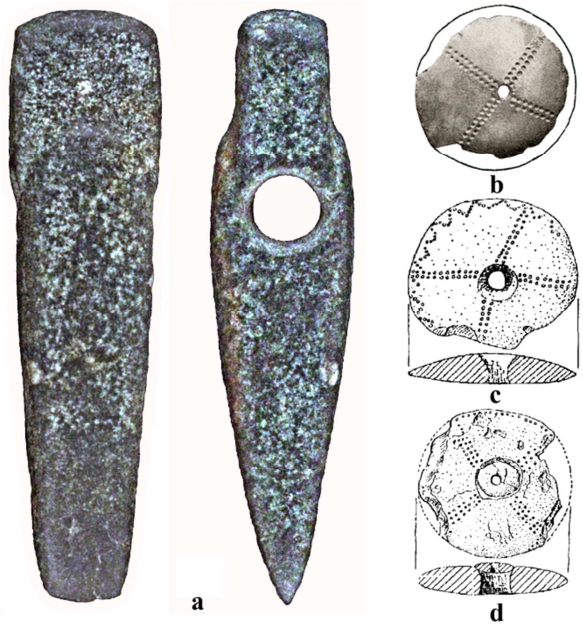

Fig. 13. Battle-axe (a) and amber disc (b) from the GAC found in the study area and amber discs (c, d) from the GAC in Poland. – a: Photo: T. Madsen; b: reproduced after P.V. Glob 1952, no. 405; c, d: reproduced after A: Pollex 1999, fig. 4. 1:2.

Traces of contacts with the GAC are also present. A battle-axe with a neck ridge and straight lateral edges comes from the north side of Horsens Fjord at its mouth into the Kattegat, where it was laid down in shallow water (fig. 13a). The type of axe, which as mentioned above is typical of the GAC, had remains of the shaft preserved. A C14 analysis indicates a dating to between 2870 and 2470 BC. The sides of the neck ridge are secondarily removed, which has changed its original appearance significantly. Another object from the study area that is particularly characteristic of the GAC is a centrally pierced amber disc decorated with four radial double rows of small pits placed in a cross (Fig. 13b). The disc originates from "the Horsens area" without further find information. It is so close to the amber discs from the GAC (Figs. 13c-d) that it is in all probability a direct import.

A new culture emerges

As mentioned in the introduction, P. V. Glob's interpretation of the origins of the SGC – as carried by an immigrant axe-wielding, nomadic people from the East – has been eagerly debated in the years that followed. Increasingly, however, it was suggested that the Jutland SGC had arisen in Jutland under external influence, or if it had come from the south, then its further spread had happened through a cultural process involving the FBC.[77)]

[76] For the battle-axe from Horsens Fjord, see T. Madsen 2019a: 150206-17. The C14-date is 4085±45 BC (AAR-5735). The disc from Horsens was published by P.V. Glob 1952, No. 405. See also L. Klassen 1999, fig. 6.

[77] The new trends in the interpretations can be seen in for instance K. Ebbesen 1982; K. Ebbesen 1997; K. Ebbesen 2005; H. Rostholm 1982; J. Skaarup 1985; C. Damm 1991; E. Hübner 2005. The latter provides a comprehensive, multifaceted and balanced discussion (p. 694-719).

Some, however, have maintained Glob's interpretation fully, most recently citing DNA studies documenting an invasion from Eastern Europe into Central Europe by people associated with the Yamnaya culture on the steppes north of the Black Sea and the Caspian Sea. [78)] Recent studies, however, show that there is a marked decrease in the Yamnaya genes among the corded ware groups from east to west and into southern Central Germany. There are no analyzes to the north and northwest in the direction of Denmark and the Netherlands, but although it is highly probable that Yamnaya genes will also be present here, this does not automatically mean a massive migration of people. A number of articles have recently appeared that warn of a prevalent uncritical use of DNA data.[79)]

In parallel with the ideas that the Jutland SGC was based on immigration of ethnic groups from the east, its starting point was archaeologically described as a supra-regional unit - "a common European horizon" or the A-horizon. The supporting elements in this were battle-axes, corded ware beakers and amphorae of A-type as well as tombs below barrows with gender-segregated individual burials in a crouched position. The definition of this horizon was based on Glob's work and transferred from this to the rest of Europe, where similar elements were found, but without significant contextual information. As the widespread corded-ware groups in Europe became better investigated, it turned more and more unlikely that an oldest common European horizon existed. The various elements occur in several places, but they are included individually in local contexts that deviate from what we see in the Jutland SGC. What is perhaps more surprising is that E. Hübner's study of the Jutland SGC shows that the common European horizon did not exist on the Jutland peninsula either. In the oldest phase 1a, we find the more “developed” local types of battle-axes (A2-3, and B1-3) and not the simpler pan-European A1 type that first appears in phase 1b.[80)]

There can be no doubt that strong external cultural influences, promoted through migration, formed a significant part of the basis for the creation of the Jutland SGC. The existing population in the Central Jutland area, which among other things is documented through settlements from late FBC below early SGC barrows, lived at the same main thoroughfare along the central ridge in Jutland that connected the FBC in northwestern Jutland with the GAC in the southeast and resulted in the innovative wagon burials. The contacts and influences through this corridor were accessible to everyone who lived along it, but the result in central Jutland was not the same as to the northwest. It became significantly more radical, concentrating on social norms and of course also religious thoughts. The individual was placed in the center, where in the traditional FBC it was focused on the kin and ancestors.

[78] K. Kristiansen 1991 and K. Kristiansen et al 2017.
[79] A. Juras et al 2018. Of papers warning of an uncritical use of DNA data see for instance V. Heyd 2017; N.N. Johannsen et al 2017, M. Furholt 2018.
[80] E. Hübner 2005. For a very clear description, see M. Furholt 2014.

At the same time, the difference between men and women was institutionalized through gender-differentiated rites and norm-conditioned personal possessions, as we learn through the burials.

How did the earliest SGC show up, and what background can we attribute to its various elements? As an example, we can take an early grave from Fasterkjær in West Jutland not far from Skjern. [81)] The tomb itself was a plank coffin where the side planks continued beyond the end pieces. In the tomb, there were traces of the deceased man lying on his right side in a crouched position with his head to the southwest. In front of the face lay a type A3 battle-axe, and close by a thick-butted flint axe. At the hip were two amber discs and close by a flint blade.

The A3 battle-axe (fig. 14c) belongs, as demonstrated by E. Hübner, to one of the earliest types in Jutland's SGC. These types are few in number and occur primarily in Jutland and Schleswig-Holstein, but it is uncertain where they were produced. In the central and western parts of the Jutland peninsula, it was certainly not, because here the stone used do not exist, and in addition, their execution testifies to a highly specialized production. E. Hübner considers them copies of copper axes from Central Europe, making the place of production even more uncertain.

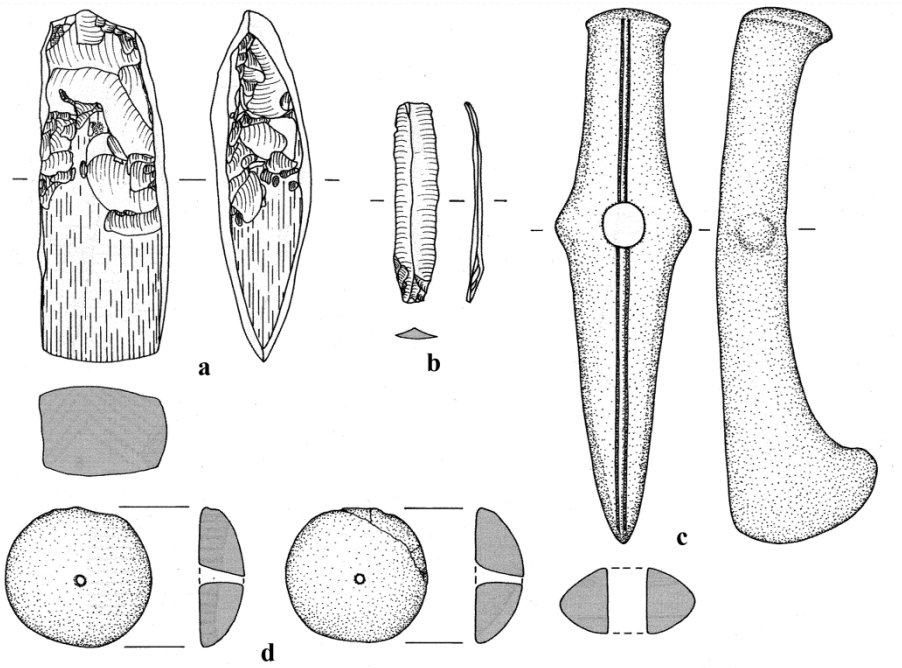

Fig. 14. The content of an early SGC grave a Fasterkjær in western Jutland. – reproduced after E. Hübner 2005, tafel 154. 1:3.

[81] E. Hübner 2005, Kat Nr. 904 and Tafel 154.

This raises the question, whether battle-axes like these were a basic element in the establishment of the Jutland SGC at all. In this connection, it is significant that two of the three A3 battle-axes we have from the study area are located in the FBC area, which testifies that they have been merchandise. It is also worth noting that the man could have a flint axe placed in front of his face in the grave on equal terms with the battle-axes. The symbolism has obviously been the same. [82)]

The butt of the thick-butted flint axe in the grave is very clumsily reshaped presumably to fit it into a haft, but the original axe, fully polished on both the cheeks and lateral edges, is carefully fabricated with almost parallel lateral edges and with a slightly concave-convex course (Fig. 14a). It must stem from the FBC in the east or to the north. The thin, straight flint blade with parallel edges may not seem like much, but in addition to the fact that it requires artisanship to make it, it also requires flint of a quality that is not found in the West Jutland area (fig. 14b). This type of blade is quite common in the early SGC graves, and as a minimum, the flint must have been imported. It is more likely, however, that finished blades were imported from North Jutland or the eastern parts of Denmark. The two amber discs with central piercing are typically inventory in early graves in the Jutland SGC, where they apparently form a local tradition (Fig. 14d). They are generally located in the waist area, and often they appear, as in this case, in pairs. They are therefore considered to form end-dots on a belt around the waist. It is, of course, tempting to compare them with the amber discs from the GAC, but this is uncertain. Partly, they are always undecorated, and partly, the earliest specimens are often very thick with a strongly convex upper side. In addition, the lower side may be concavely shaped.[83)]

The Fasterkjær grave itself was, as mentioned, a plank coffin with sides that continued beyond the ends. This is a construction common to many of the early wooden coffins in the SGC (Fig. 15c, d). The planks are usually quite thin, split from larger trunks, and often they are partially charred presumably to increase durability. Sometimes the sides and ends cross each other, showing that the planks must have been cut together, other times the sides just abuts the end pieces often held in place by stones on the outside. At first glance, there are no parallels to this type of wooden coffin, but in the Elbe-Saale area, coffins built of thin stone slabs were used, with the sides also overlapping the end pieces (Figs. 15a, b). The use of this coffin type was widespread in the GAC and reached its greatest popularity in the corded ware groups.

[82] For the position of flint axes, see E. Hübner 2005, p. 608 ff. A good example comes from L. Klassen 2005b. For the origin of the early battle-axes, see E. Hübner 2005, p. 699-700.
[83] For details concerning the amber discs, see E. Hübner 2005, p. 377 ff.

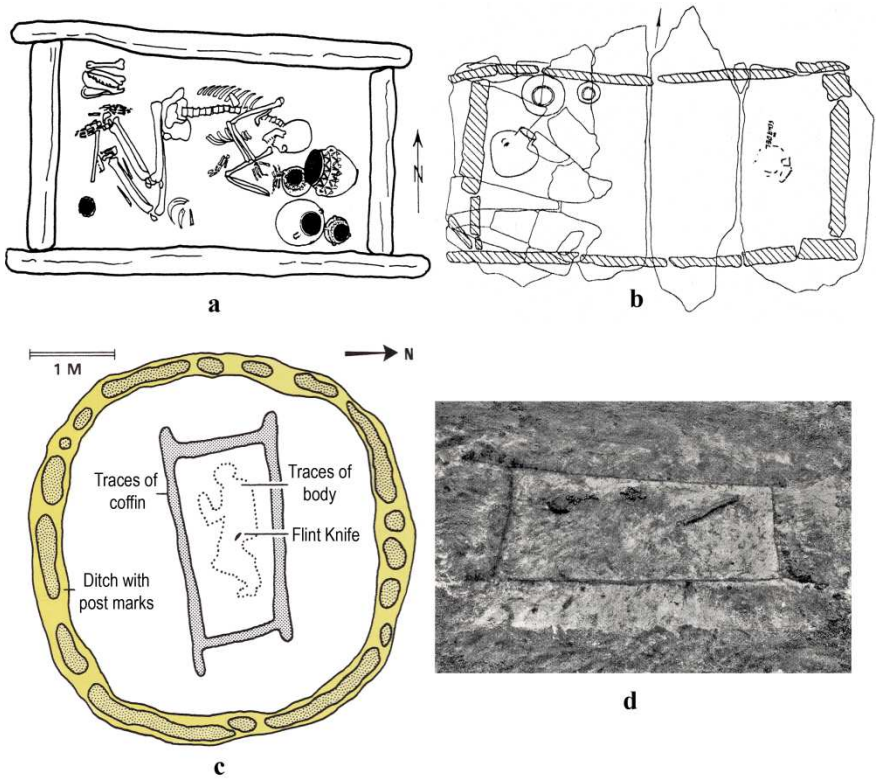

Fig. 15. Cists made with stone slabs from the GAC (a) and the Corded Ware culture (b) in the Elbe-Saale area. Circle grave with a coffin of wooden planks at Sjørup (c) and a coffin of wooden planks at Hastrup (d). – a reproduced after H.J. Beier 1988, abb. 4.9; b reproduced after U. Fischer 1956, tafel 35; c reproduced after E. Jørgensen 1981; d reproduced after P.V. Glob 1944, fig. 97.

Also to the east, into Poland, this form of burial was used. The examples shown in Figure 15 are from the GAC (a) and the corded ware culture (b), respectively, both with burials in a crouched position. [84)] In the West and Central Jutland area, stone slabs that can be used to build such coffins are not present, and we are probably faced with a creative copying and transformation of a grave form in stone into a grave form in wood.

The grave from Fasterkjær is not an average grave, but it reflects the essence of the early SGC. The artefact material, composed of predominantly imported objects, constitutes the framework for a completely new ideological and social structure with a background to the south.

[84] For the wooden coffins, see E. Hübner 2005, p. 500 ff. For the stone cists in the Elbe-Saale area, see U. Fischer 1956, p. 109 ff. and H.-J. Beier 1988, p. 49 ff.

In principle, it is the same type of development found in other areas with late FBC, where the dissolution resulted in cultural innovation. In contrast to what happened on Djursland and in Northwest Jutland, however, the shift to the SGC in central and western parts of Jutland and Schleswig-Holstein was sustainable, and it ultimately led to a radical cultural change in the entire area of the FBC.

The SGC in East Jutland between 2600 and 2250 BC

Around 2600 BC the FBC ceased to exist in the study area. Instead, it was replaced by the SGC, but contrary to what one might expect, it is the coastal parts and not the inner parts of the study area that dominate the distribution pattern (Fig. 16). Almost everything that is recorded of settlements, over half of the graves, all depositions and almost all thick-butted, hollow-ground flint axes of the Horneby type, are found here. Of what is shown in Figure 16, only the thick-butted flint axes of SGC type are more evenly distributed, and they can only be dated to the SGC in its entirety. When they are included, it is because for the coastal area it is a reasonable assumption that they are not from before 2600 BC.

Fourteen potential settlements have been recorded – potential, because it is very difficult to prove that they were actually settlements. The most evident is the shell midden from Kalvø in Norsminde Fjord with pottery, tongued arrowheads of the type D and fragments of EGK battle-axes. Not far from there, at Saxild, a small flat pit has been found with a shard that can be dated to the SGC. Of ten sites by Horsens Fjord, four of them are from the FBC, where minor occurrences of SGC pottery and in one case a tongued arrowhead of type D indicate settling from the SGC. The other six sites are surface collections dated by type D tongued arrowheads, and in addition in one case pottery, in another a battle-axe and in a third a tongued wedge. Inland, two settlements have been recorded. One is represented by pottery in and below barrow fill, while the other is a regular pit with pottery. [85)]

Of the 33 graves recorded, 19 are from the coastal zone, and of these, five are secondary burials in megalithic tombs, while the other 14, like the 14 graves inland, are “traditional” wooden coffin burials in barrows. In addition, five freshwater depositions with 9 objects and 11 deposition areas in saltwater with 25 objects in total have been recorded. The 34 objects from the depositions include of 16 battle-axes, seven tongued wedges, six thick-butted, hollow-ground flint axes of Horneby type and five thick-butted flint axes of SGC type.

The new grave forms, the battle-axes and the pottery, which are all part of the definition of the SGC, clearly show the breakthrough in relation to the FBC, but the most significant break clearly occurs in connection with the nature of the settlements.

[85] For Kalvø, see S.H. Andersen 1982; 1983. In the catalogue (T. Madsen 2019a) the settlements have the following numbers: Kalvø – 150212-13D; The pit at Saxild – 150212-32A; Excavated FBC sites at Horsens Fjord – 150203-2L, 160306-17U, 160306-47A, 160512-1J; Surface collections at Horsens Fjord – 150201-2E, 150207-28A, 160303-9A, 160502-6A, 160508-15A, 160508-24A; Inland sites – 160503-3B, 160503-9B. At Egehoved on the isle of Alrø (150201-2B) a rim shard decorated with twisted cord is possibly from the SGC, but it may also be from the EN.

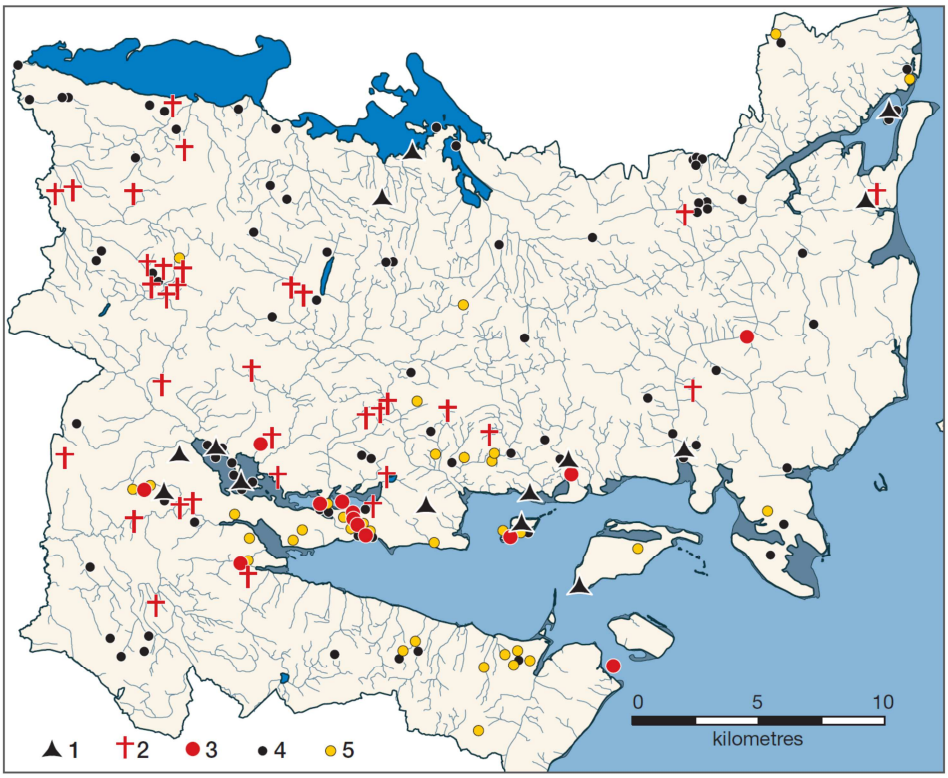

Fig. 16. The distribution of finds from the SGC in study area dated to between 2600 and 2250 BC: 1, settlements; 2, graves; 3, depositions in freshwater and marine environments; 4, thick-butted flint axes of SGC type; 5, thick-butted hollow-ground flint axes of Horneby type.

We find a shift from very large settlements that were continuously inhabited for centuries, to small settlements that we can barely isolate in the archaeological record. We find a transition from groups of hundreds of people who lived permanently together on a single site, to groups of presumably family size, who frequently changed residence and who hardly left any traces. The SGC meant a radical change in the social structure, but at the same time, a change in agriculture also occurred. The intensive exploitation of forest meadows in connection with the large permanent settlements ceased. Instead, it was replaced by a system of open permanent field systems spread across the landscape.

In the pollen diagram from Dallund Lake on North Funen, we can see that the high level of hazel that was a result of forest meadow system stops at this time, though it was not immediately followed by indicators of open areas.

However, this only means that open fields were not present in direct proximity to the lake. Even if they were only a short distance from the lake then, surrounded by forest, the pollen they produced would be filtered by the forest and not leave significant traces in the diagrams. From the study area in East Jutland, however, we have a clear indication of the formation of open field systems. Here, in a core from Norsminde Fjord taken at the mouth of Rævs River, a strong growth in the sediments from around 2700 BC and onwards of organic and mineral substances as well as carbon has been noted. It can only be the result of clearing and increased erosion on the areas along the river and its tributaries.[86)]

In the pollen diagrams from Central and West Jutland, we saw that from late FBC and further into the SGC, extensive grasslands combined with heathland areas suitable for winter grazing formed. This, together with a lack of evidence for systematic grain cultivation, we may see as an indication of cattle breeding playing an all-dominating role in agriculture in these areas. With the spread of the SGC to landscapes with different types of soil, more suitable for grain cultivation, it is not very likely, however, that cattle breeding should continue to be the dominant factor. In contrast to the early part of the SGC, we have several finds of macrofossils of grain from outside the heathland areas in Jutland, dating to the late part of the SGC. Figure 5, shows that they fit well into the overall development with a continued decline in the cultivation of wheat and an increase in the cultivation of especially naked barley. Unfortunately, we do not have similar information about the composition of the animal species, beyond what we find at the shell midden at Kalvø, and no information at all about the balance between grain growing and animal husbandry.

From FBC to EGC

How then did the shift from the FBC to the SGC take place? From a material point of view it was an either or, of course, conditioned by our formal definitions of the two cultures, but from a behavioral point of view, was it then also an either or? Did the shift happen from one day to the next, or did it happen gradually and perhaps not even contemporary in different local areas? I will start with those FBC settlements, either positioned in direct contact with the coast or short distances from the coast, that show traces of habitation in the SGC.

[86] For Dallund Lake, see P. Rasmussen 2005 and for the core from Norsminde Fjord J.P. Lewis 2011.

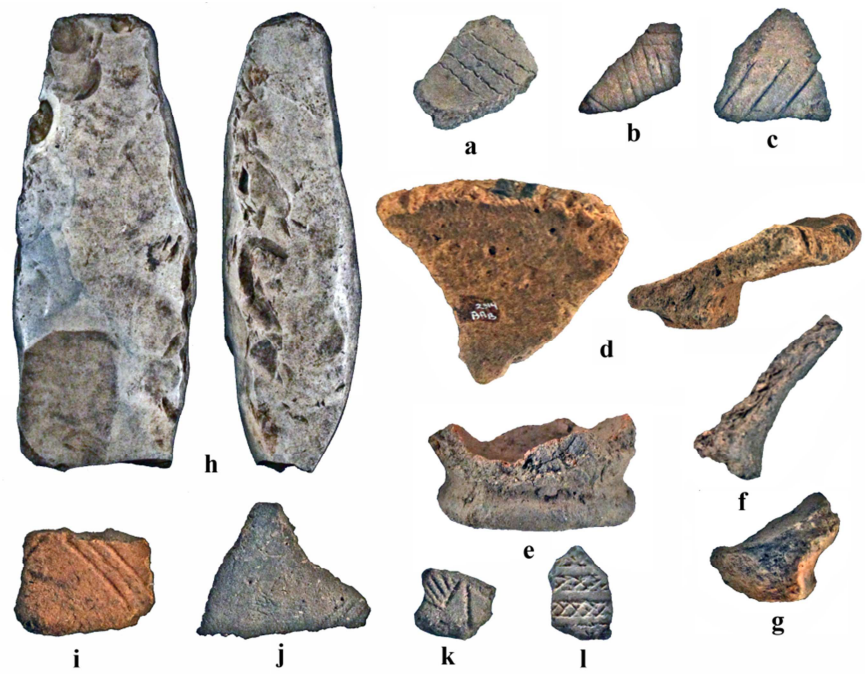

Fig. 17. SGC and FBC pottery from Bjerggård (a-g), and a thick-butted flint axe of SGC type and SGC pottery from Aalstrup (h-l). Photo: T. Madsen. 1:2.

At the settlement Provstlund near Lund west of Horsens, a tongued arrowhead of type D and two fragments of SGC pottery were found close to each other and close to the traces of a small two-nave house situated in a widespread cultural deposit from MN FBC. The house could not be dated closer than to MNA II at the earliest based on shards in the fill of the postholes, however. From a deposit at the very top of ditch A5 of the causewayed enclosure at Bjerggård come a tongued arrowhead of type D and three sherds with a sandy grid and decorations that clearly show that they originate in the SGC (fig. 17, a-c). They were found in connection with a layer of settlement debris from the last part of the FBC deposited at the top of the ditch, but lay so high that they probably did not belong to this. Included in the layer of debris, on the other hand, were bottom shards from vessels with a protruding foot (Fig. 17, d-g). Based on the grid, these definitely belong to the late FBC, but the protruding foot is an element that must have been added through outside influence. It is obvious here to think of the SGC, but it may also be from the GAC. At the Aalstrup settlement, a 2x4 m large and up to 15 cm thick layer of gray-black sand was found, containing large amounts of fire cracked stones covering a deeper lying cultural layer from MN FBC. In connection with the stone layer, a category B axe of SGC type and four shards with a sandy grid originating from the SGC emerged (Fig. 17, h-l).

The axe and one of the sherds (Fig. 17, k) lay immediately below the layer of stones, while two of the sherds (Fig. 17, i, 1) lay above it. The layer of fire-cracked stones thus with certainty dates to the SGC, and must reflect a regular settlement on the site.[87)]

On the isle of Kalvø in Norsminde Fjord, a shell midden used during the SGC was located on top of a larger settlement from the latest part of the FBC. "The excavations showed that on the island's flat top and northeast slope there was a cultural layer with artefacts that predominantly originated from the St. Valby phase (MN V), but also scattered finds from the middle SGC, Late Neolithic and pre-Roman Iron Age. (…) At the foot of the islet, the cultural layer was overlain by a small and well-defined shell midden with artefacts belonging to the SGC. (…) The shell midden rested directly on top of a sandy, black-colored cultural layer with remains (animal bones, flint and ceramics) from the FBC St. Valby phase MN V."[88)] From the shell midden, which measured 8x8 m and was 40 cm thick, there are fragments from SGC pottery, tongued arrowheads of type D and fragments of battle-axes that can be dated to periods 2 and 3 of the SGC. In addition, a thick-butted hollow ground flint axe of the Kregme type and two C14 dates of oyster shells show that the shell midden continues into the Late Neolithic. The shell midden was thus deposited over a longer period and given the limited size, it must reflect an occasional utilization of the site. The important thing here is that it constitutes a direct continuation of a larger settlement on the site from the latest FBC. Preserved bones from the deposits show a clear dominance of cattle, pigs and sheep. To this come bones that reflects hunting and fishing on the site. Red deer, seal, swan and cod are here the most important species. Apart from the fact that it must have been the hunting and fishing that conditioned the recurring visits to the site, the prolonged use makes it difficult to evaluate the bone composition. In connection with domestic animals, however, we may note that cattle, pigs and sheep/goats occur in roughly the same proportions as we see in the late FBC (Fig. 6).[89)]

At Lindskov Knude, which in the Stone Age was an island in Horsens inner fjord (Nørrestrand) containing a larger settlement from the late FBC, a thick-butted B-axe of the SGC type was found in a thin cultural layer covering a pit. In neither the pit nor the cultural layer, there was any additional datable material. At Horsens Golf Course, also at the inner fjord, a thick-butted category B flint axe of SGC type and shards from a swayed and a straight-walled beaker have been collected from the surface. At the site, which formed an island in the Stone Age, there has also been extensive settlement activity during the FBC.

[87] For finds from the SGC at Provstlund, Bjerggård and Aalstrup, see T. Madsen 2019a, 160306-47, 160512-1, I-J and 150203-2 L.

[88] Cited after S.H. Andersen 1982, p. 94-95.

[89] For the description of find circumstances and artefacts from Kalvø, see S.H. Andersen 1982; 1983, K. Davidsen 1978 and T. Madsen 2019a, 150212-13. For the animal bones from Kalvø, see P. Rowley-Conwy 1985b. The two C14-dates are 3850 ±65 BP (K-2508) and 3510 ±55 BP (K-2507).

At the southern tip of the Isle of Alrø, was also a large settlement from the end of the FBC. Here, surface collections show that the site was inhabited in both the SGC and the Late Neolithic as well.[90)]

North of the study area, at Gåsemosen immediately west of the town of Aarhus, we find a close parallel to Kalvø. It was a settlement from the end of the FBC placed on the coast of what in the Stone Age was a fjord. Directly on top of deposits from the St. Valby phase followed pottery from the SGC. Preserved bones show the same mixture of domestic animals, game and fish as at Kalvø, apparently with a special emphasis on eel fishing. The bones originate from both the FBC and SGC layers on the settlement, but there seems to be an increased emphasis on hunting and fishing in the layer with finds from the SGC.[91)]

Thus, on both inland sites and coastal sites from the FBC, there is a continued settlement in the SGC, but there seem to be significant differences between the two types of sites. Inland, the settlements appear to be very sporadic and random, considering the extent of the excavations. The settlements here cannot be seen as a continuation of the previous FBC settlements, but are rather parts of the new labile agricultural system. In the coastal settlements, on the other hand, we see, as shown at Kalvø and Gåsemosen, a direct continuity in settlement and economy linked to hunting and fishing in a restricted biotope.

From other types of sources, we also find clear evidence of continuity. This is not least the case with wetland depositions. In the FBC, these constituted a very central aspect of the ritual sphere, and for the study area, it was dominated by depositions in saltwater. In the SGC, these depositions continued with undiminished strength, and both Stensballe Sound and Horsens Nørrestrand continued to be the focal points for the depositions. Figure 18 shows two battle-axes that have been embedded in organic sludge and a thick-butted, hollow ground flint axe of the Horneby type that comes from a layer of shells. All three are from Stensballe Sound, and they clearly demonstrate the high quality of the deposited items. Another point that testifies to continuity is burials located in megalithic tombs. Unlike on the Danish Isles, however, it is limited how widespread this custom was. In the coastal zone, there are five out of 19 graves, and in connection with one of those originating from a recent excavation, it was shown that the burial took place in a wooden coffin inside the chamber.[92)]

In connection with the distribution pattern of flint axes, there are also things that point back to the FBC. The thick-butted SGC axes, fabricated through rough chopping and partial crushing, are found throughout the study area, while the thick-butted hollow-ground axes of Horneby-type with a perfect manufacturing technology occur almost exclusively in the coastal area, and even limited to parts thereof (Fig. 16).

[90] For Lindskov Knude, Horsnes Golfbane and Egehoved, see T. Madsen 2019a: 160303-2, 160303-9 and 150201-2.
[91] U. Rasmussen 2016.
[92] T. Madsen 2019a,160509-9B; For secondary burials in megalithic tombs on the Danish isles, see R. Iversen 2016.

Fig. 18. Battle-axes and a thick-butted hollow-ground flint axe of Horneby type from Stensballe Sund near Horsens. Photo: T. Madsen. 1:2

While the thick-butted flint axes of SGC type clearly were produced locally, the Horneby axes were definitely imported. This raises a question concerning the B-axes of the Vedbæk and Brogård type. Both, with a similar perfect manufacturing technology, dominated at the end of the FBC. The assumption is that they disappeared with the FBC, but we really do not know, because lack of secure settlement contexts makes it impossible to prove. It is possible that even after 2600 BC, an import of B-axes of the Vedbæk and Brogård type took place together with the Horneby axes, but that the spread of these as for the latter was limited. In the FBC, the axes, whether imported into the study area or produced locally, were efficiently spread through exchange and trade within the established social networks. With the shift to the SGC, the social structure broke up, and although exchange connections continued to some areas along the coast, people were largely relegated to make their own axes. If you look at the distribution of the Horneby axes, they are concentrated around Horsens in the very area where the FBC was most strongly founded. It was a center for exchange connections in the FBC and continued to be so in the SGC.

It is also possible that the FBC lasted longer here than further north in the study area. Thus, two of the battle-axe fragments from Kalvø have form elements that point to types dated no later than period 1c, and in addition, there is the date around 2700 BC from the core at the mouth of Rævs River with an indication of a change in land use.

The investigations show that the FBC in the study area was replaced by an occurrence of a regular SGC, but with features that had been inherited from the FBC. The shift was conditioned by a radical change in the structure of agriculture coupled with a new ideology and social structure in society. If you look to other areas in Central and Eastern Denmark, a similar trend is seen, but obviously with large variations. Thus, one cannot just transfer the results from East Jutland to other areas. It is necessary to analyze the areas individually based on local data, as has previously been done on Langeland, with a result that in some, but not all parts, is reminiscent to those obtained in East Jutland.[93)]

Towards a new era

While the transition from the FBC to the SGC was abrupt, the same was not the case with the transition from SGC to the Late Neolithic. Very simplified, it was just a matter of the men becoming equipped with flint daggers in the graves instead of battle-axes. The two artefact categories that form the backbone of the chronological division of the SGC and the Late Neolithic, respectively, also constituted the central male symbols, and as such they were mutually exclusive in the finds contexts, first of all the graves. The result is that the last phase of the SGC (period 3b) is largely simultaneous with the earliest part of the Late Neolithic. If we follow the adopted typo-chronological dating system, the result is therefore paradoxically that the SGC ended around 2250 BC, while the Late Neolithic began around 2350 BC. [94)] Formally, the transition from the Middle Neolithic to the Late Neolithic must be placed at 2350 BC of course.

The continuity is reflected among other things in the part of the pottery that was stylistically characterized by the same influences from the bell-beaker culture that led to the shift from battle-axes to daggers. However, as the pottery predominantly occurs in the rapidly growing number of recorded settlements from the beginning of the Late Neolithic, and increasingly disappears from the tombs towards the end of the SGC, it is difficult to use it for a detailed elucidation of the transition. Furthermore, the bell-beaker inspired pottery occurs mainly in northern Jutland, while in other areas it is sparse or completely absent. It is therefore ill suited for chronological studies.

[93] J. Skaarup 1985, p. 379-386. For an overview of the situation east of the Great Belt, see R. Iversen 2015

[94] E. Hübner 2005, p. 666; R. Iversen 2015, p. 29.

For the study area, this means that the early Late Neolithic material is clearly distinct from the late SGC material, although we do not really know to what extent there may be concurrency between parts of the material from the two phases. Figure 19 shows the distribution of settlements, graves and burials that can be dated to LN I, as well as stray finds of daggers of type I-III and thick-butted flint axes with a V-shaped longitudinal section. The latter belongs predominantly to the early part of the Late Neolithic, but may also be later. Twenty-four settlements, 15 graves and 8 depositions have been recorded - four from freshwater and four from saltwater. Of the graves, six are from chambers in megalithic tombs and three are from wooden coffins in mounds, while the type of grave for the remaining six is unknown. From their location, however, it is overwhelmingly probable that they are all from wooden coffins in barrows. Twelve of the 24 settlements are adjacent to or in the immediate vicinity of the coast, and three of them are associated with shell deposits. The other 12 are at varying distances from the coast. If we look at the general spread, it is very reminiscent of the one that prevailed in the late SGC (fig. 16) with a massive concentration around Horsens Fjord and a smaller but clear grouping to the northwest in the study area. To the northeast in the study area, there are remarkably few finds, a trend that continues into SN II. The cause of this is not clear.

A significant difference between late SGC and LN I is the extent and character of the settlements that are now well documented through both surface collections and excavations. There are seven excavated sites, at five of which houses have been recorded, six in all, based on postholes and in two cases sunken floors. In addition, settlement pits have been found on four of the sites. All the excavated houses originate from two areas with extensive, systematic excavations covering larger areas - one west of Horsens and the other at Østbirk in the northwestern part of the study area. In both, the LN I houses together with houses from LN II and the earliest Bronze Age form a larger built-up area. It is not regular villages, however, but rather areas with scattered longhouses and in some cases associated outbuildings, where each house was used for a limited period before it was abandoned and residence was moved to another nearby location. We thus get an impression of a system of individual farmsteads with adjacent agricultural areas.[95)]

Along the coast, there are settlements of a distinctly different character. This naturally applies primarily to those with shell deposits, where the shell midden on Kalvø is a good example of a direct continuation of coastal sites for hunting and fishing. However, there are also other types of settlements along the coast. This for instance applies to a settlement on Vorsø, a small island in Horsens Fjord. Here, in addition to artefacts from the late SGC, large amounts of artefacts from the Late Neolithic have been collected.

[95] In the area west of Horsens, 16 houses have been uncovered by four major excavations (T. Madsen 2019a, 160306-17, 160306-23, 160306-37, 160306-41), of which three can be dated to LN I. At Østbirk, 13 houses have been uncovered by four excavations (T. Madsen 2019a, 160501-12, 160501-17, 160501-20, 160501-36;), of which three have been dated to LN I. Per Borup, who have directed the latter four excavations, have published an overview of the results, where the system of individual farmsteads are clearly documented (P. Borup 1918).

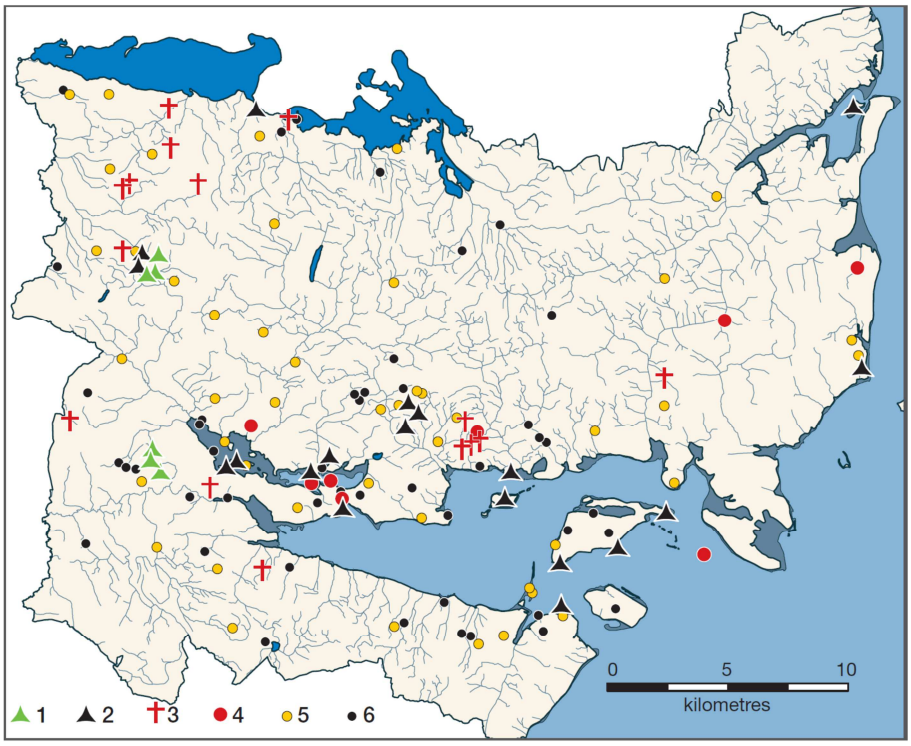

Fig. 19. The distribution of finds from the study area dated to between 2350 and 1950 BC: 1, house remains; 2, settlements based on evidence other than houses; 3, graves; 4, depositions in freshwater and marine environments; 5, stray finds of pressure-flaked flint daggers of types I-III; 6, stray finds of thick-butted flint axes with a V-shaped longitudinal cross-section.

Unfortunately, there are only surface collections from the site, but you get the impression of a larger permanently inhabited site. At Smidstrup Kær, inland to the very north of the study area, we have a similarly large longer-lasting permanent settlement. Here too, unfortunately, only surface collections are available.[96)]

With the changed social structure and settlement pattern that was introduced into the SGC and continued into the Late Neolithic, the way was paved for a farming society based on crop growing. Ironically, the settlement structure was the result of a destruction of the forest on the sandy West and Central Jutland soils that began already in the FBC and which resulted in large open areas suitable for cattle breeding, but to a lesser extent for crop growing due to poor soil quality.

[96] For Vorsø and Smidstrup Kær, see T. Madsen 2019a 160508-15 and 160510-19 respectively.

Combined with the new social structure, however, a system had been created which, upon transfer to areas of higher quality soils, formed the ideal basis for efficient crop growing. The cultivation of grain in LN I apparently took place largely unchanged compared to the late SGC, but the downward curve for wheat through 1000 years stopped (Fig. 5), and in LN II marked changes began to take place. The amount of wheat increased significantly at the expense of barley, and at the same time, new wheat varieties were (re)introduced. These were Bread and Club wheat as well as Spelt. At the same time, the forms of cultivation apparently became more specialized. Thus, at Østbirk, three storage pits with grain have been found in a house from LN II. In wooden containers, three different species of grain were stored separately – Naked barley, Emmer wheat, and Spelt - but with a small impurity in each container of grain of one of the other types. The grain in the storage pits must have been seed, and the impurities must reflect the previous year's crop in the field. The three pits thus show a three-field rotation with the order Naked barley> Emmer wheat> Spelt> Naked barley etc.[97)]

Regardless of how one perceives the background and origin of the Jutland SGC, and the last word has certainly not been said in that discussion, the spread to the east of its ideology and social structure resulted in a radical break with the prevailing culture. Looking at the circumstances in the study area, however, there can be no doubt that the foundation of the new structure after the rupture was formed by the existing population. Against the background of an obviously weakened ideological structure in the late FBC, the transition has probably been relatively undramatic. In groups, people left the large densely packed settlements and settled down scattered, not necessarily simultaneously and from all areas at the same time. Thus, an agricultural form was abandoned that for 1,300 years had been adapted to the forest environment in various ways, and a "modern" agricultural form was adopted, which overall was aimed at destroying the forest environment.

[97] P. M. Jensen & P. M. Mikkelsen 2007. P. Borup 2018, p. 111-12.