

## 2. The Wadden Sea Region

### 2. The Wadden Sea Region: A Unique Cultural Landscape

by Otto S. Knottnerus, Zuidbroek

#### 2.1 Summary

The Wadden Sea Region is one of Europe's outstanding wetland areas, stretching from Blåvandshuk in Denmark to Den Helder in the Netherlands. It consists of tidal mud flats and shoals, barrier islands and fertile marshlands, the latter mostly lying behind the dykes. The coastal zone is bordered by upland villages and towns. As such, it forms a natural hinterland for the urban centers in the interior.

Because of its characteristic natural values, the region is regarded as an area of national and international importance. Moreover, the rich cultural heritage gives evidence of centuries of interaction between men and nature. Step by step men have conquered the amphibious landscape and transformed its salt marshes, dune valleys and peat-moors into a fertile niche amidst largely unspoiled natural reserves. As a consequence, human intervention created a whole series of new environments, characterized by the combination of natural diversity and cultural richness. Anthropogenic landscape elements serve as a major impetus for the surrounding natural reserves as well.

Yet, in contrast to other wetland areas where men held out at the edges of civilization, the impact of urban culture in the Wadden Sea Region has always been considerable. These circumstances have resulted in a remarkable mix of traditionalism and readiness to change, typical of maritime societies. With regard to its cultural heritage, the area can even be compared with other centers of civilization, such as Île de France, Rhineland, and the Po river-valley.

The element of tradition is especially represented by the Frisian language and identity, which have been accredited by the EU minority language program. Low Saxon (Low German), the native tongue of the Hanseatic cities, is widely spoken in Northern Germany and the adjoining parts of the Netherlands. Its use is often associated with regional pride and egalitarian sentiments. Southern Jutland has its own dialect and regional identity as well, shaped by centuries of neglect and subsequent attempts to redirect the economy of the peninsula towards Copenhagen.

Urban orientated culture and cosmopolitanism were the result of centuries of maritime traffic. Though coasting trade stagnated after about 1870, the region kept close ties with the urban centers by supplying them with quality food-stuffs. Now the Wadden Sea Region is appreciated as a natural resource area and a tourism destination for the population of the urbanized areas in the interior.

Men's sustained interaction with nature has resulted in a great diversity of geographical landscapes and a wealth of natural values. In contrast to the well-known survey on natural values (Abrahamse 1976), the underlying report focuses on the cultural values of the Wadden Sea Region.

The remnants and reminders of the past can be traced in the actual landscape. They make up layers of cultural deposits with each layer representing different stages of development, ranging from permanently buried archeological remains to transient vernacular architecture and vulnerable cultural artifacts. The five main periods can be characterized shortly:

1. Prehistoric settlements on natural elevations and artificial dwelling mounds (before 400 AD)
2. Medieval long distance trade (400-1050 AD)
3. Village life behind the dykes (1050-1500 AD)
4. Maritime commerce (1500-1800 AD)
5. Modern agriculture (1800-1900 AD) and the recent transformation of rural societies (1900-2000 AD).

The archaeological value of the area is widely recognized, because of the excellent state of conservation due to the humid soil conditions. The large number of artificial dwelling mounds (værfter, Wurten, terpen) is extraordinary: subsequent layers of human settlement have been well preserved as the mounds were raised in order to overcome the effects of rising sea-levels. Hundreds of shipwrecks remain hidden in the shoals. Medieval field patterns, ditches, roads and dwelling mounds are often remarkably well preserved. The Romanesque and Roman-Gothic churches are among the finest in Europe, whereas the multitude and quality of church organs is virtually unique. Sluices, canals, entrenchments, harbors, dykes, duck-decoys and windmills document the rise of modern engineering and the success of Renaissance architecture. The abundance of monumental 18th- and 19th-century farmhouses with contemporary gardens and orchards is astonishing, whereas many villages still maintain an early 20th-century atmosphere.

## 2.2 State of knowledge

Shipyards, fishing harbors, dairy and fish factories, grain warehouses, brick-works, pumping stations and characteristic lighthouses exemplify the most recent developments.

Additionally, there is a strong awareness of the immaterial heritage, the techniques of coping with nature in a highly dynamic natural environment, the skills and tools, as well as the actual experiences, handed down from previous generations.

The importance of the area's cultural heritage goes far beyond the Wadden Sea Region itself. Few areas in the world have comparable physical circumstances. The amphibious landscape with its inherent dynamics required equally flexible strategies of survival. The adaptive strategies developed here provided a model for the reclamation of wetland areas all over Europe and beyond. Agricultural innovations, specialized crops, and novel breeds of domestic animals have gone all over the world. The indigenous traditions of self-government can be reckoned among the forerunners of modern democracy. Local pride and self-awareness have been admired by a wide range of writers and novelists (e.g. Theodor Storm's *Der Schimmelreiter*, Gustav Frenssen, Theun de Vries), whereas the landscape has inspired many artists as well (e.g. Emil Nolde).

The future of the area's cultural heritage is jeopardized by a host of environmental, social-economic and demographical problems. Sea level rise, coastal erosion, hydrological changes, feeble economic potentials, unemployment, intellectual brain-drain and an aging population threaten the survival of typical landscape elements as well as the continuity of the immaterial legacy. Coherence and integrity of the rural area is disturbed by housing programs, industrial settlements, oil- and gas-extraction, dredging operations, highway construction, large-scale tourism and nature development schemes. Current agricultural and technical scaling up is detrimental for soil-related objects. Standing constructions are dependent on regular maintenance schemes, due to the effects of frequent storms and humid climatic conditions.

In conclusion, the cultural heritage of the Wadden Sea Region is rich and diverse. Its survival, however, is dependent on the willingness of future urban generations to invest in the remnants and reminders of their rural past. Caution and care are the most effective ingredients of any proposed strategy fostering the legacy of a unique cultural and natural landscape.

### 2.2 State of knowledge

It is surprising that the interest for the region's cultural heritage did not start before the 1970s. The importance of the Wadden Sea as a unique cultural landscape has already been recognized by 19th-century German writers such as Johann Georg Kohl, Hermann Allmers and Wilhelm Heinrich Riehl. Others such as Fridrich Arends and Karl von Richthofen stressed the geological peculiarities of the area and the richness of its medieval sources. In fact, they continued a long tradition going back to the 17th-century historian Ubbo Emmius and his predecessors.

In the Netherlands, however, the Wadden Sea Region has mainly been perceived as an annex to the Zuider Zee culture, or, alternatively, as the ethnic homeland of the ancient Frisians. Up to the 1930s, the Dutch did not even perceive the Wadden Sea as a separate entity. The shoals and mudflats east of Ameland were considered an extension of the mainland salt marshes. Only philologists such as Johan Winkler paid full attention to the cultural affinities in the area.

Whereas the idea of a Zuider Zee culture relates to 17th-century urban civilization in Holland, there is no corresponding conception linking the Wadden Sea culture to the heritage of the Hanseatic cities. Among the folklore museums, which began to collect items of regional culture around 1900, however, the Altonaer Museum in Hamburg-Altona attained the most extensive collection. The Wadden Sea islands have been described by Christian Peter Hansen and Francis Allan from a more or less folkloristic point of view since the 1850s.

Twentieth-century German authors primarily focused on the coastal marshland ('Nordseemarschen'). The idea that the marshes should be treated as a distinctive geographical, historical and cultural unit has been widely accepted (Tacke & Lehmann 1924; Wiemann 1964; Aubin 1965; Rohde 1976; Fischer 1997). During the 1950s, the University of Münster even considered making an 'Atlas of the North Sea Area' as a counterpart to Westphalia area studies. Dutch and Danish contributions from this perspective are relatively rare (Keuning 1957; Knottnerus 1996; cf. Wagret 1966).

Alternatively, several authors have stressed the common heritage of the Frisian areas as a *pars pro toto* for the whole region (Borchling & Muuß 1931; Woebcken 1932; Folkers 1956). These ideas were very current up to the 1930s, when right-wing extremists went great efforts to

## 2.3 Delimitation area

monopolize the Frisian ethnic past (Heemskerck Düker & van der Molen 1941). Postwar authors largely restricted themselves to shared language features. International exchanges between the Frisian districts started in the 1820s and were intensified in the 20th century, culminating into the establishment of the Frisian Council (Friesenrat or Fryske Rea) in 1956. International conferences have been held in alternating towns since 1925.

Dutch interest in the Wadden Sea Region was further impeded by the closing of the Zuider Zee by means of the 30-km Afsluitdijk in 1932. Zuider Zee culture began to be perceived as the opposite of Wadden Sea nature. Most studies have been done by the Zuiderzeemuseum in Enkhuizen, which was extended in 1983 with a large open-air museum, covering the western parts of the Wadden Sea as well.

Similar developments occurred in Denmark. Most Danes were ambiguous about the region's common heritage due to the 19th-century hostilities with Prussia. Their identification with other coastal districts was largely restricted to the Frisian and Danish minority groups in Schleswig ('Sønderjylland'). Renewed interest in maritime culture resulted in the foundation of the Fiskeri- og Søfartmuseet (1968) and the Center for Maritime and Regional History (1994) in Esbjerg.

Hence, up to the 1970s archaeologists were virtually the only ones studying the coastal area as a cultural unity (Kossack 1984). Modern archaeological research started in the Netherlands with the foundation of the Vereniging voor Terpenonderzoek in 1916. Soon German scholars followed the Dutch example. The pioneers of modern marshland archaeology Albert Egges van Giffen, Werner Haarnagel and Albert Bantelmann maintained close working relations. Important contributions to the study of coastal geology have been made by Dodo Wildvang and Heinrich Schütte.

Nevertheless, several tourist guides and popular history books tended to describe the region as a coherent territory (cf. Homann 1983). The establishment in the 1950s of the Green Coast Road, a 1200-km tourist highway from Cape Skagen to Amsterdam, invited many people to explore the region and to experience its common heritage. The growth of mass tourism since the 1960s promoted wide public interest in local culture and history, particularly in Germany, where publications on this topic have a considerable sale.

Most decisive for reevaluation of the cultural heritage was the discovery of the Wadden Sea Region as an outstanding natural zone, induced by the growing awareness of the detrimental effects of unbridled economic growth (Waddenboek 1964). The Dutch Society for Preservation of the Wadden Sea, founded in 1965, gained massive support from intellectuals and members of the urban middle class. As a consequence, the interest in the cultural heritage of the Wadden Sea Region was growing as well. The first important volume on the Wadden Sea as an international nature area, published 1976 in Danish, German and Dutch, contained seven minor contributions on archaeology and history (Abrahamse 1976). Since then, public as well as scientific interest in the cultural heritage of the Wadden Sea Region has been growing steadily (Abrahamse & van der Wal 1989; Workshop 1997; Knottnerus 1999).

### 2.3 Delimitation area

The Wadden Sea Region is defined as a coherent area stretching from Blåvandshuk in Denmark to Den Helder in the Netherlands. The area's outer limits are somewhat arbitrary. Traditionally, German and Danish scholars take a broader view than their Dutch colleagues (Tacke & Lehmann 1924; Stewig 1978; Seedorf & Meyer 1992-96; cf. Barends 1986; Grau Møller 1997). In our report, the Danish part of the Wadden Sea Region is to include the Pleistocene fringe from Blåvandshuk to Højer, as settlement in the salt marsh area is scarce. In Schleswig-Holstein, on the other hand, the Pleistocene fringe (including the district of Stapelholm) is generally left out. In Lower Saxony a range of complete political districts are covered, supplemented by marshland villages of Süder-Osterstade (Gemeinde Schwanewede). As a consequence, large parts of the Stader Geest and the whole Pleistocene area of Ostfriesland have been included as well.

The tidal-river marshes are only partially covered, though tide and marine clay coverage extend beyond the cities of Hamburg, Bremen and Papenburg. The saltwater border has retreated and is presently located off Glückstadt, Elsfleth, and Leer. For practical reasons, the geographical districts of Wilster and Krempner Marsch (Kreis Steinburg), Seesterdüher, Haseldorfer and Wedeler Marsch (Kreis Pinneberg), Land Kehdingen and Altes Land (Landkreis Stade) could not be studied. The marshes

## 2.4 Diversity of landscapes

around the cities of Hamburg and Bremen as well as the city of Bremerhaven fall beyond the scope of this study.

In the Netherlands, demarcation is complicated by the huge extent of the fenland districts around the former Zuider Zee. For this reason, the scope of the underlying survey is restricted to the islands and the former salt marshes, leaving the former bogs, peat-moors, and upland villages mostly uncovered. As a consequence, the 'upland' villages of the Dollard marshes (provincie Groningen) above MOD are not included as well.<sup>1</sup> In the province of Fryslân the town of Hindeloopen has been chosen as the southern limit. In the province of Noord-Holland only the most northern parts could be covered. The polder Wieringermeer (1932) and the medieval fenland districts of West-Friesland and Kennemerland (south of the Westfriese Omringsdijk and the Hondsbossche Zeewering) are excluded. However, in our area description (Chapter 5.1.) we will pay sufficient attention to those districts that have been left out in the rest of the study.

The present study covers (parts of) the following administrative districts:

Denmark

Ribe Amt

Sønderjyllands Amt

Schleswig-Holstein

Kreis Nordfriesland

Kreis Dithmarschen

Freie und Hansestadt Hamburg

Bezirk Hamburg-Mitte (Neuwerk)

Lower Saxony

Regierungsbezirk Lüneburg

Landkreis Cuxhaven

Landkreis Osterholz

Regierungsbezirk Oldenburg

Landkreis Wesermarsch

Landkreis Friesland

Kreisfreie Stadt Wilhelmshaven

Landkreis Wittmund

Landkreis Aurich

Kreisfreie Stadt Emden

Landkreis Leer

The Netherlands

Provincie Groningen

Provincie Fryslân

Provincie Noord-Holland

### 2.4 Diversity of landscapes

#### 2.4.1 Geographical landscape types

The Wadden Sea Region contains very distinct geographical landscape types with a high level of regional variation. But their identification is complicated by the different classifications used in historical geography, geomorphology, and soil science. Moreover, national classifications are diverging as well. Sticking to North-West European and British terminology we propose a distinction between (1) dunes and moraine islands, (2) littoral landscapes, (3) coastal and tidal-river marshes, (4) polder lands and drained lakes, (5) fenlands and cut-over raised bogs, and (6) upland moors.

Table 2.1:  
Landscape types and dominant soil types in the Wadden Sea Region

	Calcareous gley-soils (sandy clay)	Predominantly non-calcareous gley-soils (heavy clay)	Peat-soils	Podzols & brown soils (sand and loam)
1. Dunes & moraine islands	((Embanked) salt marshes)			Barrier islands Beach barriers Moraine islands
2. Littoral landscape	(Salt marshes) (Halligen)			(Sandbanks)
3. Embanked coastal marshes & tidal river marshes	Younger coastal marshes	Older coastal marshes		
	Tidal riverine landscape	Tidal-river marshes (River banks)	(River Back swamps)	
4. Polder lands & drained lakes	Younger polders Former salt marshes Recent seapolders	Older polders	Drained lakes Drained broad lands & meres	
5. Fenlands & cut-over raised bogs		Reclaimed fenland marshes	Wet fenlands Black fens (Squatter colonies)	Reclaimed fenland moors Cut-over raised bogs
6. Upland moors		(Brook valleys) (Marshland meadows)		Moraine plateaus Sandy plains Moraine hillocks (Squatter settlements) (Reclaimed brecklands)

##### 2.4.1.1 Dunes and moraine islands

The dunes (klit, Dünen or duin landscapes) mainly consist of barrier islands and beach barriers, in most cases with embanked salt marshes at their lee-side. Several islands incorporate a moraine outcropping. It is a highly dynamic landscape, continuously reshaped by storm surges and tide movements. The dunes have been accumulated

Table 2.2:  
Landscape types and sea level  
in the Wadden Sea Region

Mainly below MOD	Mainly above MOD
	Dunes and moraine islands
Littoral landscape (Sandbanks & Mudflats)	Littoral landscape (Halligen & Salt marshes)
Older coastal marshes Tidal-river marshes (Reclaimed fens or river back swamps)	Younger coastal marshes Tidal-river marshes (River banks) Tidal riverine landscape
Older polders Recent sea-polders	Younger polders
Wet fenlands Reclaimed fenland marshes Drained lakes	Black fens Reclaimed fenland moors Cut-over raised bogs
	Upland moors

by the wind, locally reaching a height of 20 to 30 m. These dunes have been formed in the High Middle Ages, covering the remnants of relatively low fossil beach ridges, dating from the fourth or third millennium BC. The original dune landscape on these beach ridges was characterized by humid brown soils (Geest soils), due to the initial woodland vegetation. It can still be observed in a narrow belt of nucleated villages with unenclosed fields stretching from Alkmaar to the south (Kennemerland). In the first half of the 20th century parts of the recent dune landscape have been planted with pinewoods in order to prevent blowouts.

- a. On the true barrier islands, recent dunes and raw sands predominate. Villages, fields and meadows are usually concentrated at the lee-side of the dunes or in dune valleys with podzolic or stagnogleyic ranker-soils. Only the islands of Terschelling and Ameland have settlements reaching back as far as the Early Middle Ages. Most houses are situated on dune-ridges in the former salt marsh area, in linear respectively green villages (around a village green). Settlement patterns are quite diverse. Rømø is characterized by irregular linear villages, whereas Fanø, Mandø, and Borkum have irregular clustered villages. More recent settlements such as Keitum, Wyk-auf-Föhr, Spiekeroog, Schiermonnikoog, Midsland and Oost-Vlieland have a typical Dutch main street with side-alleys.
- b. The existing beach barriers define the outer limits of the Wadden Sea Region. The Jutland ridge reaches as far as Blåvandshuk and the

Skallingen peninsula. It covers the remnants of a fossil ridge, underlying the island of Rømø. The Eiderstedt beach ridge overlaps with a system of fossil ridges (Nehrungen, Donns) extending from Sylt and Amrum down to Dithmarschen. The Noord-Holland beach barrier includes the former islands of Huisduinen and Callantsoog. Its prehistoric predecessors were to be found several kilometers offshore.

- c. The moraine islands of Sylt, Föhr, Amrum, Texel and Wieringen have a Pleistocene core, consisting of boulder clay outcroppings with its highest points at MOD 10 to 15 m. They have podzolic soils, partly with a man-made humid cover due to the addition of mineral material to the fields. Original settlement is concentrated in green villages (Texel, Wieringen) or in linear villages with side-alleys located along the Pleistocene edge (Föhr). Sylt and Amrum have irregular clustered villages. The moraine outcroppings of Dangast and Gaasterland belong to the same sub-type, fairly comparable to the upland moraine plateaus (type 6a).

#### 2.4.1.2 Littoral landscape

The littoral landscape (vade, Watt or Wadden landscape) is constituted by canals, shoals, sandbanks, mudflats and unembanked salt marshes (marskforland, Vorland, Heller, Groden, kwelders). Approximately two thirds of the area runs dry twice a day. Raw sands, raw alluvial and unripened gley-soils predominate. The remaining inhabited salt marsh islands or Halligen occupy



the place of former mires that have been demolished by the sea. The area is culturally valuable because of the remains of numerous wrecked ships and former settlements that have been buried in the mudflats. The sandbanks and uninhabited dune islands (e.g. Scharhörn, Rot-tumeroog, Griend) serve as bird sanctuaries. The coastal estuaries and river mouths have a special hydrological regime with many transitional stages from brackish to fresh-water environments.

#### 2.4.1.3 Embanked coastal marshes and tidal river marshes

The embanked coastal marshes (marsk, Marsch or zeeklei landscape) are characterized by medieval settlement on artificial dwelling mounds, raised up to MOD +6.0 m (in the case of Hegebeintum even up to MOD + 8.8 m). Hence, the official classification as terpen or wierden landscape. Nonetheless, many villages are located on drumlins, beach ridges or natural levees. The coastal marshes are the most widespread landscape type in the Wadden Sea Region, dominated by marine clay deposits (klæg, Marsch, klei or poldervaag soils) ranging from sandy calcareous to stiff pelo-alluvial gley-soils, with man-made humid soils on the dwelling mounds. Essentially, it is a handmade landscape, molded by centuries of piecemeal human intervention. The typical scenery of the coastal marshes, with its nucleated villages, scattered farmsteads, winding roads, meandering canals and numerous irregular ditches largely resulted from the process of embankment (hence the alternative classification as older polder lands). Most of these ditches were remnants of previous tidal creeks and gullies. Occupation is concentrated on former beach barriers and salt marsh ridges with lighter soils, contrasting with grassland depressions in which fine textured material was deposited. Each new beach ridge that developed was slightly higher than the previous one behind it. Former gullies and creeks often left depressions and boggy meres between the village territories.

The coastal marshes constitute a flat, open landscape with wide views to level horizons and huge skies. Shrubs and trees, primarily poplars, ashes and Dutch elms, are mainly found as shelter belts around the farmsteads and along the roads. Typical elements are former dykes, circular pools resulting from dyke-breaches (høl, Wehl, Brack, Kölke, kolk, wiel, waai) and clay-pits

(Späthingen, Kleipütten, kleiputten) from which the earth for dyke-repairs has been dug out. Recently, the original parceling has often disappeared due to large-scale re-allocation programs.

A distinction can be made between the older coastal marshes, the younger coastal marshes, the tidal-river marshes, and the remnants of a tidal riverine landscape.

- a. The older coastal marshes or grazing marsh districts (Sietland, kleiweide area) are located in a belt behind the more recent ones. Their territories are usually waterlogged and originally parceled out in irregular, small-sized blocks, sometimes around a radial structured core. The heavy leached-out gley-soils (Brack- or Kleimarsch, zware klei), particularly the ferruginous zones (Knick-Brackmarsch or knip-klei), are best suited to pastoral farming. Their surface is lying considerably below the present Mean High Tide Level at MOD -1.5 to +0.5 m. This is hardly enough for natural drainage during low tide. The older marshes are bordered by the fenland area (type 5b).



- b. In contrast, the younger coastal marshes or arable marsh districts (Hochland, klei-bouw area) date from the High or Late Middle Ages. They have well-drained relatively light soils (See or Kalkmarsch, zavel) that are best suited to arable farming. Elevated farmsteads are often dispersed in the fields or located along winding dykes and roads. Regular, medium-sized block field-systems prevail. The younger marshes are located slightly below or around the present High Tide Level at MOD 0 to +2.0 m.

Fig. 2.1:  
Old marsh, Lower Saxony  
Photo: G. Schlicksbier

c. The tidal-river marshes (Flußmarschen) along the Elbe, Weser, and Ems Rivers constitute a diverse landscape, reaching from the former sea-marshes through the brackish riverbanks into a genuine fresh water marsh. The levees are usually 1 to 3 km in width and bordered by back swamps that largely consist of reclaimed fenlands previously covered by wood-peat bogs or sphagnum-peat moors (type 5b). Heavy soils prevail, ranging from the calcareous gley-soils (Kalkbrackmarsch) downstream to alluvial-alluvial gleys in the rear. Fossil river courses (roddons) are a prominent feature, due to the reclamation of the surrounding fenlands. As a rule, however, the clustered villages on the levees have been incorporated into the linear structured fenland landscape. Especially on the Elbe River banks most of the original block parceling has been destroyed.

The riverbanks are lying slightly below the high tide at MOD 0 to +1.5 m, but the surface is rising upstream. Nowadays, tidal movements are quite pronounced (3 to 4 m) due to extensive dredging activities, thereby enabling the low-lying back swamps to be drained effectively. Up to the 19th century, however, circumstances were worse, as the Weser and Ems River had been silting up due to upland erosion. The low tide near Bremen got stuck at MOD +2,7 m, urging steep dykes and causing the inundation of the surrounding marshes. As late as the 17th and 18th century most houses had to be built on platforms or dykes. The back swamps of the Elbe River were far better off. Though low tide in Hamburg was 1.5 to 2 m higher than today (MOD 0 to +0.5 m), in the Elbmarschen it must have been fairly comparable with today's figures (MOD -1.2 m). Most river marshes reverted to grazing, except for the Elbe River banks, where arable farming prevailed.

The inland river districts south of Hamburg, Bremen, and Papenburg have a different landscape characterized by alluvial plains, ridges, and depressions (Aueböden, rivierklei).

d. The river estuaries comprise the remnants of a tidal riverine landscape with reed-marshes, brooks, wash lands, shoals, reaches, and partly embanked islands. Until the 20th century, the embanked estuaries of the Oste and Leda River were irrigated each winter with highly eutrophic river-water. Several riverine islands have recently been embanked.

#### 2.4.1.4 Polder lands and drained lakes

Polder lands or dyke landscapes (kog, Kög, Groden, (kust) polder) have been reclaimed systematically. The farms surrounded by shelterbelts are located along dykes and roads, whereas parceling has taken place in blocks or strips according to geometrical rules. It is an extremely open landscape, dominated by firm dykes, vast fields and huge skies.

Generally, the maritime polders (large-scale zeekleipolders) consist of former salt marsh ridges and tidal plains, covered by calcareous or sandy gley-soils (polder- and vlakvaag soils). Most of the polders are suited to arable farming. Estuarine plains, such as the Jade, Dollard and Middelzee bay have heavier soils that are only suited to arable farming when specific hydrological measures are taken. Often they remained pastures. Embanked sandbanks, such as Dieksand and Zijpe have lighter soils that need extensive maturing. In most cases, each subsequent polder had a slightly higher level than the previous one, leading to substantial drainage problems. Older dykes, however, were not always leveled. Often they maintained for security reasons, leading to compartmentalizing of the landscape.

A distinction can be made between older and younger polders, drained lakes and recent sea-polders.

a. The older polders were embanked by local communities from the 13th century onward. They had a small-scale parceling, often in parallel strips extending from the adjoining areas. Farms and cottages were located in linear settlements near or on the dykes. As their soils became leached-out and drainage was blocked by subsequent embankments, they often reverted to pastoral farming. Most older polder lands lie between MOD -1.0 to + 1.0 m, partly due to the subsidence of underground peat layers.

b. Since the 16th century embankment often took place under the direction of foreign entrepreneurs. These younger polders were designed and parceled out in a Renaissance chessboard fashion. The farms were dispersed along dykes, roads, and canals, villages were situated near tidal harbors or at crossroads. As a rule, the younger polders lie between MOD 1.0 and +2.5 m, due to the fact that the former salt marshes have been raised up until 1.0 m above the Mean High Tide. Yet, several polders that have been embanked prematurely are lying below MOD. The Zijpe and

Wieringerwaard polders in Noord-Holland, lying at MOD -2.0 to 0.0 m, were completely dependent on artificial drainage from the onset.

The most recently embanked former salt marshes are largely uninhabited and used for pastoral farming. They are located in Jutland, on the coastal islands and along the Eider, Elbe, and Weser Rivers. A typical element in these former salt marshes are 18th and 19th-century drinking-water pits for cattle, often surrounded by a dyke. A 19th-century summer-polder in Oostergo has recently been reconnected with the sea.

- c. Drained lakes and meres (older droogmakerijen) are the remains of eroded fenlands and peat-moors beneath which old marine clay or Pleistocene sand was uncovered. The drained lakes are completely dependent on artificial drainage, as their bottoms are ranging from MOD -0.5 to -3.0 m, in Holland even going down to -5.0 m. Their humid-alluvial gley-soils (plas-, tocht- and leekeerd soils) were mostly suited to pastoral as well as arable farming. From the 16th century onwards, the lakes have been reclaimed under the direction of foreign entrepreneurs, who conducted the project in a modern Renaissance fashion. The 7,200 ha Beemster Lake in Noord-Holland (1612) served as a model to many other projects. As a rule, the lakes was surrounded by a dyke, rationally parceled out and drained by windmills or pumping-engines that siphoned off the water into a circular canal. Villages were usually situated along the roads or at crossroads, sometimes in a chessboard fashion (Staverse Meer, Wargaster Meer, and Sensmeer). Whenever artificial drainage was unsuccessful farmers had to restrict themselves to extensive cattle farming. Here we find dispersed farms on dwelling mounds (Gotteskoog, Stapelholm). Other drained lakes were largely uninhabited and used as hay-meadows (Meggerkoog, Wieseder Meer, Freepsumer Meer, Huningameer). In the 19th-century extensive areas of broad land resulting from peat dredging, have been reclaimed. These so-called peat-polders (veenpolders) are largely restricted to Holland and Fryslân. In the latter case, there was a legal obligation to reclaim the peateries after dredging (1822).
- d. Recent sea-polders (newer droogmakerijen) are the product of 20th-century large-scale engineering. Some of them are completely

dependent on artificial drainage, which is the case with the Wieringermeer, lying at MOD -5.0 m. Others have developed behind modern dams that were constructed for the sake of coastal protection and as drainage reservoirs, such as Beltringharderkoog, Speicherkoog and the embankments of the Lauwerszee. These areas are important as bird sanctuaries.

#### 2.4.1.5 Fenlands and cut-over raised bogs

The fenlands or the peat reclamation landscape (mose, Moor or veen landscape) constitute the remainders of a belt of former back swamps and peat-moors lying between the coastal marshes and the inland districts. They were systematically drained and reclaimed since the 9th or 10th century AD. The individual holdings were parceled out in parallel, tapering, fish-bone or fen-shaped strips (Hufen, stroken, slagen), separated by ditches and intersected by roads and canals at which the farms and cottages were located. Each strip constituted a farmstead. Linear settlements along the roads or canals (Hufen- or Reihendörfer, rijen- or streekdorpen) were the rule. Partially uninhabited irregular strips (wischen, mieden, or blok-stroken) at the edges of the older coastal marsh districts (type 3a) result from the initial reed swamp reclamation, preceding the development of linear settlements in the rear. More recent villages sometimes take the form of squatter settlements (Kolonistsiedlungen).

We can distinguish between wet fenlands, reclaimed fenlands, reclaimed peat-moors, black fens and cut-over raised bogs.

- a. The wet fenlands, grazing fens or broad lands (Sietland, veenweide or veenplassen landscape) are waterlogged and reserved to pastoral farming. Most of the original bogs and moors have been reclaimed during the Middle Ages. Often 15 to 25% of the area are taken in by ditches, sometimes intersected by meres and lakes. Their soil consist of earthy peat (Nevermore, laagveen = koopveen and madeveen) or raw peat covered by a gleyic layer (Moormarsch, klei-op-veen = weideveen) due to inundations after initial reclamation. The fields are usually treeless, except for some rows of willow pollards. Several districts close to the former peat-moors have a more intimate character due to alder hedgerows and copses; others are dominated by lakes, waterways, and canal settlements. The surface is lying far below the present sea level at MOD -



2.0 to 0.0 m. Several districts are completely dependent on artificial drainage.

- b. The reclaimed fenlands (Marschhufen or Deichreihen settlements) consist of former bogs and sphagnum peat-moors that have been largely transformed into fertile marshes, due to the fact that the peat cover has eroded at an early age. The fenland marshes are partly overlapping with the tidal-river marshes (type 3c), whose back swamps had initially been covered by eutrophic wood peat rising just above the fresh water level (open landscape). If drained sufficiently, the ranker-like or humid gley-soils (woudeerd and leekeerd soils) were perfectly suited to arable farming and horticulture. Locally, extensive dredging and maturing provided a thick humus cover (tuineerd soils). This is particularly the case in West-Friesland and the Elbe River marshes. The latter are characterized by ridge and furrow agriculture (vaulted fields). The surface varies from MOD -2.0 (West-Friesland) to +1.0 m (Elbe River marshes), making the lowest parts completely dependent on artificial drainage.

In the brackish area behind the older marshes, the initial peat-cover largely consisting of reed peat hardly left a trace. These areas are mainly used for grazing. The dominant soils are humid pelo-alluvial gley soils (Brackmarsch or tochteerd soils) more or less comparable to the older marshland surface (type 3a). Locally, these gley soils rest on humus substratum (Organomarsch, plaseerd soils).

- c. The reclaimed peat-moors (Geestrandmoore, Aufstrecksiedlungen, or wouden) resulted from systematic colonization of the raised bogs on the Pleistocene fringe. We find them on the western plains (including the western Pleistocene fringe of Ostfriesland) as well as in Nordfriesland and Dithmarschen. The colonists usually proceeded from the coastal marshes up to the Pleistocene fringe, reclaiming one village after another. As soon as the 2-3 m thick peat cover began to subside, settlement was concentrated on Pleistocene ridges emerging above the sinking fields. Yet, the original field-system was maintained. The parallel strips (opstreckende heerden) stretched from the green brook valleys up to the remaining peat-moors, often reaching a length of several kilometers. As a rule, the individual strips were separated by hedgerows and sod banks (Wallhecken, Knicks, houtwallen), giving the impression of an enclosed boscaje land-

scape. The dominant soils are podzolic sand-rankers. The fully reclaimed peat-moors are often classified as 'upland' moors (type 6), though they are lying between MOD 0.0 and +5.0 m.

- d. Partly reclaimed peat-moors or black fens (højmose, Hochmoor or hoogveen) constitute a transitional stage in the reclamation of raised bogs. Parts of the dark earthy peat-soil (meer- and vlierveen soils) are still present. Drainage, cultivation, and amelioration will eventually result in the full disappearance of the humus peat-cover, unless the water table cannot be lowered further. Their extension is largely restricted to the eastern districts (e.g. Kornkoog, Dithmarschen, Elbmarschen, Kehdinger Moor, Hadelner Sietland, Moorriem, Bollenhager Moor). Settlement is usually concentrated in linear villages at the edge of the former raised bog (Moolland and Moorhufen settlements). Each colonist extended his strips of land (either dispersed or concentrated around the farmstead) into the peat-moor. Parts of the bog have been cut for fuel, whereas the remaining inferior peat-soils were improved by marling with the help of the underlying sand or clay soil. Arable farming has been the rule until the 20th century, mostly buckwheat cultivation in a slash-and-burn system, alternated with rye and potatoes. Nowadays most reclaimed black fens are used for pastoral farming. Erosion often took a swift course: the Kehdinger Moor has subsided more than 1.5 m during the last century. The 19th-century cultivation of the Schweiburg peat-moors led to its reduction by two-thirds.

Additionally, cotters and smallholders were recruited after 1750 to settle down on state property in squatter colonies and planned peat-moor colonies (Moorkolonien, see also type 6). These were parceled out in a small-scale geometrical fashion or in parallel strips. Most of them can be found in Ostfriesland. More recent reclamation efforts usually resulted in larger farms. Most of these colonies are lying several meters above sea level.

- e. The cut-over raised bogs or genuine peat-moor colonies (Moorhufen or Fehn settlements, veenkoloniën) can be compared with large-scale polder lands and drained lakes. During the 16th and 17th centuries modern entrepreneurs in the northern Netherlands started to reclaim the 'upland' peat-moors below MOD +5.0 m in order sell the peat to

the urban population (hence the classification as turfwinings or hoogveen-ontginings landscape). A web of waterways and sluices connected the peat-moors to the neighboring coastal harbors. Farms and cottages were located along the canals, from where individual strips stretched out geometrically into the hinterland. By middle of the 20th century, most of the peat-reserves had been used up. This landscape type is largely restricted to the western districts (including Ostfriesland and Papenburg), but after 1750 it was imitated near Bremen (Teufelsmoor), in Oldenburg (Augustfehn and Elisabethfehn) and in the Wilster Marsch (Vaalermoor).

During the 18th- and 19th-centuries more or less systematic peat dredging below the water-level resulted in the creation of amphibious broad lands with pits (petten) and ribs (hence the classification as veenplassen landscape). In our area, their extension is limited.

#### 2.4.1.6 Upland moors

The upland moors or brecklands (hede, Geest, zand landscape) are a quite diverse region, ranging from picturesque hamlets, enclosed fields and copses along the Pleistocene fringe to large-scale modern villages, vast pastures and maize fields, endless windbreaks and dull pinewoods in the hinterland. Up to the 19th century, however, the picture was quite different. The upland districts were characterized by endless tracts of heath, peat-moors, and sand blow-outs. Woods were scarce, except for Holstein, the Stader Geest, and a few moraine outcroppings. Villages and fields concentrated near brook valleys and marshland edges. Only villages with sufficient hay-meadows and pastures could attain a certain wealth. Green villages and hamlets clustered around a central green prevailed (forte, Forta, Esch, es, brink or plein settlements), augmented with star-shaped settlements along the main roads towards the commons. The unenclosed infields were carefully protected by sod banks and hedgerows and fertilized with a mixture of heath sods and manure, resulting in a cover of man-made humid soil (humus, Plaggen or enkeerd soils). The original brown and podzolic soils were rather poor (sand, Geest, zand soil) and have locally been transformed into inland dunes. Due to continuous reclamation efforts the cultivated area had been enlarged with enclosed fields (kampen), whereas the

remaining commons were enclosed in the 19th century. Since then, artificial fertilizers and rising urban demand have made an end to centuries of heath land poverty. Most of the area is now devoted to pastoral farming, pig breeding, or potato cultivation.

During the 18th and 19th century, cotters began to settle down in scattered huts in the village outskirts, sometimes leading to specific squatter settlements (Kolonistsiedlungen, heidedorpen). Many older settlements developed into nucleated row villages (Straßendörfer, straatdorpen) or irregular clustered villages (Haufendörfer, nevelvlek- or eszwermdorpen). The squatter settlements usually acted as labor reserve for the surrounding districts. In Jutland and Schleswig, refugees from the Palatinate were settled down in state-owned moorland colonies (Heidekolonien). More recent planned settlement resulted in a specific type of reclaimed breckland landscape (heide-ontginings landscape), parceled out geometrically and its most unrewarding zones planted with pinewoods. Typical landscape elements are megalithic graves, barrows, circular forts, defensive dykes, loam pits, and pingo scars. The latter are circular pools surrounded by copses on a natural rim, remaining from a glacial ice-dome. Sudden transitions from moraine outcroppings to marshland are often marked by steep cliffs (Klev, klif).

A distinction can be made between moraine plateaus, sandy plains and moraine hillocks.

- a. The billowing moraine plateaus (bakkeøer, Geestplatten, Börden, middelhoge zandgronden) harbored the bulk of the population. They had loamy, relatively fertile brown podzolic soils, whereas they were surrounded by productive brook lands (hence the name beekdal landscape) and unsurpassable raised-bogs. Their height reaches from MOD +5 to +25 m in The Netherlands to 10-40 m in Schleswig-Holstein and on the Stader Geest. Several districts had some deciduous forest. The low-lying moraine plateaus in Ostfriesland and The Netherlands were overgrown by peat-moor and reclaimed by fenland colonists during the 11th to 14th centuries (type 5c).
- b. The relatively low-lying sandy plains (hedeslette, Vorgeest, Sander, lage zandgronden) consisted of sterile aeolian or fluvio-glacial sands, largely treeless and partly overgrown by peat-moor because their podzolic soils were insufficiently drained. The subsoil often contained bog-iron. These areas, mostly

lying at MOD +10 to 15 m, were scarcely populated until the 19th century.

- c. The moraine hillocks (*randmoræne*, *hohe Geest*, *hoge zandgronden*) were largely uninhabited for long, as their podzolic soils were arid and unrewarding. They were deforested at an early age.

#### 2.4.2 Regions and sub regions

The geographical landscapes or regions and sub regions of the Wadden Sea Region can be arranged as follows:

##### 2.4.2.1 Denmark

The Danish part of the Wadden Sea Region consists of the Jutland Pleistocene fringe and the green meadows of the former salt marshes along the Varde Å, Sneum Å, Kongeå, Ribe Å, Brede Å and Vidå. Only the marshes of the Brede Å and Vidå (Tønder Marsk) are characterized by medieval dwelling mounds. The Tønder Marsk was embanked in the 16th century, together with the adjoining parts of Nordfriesland. The other marshes remained unembanked until the 20th century. The uplands are dominated by former tracts of heath, recently planted up with hedgerows, whereas the settlements are concentrated at the edge of the marshland. The coastal villages were relatively prosperous, due to their in shipping and commerce. The harbor of Esbjerg was founded in 1868 and opened for traffic six years later. Off the coast we find the dune ridges of the Skallingen peninsula as well as the barrier islands of Fanø, Mandø, Rømø and the sandbank Koresand. The marshland island of Gammel

Mandø has been abandoned in the 16th century, the Hallig island of Jordsand in the 17th century, the tiny island of Langli in the Hobugt in 1911. The remnants of Jordsand have recently disappeared.

##### 2.4.2.2 Schleswig-Holstein

Nordfriesland is patterned around former peat-moors that were destroyed during the Late Middle Ages. Its central part consists of the reem-banked marshland islands of Nordstrand and Pellworm and the inhabited salt marsh islands or Halligen. Another ancient peat-moor district is the Bökingharde with the former Risummoor island (Kornkoog) and several embanked Halligen (formerly known as the Westermarsch). The Bökingharde, Wiedingharde (formerly Horsbüllharde), and the Hattstedter Marsch form the medieval centers of a large-scale modern polder district. The spacious polder lands are surrounded by outstanding wetland areas, such as the Gotteskoog and the older polders bordering the Pleistocene fringe. The traditional farms have often thatched roofs. The upland districts (not included here) are divided into the Lecker Geest (Karrharde), Schleswiger Vorgeest, Bredstedter Geest (Nordergoesharde) and Osterfelder Geest (Südergoesharde) with the Wiedau (Vidå), Süder Au, Lecker Au, Soholmer Au and Arlau as minor rivers. The islands of Sylt, Föhr and Amrum contain a moraine core, bordered by dune ridges. The embanked salt marshes on Sylt and Föhr are largely uninhabited. The islands of Sylt and Nordstrand as well as the Hallig islands of Oland, Nordmarsch-Langeneß (with Butwehl), Hamburger Hallig and Nordstrandischmoor are connected to the mainland by recent dams. Among

the other islands, Gröde-Appelland and Hooge are still inhabited, but Habel, Norderoog, Süderoog, and Südfall have been abandoned. The dunes and sandbanks of Japsand, Norderoogsand, and Süderoogsand may have been partly constituted by the remains of former moraine islands. The recent dams connecting Nordstrand with the mainland contain a brackish wetland area.



Fig. 2.2:  
Blavandshuk, Denmark  
Photo: S. Tougaard



Fig. 2.3:  
Church on Föhr,  
Schleswig-Holstein  
Photo: W. Raabe

The peninsula of Eiderstedt has been formed out of several embanked salt marsh islands (Eiderstedt, Everschop, Utholm) and dune ridges, bordered by early modern polders. It is a largely pastoral farming district with many stately farm-buildings dispersed along the dykes and substantial villages built on dwelling mounds. The wooded Pleistocene island of Stapelholm is surrounded by the green Eider and Treene River marsh. Dithmarschen is a stronghold of modern arable farming. Medieval dwelling mounds, linear settlements, small towns, and recent embankments are bordered by an extensive upland zone with deciduous woods. Large forelands have been embanked in the 19th century, beginning with the Kronprinzenkoog (1787). Many settlers came from Ostfriesland. The port of Büsum is the remnant of a submerged marshland island. The recent island of Trischen was embanked in the 1920s, but abandoned in 1942. Blauort, Tertius and Gelbsand are recent sandbanks, Dieksand and Helmsand have been united with the mainland. The Eider River mouth and the vast Dithmarschen salt marshes have recently been dammed, which created the wetland area of Katinger Watt and the Speicherkoog.

The Niederelbe-Marschen (not included here) are dominated by reclaimed fenland, picturesque linear villages and characteristic farmhouses behind the Elbe River banks, intersected by the

Stör River, Krückau and Pinnau, which recently have been dammed. The low-lying Wilster Marsch is only suited to pastoral farming, whereas the tidal-river marshes of the Kremper Marsch, Seestermüher and Haseldorfer Marsch are characterized by ridge and furrow agriculture, supplemented by grazing marshes and recent orchards near Haseldorf. The Wedeler Marsch consists of embanked river sands with meadows and willow-coppices. The riverbanks are an important bird sanctuary. Large parts of the picturesque river-marsh islands near Hamburg have recently been sacrificed to the enlargement of the harbor.

### 2.4.2.3 Lower Saxony, Hamburg and Bremen

The coastal regions of Lower Saxony have often been compared with a tasteful crust around a dry pancake. The reclaimed fenland marshes of the southern Niederelbe-Marschen and the Unterweser-Marschen (Elbe-Weser district) are characterized by colorful rows of timber-framed farmhouses in a rustic setting, bordered by wet fenlands and black fens. The tidal-river marshes of Altes Land and the adjoining parts of Land Kehdingen (not included here) are known for their orchards. The coastal marshes of Nordkehdingen, the Ostemarsch (Neuhaus and Osten), Hadelner Hochland and Land Wursten are dominated by ridge and furrow arable farming. Linear villages and dwelling mounds alternate, intersected by the Este, Lühe, Schwinge, Oste and Medem Rivers. The Oste River has been dammed in 1968. The Wesermarsch is intersected by the Geeste, Lune, Hamme, and Wümme Rivers. Pastoral farming dominates the Hadelner Sietland, the villages of Lehe, Vieland and Stotel (now Bremerhaven, not included here), Landwürden, Osterstade and the wet fenlands around Bremen (Werderland or Vier Gohe). The former island of Landwürden (Loxstedt-Dedesdorf) has recently been united with the mainland. The extensive

sand-bank islands in the Elbe and Weser river at MOD +2.0 to +3.0 m (Bützflethersand, Hahnöfersand, Krautsand, Große Luneplatte, Harriersand, Hammelwardersand, Radersand) have recently been embanked and partly put under the plough. The island of Krautsand has many dispersed farms on platforms. Off the coast, we find the embanked marshland island of Neuwerk (Hamburg) and the dunes and sandbanks of Scharhörn and Großer Knechtsand.

The Unterweser and Jade districts in Oldenburg are mainly suited to pastoral farming, though in the past arable farming was widespread in the coastal villages. The dwelling-mound villages and dispersed red brick-built farms in the marshland districts of Butjadingen and Stadland resemble those in Ostfriesland. Part of the area is consisting of low-lying polderland (Seefeld) and black fens used for grazing (Schweiburg). A floating peat-moor outside the Jade Bay dyke (Schwimmendes Moor) recalls the former Wadden Sea mires. The mudflats north of Butjadingen (Hoher Weg) end with the dune-island of Mellum.

The typical river-marsh district of Stedingen is characterized by linear dyke-bound settlements (Lechterseite or Weserhochland) and rows of timber-framed farmhouses in low-lying districts with shrubs and hedgerows at the edges of the former peat-moor. The inner parts of the area (Moorriem, Wüstenlande, and Brookseite) consist of fenlands and black fens. The tide the Hunte River reaches as far as the city Oldenburg. The newly reclaimed Bollenhager peat-moor and the green polderlands of the Jader Marsch constitute a transitional zone towards the wooded upland villages of the Friesische Wehde (Varel) and the southern district of Ammerland (Oldenburgische Geest, the latter not included here). Jeverland has a wooded Pleistocene core, surrounded by pastures, ancient village mounds and at its western border vast arable polderlands with long rows of substantial East-Frisian farm-buildings. The naval harbor of Wilhelmshaven has been established in 1852.

The northern and western districts of Ostfriesland are dominated by arable or mixed farming. Harlingerland and the adjoining parts of Norderland (Dornum) have dozens of ancient village mounds around the branches of the former rivers Harle and Accumer Ae, bordered by early

Fig. 2.4:  
Aerial photo of the  
mound village Ziallens,  
Lower Saxony  
Photo: Wesemann



upland areas of the Stader Geest are characterized by billowing plateaus and attractive oak woods, alternating with green valleys and former peat-moors. The port of Bremerhaven at the Geeste River was founded in 1827. The elevated



modern polders, whereas the rest of Norderland (Hagermarsch, Ostermarsch, Westermarsch) is characterized by dispersed farmsteads in a treeless polder land. Dyke-lock fishing harbors are located at the mouth of the canals. Brookmerland consists of linear settlements in a varying boscaje landscape with pastures, fields, wetlands, lakes, and woods. The Leybucht is partly embanked. The district of Krummhörn is studded with large rustic marshland villages on dwelling mounds, of the same type as the villages on the other side of the Ems river. The modest villages in Moormerland, Overledingen, and Rheiderland are situated on the Ems and Leda riverbanks, separated from the upland villages by low-lying fenland pastures. The western part of Rheiderland is a fertile polder district, continuing on the other side of the German-Dutch border. Most of the Ostfriesische Geest consists of a flat boscaje landscape with brick-built villages, hedgerows, oak shrubs, and recent pinewoods. Typical elements, however, are the linear settlements along the canals intersecting former peatbogs and the untidy squatter settlements around Aurich and the district of Uplengen. The peat-moor colonies extend to the city of Papenburg (Landkreis Emsland, not included here). The barrier islands of Wangerooge, Spiekeroog, Langeoog, Baltrum, Norderney, Juist and Borkum are mainly composed of arid dunes. Minsener Oog and Lütje Hörn are no more than sandbanks, whereas Memmert has dunes.

#### 2.4.2.4 The Netherlands

The Dollard marshes in Groningen are one of the most spacious polder land districts along the Wadden Sea coast. The fields are mainly used for arable farming. Settlement is concentrated in linear villages on the Pleistocene fringe and in hamlets on the reclaimed peatmoors. Together, polders and 'upland' villages make up the Oldambt district, well-known for its huge brick-built East-Frisian farm-buildings and working-class cottages. The borders with the upland districts of Westerwolde and Duurswold (not included here) are blurred. The latter is a typical reclaimed fenland district, bordering the reclaimed fenland marshes. The upland soils are mainly used for growing potatoes. The adjoining cut-over raised bogs of the Groninger Veenkoloniën (not included here) were an important center of peat

export, shipping, and agro-industrial production during the 18th, 19th and early 20th century. A system of 17th-century canals, supplemented by the 1876 Eemskanaal, connects the Groningen hinterlands with the dammed river mouths of the Westerwoldse A, Reitdiep, and Lauwers. The salt marshes, mudflats, and shoals of the Dollard Bay constitute an important bird sanctuary.

The ancient marshland districts of Fivelingo and Hunsingo consist of a low-lying core with pastoral and mixed farming, surrounded by an extensive arable zone known as Hogeland (highland). The inner districts consist of reclaimed fenland and older marshes with large village mounds. Population is concentrated in small towns and dyke-bound linear villages on the edges of the recent polder land along the coast. Characteristic farms with huge Frisian barns are dispersed all over the area. Dispersed farms and village mounds dominate the marshland districts of Middag and Humsterland (Noordelijk Westerkwartier), which are largely devoted to pastoral farming. Both districts have been nominated for inscription in the UNESCO World Heritage cultural list, because of its well-preserved medieval landscape. The adjoining polder lands around the village of Grijpskerk concentrate on arable farming. The rest of the 'upland' districts of Langewold and Vredewold (Zuidelijk Westerk-



Fig. 2.5:  
Callantsoog, The Netherlands  
Photo: D. Marrewijk

wartier, not included here) make up a boscaje landscape with wooded linear settlements. The bay of the Lauwerszee (Lauwersmeer) has been embanked in 1969. Since then, it has been used as military training-ground and bird sanctuary.

Lauwersoog has developed into a modern fishing port.

The contrast between coastal marshes and reclaimed moors continues in Fryslân. The boscaje landscape of the Dokkumer Wouden (not included here) makes up the central part of the district of Oostergo. Its northern marshland zone is dominated by dozens of ancient village mounds and dispersed farms, confined by the Dokkumer Ee. To the West the older marshes are bordered by the embanked polder lands of Het Bildt and the former Middelzee (Nieuwlanden). Here, villages and farmsteads are located along linear main roads. The adjoining district of Westergo is literally stunned with maritime towns, village mounds, and characteristic Frisian farm buildings. Fryslân's northern coastal fringe (Bouwhoek) is preferred for arable farming. The inner marshland districts (Greidhoek) and the low-lying southern parts (Lage Midden, De Hemen) with many lakes and wetlands are only suited to pastoral farming. Trees are mostly lacking. Fryslân is intersected with many canals. Most natural rivers such as the Boorne River have been diverted into the lake district to the south, which is bordered by the drained broadlands (Veenpolders) and the wooded upland villages of Zevenwouden and Stellingwerf (not included here).

The northernmost part of Noord-Holland (de Kop van Noord-Holland) mainly consists of medium quality polder land, bordered by the former barrier islands of Huisduinen and Callantsoog, connected to the mainland in 1610. It is an open landscape, mainly used for mixed farming and horticulture. The polders of Zijpe (1597) and Wieringerwaard (1610) have many characteristic farm-buildings, situated along the main roads. The town of Den Helder originated from a 17th-century naval roadstead that was transformed into a major naval fort by Napoleon. It harbors a naval shipyard since 1822 and serves as the entrance of the Noordhollands Kanaal since 1824. The moraine island of Wieringen has been connected to the mainland in 1925, followed by the embankment of the polder Wieringermeer (1930) and the construction of the Afsluitdijk (1927-32). The island is characterized by a small-scale boscaje landscape. The low-lying West-Friesland peninsula (not included here) is a mainly pastoral used fenland district, intersected by fossil river courses (roddons), suited to horticulture. The linear villages include hundreds of characteristic farm buildings. The northernmost parts (De Gouw) and the adjoining

Groetpolder (1846) have been nominated for the UNESCO World Heritage list because of the typical landscape values and the archeological remains of Late-Neolithic settlements and summer camps. The western parts of West-Friesland have a marshland landscape. Around the town of Schagen, we can find many dispersed farmsteads on medieval dwelling mounds. The peninsula is enclosed by a 13th-century dyke (Omringdijk). Its name must not be confused with the German expression 'Westfriesland', which has been used since the 16th century for the province of Fryslân. The western district of Kennemerland is formed by dunes, fossil beach ridges, and tidal marshes.

The island of Texel has a moraine core as well as an extensive polder district. It was united with the barrier island of Eierland in 1630, which was embanked in 1835. The other islands are true barrier islands: Rottumeroog, Schiermonnikoog, Ameland, Terschelling, and Vlieland. Only Schiermonnikoog, Ameland, and Terschelling comprise an embanked salt marsh area. Rottumeroog has been abandoned in 1965 and is destined as bird sanctuary. They all have picturesque towns and villages, due to urban influences. The island of Griend has been abandoned in the 17th century. Rottumerplaat and Engelsmanplaat are just sandbanks with recent dunes, Boschplaat has been united with Terschelling in the 1930s.

The shallow sandbanks of the western Wadden Sea is included are the tentative World Heritage cultural list, because of the many shipwrecks. The hydrological regime in the area was completely changed by the construction of the Afsluitdijk in 1932. As a consequence, the shallow Zuider Zee with its brackish wetlands and picturesque fishing villages has transformed into a monotonous sweet-water reservoir surrounded by polders, artificial wetlands, and recreational harbors. The modern IJsselmeer is deprived of tidal movements.

## 2.5 Natural history



Fig. 2.6:  
Land reclamation,  
The Netherlands  
Photo: D. Marrewijk

### 2.5 Natural history

The history of the Wadden Sea Region is distinguished by three closely related features:

1. The highly dynamic natural environment, molded by incessant processes of sedimentation and erosion, and propelled by the periodically rising sea level (present chapter).
2. The intensive and sustained interaction between men and nature (chapter 2.6).
3. The vivid interplay between local culture and foreign incentives, resulting in the articulation of local identities (chapter 2.6).

Natural dynamics were restrained by the underlying geological frame. Geological developments were dominated by moraine plateaus, drumlins and ridges, formed by different stages of glacial extension during the Saale-Riss ice age (180,000-130,000 BP). Several moraine ridges such as the Hohe Lieth extend far into the sea, serving as fixed points for coastal erosion and sedimentation. This is also the case with the islands of Sylt, Föhr, Amrum, Texel, and Wieringen. Eroded moraine banks off Blåvandshuk, Fanø, Amrum, and Texel may have been the remnants of submerged islands. Sylt has an additional Tertiary core (Rote Kliff, Morsumkliff). During the ice ages, the areas between the plateaus were subsequently filled up with fluvio-glacial and fluvial deposits, whereas eolian sands partly covered its surface. Locally, older banks of glacial black till have been used by brick-works and potteries.

Surface relief has determined the size and structure of the distinctive landscape units. Relief is most pronounced around the glacial valley of the Elbe river, with its highest points at more than 100 m. To the north the billowing Pleistocene fringe often reaches a height of 25 to 50 m. To the west differences in height are rapidly decreasing. As a consequence, landscape units are more extensive, culminating in the Groningen and Fryslân coastal plains and the former peat-moors around the Zuider Zee.

Natural dynamics were boosted up by sea-level rise. From the latest Ice Age (about 10,000 BC) to today the level of the North Sea has risen by 100 m. The coastline continually moved south and eastward, until it reached the present Wadden Sea Region at about 6,000 BC. At 5,000 BC the Strait of Dover was flooded, which caused the currents to run parallel to the coast. Sand was heaped up to form sandbanks and barrier islands, sometimes developing into beach barriers that subsequently broke down again. Differences in tidal range determined the outcome. In the German Bight tidal movements are most pronounced (nowadays 3 to 4 m), which prevented the development of barrier islands. On the outer edges of the Wadden Sea tidal range is more restricted (1 to 2 m), which facilitated the formation of uninterrupted beach barriers. Barrier islands dominate the rest of the coastal area. Many details of coastal development are still debated, however, as reconstructed phases of maritime transgression and regression are not

generally accepted. Especially the locally observed effects of the so-called Dunkirk-I (700–100 BC, Midlum layers), Dunkirk-II (200–600 AD, Pewsum layers) and Dunkirk-IIIa transgression (after 800 AD) may have been caused by other, largely regional factors.

As sea-level rose, so did the ground water table. The coastline was driven south- and eastward, a broad belt of marsh and bog spreading before it over the Pleistocene surface to form a basal layer of peat. Between the sandy coast and the inland mires, a vast lagoon of mud flats and shallows – the Wadden Sea – came into existence, gradually filling-up with sediments transported by the sea through tidal inlets. Sand was deposited along the canals, whereas the finer clay particles were taken further inland and deposited under more quiet conditions. Bit-by-bit they constituted an elevated salt marsh fringe behind the lagoon, which protected the inland mires. At many locations layers of peat and marine sediment alternate, due to recurrent periods of rising ground water levels and peat-growth, peat-bank erosion and subsequent maritime incursions.

Wherever extended moraine ridges confronted the rushing waves (as in Dithmarschen and Eiderstedt), these ridges were partly eroded to bars and dune ridges, supplying the sediment for the advanced salt marshes and protecting the back swamps. Wherever the wind got hold of the washed up sea-sand, immense dunes developed. Most of these islands tended to drift south- and eastward. The Jutish marshes consist of a former lagoon, drowned in the last millennium BC and subsequently raised by tectonic movements, preventing the development of back swamps. The sediments in the filled-up glacial valley of the Weser and Jade rivers, on the other hand, tended to set, causing subsequent cycles of inundation, sedimentation, peat-growth, and peat-bank erosion.

Most of the inland mires developed into peat-moor domes, often 10 to 15 km in width and reaching 3 to 6 m above the original surface. Sphagnum-peat growth amounted up to 0.15 to 0.25 m per century. Locally, the upland Oldenburg, Emsland, and Bourtanger Moors may have reached 10 to 12 m. Initially, natural depressions were filled up by reed- and sedge-peat bogs. Subsequently wood-peat began to cover the river back swamps and glacial flood plains, gradually developing into sphagnum-peat moors as soon as the inflow of eutrophous river-water came to a halt. Finally, oligotrophous raised bogs

came into existence, overgrowing higher grounds until the moraine plateaus became isolated from each other. Up to the Early Middle Ages the North-Frisian shallows and the western parts of the Wadden Sea have been covered by extensive peat-moors as well, protected by prolonged beach barriers. The remnants of maritime peat-banks have been reported near the islands of Juist, Borkum, Ameland, Terschelling, and Vlieland.

Peat growth was greatly accelerated by a sudden fall in temperatures and rising precipitation quantities around 800 BC. As consequence, more recent peat-layers are inferior in quality to the initial dark peat-layers. On the other hand, rising temperatures and periods of drought since the 10th century AD prompted the erosion of existing peat-banks and beach barriers. The existing dune barriers were completely transformed, as the lower prehistoric dunes were partly overwhelmed by towering younger dunes, covering the humous fields and former woodlands by shifting sands. The medieval climatic optimum lasted until the 13th century. Due to its after-effects, sea levels began to rise again until they reached a climax in the 16th century. By then storm-surge frequency also reached a peak due to falling temperatures. Severe storm surges took place in 1164, 1219, 1287, 1330s, 1362, 1374, 1421, 1436, 1509, 1511, 1532, 1570, 1634, 1686, 1717, 1825, and 1962. The islands of Büsum, Vlieland, Huisduinen, and Callantsoog shifted landward, Mandø moved to the south. The village of Sønder side and the islands of Großer and Kleiner Wall (Hwæla Major and Minor), Buise, Bant and Ganc disappeared. The Elbe, Weser and Ems river-banks were eroded by streaming water, causing the destruction of villages in the Seestermüher Marsch, Haseldorfer Marsch, Land Hadeln, Land Wursten, Osterstade, Krummhörn and Rheiderland. Several coastal villages in Butjadingen, Harlingerland, Fryslân and West-Friesland were destroyed as well, where their remains can still be found on the shallows or in re-embanked polders. In Nordfriesland 14th- and 17th-century storm surges destroyed large parts of the marshlands lying in the Wadden Sea.

Many mires were eroded and died off during the Late Middle Ages. Dozens of stories about floating islands of peat, sometimes with trees and cattle still on it, have been recorded. As these floating peat-banks disappeared, the coastal marshes became more liable to floods. Nevertheless, the most serious damage was

## 2.6 Cultural history

done by human efforts to drain and cultivate the mires. The Maadebucht, Harlebucht and Marsdiep inlet probably date from the Early Middle Ages. By the 11th and 12th century the mires of Nordfriesland, Lauwerszee and the western Wadden Sea became exposed to the sea, causing a rapid fall of water-levels in the Zuider Zee and putting the area into tidal range. By the 14th century, the bays of Wiedingharde, Jade and Leybucht had broken in, followed by the Dollard in the 15th century. The fenland island of Nordstrand was destroyed as late as 1634. In each case the silt and organic material set free provided the building elements for new mud flats, salt marshes, islands and polders.

Hence, tidal movements, extreme weather conditions and ceaseless processes of erosion, sedimentation and production of organic material made the Wadden Sea a highly dynamic natural area. Tidal inlets and channels often changed their course, having a far-reaching effect on neighboring islands, salt marshes and mires, thereby determining the possibilities for human survival and intervention.

### 2.6 Cultural history

#### 2.6.1 The coastal niche

The dynamics of the natural environment had its repercussion on the settlers' cultural heritage. Interacting with nature, men had to adapt themselves to continuously changing circumstances. As a consequence, they created a unique social-ecological niche with four main elements:

1. Abundant natural resources, originating from agriculture on rich alluvial soils, peat-digging, salt-making and fishing in shallow waters.
2. A system of collective arrangements, generated by the need to survive in a potentially hostile environment: artificial dwelling mounds, embankments, drainage schemes, fuel, hay and drinking-water supplies, as well as effective strategies of military defense (flood belts and entrenchments).
3. Accessibility to overseas trade, which enabled its inhabitants to realize their assets and provided cultural incentives at the same time.
4. Geographical insulation and climatic restraints (e.g. malaria), which prevented sudden incursions into coastal wealth and

frustrated long-term military control until the Early Modern Age.

Moreover, coastal civilization had a very distinctive dynamic, characterized by continuous interaction of traditional beliefs and current incentives. Rural traditions, based on experience, were constantly challenged by urban innovations, economic conjunctions and political realities. This resulted in articulate local identities and a more or less insular culture, accustomed to the assimilation of foreign influences as well as to counterbalancing their unwanted effects. Coastal culture was characterized by centrifugal tendencies, in spite of its vicinity to the sinews of international commerce. Hence, cosmopolitanism and holding on to tradition went hand in hand.

During the late 19th and 20th century, the coastal districts took the penalty for taking the lead. They fell victim of a 'leapfrog effect', as they had invested heavily in technologies and ways of life which gradually became outdated. The region's infrastructure was reversed: inland traffic increased, whereas the coasting trade came to a halt. Economic growth fell behind, due to the fact that the demand for agrarian products was inelastic as compared with industrial outputs. As a consequence, many cultural and natural values survived the pressure of modernization. The inland districts, on the other hand, had 'the advantage of backwardness', as the moorland landscape was completely transformed.

#### 2.6.2 Prehistoric Age (before Christ) and Roman Iron Age (0-400 AD)

Men have inhabited the Wadden Sea Region since the late Neolithicum. The marshland amphibian environment with its diversity of fish, shellfish, fowl and wild plants has been exploited since the 5th millennium BC by the sedentary Ellerbek-Ertebølle and Swifterbant cultures. Subsequently, Neolithic, Bronze and Iron Age settlers learned to use the fertile salt marshes and riverine thickets for pasturage, agriculture and fishing.

For long, permanent settlement was largely restricted to the edges of the coastal area. Dozens of sites were located on moraine hillocks and river dunes, where they were subsequently buried under marine or riverine sediments or became overgrown by the mires. In fact, most of these settlements may be considered as outposts of the upland funnel-beaker civilization. Appar-



ently, their inhabitants fled the area as soon as the impact of rising sea levels came to be felt. Near Delfzijl Neolithic settlers built a megalithic chambered tomb about 3350 BC. After 2200, BC the site disappeared under several feet of clay and peat. Settlement remains are known from Emden and Winsum (Groningen), but scattered findings suggest that human activities extended far into the present Wadden Sea. As much as 77 megalithic graves and 1,000 Bronze Age barrows are located on Sylt, Föhr and Amrum alone, whereas the adjoining mudflats and sandbanks provided dozens of flint daggers and sickles. Barrows and megalithic graves are also numerous in the upland districts.

As sea-level rise slowed-down, other tribesmen began to reclaim the coastal plains. The oldest known maritime settlements, dating about 2600 BC, have been found in a former salt marsh area in West-Friesland. Archaeologists

Fig. 2.7:  
Burial mound, Hjerpsted,  
Denmark  
Photo: C. Christiansen



assume that the beach-ridges may have been settled even earlier. The earliest findings are associated with the Vlaardingen civilization (3500-2500 BC), an amphibious counterpart of the upland funnel-beaker settlements. But the overall picture is very incomplete, due to coastal erosion. Apparently, local people have learned to build seaworthy boats at an early date. Even the oldest marshland settlement reveals traces of haddock, caught in open sea. Wherever possible, diets were supplemented by large amounts of shellfish. During the Bronze Age (2100-600 BC) the island of Helgoland, 100 km off the coast,

apparently developed into a center of copper production, flint mining and amber trade. The moraine island of Texel has also been inhabited since the Bronze Age.

About 1350 BC Bronze Age farmers settled down at a former salt marsh estuary near Hoogkarspel (Noord-Holland). As far as we know, they were the first marshland dwellers who held out against rising water levels by building their farmsteads on raised platforms. Another Bronze Age settlement has been found at the Weser River banks near Rodenkirchen. In either case, settlements were abandoned before the beginning of the Iron Age.

The riverbanks of the Ems have been first colonized during the 7th century, the Elbe River banks at the latest during the 4th century BC. Several contemporary burial places have been discovered in the Ballum Marsk. These Bronze and Iron Age settlers adapted to the amphibian environment by draining their fields, expanding their stocks and supplementing their diets with fish and fowl. The riverine woods were cut down in order to obtain building material, fodder and fuel. In some cases, the inhabitants started to raise their farmyards in order to cope with increasing ground-water levels. When forward pushing mires and recurrent sea-breaches submerged their fields, people had to give up their quarters. Most riverbank settlements and several inland districts were abandoned during Pre-Roman times.

It took even greater efforts to establish hamlets in the unprotected salt marshes, as people had to cope with shortages of fuel, timber and drinking water, as well as with the risk of storm surges. The first settlers may have been transhumant pastoralists, who spent the winters on higher grounds. Probably the expansion of inland bogs reduced their means of subsistence and made them look for alternatives in the rapidly expanding marshes. Many upland villages with walled-in field systems ('celtic fields') have been abandoned during the last centuries BC. The salt marshes were largely treeless, dominated by immense reed-lands beyond the reach of the eye. Intensive grazing and mowing, however, created an open landscape in which black-grass communities (*Juncetum gerardi*) were the dominant vegetation.

The Groningen and Fryslân coastal marshes were inhabited permanently since the 6th and 5th century BC. According to recent studies, the first settlers probably came from the east, supplemented by immigrants from the adjoining

upland districts. In Lower Saxony and Noord-Holland, the coastal districts have been colonized since first century BC, the Schleswig-Holstein marshes during the first century AD. By then, a densely populated zone of marshland villages stretched from the Wiedingharde district down to the river estuaries near Amsterdam. Additionally, the North-Frisian islands, the island of Texel and the Jutland coastal fringe came to harbor a large population, in the North-Frisian case probably supplemented by foreign immigrants. Several other islands may have been inhabited as well. Roman naval expeditions conquered a fort on 'Burchana', probably the former fenland island Bant (now Kopersand) near present-day Borkum. But archeological findings are totally erratic.

The ethnic identity of the settlers remains unclear. Roman sources mention the Frisii and the Chauci as well as a series of tribes on Jutland peninsula (e.g. Sabalingi, Sigoulones, Aviones, Ambrones, Saxones). We may expect, however, that only minor cultural differences existed between the marshland dwellers, the island population and the upland coastal tribes.

In each case, the first marshland settlements were established on the surface just above high-tide levels. Subsequently, farmyards were raised. Near Bremerhaven and Harlingen archaeologists discovered that Roman-time settlers sometimes surrounded their infields with quays, measuring three to four feet in height. Only after several generations people started to build collective raised mounds (toft, værft, Warf, Wurt, wierde, terp) from sods and dung on which they situated their farms and infields.

Step-by-step permanent settlers became fully adapted to living in tidal areas, building cattle-farms on mounds, preserving winter-stocks of hay, fuel and drinking water, and tilling the stiff clay-soil during the brief summer season. Various tribes shared virtually the same technology. They cultivated salt-resistant summer-crops such as barley or bere, broad beans, flax, gold of pleasure (*camelina sativa*) and probably kale. Furrows indicate that the mould-board plough may have originated here. The outfields were carefully drained by ditches, radially descending

from the village mound and running towards tidal creeks and gullies. Farms, accompanied by helmed haystacks and artisan pit-houses, were located side by side along the slopes of the mound, in the Late Middle Ages often surrounded by a circular road. Alternatively, along the riverbanks where tide was restricted, farms were situated on a row of house platforms bordering a tidal creek (Ostermoor, Kreis Dithmarschen). The aisled longhouses had roughly the same structure as their Bronze Age predecessors. Cattle was stalled in the side-aisles behind a gutter, the living quarters were located in the adjoining hall. Wells and ponds guaranteed fresh-water supplies, dried cow-dung or peat served as fuel, timber had to be imported.

During the Roman Iron Age (0-400 AD) all coastal tribes had brisk sea-borne contacts with the Roman borderlands from which they borrowed material items (weapons, pottery, quern-



Fig. 2.8:  
Castle mound Menaldum,  
The Netherlands  
Photo: D. Marrewijk

stones, glass, jewelry) as well as religious and political ideas. In return, they offered cattle, hides, textile, bone artisan products and probably also slaves. Many of them served as Roman soldiers, others turned to piracy against the Empire. Ships, however, other than large hollowed tree boats, have never been discovered. A Roman trading post has been excavated at Jemgum-Bentumersiel (Landkreis Leer). The circular forts of Archsumburg on Sylt, Trælbanken in the Højer Marsk, Heidenschanze and Heidenstedt near Langen-Sievern (Landkreis Cuxhaven) and the fort near Borkum mentioned before

show the consequences of nascent political centralization, partly due to increasing interaction with the Roman Empire.

Political turmoil increased during the next centuries. Due to the Germanic tribal expansion Groningen and the adjoining parts of Drenthe and Fryslân came under the influence of the Chauci, leaving only the western districts to the Frisians. The Chauci became subsequently integrated into the Saxon tribal confederation, while the remaining Frisians were dragged into the chaos of the collapsing Roman empire. A host of maritime intruders from Jutland tried to benefit from the unsure situation. Moreover, as sea levels rose, coastal dwellers had to cope with washed-over fields, drowned animals and salted wells. The introduction of malaria (a principal mortality cause in the marshes ever since) may have caused a demographic disaster.

By 300 AD the Fryslân and Noord-Holland coastal marshes were to a large extent abandoned, whereas Groningen and Ostfriesland encountered a profound reduction in population levels. The Schleswig-Holstein and Lower Saxony coastal areas were abandoned somewhat later as the Anglo-Saxons left for Britain, where climate and living conditions were better. Only Jutland saw a more or less continuous development, though several villages were abandoned in the 6th century, probably due to sea level rise.

### 2.6.3 Early Medieval Time and Viking Age (400–1050 AD)

After a partial break in the 4th to 6th century, coastal population grew to unprecedented levels of density and wealth. Basic technology, however, remained practically the same. As before, the colonists often settled down on the surface before they started to build dwelling mounds. Most villages were located on recently deposited seashore banks. As these obstructed drainage, the original settlement areas often became overgrown by the peat-moors. During the migration period large family farms tended to be replaced by small farms and pit-houses, but soon circumstances improved. By then, most adults may have acquired a certain immunity against the endemic marsh-fevers, which were to rage among children and foreign visitors for many centuries to come.

Resettlement of the western districts took place after 425 AD, mainly by Anglo-Saxon colonists from the East. Apparently, they claimed the old tribal name of the Frisians, which now

covered the whole coastal area down the to mouth of the Scheldt river. Probably the area served as an intermediate for the colonization of Britain. During the 6th and 7th century, Frisian immigrants also repopulated the eastern districts up to the Weser river, including the upland districts, followed by the Bremerhaven area (Wursten, Lehe, Stotel, Vlieland). Here the Frisians may have settled down as military colonists under Frankish rule. Since the 8th century, Frisian colonists also settled down at the edges of the North-Frisian mires, in Eiderstedt, at the islands of Sylt and Amrum and at the fertile lee-side of the other barrier islands (e.g. Terschelling, Ameland). Beyond the Eider river, Frisian immigrants (probably from the Weser area) rapidly outnumbered the Jutish settlers from the North, apparently because of their superior technology, which enabled them to exploit the salt marshes more effectively. Dithmarschen and the Elbe riverbanks were recolonized since the 7th century by Saxon tribes, apparently coming from the upland districts. These villages can often be arranged according to their names: the older ones ending on -wort/warden/wierde, -ingen/ens, -stedt/stede or -thorp/rup/dorp, the younger ones ending on -büttel/büll/bøl, -fleth, -lak, -um/heim, -husen/huizen or -buren/bert/bierum.

Scandinavian bracteates and many other luxury items prove that the whole region was politically and religiously connected with Scandinavia until about 700. Yet, the Frisians and Saxons spoke West-Germanic dialects, closely related to Old English, and quite different from the Scandinavian dialects of the North. Early state formation took place under the charismatic rule of petty kings such as Radbod (d. 719), who resided in Utrecht, but whose political influence reached as far as Helgoland. The jewelry produced at a royal site near Wijnaldum counts among the finest contemporary objects known in Europe. The fame of the Frisian kingdom is reflected in Anglo-Saxon literature.

Shortly after, Frisians and Saxons became formally christianized and incorporated into the Frankish kingdom. The tribal leaders and their families were largely absorbed by the hierarchical structures, developing around the royal court and its ecclesiastical equivalents. Noble estates were granted to remote abbeys and episcopal sees, whereas local chiefs declared their loyalty to foreign magnates. Timber-built baptismal churches were carefully distributed over the various districts in order to support political power

with the suggestion of divine blessing. Though the web of feudal duties was not as inevitable as in the inland districts, by the year 800 the coastal region was fully integrated into the hierarchical configurations of the Carolingian Empire. During the next four centuries the Duke of Saxony, the Archbishop of Hamburg/Bremen, the Bishops of Münster and Utrecht and a whole range of Saxon, Westphalian and Low Country counts dominated the political scene of the Wadden Sea Region. Carolingian power reached as far as the Eider river, where the Danes had erected a defensive wall across the Jutland peninsula. Southwestern Jutland was effectively christianized in the second half of the 10th century under the authority of king Harald Blåtand and his jarls, Ribe and Schleswig becoming the main episcopal sees.

Christianized merchants from the Frisian districts played an important part as middlemen between the Frankish kingdom and the semi-tribal societies of Northern Europe. Their kinsmen established outposts far beyond the borders of the Empire. Trade concentrated on exchanging foreign luxury products, which were vital for the gift economy of local warlords and their retainers. The port towns were newly created under the protection of local magnates and royal representatives. Houses were situated along riverbanks and tidal creeks, where the inhabitants could easily moor their cargo ships and pull them

ashore. These flat-bottomed sailing ships are considered the forerunners of the Hanseatic cog ship (kogge), of which an example from 1380 is exhibited in the Bremerhaven shipping museum.

The most famous of the maritime emporia were the towns of Dorestad (Wijk bij Duurstede near Utrecht) and Hedeby/Haithabu (Schleswig). The former was the gate to the German Rhineland, the latter controlled the shipping route from the Baltic along the Eider and Treene Rivers towards the North Sea. The towns of Ribe and neighboring Dankirke, Hamburg, Bardovick (Landkreis Lüneburg), Stade, Brüggehusen (Bremerhaven–Lehe), Bremen, Jever, Emden, Stavoren and Medemblik had a similar history. Moreover, foreign outposts were established along Europe's main waterways from Scandinavia to Britain (York) and down to the Rhine and Loire valleys. This was not only the case in the towns, but sometimes also in the surrounding countryside. In most cases, Frisian presence is documented by the pottery meagered with grinded musselshells. Frisian grave-goods have been discovered in Darum near Ribe, along the banks of the Elbe river and in Dunum (Landkreis Wittmund). The Frisian guild in Sigtuna (Sweden) existed up to the 11th century. Cities like Cologne, Mainz and Strasbourg had their own Frisian quarters, Frisian small coins (sceattas) were widespread, whereas the North Sea was sometimes called 'Mare fresicum'.



Fig. 2.9:  
Farmhouse in the Ballum  
marsh, Denmark  
Photo: J. Frederiksen





Fig. 2.10:  
Misthusum, part of an old  
dwelling mound ensemble,  
Denmark  
Photo: C. Christiansen

Consequently, international commerce brought the Frisians homelands in contact with foreign countries all over Europe. In the Wadden Sea Region a new type of village came into existence: oblong mercantile dwelling mounds, situated along tidal creeks, populated by merchants, skippers and artisans, and protected by a local lord. In many cases these villages developed into centers of political and ecclesiastical power, as was the case with Emden, Farmsum, Appingedam, Winsum, Dokkum, Leeuwarden, Bolsward, Oldeboorn, Stavoren and Medemblik. Others had a more local significance, such as Nesse, Groothusen, Grimersum, Oldersum, Hatzum, Jemgum, Termunten, Garreweer, Westereyden, Holwerd and Berlikum. Sometimes a second village church witnessed the growing self-awareness of the local inhabitants, e.g. Langwarden. To what extent the eastern districts participated in maritime commerce, remains uncertain. The dwelling mounds of Otterndorf, Belum and Hohnswik near Ihlienworth (Landkreis Cuxhaven) are from the same type as the ones mentioned above. On the other hand, Elisenhof (Kreis Nordfriesland), Wöhrden and Wellinghusen (Kreis Dithmarschen) had a radial structure, despite of their contacts with interregional traders. Viking-age merchants from Jutland may have been involved in shipping activities as well.

Since the 9th and 10th centuries, however, Frisian commerce gradually declined, as long-

distance luxury trade gave way to a monetized trade of bulkier consumer goods. Bit-by-bit traditional emporia were replaced by regional market towns. Still, Frisian small coins have been widespread until the 11th and 12th century. By then, however, Saxon merchants and ship owners from the emerging Hanseatic cities had started to take over the Frisian's leading role.

Additionally, Frisian expansion suffered from the dissolution of the Frankish empire. During the 9th century, the Wadden Sea Region came under the influence of christianized Viking warlords such as Harald Klak, who were driven out of Denmark by competing royal lineages. Hidden treasures found on the island of Wieringen witness their activities. Conversely, dissident Frisians settled down beyond the border on Danish territory. As before, the Wadden Sea Region became an intermediary for the conquest of England. Frequently, whole districts were held to ransom, whereas villages were burned and their inhabitants sold as slaves. Probably, however, piracy and trade went hand in hand. Viking age barrows are known from Föhr, Sylt and Amrum as well as from the Jutland coastal area.

A new generation of circular forts served as nuclei of emerging state power. The oldest ones were erected during the wars between the Saxons and their Frankish opponents: Stellerburg, Bökelburg and Kuden (Große Westburg) in Dithmarschen, Kaaksburg and Esesfelt near Itzehoe, Pipinsburg, Hollburg and maybe Judenkirchhof around Cuxhaven as well as Bokelerburg near Rastede (Landkreis Ammerland). Several forts were part of a Carolingian coastal defensive line stretching from Boulogne to Den Burg on the island of Texel. Another 10th-century fort has recently been located at Cuxhaven-Altenwalde. Contemporary structures beyond the imperial border may have been built by Frisian immigrants (Lembecksburg on Föhr, Tinnumburg on Sylt, the former Ratsburg near Rantum). The Woltersberg at Jever-Schortens and three connected moats near Bad Zwischenahn are 11th-century structures, probably established to back the feudal aspirations of the Saxon duke. The Hamburg Nicholas-church marks the location of another ducal fort. Viking attacks ended mid-11th century, as state authority was firmly established in Scandinavia. The political ties between Denmark and its overseas colonies soon broke off.

On the whole, foreign visitors were surprised by the prosperity of the coastal inhabitants. Archaeological findings show a rich and diverse



material culture, witnessing extensive commercial contacts and a considerable degree of specialization. Next to stockbreeding, sheep breeding and some arable farming, people were engaged the production of cloth, salt and hides. Spinning, dying and weaving were female work. Weaving patterns were sometimes quite delicate. Apparently, the woad-died cloths served as currency. Quality and quantity was dropping in the Late Middle Ages, probably due to competition from Flanders. Nordfriesland was a last resort. By the middle of the 16th century, however, local production had come to a halt.

The Frisians were specialists in salt-making, for which they burned silted peat and boiled the ashes. Entire peat-banks have been systematically destroyed in order to obtain the raw material. For each 100 kg of salt 4 cubic meters of peat had to be processed. Additionally, during the relatively warm 12th and 13th century, genuine salt pans, in which salt-water was reduced by evaporation, may have been in use. Early and high medieval salt pits (*daliegaten*) have been discovered at several locations in Ostfriesland, Groningen (e.g. Zoutkamp), Fryslân and Noord-Holland. The former island of Bant (near Borkum) produced salt until the 16th century. Yet, the most productive locations were in Nordfriesland, where several sites were operative until the 18th century. Again, foreign competition was destructive. Lüneburg and Biscayan salt (the latter since the 15th century) were purer and more suited to the preservation of cheese, butter and dried beef than the bitterly tasting local products. Traditional centers of salt-refinery, such as in Harlingen and Alkmaar, switched over to imported salt. The remaining local production was exported to Jutland and Norway. Local salt was also used for the preparation of cowhides.

Most coastal villages were largely agricultural. Farm construction probably remained the same, but wickerwork was temporarily replaced by sod walls, probably due to the scarcity of locally available brushwood. Most dwelling mounds had a fresh-water pond (*fedding*, *fething*, *feit*, *dobbe*), often connected to a natural well. The infields were located on elevated mounds, banks and holms surrounded by ditches and hedgerows (*esing*, *eske*, *marren*, *kampen*, *esscher*, *gast*, *houw*, *valg*, *felling*, *zaadland*). After the harvest, these served the sheep flocks as a winter-refuge. The outfields were parceled out into privately owned irregular square fields (*fenne*, *fen*, *krog*, *block*, *hamm*), leaving only the remote meadows (*wisch*, *miede*, *hemrik*, *zwaag*) undivided. Prob-

bly each peasant had an individual claim to a certain number of wagonloads of hay and specified grazing-rights, depending on his wealth. In this respect, coastal society was not egalitarian at all.

Newly established villages were parceled out in a more or less rectangular pattern instead of the radial forms known since the Iron Age, probably reflecting the rise of private property. By the 9th or 10th century, the newly deposited salt marshes that were suited to arable farming were parceled out in regular blocks (e.g. Butjadingen, Groningen, Fryslân). Planned villages suggest the existence of small-scale royal, noble or ecclesiastical manors. A 10th-century manor near Hatzum (Landkreis Leer) shows a hall with an adjoining pit-house, where female servants or serfs made cloth. The village of Baflo (Groningen) originated from a Carolingian manor. In Dithmarschen and Wursten settlement moved from the inland villages towards a long row of individual farm mounds along the coastline, which were subsequently connected by a dyke. In Wiedingharde and northern Ostfriesland individual farm mounds were dispersed all over the area, but in the other districts village mounds remained the rule. Occupation along the Pleistocene fringe was mostly concentrated in hamlets at the border of the marshland zone. Here traditional aisled buildings had been replaced by simple longhouses with exterior wall-posts, which gradually evolved into the high-medieval aisled open-hall type.

The cultural heritage of the prehistoric and early medieval landscape is still omnipresent, particularly in the German coastal districts. In the Netherlands many mounds have been leveled by digging during the 19th and early 20th century, because the humose soil gave a perfect sort of manure. Re-allotment programs since the 1950s have erased much of the original field-systems. Still, many medieval mounds and ancient field-systems are intact, serving as a treasury for archaeologists and landscape-historians from all over the world.

#### 2.6.4 High and Late Medieval Time (1050–1500 AD)

During the 11th and 12th centuries, Europe witnessed a change from outward expansion to internal colonization, due to a growing population and encouraged by the efforts of feudal lords to enlarge their income. Until then, most coastal districts were virtually insulated from the

higher Pleistocene grounds by impassable peat-moors, bogs and lagoons. Thenceforward, huge efforts were made to expand cultivated areas by draining the inland moors and building protective dams against floods and inundations. Moreover, almost 1,000 parishes were founded, reorganizing the population around the priest and the local gentry.

At the end of the Middle Ages, the coastal area had been completely transformed into a cultivated landscape. Entire marsh districts were surrounded by an unbroken earth-wall of more than a man's height, designed to shut seawater and acid bog-water seepage out of the vulnerable fresh water milieu within its confines. Populous villages lay dispersed in a patchwork of fertile arable fields and enclosed pastures, the farms and cottages sheltering around newly built brick churches or dispersed along dykes and river-banks. In the rear, the former peat-moors had given way to a belt of low-lying pastoral farming settlements, boggy meadows and waterlogged wastelands, isolating the maritime zone from its hinterland and functioning as a powerful military defense line.

At the edges of the Wadden Sea powerful cities had risen, sending their freight ships along the North Sea coast and buying the countryside's agricultural surplus. The islands began to take part in the shipping and fishing industry, whereas the villages along the Pleistocene fringe shared in the maritime wealth of the coastal zone as well. The contrast with the inland zones was striking, however, as these were increasingly characterized by endless tracts of disforested heath and desolate peat-moors.

The embankment of the coastal marshes began in the 11th and 12th century. Sometimes neighbors just started with a dyke around their fields or around several villages (Eiderstedt, Butjadingen), alternatively dozens of villages collaborated from the beginning (Nordstrand, Oostergo, De Hemmen). Both ring-shaped quays and linear embankments have been observed. By the 13th century a 1 to 2.5 meter dyke surrounded most districts, with timber-built valve-locks or hollowed trees at its lowest points. Inner dykes such as the Grauwall (Wursten) and the Slachte (Westergo) protected the low-lying inland districts against surface water from the coastal area. Subsequently, rivers became dammed up by a series of parallel dyke-locks (Siele, zijlen). The administration of dykes, locks and polders required completely new forms of administration and control (Köge, Sielachten, zijlvesten, koggen,

waterschappen). Yet, these embankments could not prevent that the fields became inundated by storm surges. The dykes had mild slopes, so that the waves could do limited damage.

At the same time, population growth caused an inward drift in which numerous drawn-out linear villages were founded. Peat-moor colonization started in Zuid-Holland and Utrecht fenlands and in the Frisian districts north of Amsterdam, probably in the 9th or 10th century. But the Frisians districts up to western Ostfriesland and around the Jade and Weser rivers soon followed. By the 11th century, a second wave of Frisian emigrants (probably coming from the districts around the Ems river) began to reclaim the North-Frisian marshes, which were recently made accessible by drought and coastal erosion. They mainly settled in Eiderstedt, Nordstrand and on the edges of the former Risummoor (Bök-inghamde). Other fenland villages were established on the Pleistocene fringe behind the former peat-moor domes (Klixbüll, Schnatebüll, Stedesand, Enge, Bargum, Langenhorn). The Tøndermarsk was settled in the 12th century. Experienced colonists from the Zuid-Holland plains settled down at the peat-moors behind the Elbe and Weser Rivers banks. The oldest colonial settlements were in the so-called Hollerland near the city of Bremen, established in 1113. Local settlers reclaimed the Dithmarschen peat-moors.

The fenlands came to be characterized by a honeycomb pattern of dykes and canals, designed to protect each village territory against the down-streaming water from neighboring districts (Sietwenden) and landward peat-moors (Hinterdeiche). Individual properties (Stave, Hufe, Spal, Bau, heerd, sate) were divided in lengthy parallel strips separated by linear ditches. Wherever peat-land reclamation reached into the upland peat-moors ditches were replaced by hedgerows and sod banks (e.g. Hadelner Sietland, Moorriem, Brookmerland, Westerkwartier, Friese Wouden). Most Frisian villagers had an unrestricted reclamation privilege (right of *Aufstreck* or *opstrek*) that resulted in toothed boundaries between competing village territories. The Hollander colonies, on the other hand, had a more systematic layout with a linear back-frontier, as they were administered by noble entrepreneurs (locators) with limited claims. Frisian settlements usually got names ending on *-wold/woud*, colonists from Holland often used names on *-kop/cope* or *-wetteren*, both employed names on *-brook/broek* or *-wisch*.

These initial reclamation efforts, however, provoked an irreversible range of hydraulic measures, as they corroded the peat surface and made its subsoil set. Every reduction of water levels caused drastic surface subsidence, which made further reductions necessary and increased the risk of inundation. As a rule, farms and villages were relocated several times up to the recently reclaimed peat-moor, reassigning their drenched fields as pastures and meadows. By the end of the Middle Ages, many fenland districts were submerged with rainwater during wintertime. The peasants reverted to cattle farming, supplemented by small-scale agriculture on riverbanks, holms and artificial ridges. This



was the case in the Wilster Marsch, Hadelner Sietland and in the fenland districts along the Weser and Ems River as well as in the low-lying districts of Groningen, Fryslân and Noord-Holland. In the Late Middle Ages, rising seawater levels and rising tides, due to embankments, made the situation even worse. Some fenland areas were completely devastated by the sea after the dykes had been neglected, such as the Jade and Dollard Bay. In Nordfriesland, the legendary town of Rungholt was submersed in 1362. Probably adjacent areas were hit as well: 40 churches are reported to have been destroyed in the 14th and 15th centuries. A stream of Frisian refugees settled down at the Pleistocene fringe around Husum and in the remaining parts of the Risummoor (Kornkoog). The heavily populated district of West-Friesland could only be saved by a 4 to 5 m high sea wall, strengthened with wooden palisades, seagrass (zeewier), twigs, thatch, brick and boulders, greatly reducing the risk of salt-water flooding. Parts of a seagrass dyke have been preserved at the former island of Wieringen.

On the islands and in the upland districts population grew as well during the High Middle Ages. By the end of the Middle Ages, most woodlands were replaced by heath. Villages were relocated at favorable spots next to the marshland area, often situated around a central green (vortoft, forte, brink, theen, tie) and surrounded by oak shrubs. During the Middle Ages, arable farming came to be concentrated in heavily manured infields for the cultivation of winter-

proof rye (alsædjord, dayelsklûn, marker, kampen, gast, es, bouwte), supplemented by temporary outfields for oats and flax (wungelûn, haferland, dries, tresk) and carefully protected by hedgerows, dykes and ditches against cattle roaming on the exhausted commons (ellemode, mente, marke, meenschar). This system was most pronounced in the districts south of the Elbe River as well as on the North-Frisian islands and in the adjoining mainland villages, where peasants completely abandoned the practice of fallowing their infields each third year. In wintertime, the cattle was stalled on heather-sods taken from the commons, which resulted in an increase of available quantities of necessary manure. Buckwheat was introduced in the 15th and 16th centuries.

On the mainland and on several islands (Föhr, Ameland, Terschelling) a restrictive open field system prevailed, in most cases until the 18th or 19th centuries. On the moraine islands of Texel and Wieringen the open fields were enclosed in the 17th and 18th centuries, resulting in a characteristic patchwork of tiny fields embedded by a grid of sod banks (tuunwallen). On the other islands, arable farming was mostly restricted to specific fields in dune valleys, surrounded by a dyke or fence (riem). Unrestricted grazing on the commons reinforced the process of wind-erosion, thereby contributing to the inherent instability of the coastal dunes and inland sand-drifts. Whole villages have been covered by sand or washed away into the sea (e.g. Alt-Rantrum, Ording, Sier, Callinge). Low-lying areas were

Fig. 2.11:  
Dyke in the province of  
Groningen, The Netherlands  
Photo: D. Marrewijk



before the end of the Middle Ages, in the Tøndermarsk as late as 1556. Some areas were only protected by summer-dykes, such as Misthusum in the Ballum Marsk where colonists started to build eight dwelling mounds as late as the 12th century. Apparently, these colonists came from Holland. Instead of building sea-dykes, they left for higher grounds in the 17th and 18th century. The same holds true of the marshland villages established on natural holms near Ribe (Yder Bjerrum, Jernkær) and on dwelling-mounds near Mjolden. Contemporary mounds on Föhr have been deserted

Fig. 2.12:  
Wheel (old breach in the  
dyke) in The Netherlands  
Photo: D. Marrewijk

overgrown by peat, as heathland exploitation caused surface leaching and the formation of impermeable underground layers of bog-ore. Locally, bog-ore was excavated and processed into iron.

The dominant type of upland farm building changed from convex longhouses into aisled open-halls, in which the harvest had to be stored and dried in the loft above the central fireplace. The additional rooms were left unheated. By the 15th century, timber-framed open-halls prevailed from Nordfriesland to Drenthe, leaving only the coastal area to more traditional longhouse buildings. Moreover, the constructive properties of timber-framed buildings were integrated into the traditional longhouses in Jutland and Schleswig-Holstein.

Wherever arable farming was worthwhile systematic salt marsh reclamation took place at an early date. Several recently silted up bends and forelands were embanked since the 13th century, such as in Eiderstedt, Krummhörn (Bucht von Sielmönken), Groningen (Fivelboezem) and Fryslân (Middelzee). These newly reclaimed areas were famous for their fertility. Monasteries and landlords often took a leading role. On the other hand, whenever peasants stuck to traditional cattle-farming embankment was delayed, particularly in those districts where individual farmsteads prevailed. In the Wiedingharde, Hattstedter Marsch, Husumer Südermarsch and Norderland embankment was not concluded

before the marshlands were embanked in the 16th century. Everywhere the upland dwellers were rather reluctant to embank the uninhabited salt marshes and river estuaries, because the floods had a fertilizing effect on pastures and meadows. The Jutland coastal fringe and several barrier islands were provided with dykes as late as the 20th century.

A special case were the Halligen: the exposed salt marsh islands in Nordfriesland and elsewhere, studded with hamlets built on dwelling mounds. Their early history is largely unknown. Probably local settlement originates from salt-making communities, working in the outskirts of the drowned peat-banks. Archaeological remains and references to former churches suggest that the area was quite prosperous. The islands of Oland, Langeneß, Nordmarsch, Gröde, Habel and Hooge have been mentioned in 13th- and 14th-century sources, together with the former islands of Gestenack and Hingsteneß. Norder- and Süderoog must have been settled by then as well. The Halligen Hooge, Südfall, Hamburger Hallig and Nordstrandischmoor were originally part of the embanked island of Nordstrand. The first two have been cut off as early as the 13th or 14th century, the latter contains the remnants of a former raised bog, inundated in 1634. The area's natural environment is very dynamic, however, the present landscape largely dating from the last few centuries. Moreover, the popular idea that Hallig life reflects medieval patterns



is erroneous. The sophisticated system for catching rainwater (schetel) and storing it in a pond (fething) or in cisterns (sooten) may have been quite recent. The house posts were subterraneanly interconnected in order to prevent collapses during a storm surge.

Dozens of small Hallig islands have disappeared, others were included in the embanked polderlands (Galmsbüll, Dagebüll, Fahretoft, Ockholm). Comparable settlements in other parts of the Wadden Sea Region were Jordsand, Bant, Griend and the excavated mound of Torp (near Den Helder). They have all been abandoned in the 16th or 17th centuries. The same holds true for a series of peat-moor islands in the former bays of Jade, Leybucht and Dollard. A special case is the island of Neuwerk, where the city of Hamburg built a fortified tower against pirate attacks around 1300. The tower was erected on an artificial platform and was renewed in the 1370s. The island is embanked in the 1550s and subsequently settled by farmers, who lived on dwelling mounds.

Marshland agriculture suited the amphibious environment. As before, barley, bere, oats and broad beans were the most important arable crops. Peat-moor colonists mainly grew rye. Topsoil desalination, however, had its repercussions on the local economy as it increased the range of available grains and grasses but also gave way to new weeds and plagues. Sheep farming, which had been essential to the Frisian cloth-trade, was restricted by the appearance of liver fluke (carried by dwarf pond snails). Some local cloth and salt production survived, but the local economy came to drift primarily on agricultural exports. Dairy farming grew in importance, particularly in Holland and Fryslân, where new techniques of preserving butter and cheese became available. Huge haystacks with adjustable roofs made it possible to increase the amount of the winter-fodder. The commons were mostly divided among the farms, except for specific plots intended for the poor. Among the farm buildings the traditional longhouse with wicker walls and thatched roofs prevailed. Their durability was greatly enhanced, however, by the use of saddle stones and additional braces instead of dug in posts. Since the 15th century the living quarters were often made of brick, provided with a vaulted dairy cellar, an elevated storage room for valuables (pesel, pisel, upkamer) and sometimes a stately hall with a chimney (saal, binhûs).

The eastern districts, on the other hand, specialized in arable farming. In the Elbe and Weser river districts the longhouses were replaced by timber-framed open-halls in the 14th or 15th centuries. If the longhouse was maintained, as in Ostfriesland, its central floor was widened to increase the loft. Additionally, detached barns, byres, wagon-sheds, granaries and adjustable haystacks were built. Marshland peasants employed a ridge and furrow system, according to which 10-15 m wide ridges were heightened and fertilized with mud from the ditches. In the river marsh districts the ridges often reached a height of 1.5 m. In the arable districts of Fryslân and the adjoining parts of Groningen another system has been observed. The irregular shaped fields were heightened as a whole, resulting in a crested (kruinig) profile.

Political and religious structures changed together with the landscape. By the 11th and 12th century the local elite began to strive for autonomy. Explicit ties with foreign rulers were gradually loosened, if not broken off completely. Only the Holland beach barrier and most of the upland districts were fully integrated into nascent states at an early date. Actual territories were small because of the waterlogged terrain that restricted the effective reach of military control. Moreover, the nascent military techniques that gave armored horsemen an advantage over foot soldiers were rather useless in the marshlands, except for summer drought and extreme winter cold when the roads set hard. The inner dykes were also used to create defendable flood belts, which were sometimes drained again so that the ice did not hold. Several districts had a medieval defense line (Landwehr) with canals, dykes and unsurpassable thickets stretching into the peat-bogs, sometimes used up to the 18th century.

Within these coastal territories participial government had an early start, urged by the requirements of hydraulic management and military defense. They resulted into a range of about forty or fifty peasant republics under the rule of local chiefs and abbots. Officially modeled as urban corporations with counselors and bailiffs these pristine states acted as a rural counterpart to the free Hanseatic cities. In the central area of the Wadden Sea Region most districts had gained full independence by the middle of the 13th century. To a large extent, they benefited from the political vacuum left by the Saxon duke Henri the Lion and the shift of imperial policy towards the Mediterranean. Dithmarschen



became an official member of the Hanseatic confederation, whereas the loosely structured Frisian republics between Zuider Zee and Weser held irregular conferences at the Upstalsboom near Aurich. Just as in their urban counterparts, actual oligarchy went hand in hand with egalitarian feelings, reaching a climax during the 15th century. Local autonomy came to be identified with ancient (Frisian) freedom, supposedly bestowed by kings and emperors.

Local meeting places were found in walled churchyards, in the churches, on the dyke-locks or on special greens, such as Dinghügel (Sylt), Fegetasch (Wiedingharde), Soptswarft (Bökingharde), Ordinger Berg, Burmannswege (Eiderstedt), Auf dem Schinkel (Kehdingen), Warning-sacker (Hadeln), Klénckenhamm (Wursten), Staleke (Osterstade), Rading (Butjadingen), Landeswarfen (Jeverland) or Wonser weerstal (Wûnseradiel). Since the 15th century churches, belfries and vicarages sometimes had a special secretary room where the archives were kept. Butjadingen had a district hall. Often, however, the officials ruled from their own houses.

On the fringes of the coastal area, however, dynastic intervention had to be settled for. The islands of Texel, Vlieland and Wieringen were conquered by Holland in 1184, West-Friesland followed in 1289 after count William II had been murdered by Frisian peasants in 1256. Fryslân had to repel several assaults by the count of Holland and his indigenous allies, namely in 1345 and in the years 1398 to 1401. The upland districts of Drenthe and Westervolde remained formally dependent on the bishops of Utrecht and Münster. The rebellious fenland colonists of Stedingen and Osterstade (Wesermarsch) were completely defeated by an aristocratic crusade in 1234, whereas the Elbe River marsh settlers acknowledged the archbishop of Bremen's formal authority in exchange for autonomy. King Abel of Denmark was killed by Eiderstedt warriors in 1252. Ever since, the loyalty of the Nordfriesland coastal districts (Uthlande) towards the Danish crown was enforced by an alternating mix of military expeditions and tempting privileges. Famous battle-fields on which the coastal republics successfully defended their privileges against feudal lords, were remembered for long: Östringfelde near Schortens (1153), Altenesch (1234), Mildeburg near Oldenswort (1252), Stavoren (1345), Coldewärf near Blexen (1368), Wilde Äcker bei Detern (1427) or the Dusenddüwelswarf near Hemmingstedt (1500),

Wremer Tief (1517) and the churchyard of Mulsum (1524).

In many ways, however, the republican framework relapsed into a more or less stateless society, in which feuds and blood-revenge were the rule. Carefully arranged marriages, ecclesiastical intervention and alliances with foreign powers helped to balance a basically unstable situation. Leading families were knit together by networks of cognate kinship ties. Alternatively, where Frisian or Dutch family law was unknown, as in Dithmarschen, quasi-agnate clans evolved, not unlike their Scottish counterparts. Political instability was most evident in the Frisian districts between the Weser River and the Zuider Zee. Here local chiefs began to build hundreds of brickwork donjons and other types of fortified houses by the 13th century. Particularly in Fryslân they were often located on a moated mound (motte, stinswier), though these mounds are also known from other coastal areas (e.g. Eiderstedt). In the 15th century most villages and towns had several fortified houses where local squires resided (e.g. Langwarden, Bunderhee, Veenwouden). Due to continuous warfare Fryslân fell into anarchy, whereas the eastern territories were more or less pacified by the cities of Hamburg, Bremen and Groningen. By then several regional warlords had started to build real castles, from where they tried to consolidate their territories at the expense of communal government (e.g. Jever, Esens, Greetsiel, Emden). Many free peasants were forced to become tenants, conveying their property to local lords.

Apparently, however, the costs of brickwork and the overwhelming power of the Hanseatic cities prevented the erection of similar buildings in the east of the Weser river. Only the donjons of Neuwerk (1309) and Cuxhaven-Ritzebüttel (circa 1340) are comparable with western examples, though excavations at Schwabstedt and Bederkesa have shown similar buildings. A whole range of strongholds along the Elbe and Weser river and elsewhere was destroyed by the local peasants or the urban militia. Their locations have been remembered since (e.g. Kiek in de Elve, Morgenstern, Friedeburg, Siebetsburg). In general, castle-building was restricted to the strongholds of territorial lords or bishops, such as Riberhus, Møgeltønder, Tønder, Itzehoe, Steinburg, Haseldorf, Stade, Otterndorf, Bremervörde, Oldenburg, Neuenburg and Papenburg. The privately owned Sjaerda castle in Franeker and the castle of Schagen were the exceptions. The count of Holland built five sizable castles in

1287 to subject West-Friesland, of which Radboud castle in Medemblik and the excavated ground plan of Nuwendoord (Eenigenburg) are left.

Another effect of the prevailing political anarchy was the persistence of piracy and wrecking, despite dozens of treaties between the coastal republics and the Hanseatic cities. Pirates did not only find refuge with local warlords, they were often licensed by emerging territorial lords who tried to monopolize the lucrative right of salvage. Since the middle of the 14th century piracy became endemic, leading to a several wars in which the Hanseatic cities tried to pacifying the region. Piracy and wrecking were concentrated on the islands, particularly on Föhr, Sylt and Amrum and the Ostfriesland barrier islands. Famous pirates were the Wogensmänner of Eiderstedt and the noblemen Valdemar Sappy, Hennecke Lembeck, Edo Wiemken and Hero Omken. Most remembered in legends and songs were Klaus Störtebeker and his Likedeelers (equal sharers), who operated at the end of the 14th century from Marienhaf (Landkreis Aurich).

Only the upland villages were more or less feudalized. In Schleswig-Holstein and Jutland they were dominated by royal servants and lesser noblemen who were dependent on the king (or, alternatively, on the duke). The remnants of numerous moated mounds can be found in the low-lying village outskirts. Ecclesiastical landlords were important too: the bishop of Ribe owned about 60% of the district's farms, whereas the bishop of Schleswig, residing at Schwabstedt, held most of the local peasants in servitude. Yet, the most important landowner was the crown. South of the Elbe river, feudalism was more pronounced. The strongholds of leading noblemen dominated the Stader Geest and the Westphalian hinterland, keeping most peasants in a state of bondage. Here too, the timber-framed residences of lesser noblemen were built on small moated mounds.

Christianization, pacification and reclamation efforts were intrinsically connected. Religious zeal, documented by massive Frisian participation to the crusades, acted as an impetus for all kinds of communal endeavor. Parish organizations were fundamental to the political system as a whole, as they were interwoven with numerous local guilds, fraternities and neighborhood districts and knit together on the regional level into draining boards, public courts, deaneries and abbeys. Village-priests and other officials

were recruited from the leading families and nominated by their neighbors and relatives. The widespread elusion of celibacy in the Frisian districts helped to release the inherent tension between ecclesiastical and secular claims. Ecclesiastical jurisdiction was secularized, whereas tithing came to be ignored.

Many parish churches have originally been built near a nobleman's estate. In most cases they served as a nucleus where artisans, merchants and laborers settled down on ecclesiastical grounds. The churchyard was often used as a market. The vicarage was often accompanied by the village fishpond. Since the 14th century many of these villages got a post-mill (Bockwindmühle, standerdmolen), replacing the ancient quernstones. Traditional porridges and cakes were partly replaced by black bread made of barley. These mills were often situated on a special mound. In the coastal districts the milling business usually was free. In the upland districts, on the other hand, it was monopolized by local noblemen or subjected to special permissions. In Jutland, Schleswig-Holstein and on the Stader Geest most upland mills were water mills. Remote villages and islands did not have mills at all. Tide-mills, as in Zeeland, were probably unknown, except maybe for Fedderwarden.

The oldest remaining churches are built with Rhineland tuff, Weser sandstone (Wesermarsch), locally shaped granite blocks (Ostfriesland) or boulders. Tuff churches were especially widespread in the Ribe area, Groningen and Fryslân, but also present in Ostfriesland and the Weser area, witnessing the coastal wealth. Many fragments of sandstone sarcophagi and several baptismal fonts have been preserved.

By the middle of the 12th century locally produced bricks and pantiles became an important building material. Many Romanesque church-buildings can be found in Fryslân and the western parts of Ostfriesland (often with a round apse, sometimes with a noblemen's loge in the western tower), whereas Groningen and the rest of Ostfriesland are dominated by immense Roman-Gothic cruciform churches, often decorated with brick and sandstone ornaments. Ribe had its own cathedral, but the churches of St. Johannis on Föhr, Meldorf, Norden, Marienhaf (with interesting sculpture fragments) and the former basilica of Midwolda (with four towers) had a comparable scale. Several romaneseque and Roman-Gothic can also be found in Dithmarschen, Land Hadeln and Wursten. Apparently brick-making in the western districts was

more advanced as the large-scale reclamation of the peat-moors provided sufficient fuel. Even the important church of Løgumkloster (c. 1200) was built on arches according to western examples. The dark red brick walls, joined with pale shell-lime, have been typical for the Wadden Sea Region until recently.

Quite characteristic for Groningen and Ostfriesland are the fortified detached belfries, designed for military as well as religious and civil purposes. Gothic architecture is well represented in Nordfriesland, the Elbe and Weser River marshes and Noord-Holland as well as in the Frisian cities, often in the form of large aisled halls (e.g. Emden, Groningen, Franeker, Bolsward, Workum). Timber-framed churches are relatively common in the Elbe and Weser River districts. In many churches fine 14th-, 15th- and early 16th-

century fresco's can be seen. Medieval altarpieces, bronze baptismal fonts and other objects of worship are relatively scarce in the western Calvinist districts, where they have been deliberately destroyed at the end of the 16th century.

The coastal area had only a few local saints and places of pilgrimage, for instance the Holy Virgin of Stavoren, the statues of Lambert of Ribe, Catharin of Schönemoor and Stephanus of Östringfelde, the slippers of Pancratius (Nordstrand), the head of Petrus (Burg), the relics of Cosmas and Damianus (Bremen), the shrine of Magnus (Esens), the knee-prints of a praying bishop Rembert (Norden) and the graves of Hippolythus (Blexen) and Dionysius (Bremerhaven-Lehe). Most of them hardly left a trace. Other local saints were Poppo of Schleswig, Hatebrand of Feldwerd, Walfridus and Radfridus of Bedum, Emmanuel de Sescalco (Aduard), Fredericus of Hallum, Siardus of Mariengarde, Dodo of Haske and Adalbert of Egmond. Several churches in Holland and Fryslân had a sacred fresh-water well, dedicated to the Frisian bishops Willibrord or Bonifatius, for instance Dokkum where the latter had been slain in 754. The village of Holwierde (Groningen) still harbors a boulder with the devil's footprint.

The oldest, largely aristocratic monasteries were those in Seem, Stade, Bremen, Rastede, Reepsholt and Egmond, dating from the 10th, 11th and early 12th centuries. Nonetheless, religious houses have only been numerous in the stateless societies between the Weser River and the Zuider Zee. Since the last decades of the 12th century more than two hundred monasteries and nunneries were founded, which played an important part in water management, land reclamation and agriculture. Most of these houses had several granges or model farms, worked by servants and lay brothers. By the end of the Middle Ages the religious houses owned 15-25% of the cultivated area, largely let out to tenants. By then, Noord-Holland and Texel had a dozen religious houses and hospitals as well. Probably the religious houses served the local elite as a refuge for unwelcome heirs (like the crusades did before) and as a political counterbalance against family and village rivalry in the Frisian homelands. Monks and village priests, moreover, provided the literary infrastructure required. The most important monasteries were those in Ihlow, Aduard and Mariengarde.

The religious houses in other parts of the Wadden Sea Region were largely restricted to towns like Ribe, Tønder, Stade, Bremen and Ol-

Fig. 2.13:

Cathedral of Ribe, Denmark  
Photo: J. Frederiksen



denburg, whereas Husum, Lunden and Meldorf got their beggar monks. The monastery of Løgumkloster and the nunneries of Itzehoe, Uetersen, Himmelforten, Osterholz, Lilienthal and Hude were reserved to the daughters of the inland aristocracy. Only the nunnery of Langen-Neuenwalde partly served as a refuge for daughters of the coastal rural elite. Few buildings have been left, most of them used as village or town churches (Løgumkloster, Uetersen, Hude, Thesinge, Aduard, Leeuwarden, Bolsward).

Most coastal cities started their development during the 12th or 13th centuries, as the Baltic trade set in. The towns of Ribe, Hamburg, Stade, Bremen, Groningen, Stavoren and Kampen played a leading role as centers of finance, trade and maritime commerce. Soon Lübeck, Hamburg, Bremen and Groningen evolved to major powers, protected by city walls. Part of their success was due to the brewing industry, which profited from the lack of fresh water in the coastal marshes. In the 14th century Hamburg had 250 to 300 breweries, mostly producing for the Dutch and Frisian market. Ribe, Husum and Schleswig were important for the overland trade, as they provided a safe shortcut between the North Sea and the Baltic. Since the 1390s the Stecknitzkanal between the Elbe River and Lübeck provided a more convenient route. By the 15th century Amsterdam, Hoorn and Emden had entered the stage with 10 to 20,000 inhabitants each. The cities of Ribe, Husum, Stade, Leeuwarden and Alkmaar played a secondary role with at least 4 to 5,000 inhabitants. In the coastal hinterland the cities of Flensburg, Schleswig, Lübeck, Münster, Kampen and Utrecht exerted political and commercial influence as well. Several influential merchant families stemmed from the coastal marshes. By then, the most important cities had succeeded in curbing the rural commerce by enforcing a staple-right on the surrounding countryside. Secondary towns such as Itzehoe, Buxtehude, Stade, Oldenburg and Sneek got city walls as well, others had earthen ramparts. The Baltic trade was dependent on bulk transport. Textiles, bay-salt and luxury items were traded against corn and wood. The Hanseatic cog ships were enlarged and supplemented by new ship types such as the British 'hulk' and the Dutch 'mars' ship, often measuring 2 to 300 tons. As ships grew bigger, minor ports declined. Only those cities laying at open streams could really profit from international commerce. Wooden quays were built for the ships to moor. When the harbors silted up, lighters were used to

transfer the cargo ashore or on smaller ships. During the 14th and 15th centuries, however, smaller ship types were developed, better adapted to sailing in shallow waters and mooring near the coast, drawing less than 1.5 m of water. Skippers often sailed in convoys on the Wadden Sea and were organized in special guilds, in which their knowledge was passed from one generation to the next.

The towns and the major islands played an important part in the fishing industry. Already in the 13th century List-auf-Sylt and Neuwerk served as roadsteads for the herring-fisheries around Helgoland. Skippers from Fryslân probably participated in the fisheries around Skåne. As Skåne's herring-shoals suddenly disappeared after 1425, the center of fishing activities shifted to the west. Each summer dozens of shipcrews were active around Helgoland, coming not only from Fanø, Rømø, Sylt, Föhr and Wangerooge but also from a range of coastal towns and villages from Ribe to Enkhuizen. Fishing vessels from the islands of Vlieland, Texel, Huisduinen and Callantsoog were active around the Doggersbank. Mainland fishing activities concentrated in specific villages, such as Sønderby, Büsum, Nesse and the dune villages in Holland (De Zijde).

Apparently, the moderate fishing vessels (pinks, seineships, everts) were used for various purposes, including trade. Part of the year, the fishermen caught cod, haddock, whiting and plaice, which were usually salted, dried in the open air and sold to the urban population. The novel technique of long-line fishery spread after 1500 from Flanders to the Wadden Sea Region and subsequently to Jutland. Zuider Zee herring was often smoked, Doggersbank herring preserved by the novel technique of gutting and curing. The rivers harbored large sturgeons and salmons, whereas the brackish meres, canals and sluices also yielded large quantities of eel, flounder and other fish species. Especially the Zuider Zee was famous for its quantities of fish. On the other hand, the genuine Wadden Sea fisheries were quite modest. The local fishermen were poor, living in hamlets behind the dykes and possessing only tiny boats or sledges. Their catch consisted of speared flounder and ray, clubbed seals, gathered mussels as well as other species captured with the help of reed fences, weirs and baskets (eel, anchovy, smelt, shrimps, etc.). On the beaches, the quest for washed ashore amber was an additional source of income until the 19th century.

In conclusion, the initial marshland landscape was supplemented by embankments and fenland reclamations. The specific cultural heritage of the Middle Ages is primarily expressed in settlement patterns and field-systems, in the remaining tracts of dykes, canals and roads, in specific landscape elements such as mounds and pools, as well as in hundreds of splendid churches and many items of urban architecture.

### 2.6.5 Early Modern Time (1500–1800 AD)

From the 16th century onward the coastal districts were rapidly integrated into the modern world economy. Rapidly growing cities at the edges of the region required a stream of food-stuffs, people and raw materials. In return, urban culture started to dominate the countryside. Until the 1570s Antwerp was the major city in the region, then Amsterdam took over its leading role. Most fashions and techniques gradually spread from Brabant and Holland through the Zuider Zee area into the eastern districts, known to the Dutch as 'Little East' (Kleine Oost). The islands and coastal ports served as an intermediary. The Hanseatic cities, bound by rigid traditions and guild regulations, acted as a conservative counterpart. In the 18th century Hamburg became an influential stronghold of the Enlightenment, whereas Copenhagen and the metropolis of London became more important as distant centers of civilization as well.

The coastal population probably doubled during the 16th century to about 30 to 50 inhabitants per square kilometer, making the Wadden Sea Region one of the most densely populated areas of Europe. Several districts such as Dithmarschen, Altes Land, West-Friesland and the island of Wieringen had even higher figures. Then population figures stagnated until the middle of the 18th century. In Dithmarschen, Butjadingen and West-Friesland they even dropped. At the beginning of the 19th century the number of inhabitants per square kilometer was diverging from 30 to 50 in the fenlands and grazing marshes to about 40 to 60 in the arable districts and peat-moor settlements. The marshes around the city of Hamburg and the islands of Föhr, Nordstrand and Pellworm harbored the highest population figures. Even by then, most upland districts hardly reached 15 to 30.

Agriculture and maritime trade were greatly intensified, dozens of harbors built, dykes heightened and many forelands embanked. The

islands largely served as a recruiting ground for maritime personnel in the coasting trade and the whaling industry, whereas the upland districts provided the seasonal labor, agricultural products, fuel and timber that were lacking in the marshes and on the islands. The agricultural production suffered from the 17th and early 18th century economic crisis as well as from climatic backlashes (Little Ice Age). The island of Nordstrand (200 square km) was destroyed in 1634, whereas the 1570, 1686 and 1717 storm surges also did widespread damage. During the second half of the 18th century, however, cereal prices began to rise, leading to a considerable wealth among the farming population.

The agrarian exports were made possible by the existence of a growing fleet of flat-bottomed barges. During the 17th and 18th century the Wadden Sea was one of busiest transport routes in Europe, conveying 3 to 5,000 passages a year. Traditionally, international traffic mostly used large ships that could only sail off the islands and down to the river ports, such as caracks, hulks, caravels, galliots, flutes and pinnaces. Coastal shipping, on the other hand, had to rely on small vessels that could sail in shallow waters. Leeboards would often replace the keel. Small easy-handled rigs enabled tacking in narrow channels. Many boyers, tjalks, everts and yawls did not exceed the loading capacity of 20 to 40 tons. Additionally, larger flat-bottomed ships up to 100 tons were developed, such as boyers, boats, smacks, schniggs, hookers, koffs and galliots. These could sail into open sea but were able to land in the newly constructed tidal harbors as well. The spritsail and the gaff-sail spread successfully from the Netherlands to other regions. Each major port had at least one skippers guild, which also provided sea-insurances against wreckage and piracy. Special roadsteads such as Rømø, List-auf-Sylt, Neuhaus (Oste), Bremerhaven-Lehe, Vlieland, Terschelling, Wieringen, Texel and Huisduinen (Nieuwediep) were suited to re-load the products into larger ships or back onto lighters and barges that could sail into the shallow river-mouths and into the Zuider Zee. In case of war they often took in a key position. Hundreds of ships fell victim to storm surges, as they did not reach a harbor in time. The number of shipwrecks is most pronounced in Nordfriesland and Dithmarschen as well as in the western Wadden Sea.

Merchant shipping largely concentrated in the harbors around the Zuider Zee as well as in the main cities. Additionally, the ports of Glückstadt,



Hamburg-Altona, Stade, Bremen, Emden, Groningen and Hoorn participated in colonial trade. Many ships were to be found in the Alte Land, partly used for fruit exports, as well as in the Tønder, Møgeltønder and Højer districts and around Husum, where many local farmers participated in international trade. During the 16th and 17th centuries the islands of Rømø, Sylt, Föhr, Helgoland, Wangerooge, Schiermonnikoog, Terschelling and Vlieland harbored hundred of merchant ships, which may have been used for fishing as well. By the 18th century most of these ships had disappeared (except for Schiermonnikoog), whereas the men enlisted on Dutch vessels. The Hobugt district (Hjerting, Ho, Oksby, Varde), the Elbe and Weser River banks as well as the tidal harbors in Schleswig-Holstein and Ostfriesland did somewhat better. The island of Schiermonnikoog even had more than a hundred tiny vessels. After 1750, however, the major centers of coastal shipping became the peat-colonies in Groningen and Ostfriesland. In general, the skippers and ship-owners were quite mobile. When wars obstructed free trade they often took refuge in neutral ports, sometimes permanently, after 1650 mostly temporarily. Tönning, Glückstadt, Stade, Neuhaus (Oste), Varel, Emden and Papenburg were famous for their hospitality in case of war.

The littoral landscape has been reorganized since the Late Middle Ages for the sake of maritime traffic. Beacons, buoys and beacon-lights had to secure the major trade routes. The cities of Ribe, Hamburg, Bremen, Emden, Kampen and Amsterdam were the first to regulate coastal traffic, forcing all passing ships to pay for the expenses made. The island of Neuwerk got a lighthouse-tower in 1310, followed by Terschelling in 1323. Open fires burned during the shipping season on the islands of Terschelling, Vlieland, Texel and Huisduinen since 1452. By the middle of the 16th century the main channels and sandbanks in the Wadden Sea were marked each spring with a chain of beacons, buoys and pricks. Additional towers were built on Borkum 1576 and on Wangerooge

1597 (by the Count of Oldenburg), whereas the Saint Brendan tower on Terschelling was relocated in 1594. The flattened church-towers of Pellworm, Imsum and Marienhafte may have served as fire-beacons as well. Other church-towers were provided with characteristic spires (e.g. onions) to facilitate maritime navigation. Special groves were planted with the same purpose. As the shipping season was extended into the early spring and late autumn, piloting became more important. Cuxhaven and the islands of Helgoland, Borkum, Terschelling, Vlieland, Texel and Huisduinen (Den Helder) had many specialized pilots, partly organized in guilds.

On the political level the coastal districts lost their independence during the 16th century. They were fully integrated into territorial states and controlled by government officials. Denmark and Northern Germany were largely governed by foreign rulers (Denmark, Sweden, Britain, Prussia, Russia) who considered the remote coastal districts as a strategic investment. Actual government was dominated by the upland aristocracy. The Dutch Republic and the cities of Hamburg and Bremen, on the other hand, were republics where the actual power lay in the hands of the urban elite and their rural allies. In both cases, the rural elite traded for a relatively large measure of autonomy, guaranteed by special institutions and statutes comparable with urban



Fig. 2.14:  
Hallig Hooge, Schleswig-  
Holstein  
Photo: W. Raabe

arrangements. In Fryslân the aristocratic landowners played the major part, in Groningen and Ostfriesland they had to share power with the urban landowning elite. Nevertheless, the other privileged districts were dominated by yeomen-farmers, with the exception of Kehdingen and the Ostemarsch where a substantial number of privileged noblemen resided. More or less feudalized were the edges of the Krempfer Marsch with the adjoining Seestermüher and Haseldorfer Marsch (Itzehoeer Güterdistrikt). On the islands wealthy ship-captains and -owners held dominant positions. (Further details on political territories in chapter 2.7.1)

In the coastal marshes and on the islands, yeoman-farmers, major landowners and ship owners made practically all the decisions. They were dominating parish organizations (sogn, mating, karspel, kerksoking) and neighborhood guilds (bylag, burlag, egge, hove, viertel, rott, theene, kluft, gilde, buurt) as well as polderboards, local courts and citizen soldieries. Often they appointed clergymen and schoolteachers. In the Calvinist districts (the Netherlands and Ostfriesland) they controlled the religious colleges of elders and deacons. In Groningen and Ostfriesland the aristocratic landowners even monopolized the right of jurisdiction. In Schleswig-Holstein the yeomen-farmers formed their own burial and fire-insurance guilds, which set them apart from smallholders and cottagers. Smallholders were dependent on credit and protection offered by the local elite, who monopolized the relations with government officials. Their family power was expressed in grave monuments and memorial tablets in village churches, on sluices and other public buildings as well as on private houses.

The majority of the coastal population valued their supposed liberties and privileges, which were defined in contrast to the feudalized hinterland. Egalitarian feelings were often directed against members of the rural elite that were accused of treason. Political loyalties, however, were often defined in religious terms. Since the Reformation, the eastern districts were largely Lutheran, whereas the western districts converted to Calvinism. Lutherans, particularly in Germany, were far more inclined to cling to traditions than Calvinists, who turned against many expressions of folklore and superstition. The latter, on the other hand, were more tolerant, leaving some room for catholic, Mennonite, Libertarian, Lutheran and Jewish minorities. Yet, both were united in their antipathy against the inter-

national powers of Catholicism, which were associated with feudalism and tyranny. These feelings were sustained by traumatic experiences, such as the Dutch war against Spain, Tilly's occupation of Northern Germany in the 1620s and several military campaigns by France and its allies. Particularly during the 18th century, when pietism gained support in most rural districts, political tensions were often disguised as religious conservatism. The urbanized zones at the edges of the coastal region, on the other hand, became more inclined to modern ideas. (Further details on religion in chapter 2.7.2)

By the 16th century dyke-building had become fundamental for the preservation of the coastal marshes. Dykes were substantially heightened (up to 3.5 to 5 meters) and secured, their width doubled, their volume tripled. The Noord-Holland palisade dykes were heightened up to 6 or 7 meters. Dyke-locks were widened and drainage-schemes improved. This was partly meant as a reaction to higher seawater levels and unstable weather conditions. But modern techniques of dyke-building also enabled more offensive embankment procedures. These implied the erection of palisades before endangered dykes and the construction of dams and groynes with piling and osiery filled with faggots and clods. Breaches were closed with fascines, cofferdams, willow matting and sunken ships. Yet, earthen dykes continued to be valued, they were provided with gradually inclining slopes and carefully sodded with grass. Bare stretches were stitched twice a year with a covering of straw or thatch. Most of these techniques spread eastward from Holland and Zeeland during the 16th century and were improved later on.

After the 1717 storm surge that struck most of the coastal area, massive state intervention accounted for further dyke reinforcements. The introduction of the shipworm (*Terredo navalis*) in the 1730s caused a total destruction of the embankments in Noord-Holland and Fryslân. Existing palisades and cofferdams had to be replaced by earthen dykes with a stone cover. Shiploads of boulders were imported from Drenthe as well as from the Elbe, Weser and Ems districts, for which dozens of megalithic tombs, church ruins and many tombstones were destructed. As boulders ran out, the engineers had to revert to stones from Norway. In the second half of the 18th century stone dykes were also introduced in Northern Germany (Hadeln, Butjadingen), but it was not until the second half of the 19th century that they became the rule.

Here and there the boundary-posts that marked the distinct dyke-pounds have been preserved.

Additionally, simple dyke-locks were replaced by large timber-built floodgate tunnels, often suited to shipping. These have been in use in the western districts since the 15th century (e.g. Greetsiel, Delfzijl, Harlingen), but their design was perfected later on. Most locks had three pairs of gates in order to neutralize the effect of changing tides and storms-surges. Dyke-locks out of masonry, open sluices and chamber locks were relatively scarce until the 18th century. Wealthy towns like Friedrichstadt, Emden, Makkum, Workum, Hindeloopen, Stavoren, Edam and the polder Zijpe were the first ones to have open sluices from brick.

Around the locks a new type of rural settlement came into being: dyke-lock harbors (Sielhäfenorte) planned around an artificial tidal inlet, often provided with a backside water basin to flush the harbor. The oldest examples in Holland date around 1400 (Spaarndam, Delfshaven, Broekerhaven, Kolhorn). The first one in Fryslân was Oude-Bildtzijl from 1505, followed by dozens of tidal harbors in Ostfriesland, Groningen and Noord-Holland (Oudesluis). Each subsequent embankment created a new tidal harbors in front of the older one. Comparable examples in the eastern districts were mostly created 17th century by government initiatives: Rudbøl, Wykauf-Föhr, Pellworm-Tammensiel, Tönning, Friedrichstadt, Glückstadt, Neuhaus (Oste), Cuxhaven and Bremen-Vegesack. The latter was founded 1619 as a new sea-harbor for the city of Bremen, because the Weser River got silted up. The dyke-lock harbors of Land Wursten and the Wesermarsch, including Fedderwardsiel (1821), date from the 19th century. Until then, most of the tidal harbors in the eastern districts were no more than creek banks where flat-bottomed sailing ships could be set ashore.

The lock-canal were made navigable for drawn barges, whereas they came to be interconnected. The first canals connecting partially land-locked towns such as Groningen, Leeuwarden, Franeker, Bolsward and Alkmaar with nearby harbors date from the 15th and early 16th centuries. By the middle of the 17th century a complete web of ship-canal and towing-paths (trekvaarten) with chamber locks (verlaten) and drawbridges at its knots covered the western districts, providing an inland route from Amsterdam across the Zuider Zee to Groningen and western Ostfriesland. These canals mainly served the export of peat and agricultural products to

the urbanized districts in Holland and Fryslân. Scheduled ferry-services facilitated personnel and commodity transport. Minor shipping routes sometimes got a rolling bridge (overtoom), where ships could be drawn across a dyke. In the eastern districts, on the other hand, ship-canal such as the Bootsfahrten in Eiderstedt and the Hooksielier Tief towards Jever remained the exception until the 19th century. Many towns had special guilds for river-, canal- and market-boat-skippers. Nevertheless, the canals and harbors were indispensable, as marshland road-traffic was a nuisance until the 19th century when paved roads were introduced.

The hydrological measures mentioned above caused an important reduction in the frequency of salt-water inundations. Since the middle of the 16th century recurrent dyke-breaches became the exception. As a consequence agriculture could be intensified, the acreage of winter-corn was increased, pastures and meadows were improved and the remaining commons enclosed (Osterstade). Many large farms were relocated from the villages to dispersed house-platforms surrounded by a moat, where they were safe for the seasonal fresh-water inundations that were customary until the 19th century. Smallholders and cottagers often settled down alongside the dykes. Large arable farms were more successful than smaller pastoral ones: by the 18th century farms above 20 to 30 hectares grew bigger, whereas many smallholder families lost their property and became laborers. The effects of scaling up and proletarianization were most pronounced in traditional arable districts where the number of smallholders used to be considerable (Dithmarschen, Hadeln, northern Westergo). Mainly pastoral farming districts already had relatively large farms. Only the pastoral districts of Noord-Holland were dominated by small-scale property and seasonal maritime labor.

Rural property relations were quite diverse: in the eastern districts free-holder property was the rule, except for state domains and feudal enclaves. In Butjadingen, Ostfriesland and Groningen most farmers were long leaseholders who owned their farm-buildings, in Fryslân and the Noord-Holland polders they were mostly tenant farmers. But landowners normally did not interfere with actual farming practices. Arranged marriages and, egalitarian inheritance customs provided each farmer generation with sufficient assets to conduct business as before. Relatives, landlords and merchants supplied them with the



Fig. 2.15:  
Farmsted Oosterklief,  
The Netherlands  
Photo: D. Marrewijk

necessary credit. Things were different, however, on state domains, noblemen's manors and summer residences owned by the urban elite. These were farmed out to qualified tenants or managers, who had a close relation to their landlords. Large model farms such as Groß Bombüll, Arlewattshof and Pynackerhof in Nordfriesland, the Rote Haubarg in Eiderstedt, the domanial granges in Oldenburg and Ostfriesland and the polder-board house of Wieringerwaard served as an example for the surrounding countryside.

Oats, barley and broad beans continued to be the main crops, but they were supplemented with wheat, peas, rye, oilseed rape and sometimes flax, chicory or mustard. Red and white clover were successfully introduced from the Netherlands in the 18th century. Rye for bread-corn was usually imported from the Baltic, Westphalia or the upland districts. In Ostfriesland, Groningen and parts of Fryslân arable farming was extended since the end of the 17th century. Fields were leveled, drainage was improved, whereas novel implements such as Brabant ploughs (not in Fryslân), threshing cylinders and winnowing machines came into use. Flexible rotation schemes and primitive row cultivation were introduced at the same time. The eastern districts, on the other hand, stuck to their traditional ridge and furrow system, heavy carriage-ploughs and fixed rotation schemes. Nevertheless, arable farming was further increased here as well. Around 1800 more than half the coastal marshes were being tilled. Marling with excavated calcareous clay spread rapidly from Ostfriesland to Schleswig-Holstein, allowing an explo-

sive increase in the acreage of valuable market-crops such as oilseed rape and wheat.

Smallholders specialized in cow-milking, market gardening or fruit production. Small-scale horticultural centers were to be found around the cities and near export harbors. The areas around Friedrichstadt, Glückstadt, Bremen, Emden, Groningen, Leeuwarden, Harlingen, Alkmaar and Hoorn produced carrots, parsnips, cabbage, chicory and potatoes. The districts of Altes Land and West-Friesland had many orchards, whereas Altes Land also produced horseradish. Osterstade became well-known for its sweet cabbage. Most of the horticultural knowledge as well as many seeds, roots, bulbs and fruit-

trees were important from Holland. White hawthorn hedgerows, trimmed lime-trees, poplars and elms planted in rows came from Holland as well.

Beef cattle trade reached a zenith in the 17th century. Each spring meager oxen from Jutland and the other upland districts were driven to the coastal marshes, where they were fattened and subsequently sold in the cities. Oxen trails cut through the Jutland peninsula, passing through Ribe, Husum and Itzehoe. Ferries took them across from Wedel to Stade. Part of the oxen went from Bremerhaven-Lehe to Jever, where they were sold at the markets of Aurich and Groningen. Another part of the export to Holland went by ship. Typical fattening districts were Eiderstedt, Dithmarschen, Osterstade, Groningen en West-Friesland. Recurrent waves of cattle-plague, however, made an end to the cattle trade in the 18th century. The cattle-plague's social and economic consequences were profound: large-scale arable farming was increased, whereas smallholders impoverished. The traditional red, gray-patched or stained breeds came to be replaced by fashionable black-patched Holsteiner (Breitenburger or Lowland cattle) and Frisian milk-cows. The Groningen black-and-white-faced (blaarkoppen) and the Frisian and Holsteiner red-patched cattle date from the 19th century. The red cattle from Ballum (Sønderjyllands Amt) and Nordfriesland held out until the 19th century. The black- or gray-patched milk-cows from Jutland (Jydske kvæg), descendants from the original Jutish race, were kept until the 20th century. Both races have now become extinct due to interbreeding with others,



though there are some attempts to reconstruct the Jutish race. In Jutland they were partially replaced by British shorthorns, imported in Eiderstedt in the 19th century.

Horse breeding was intensified by 17th-century military demand. The large Holsteinian, Hanoveran, Oldenburg and Frisian warm-blooded horses had a reputation all over Europe. Here too, black blazed horses came to be valued since the end of the 18th century. The Groningen horse, on the other hand, is an late 19th-century offspring from the Oldenburger and Ostfriesland race, whereas the underbred Jutland and Schleswig horses were developed in the 19th century from existing stocks. The large white marshland sheep were improved by interbreeding with foreign rams since the 16th century. The traditional multipurpose sheep developed into a mutton-sheep since the 1840s. Only the Ostfriesland and Frisian-Zeeland milk-sheep and the Texel mutton-sheep survived as distinct races. Several districts specialized in pig breeding with buttermilk, whey and barley during the 16th and 17th century. The distinct marshland swine, large and square-built with standing ears, was completely replaced by interbreeding with bald Yorkshire pigs in the second half 19th century. Goats were largely unknown (except for the island of Vlieland). Traditional chicken races are the Groningen-Ostfriesland gull, the Frisian hen and the Assendelfter hen. In Fryslân and Holland it was a widespread privilege to keep mute swans, whereas most manors and yeomen farms in Ostfriesland, Groningen and Fryslân had special stone or timber pigeon-houses for the meat. The multi-colored half-tame ducks and pigeons that were numerous until the 1950s have disappeared from the countryside since then. The only local pigeon race that has been left is the Groninger slenk. Danish-minded patriots in Sønderjylland and Schleswig bred a red and white fancy pigeon called the Danebrogsdue after 1864.

Dairy farming was improved in the 16th century by the introduction of Dutch cheese making. Mainly pastoral farming districts such as Eiderstedt, Wilster Marsch, Butjadingen, Jeverland, Rheiderland, parts of Fryslân and West-Friesland concentrated on the production of durable sweet cheese. Well-known export products were kosher cream cheese from the Wilster Marsch, meager clove-cheese from Fryslân and green ewe-cheese from Texel and Griend. The meager round Edamer cheese is a 19th-century product. Ostfriesland, Groningen and Fryslân also produced

lots of salted butter, for which the horse-driven churn was introduced after 1660.

As a rule, the fenland districts specialized in dairy farming and extensive stockbreeding. Arable farming was restricted to a minimum, whereas the redundant population left for the cities. In West-Friesland rural population figures even dropped by about 40%. Seasonal laborers from the upland districts (Hollandgänger, velinks, hannekemaaiers, mieren) took over the hay-harvest. Hay was also exported to the urbanized districts. Large wetland areas such as the Ostemarsch, Hadelner Sietland, the Weser River marsh, the lake district near Emden, the Leda River marsh and the central parts of Fryslân (Lage Midden) became inundated every winter season. Often the farmers opened the sluices deliberately in order to benefit from the fertilizing effect of the muddy waters. Nevertheless, many fenland districts and river marshes were troubled by untimely inundations due to reclamation efforts and deforestation in the upland districts. Some districts, particularly around the city of Bremen, sank into poverty, others became depopulated.

Several amphibious districts such as the Gotteskoog, the wetlands around Bremen and Emden and the Noord-Holland wetlands specialized in breeding geese and ducks. The snow-white marshland goose (preserved as the Emden goose) that stayed close to the farms, was mainly kept for its down. The white-chest ducks from the Waterland district (north of Amsterdam) were kept for their large production of eggs. By selective breeding fancy crested and hookedbill ducks were raised, which were popular around manors and large farms all along the Wadden Sea. Another wetland occupation was reed farming for thatching, which could be very profitable. Several river bank districts specialized in basket making out of willows. The wetland areas were well-known for their fowl and eggs. Geese, swans, cranes, ducks, snipes and golden plovers were hunted with nets or shotguns operated from hidden huts. Small birds were caught with snares. Egg hunting was very rewarding too, particularly on the islands, where thousands of sea-gull eggs could be found. In the 19th century lapwing eggs were even exported.

A typical Dutch innovation were the duck-decoys: artificial ponds surrounded by bushes designed to lure swarms of wild ducks into wicker-work cages, mostly with the help of trained calling ducks and decoy dogs. Duck-decoys originate from Holland, where they have been men-



tioned since the 15th century. From here they have been introduced in Fryslân, where 150 of them could be seen in the 18th century, as well as in Groningen and Ostfriesland. Dutch emigrants introduced the duck-decoy in Stapelholm about 1630. The first decoy on Föhr dated from 1730, followed by a dozen others on the adjoining islands. Most of them have been closed down, the remaining ones are mainly used for bird counting. A special type of dog (*wetterhoun*) was used in the Frisian wetlands for hunting fowl, otters, fitchews, rats and other animals. Hunting in the marshland was largely restricted to hares that were chased with dogs and shotguns. In some districts hunting was only allowed to government officials, in others the freeholders clung to the ancient privilege of free chase. In the upland districts also deer and swines were hunted. Each year falconers from Valkenswaard in Brabant visited several upland districts in order to catch new preying birds.

Arable farming was particularly successful in the newly embanked polderlands. Between 1500 and 1650 more than 140,000 hectares have been reclaimed, largely with the help of urban capital and Dutch know-how. Most of it consisted of former salt marshes and shallows that were subsequently put under crop. The embankment activities shifted eastward and came to a partial standstill after 1640 but were resumed in the 18th century. Up to the 16th century most embankment activities were carried on by local peasants, who enlarged their holdings according to the traditional right of accretion that also applied to the former peat-moor areas. In several districts these rights were conferred upon the maintainers of a dyke-pound (*Hadeln*, *Oostergo*). By the 17th century, however, the territorial lords began to exercise exclusive claims on the forelands. They expropriated the local population and conferred special patents to groups of entrepreneurs, who completed the embankment and recruited the settlers. The work was carried out by contractors and navvies who were specialized in carrying out large earth-works with the help of wheelbarrows on rails. Many of the newly embanked polders got a rational parceling according to Renaissance standards. Large farms were situated along the main road, whereas the former navvies settled down as cottagers along the dykes. Typical mostly 18th-century dyke-bound linear cottage settlements are *Neukirchen-Rosenkranz*, *Dagebüll-Fahretoft-Holländerdeich*, *Vollerwiek-Wester-*

*deich*, *Barlterneuendeich*, *Kollmar-Deichreihe*, *Krummendeich*, *Balje*, *Belum-Deichreihe*, *Schortens-Roffhausen*, *Hooksiel-Wüppelser Altendeich*, *Ditzumerverlaat*, *Drieborg*, *Kollumerpomp* and *Oude Bildtdijk*.

The first large entrepreneurial project was the embankment of 5,000 hectares of saltings at *Het Bildt* (Fryslân) in 1508, populated by settlers from Holland, another was the *Zijpe Bay* near *Alkmaar* in 1553 and again in 1597, measuring no less than 6,600 hectares. The projects in the eastern districts were smaller, mostly dating from the 17th century, e.g. *Glückstadter Wildnis*, *Cuxhaven-Ritzebützel*, *Wurster Neuland*, *Schweiburg*, *Christian-Albrechtskoog*, *Kroonpolder* (*Dollard*) and the re-embankment of *Nordstrand* by entrepreneurs from Brabant. Several larger projects in Nordfriesland failed. Famous projects of the 18th century were *Landschaftspolder* (1752) and *Kronprinzenkoog* in *Dithmarschen* (1787), where the wealthiest farmers of the whole region were to be found. The latter was largely populated by colonists from Ostfriesland. The newly embanked polderlands were very fertile, suited to barley, wheat and especially oilseed-rape. The latter was sold at high prices to Dutch merchants and transported to the oilmills in the industrial district of the *Zaanstreek* (north of Amsterdam). The flowering rape- and bean-fields fed many bees, thereby stimulating professional bee keeping. Rape-honey is considered to be a delicacy. Part of the beekeepers lived in the coastal villages, others in the upland districts where the bees were transported to as soon as the heather fields came into bloom.

Entrepreneurial activities also lead to the development of extensive peat-moor colonies in the western districts. The raised bogs were drained by canals that subsequently served for carrying off the peat and bringing down urban manure in order to cultivate the remaining moors. Large-scale activities conducted by the city of Groningen, which acted as the largest landowner of the area, served as a model for the other peat-moor districts. Most of the peat workings and subsequent reclamation efforts were conducted by individual farmers, who were obliged by the city government to reclaim their cutover fields. Farming systems and popular culture were comparable to the coastal marshes. The canal settlements were heavily populated, though general wealth was lower than among the coastal population. Many colonists descended from seasonal laborers from the Westphalian

hinterlands, but the bulk of the population came from the neighboring districts.

Special development cases were former fenland lakes that were drained with the help of hundreds of large Dutch windmills with scoop wheels. Foreign investors tried in vain to repeat the success of huge projects in Holland like the Beemster, Schermer and Purmer lakes. The drainage schemes in other districts were rather unsuccessful, except for a few small lakes in Fryslân. The draining of the Gotteskoog and Stapelholm wetlands (Meggerkoog) led to financial disasters, because the maintenance of canals, locks and windmills was neglected.

The use of large octagonal smock mills with a revolving cap (inside cap winders or *binnenkruiers*) was greatly restricted to the wealthiest districts of Noord-Holland, where whole fenland areas lying one or two meters below sea-level became completely dependent on artificial drainage. By the 18th century the more efficient outside cap winder (*Holländermühle*, *bovenkruier*, *muonts*) and the Archimedean screw came into use, which spread into Fryslân, Groningen and Ostfriesland. Originally meant to reclaim the low-lying fenland areas, these drainage mills proved to be so successful that they came into use in the coastal marshes, enabling a substantial increase of the corn-growing acreage.

Initially more successful was the introduction of smaller hollow post drainage mills, suited to drain individual fields and farms (*Wippmühle*, *Kokermühle*, *spinnkop*, *aanbrenger*). They have been invented in the Zuid-Holland fenlands in the 15th century, from where they were exported Fryslân, Groningen and Ostfriesland. In the Wilster Marsch and around Hamburg and Bremen more than a thousand drainage mills were built since the 1570s. Tiny drainage mills with an Archimedean screw (*tjasker*, *Wasserrose*, *Flutter* or *Schrückmühle*) were developed in Fryslân during the 16th century, from where they spread to Ostfriesland and Oldenburg after 1700. In the Wilster Marsch many traditional drainage mills got a screw since the close of the 18th century (*Schneckenmühle*).

In the wake of the dyke-builders and entrepreneurs a new type of farm-building was introduced: the Frisian aisled barn (*Gulfsche-*



une) with a side-passage from where the harvest was piled up in the central bays, while the cattle was stalled in the opposite side-aisle. Its success may be partially explained by the efficient use of timber, which became increasingly scarce. Oak was mostly imported from the Lower Saxon and Westphalian hinterland and transported in rafts coming down the Elbe, Weser and Ems River. During the 17th century it was replaced by Norwegian fir. The walls were normally made of brick.

The first aisled barns were built around 1550 as monastic granges or near gentlemen's manors. Medieval granges in Flanders probably served as a model. Soon they came into use on large farms in Ostfriesland, Groningen and Fryslân. Haystacks became redundant. Normally the barns were attached to the existing brick-built living-quarters, where they replaced the traditional longhouse byre, thereby leading to the so-called head-and-barrel or head-neck-and-barrel (*kop-hals-romp*) type. In Noord-Holland, however, the aisled barn soon developed into a more or less rectangular building with integrated living quarters, the so-called 'cloche'-house (*stolp*). Dutch settlers and engineers were responsible for its transference to other districts. Aisled sheep-sheds (*schapenboet*) became common on the island of Texel. Aisled barns and farmhouses (*Bargscheunen*, *Barghusen*) were introduced in the Wilster Marsch around 1600. Fully developed Dutch 'cloche'-houses (*Haubarge*) were built in Eiderstedt, in the pastoral farming zone of Fryslân (*stelpen*) and on domanial farms in other dis-

Fig. 2.16:  
Weighing building in  
Leeuwarden, The Netherlands  
Photo: D. Marrewijk

tricts. In Ostfriesland and the adjoining districts (Butjadingen, Oldambt) they developed into a large aisled farmhouse (Gulphaus), which replaced the Frisian barns and longhouses. The tiled roof and painted gutters fed the rain cisterns. Cereals were dried and stored on a huge corn-loft above the living quarters, which were made to resemble contemporary urban dwellings. The Ostfriesland type was quite successful: it became the dominant building tradition in the adjoining upland districts, whereas East-Frisian barns supplemented the traditional open-halls in the Weser Marsch. It was also imitated in cottages (often combined into double houses or bummerts). In Fryslân and Noord-Holland, on the other hand, cottages were smaller, consisting of a single brick room with an additional shed.

The Elbe and Weser River districts lying closer to the timber-supplies largely stuck to huge timber-framed open-halls, byres and barns which were often enlarged with deeper side-aisles and additional rooms built out of the house (e.g. the Wilster Marsch Husmanshus). Cottages were of the same open-hall type, often shared by two, three or four families at once. In the northern districts, on the other hand, traditional halls and longhouses were extended with supplementary barns and byres, separated by traverse passages and threshing-floors. Sometimes these were integrated into the farmhouse, as on the North-Frisian islands (Uthlandhaus) and in Dithmarschen (Dwerhus). But usually they developed into L-, Z-, H- or U-shaped assemblies (Geesthardenhaus), culminating into the courted farmyards known from Jutland and the Wiedingharde. Moreover, as brick replaced wickerwork, board and timber-frame walls during the 16th and 17th centuries, the inner posts moved side-ward until they were often left out because of timber scarcity. By the 18th century farms with separate living rooms, transversely built byres and aisled barns were the rule in Jutland, Nordfriesland and parts of Dithmarschen. In the latter case they were ousted in the 19th century by an Ostfriesland type hybrid, imported by settlers from that region.

Other 16th-century innovations were chimneys and heated parlors, built after urban examples. Whereas the western districts stuck to large kitchens with open fires beneath a chimney, probably due to the abundance of peat, the eastern districts (including Butjadingen and Jever) changed over to heated parlors with a tiled stove (stuv, dôns, dornze, Stube). Most of the large

farms in the eastern districts also had a baking shed, whereas the western districts got used to ordering black rye bread from the village bakery. Urban-style wheat bread was only in use in Noord-Holland, Westergo and Eiderstedt. Cupboard-beds with heavy eiderdowns were the rule, except for Holland and Fryslân where blankets were used. During the 17th and 18th century many urban style luxury items found their way to the rural elite, such as illustrated Frisian tiles and wall-case clocks, Dutch linen, Hanseatic cupboards, carved chests, painted ceilings as well as pewter, pottery, majolica and faience. Many farms had an orchard with dozens of different trees surrounded by trimmed maple-trees, as well flower beds with many bulbs and hedges in a baroque style. In the western districts, window-frames, doors and woodwork were often painted in fresh colors, in the eastern districts the front door is often richly decorated. Typical for Jutland and Schleswig-Holstein are the half-hipped roofs and the dormer windows above the doorways.

Aristocratic mansions were numerous in the Elbe River marshes and in the western districts. Around 1600 Kehdingen alone had 100 manor houses, Ostfriesland more than 50, Groningen 120 and Fryslân 200, most of them lying in the coastal marshes. Some of them were real palaces, such as the castle of Breitenburg near Itzehoe. Others such the ruined castle of Trøjborg and the former 17th-century manors of Norden-Lütetsburg and Stedum were quite substantial as well. Typical 16th-century castles, most of them surrounded by a moat, can still be found at Witzwort (Hoyerswort), Meyenburg, Hooksiel (Fischhausen), Dornum, Krummhörn-Groothusen, Hinte, Wedde, Slochteren, Jelsum and Marsum. The remaining 17th- and 18th-century manors have mostly been (re)built in a Renaissance, Baroque or Classicist style, such as the manors of Møgeltønder (Schackenborg), Leck-Lütjehorn, Haseldorf, Sande-Gödens, Leer-Loga, Uithuizen, Leens and Ysbrechtum. Often they are surrounded by a park. The majority of the local aristocracy, however, hardly distinguished itself from the yeoman-farmers. Their numbers were shrinking rapidly and many manors were farmed out in the 18th and 19th centuries or sold to urban investors and yeoman-farmers. Dithmarschen, Land Wursten and Butjadingen did not have any manors or castles.

Most villages and towns showed a substantial growth during the Early Modern Age. The number of people involved in trade and commerce

was increasing more and more. Traditional rural fairs gave way to customary weekly markets: the towns got weigh-houses and specialized market places for items such as horses, cattle, dairy, corn, fish, peat and vegetables. Many villages got a secondary main-street with stone road surface, an elongated green and rows of elms or lime-trees after the Dutch fashion (*buorren, voorstraat, riepe*). This was particularly the case in Fryslân, Noord-Holland and on the islands, but also in several other towns such as Møgeltønder (Slotsgade). Alternatively, they were provided with a harbor around a dead-end canal (*opvaart*). Nevertheless, several older shipping villages such as Sønderho, Borkum and Molkwerum kept their original street labyrinth.

The big houses at the markets and along the main streets harbored merchants, government officials, innkeepers, tradesmen and retired farmers, whereas poor people settled down in the side-alleys. The western districts often had colorful one-story houses made of yellow (or red) brickwork, the eastern districts mostly had partly timber-frame houses with red brickwork and a boarded gable. Tiled roofs were often prescribed after big fires. Amphibious towns such as IJlst, Sloten and Kolhorn harbored fancy gardens along the boards of the canals (*overtuinen*). Emigrant towns such as Friedrichstadt, Glückstadt, Hamburg-Altona, Norden and Emden as well as the main cities in Groningen, Fryslân and Holland were characterized by numerous stately houses in Dutch Renaissance style, often decorated with painted stone tablets indicating the name of the house or the owner's trade. The early modern city-centers of Hamburg, Bremen and Emden have been mostly destroyed in World War II.

Medieval churches were redecored or enlarged. Many villages got a new parish church, often in a light and spacious Renaissance, Baroque or Classicist style. In the western districts they were stripped from catholic paraphernalia and repainted in plain colors, in the eastern districts they often got splendid altars-pieces by painters educated in the Netherlands, rich wood-carving and a colorful decoration in a peasantesque Baroque style. Many high quality church organs in the coastal districts were built by famous German organ builders such as Arp Schnittger, Huß, Hinz and Freytag. The western districts also harbored many plain hidden churches for religious minorities. Hamburg-Altona, Glückstadt and Amsterdam had substantial communities of Jewish merchants from the

Mediterranean. Yet, most Jews that settled down in the coastal towns since the 17th century were poor immigrants from Eastern Europe, who devoted themselves to unpopular professions such as butchers, sheep-traders and rag-men. Their numbers were only substantial in Friedrichstadt, Hamburg-Altona as well as in the western districts including Ostfriesland. Only a handful of 19th-century synagogues have been preserved.

During the 16th or early 17th century most privileged cities ordered an elegant town hall to be built. Often they also got other official buildings, such as almshouses, orphanages, hospitals, guild-houses and a government castle. The towns of Husum, Oldenburg, Jever, Aurich, Groningen and Leeuwarden had a princely residence, Glückstadt a 17th-century royal palace, which has been demolished in 1708. Dokkum, Harlingen, Enkhuizen and Hoorn harbored the board of admiralty. Smaller market towns such as Heide were often provided with a court- or district-house. The universities of Groningen (1614) and Franeker (1585-1815) were popular among German students, whereas Husum, Meldorf, Hamburg-Altona, Hamburg, Stade, Bremen, Jever and Amsterdam had an academy, most of them founded in the 16th century. Most other coastal towns had a gymnasium.

Urban population growth mainly took place in the 16th century. At the turn of the century Amsterdam, Hamburg, Bremen, Groningen and the newcomers Emden and Enkhuizen were the most important cities of the region with 20,000 inhabitants or more, followed by Hoorn, Alkmaar, Leeuwarden, Harlingen, Stade and Husum. Most cities were even smaller, harboring less than 2,500 inhabitants. Dutch immigrants and refugees settled down in Sande-Neustadtgödens (1544), Emden (1550s), Hamburg, Bremen and Stade (1560s), Tönning (1590s), Hamburg-Altona (1601), Glückstadt (1617) and Friedrichstadt (1621). Yet, in subsequent years urban population growth stagnated until the second half of the 18th century, except for Amsterdam, Hamburg and Hamburg-Altona. Formerly booming towns like Enkhuizen, Emden, Husum and Ribe lost more than half of their population, whereas Hoorn, Alkmaar and Stade were reduced in size as well.

City fortifications were thoroughly reconstructed during the 16th and the beginning of the 17th centuries, first with the help of Italian engineers, then by Dutch experts. Large earthen ramparts, complicated canals and extensive flood belts made it virtually impossible to siege

the cities of Hamburg, Bremen, Emden and Groningen up to the 18th century. Unsurpassable flood belts also surrounded the fortresses of Tönning, Glückstadt, Stade, Oldenburg and Delfzijl, which harbored garrisons. Complete failures were the fortresses of Carlsburg (now Bremerhaven) and Christiansburg near Varel, originally designed in the 1670s as free-trade ports. The Dutch border was defended by an inundation line and series of fortified market towns at the edges of the Bourtanger raised bogs: Nieuweschans, Oudeschans and Bourtange with the outposts Dieler Schanze and Leerort. The Fryslân peat-moors served as a secondary defense line. Additionally, dozens of small fortresses have been built all over the region. Most of them have been leveled in the 18th and 19th centuries. Fortresses at Cuxhaven-Franzenburg, Norderney, Oudeschans and Oudeschild on Texel are still more or less intact, whereas Bourtange has been reconstructed in a large-scale fashion. Remnants of Hetlinger Schanze and Belumer Schanze can be observed as well.

Several industrial methods originated in Holland. During the 17th the Zaanstreek became a center of industrial production with hundreds of powerful smock mills and revolving paltrok sawmills. From here millwright techniques spread to other districts, first and foremost to the port of Harlingen and its surroundings. In the last decades of the 17th century oilmills, hulling mills, sawmills and smock corn-flour-mills were introduced in Fryslân, Groningen, Ostfriesland, Oldenburg and Hamburg-Altona, where they gradually replaced the traditional post-mills. In the 18th century hulling mills came into use in Nordfriesland and several other districts where barley-gruel (prepared from buttermilk) was preferred. Nevertheless, in the eastern districts wind-driven oilmills and sawmills remained the exception until the 19th century. Most surviving mills are smock mills. Only a few post-mills have survived or been reconstructed (Langeneß, Bremerhaven-Speckenbüttel, Dornum).

Medieval brickyards were replaced by modern kilns in the 17th and 18th century. The brickworks on the Oste, Weser and Ems River banks and in central Groningen employed ferruginous marine clay for the production of medium sized red bricks and Frisian pantiles. The city of Harlingen and its surroundings produced millions of small yellow bricks, which were exported in large quantities to Northern Germany and the Baltic, as well as glazed blue pantiles. The scattered works in other districts mostly stuck to red-bak-

ing boulder clay. Only Fryslân and Ostfriesland exported large quantities of brick and pantiles. In the 18th and 19th centuries seasonal brick-makers from Lippe virtually had the monopoly on designing and operating the coastal brick-works. The leveled fields are left as depressions in the landscape, mainly used for pastoral farming. Lime burning originally took place in the open air, but in the 17th century special kilns came into use. Specialized skippers, most of them from the islands (including Wangerooge), dug off the mussel-banks on the mudflats and transported the mussels to the mainland, where they were processed. Not much has been left from the shipbuilding industry. Most cities had shipyards and ropewalks, but many ships were bought second-hand from Holland and Fryslân. By the 18th century, Harlingen and the neighboring towns of Makkum, Workum and Leeuwarden may have been the most important industrial centers in the Wadden Sea Region. They harbored specialized mills, brickworks, tile-works and other branches of industrial production. Specialized faience-works, mainly producing for the wealthy coastal districts, have been operating in Kellinghusen, Bremen-Lesum and Jever.

In general, the western marshland districts had more industry and artisan trade than the eastern ones, particularly bakers, tanners and shoemakers. Several towns and villages (e.g. Leer, Harlingen) had a substantial textile production that gradually disappeared after 1750. Guild regulations were less restricted, in contrast to the districts east of the Weser river, where many professions were not allowed to settle on the countryside. Many coastal dwellers had an aversion for home industry, which was associated with the meager upland districts. New centers of proto-industrial production after 1750 were the Elbe, Weser and Ems River marshes, the Friesische Wehde and the Groninger Veenkoloniën. Most towns bordering the Pleistocene fringe had a substantial brewing industry, due to the fact that the marshlands lacked fresh water. Apart from strong beers from Hamburg, Bremen, Groningen and Delft the local beers from Husum, Friedrichstadt, Bederkesa, Friesische Wehde, Norden, Oldersum and Dokkum also had a certain reputation. Husum's own malting industry collapsed at the end of the 16th century. After 1750 many brewers switched over to distilling brandy flavored with caraway or juniper-berries (aquavit, köm, jenever). Beer became to be replaced by coffee and chicory. Several maritime districts, however, had already switched over to



tea. In Ostfriesland tea drinking became a highly valued ritual, originally connected, as British teetotalism, with religious and social motives.

In contrast with the coastal districts upland developments were modest but undeniable. Only those villages bordering directly on the coastal marshes, such as in Jutland and around Husum, had a full share in the coastal wealth and in international trade. Yet, the upland population grew steadily, particularly since mid-18th century, when potato-cultivation allowed a growing number of cotters to settle down at the edges of the commons. For ten thousands of cotters and smallholders seasonal labor in the coastal marshes and in Holland provided a major opportunity to earn some cash. Especially the squatter settlements and black fens bordering the marshes acted as a labor reserve for the coastal farmers. The squatters used to prepare the peat-moors by slashing and burning, then it was seeded to buckwheat. The method of swidden moor cultivation is first reported 1556 at the edges of the Dollard marshes. It spread to neighboring districts very rapidly. In spring the annoying smoke or 'dry fog' (Haarrauch, veendamp, brouillard sec) sometimes affected the weather at a distance of hundreds of kilometers. Depending on the direction of the wind, its effects were to be felt as far as Vienna, Krakow, Frankfurt, Paris or London.

In many upland districts artisan production such as spinning, weaving, knitting and flax processing served as an additional source of income. The Friesische Wehde produced carved furniture, the district around Tønder harbored thousands of lace workers, whereas dozens of Jutland villages specialized in baking coarse black pots. Several oak groves were cut down and sold to the neighboring marshland districts as well as to foreign buyers, particularly during 16th and 17th-century wartimes. Merchants from Holland were partly responsible for the deforestation of the Stader Geest. Peasants often specialized in breeding cattle and horses that were sold to marshland farmers. Up to the 18th century they profited greatly from the international meager oxen trade.

In general, the upland population was eager to borrow from items of coastal culture. They admired the coastal wealth and the presumed freedom, which they found lacking in their home districts. Nevertheless, agrarian reforms, enclosures, the redemption of feudal dues and the parceling out of former mansions gave an important impetus to rural change after 1750. The benefits were also shared by the upland-fringe market towns (Geestrandorte), such as Bredstedt, Husum, Heide, Itzehoe, Elmshorn, Wedel, Buxtehude, Delmenhorst, Varel, Wittmund, Aurich, Leer and Winschoten. Trade in cattle,



Fig. 2.17:  
Moundvillage Midelstum,  
The Netherlands  
Photo: ROB Amersfoort

horses, timber, flax and home products concentrated on major fairs, at which the coastal and inland population met. Hundreds of upland servants and day laborers gathered there, applying for jobs in the marshes. Famous servant markets were Ribe, Bredstedt, Friedrichstadt and Otterndorf. In the 19th century upland harvesters were often recruited in central towns such as Garding, Wesselburen, Norden, Pewsum, Winschoten and Sneek.

The islands benefited from the flourishing international trade. Especially those islands that served as roadsteads and pilot stations had a share in the coastal wealth. Terschelling and Vlieland were more or less urbanized during the 16th century, whereas Rømø, Wangerooge, Borkum, Texel and Huisduinen also profited from their location at major trade routes. As a consequence, the painstaking agricultural activities were restricted. Wrecking proved an important source of additional income, carefully administered by state officials but often leading to abuses. State-owned rabbit farms were another matter of concern as they often provoked poaching. Nevertheless, the insular prosperity was rather fragile. On several occasions maritime conflicts and storm-surges completely destroyed a local fleet, condemning the survivors to a more primitive way of life. Especially the barrier islands from Wangerooge to Schiermonnikoog suffered from storm surges and coastal erosion. To curb dune blowouts, state officials stimulated the planting of beach grass, a technique borrowed from Holland, where it had been known since the 14th or 15th century.

After 1650 most insular shipping and fishing activities declined, probably due to foreign competition and the availability of more rewarding alternatives. Instead, the men engaged on Dutch or Hanseatic ships. The Hallig population engaged in these activities as well, enabling the inhabitants to continue their insular existence in spite of ongoing coastal erosion. Merchant shipping and whale hunting brought prosperity to the islands, overwhelming them with various items of Dutch culture. Sometimes they even got a paved main street with rows of trees after the Dutch fashion. Retired captains and successful whaling commanders began to dominate the local communities with their money and foreign ideas. Together with the coastal ports around the Zuider Zee the islands and Halligen acted as an intermediary, responsible for spreading Dutch culture into the German and Danish hinterland. After 1750 the islanders reverted to merchant

shipping. Fanø, Juist, Borkum and Schiermonnikoog had their own merchant fleet, but the French occupation largely pushed them out of business.

Reports of stranded whales, mostly sperm whales and blue whales, but also northern right whales and narwhals, start in the 15th century. They stem from the islands as well as from the mainland districts. The whales were mainly slaughtered for train oil. Additionally, seals, dolphins and harbor porpoises were hunted for their oil and flesh until the 20th century. The Dutch started systematic whale hunting from Spitsbergen (Svalbard) in 1619. Later on large ships came into use, transporting the blubber back home for processing it into train oil. Most whaling activities were conducted from Den Helder and Hamburg, though Bremen, Emden and Harlingen also took a share. The whaling crew largely came from the islands. After 1750, whale hunting was primarily conducted by mainland speculators. Even merchants and farmers from coastal villages founded whaling companies with one or two ships. By then the hunters had sail as far as Greenland and Street Davis, because the Eastern Atlantic whale population had been decimated. Other whalers, particularly those from Rømø, shifted to seal hunting. After the middle of the 19th century whale hunting was no longer profitable. Most of the whale jaws and ribs, frequently used as fences, gates and tombstones, have decayed.

During the 16th and 17th centuries the most important open-sea fisheries came to be concentrated in Holland. The large herring boats (buizen) from Enkhuizen on which the herring was processed were so efficient that other fishing villages such as Sønder side were forced out of competition. Additionally, there are reports that the herring shoals began to move away from the eastern North Sea. Attempts to imitate the Dutch success in Friedrichstadt, Tønning, Glückstadt and Emden were doomed to fail. Subsequently, urban demand shifted from dried to smoked and fresh fish. The latter was caught in drift nets and transported in fish-wells to major urban markets such as Amsterdam, Hamburg and London. Faster and stronger ship-types such as the watership came available, which could supply the urban consumers with fish from every corner of the Wadden Sea.

Drift-nets (Kuhlen, kuilen) and boomtrawl-nets (kurre, kor, ra, schrobnet) may have been introduced in the Wadden Sea Region in the late 17th century, together with the longboat called

snekke, schnigg or snik. As a consequence, the number of sea-fisheries was greatly reduced, while many fishermen could not afford the investments required. Only a few places such as Hjerting, Schiermonnikoog and Ameland held out somewhat longer, exporting large quantities of dried flounders and plaice.

Yet, long-line fishery made an unexpected comeback, as many fishermen were not able to upkeep the expenses for longboats and nets. Local fishermen from Helgoland were the first to use boomsail shallows, normally used for whale hunting. Subsequently, most fishing villages reverted to long-line fishery at the turn of the 18th century, forthwith using shallows, yawls and other types of small sailing boats. Many Dutch skippers, on the other hand, did not give up boomtrawl-fishery altogether and combined it with long-line fishery. They switched over to the aak or schokker, which was replaced by the blazer after 1880.

The village of Blankenese near Hamburg became the most important fishing port in the region. Its fishermen held on to draw-nets and subsequently switched over to lighter ships such as everts, cutters and luggers, which were better suited for drawing modern cotton nets. Skippers from Blankenese often transported fish from other harbors as well. Additional fishing harbors were Büsum, Helgoland, Wangerooge (until about 1800), Norderney, Zoutkamp, Schiermonnikoog, Paesens-Moddergat, Wierum, Ameland, Terschelling, Oosterend, Oudeschild, Den Helder and the 19th-century newcomers Finkenwerder, Altenwerder, Fedderwardersiel, Ditzum and Den Oever. The province of Fryslân exported large quantities of eel, which were caught in the surrounding districts and transported to London alive in fast-sailing yachts.

Nevertheless, hundreds of fishermen working with simple yawls and herring boats continued producing for the local market, using traditional tools such as reed fences, weirs and fish-traps. Each district had its own fishing villages near the dyke. Particularly around the Zuiderzee large quantities of white herring (panharing) were caught. Selling shrimps gathered by means of pushed nets, moreover, became an occupation for many impoverished men and women. Oyster fishing was largely farmed out by the state. It started in the 17th century near Sylt and Amrum and spread to the western Wadden Sea, but it disappeared again in the 19th century due to over-exploitation.

We may conclude that the Early Modern Age was essential for the way in which the coastal landscape has been furnished. To be sure, the polderlands, ports, peat-moor settlements, and market towns constituted additional geographic elements. But the most important contributions to the coastal heritage were the specific architectural styles for farms and cottages, the modern technical implements such as windmills and sluices, as well as the introduction of novel agricultural, industrial and fishing methods that have been fundamental for coastal civilization ever since. Finally, there is also an important immaterial heritage, consisting of seasonal folklore, religious perceptions and regional identities. Regional customs at Saint Peter, Eastern, Whitsunday, Martinmass, St. Nicholas' or New-Years Eve, such as bonfires, may-poles, mockeries, masquerades, harvest-homes and beggary with rumbling-pots are characteristic of the Early Modern Age, often referring to the social tensions and communal obligations of the day. Specific sports such as ball playing on courts (kaatsen) or ball-throwing (BoBeln) originate in the 17th, 18th and early 19th centuries, as well as specific dishes, beverages and costumes. In general, they also reflect the impact of a bipolar urban culture, dominated by the distant centers of Amsterdam and Hamburg.

#### 2.6.6 Modern Time (1800-2000 AD)

The 19th-century contribution to the cultural heritage of the Wadden Sea Region was more a matter of quantity than quality. It was the era of industrialization, urbanization, population growth and social upheaval. Cultural patterns that originated in previous centuries prevailed, but their effects were more spectacular and their success more appealing than before. Economic growth was remarkable, whereas the belief in progress was unprecedented. Nonetheless, the major innovations that promoted coastal development were subjected to diminishing returns. Eventually, coastal civilization failed to adapt to the requirements of the modern age.

In many coastal districts the working-class population more than doubled during the 19th century, due to the booming market for agricultural products, but the urban population grew even more. Almost imperceptibly, cities began to outstrip the countryside. Developments were most spectacular in seaport towns and administrative centers, particularly in Germany. Hamburg with its suburbs had grown to 900,000

inhabitants in 1900, Amsterdam had 500,000, Bremen 200,000, Groningen 70,000, Bremerhaven and Wilhelmshaven each 60,000, Oldenburg 45,000, Leeuwarden 32,000, Den Helder 25,000, Emden 22,000 and Alkmaar 18,000 inhabitants. Next came the booming market towns such as Esbjerg, Itzehoe, Elmshorn, Stade, Delmenhorst, Leer, Winschoten, Veendam, and Hoorn. The other coastal towns were expanding as well, though many traditional centers lagged far behind. The previous orientation of the coastal marshes towards Amsterdam completely disappeared, as London and Hamburg became the principle markets for agricultural products. Large parts of the countryside had reached the same population figures, as we know today, approximately 75 to 100 inhabitants per square kilometer. The Dutch coastal provinces were more populated, whereas Jutland and Nordfriesland lagged behind. Most of the islands, on the other hand, fell back into their initial poverty, as maritime traffic began to ignore their roadsteads and labor reserves.

Still, the 19th-century developments were the forerunner of more profound changes in the 20th century. The construction of highways, canals and railroads resulted in a reversal of the coastal infrastructure. Tidal harbors and their surrounding marshes were condemned to a peripheral existence, whereas the inland districts benefited from their location close to the urban centers. Coastal shipping declined after 1870. Coastal agriculture lost its comparative benefits, as it was suffering from falling prices, rising wages and the mounting costs of hydrological management. Substantial numbers of working-class families moved to the cities or emigrated abroad. The sterile upland moors, on the other hand, were greatly improved by the use of modern fertilizers and land-reclamation techniques. They took all the benefits from the possibilities of modern pig-breeding and dairy farming.

As the countryside started to lose inhabitants, the remaining population gathered in towns and major villages, which grew in size and number. Industrial centers and suburbs expanded even more, reducing the surrounding districts to a dormitory area and recreational foreland for the urban economy. This was particularly the case around the major cities. During the 20th century the number of inhabitants of nearby cities doubled to a figure of approximately 5 million, not to mention the more distant urban agglomerations in Holland and North-Rhine-Westphalia, which began to regard the Wadden

Sea Region as their rural foreland as well. At the end of the 20th century, Hamburg had 1.7 mill. inhabitants, Amsterdam 727,000, Bremen 550,000, Groningen 173,000, Oldenburg 154,000 and Bremerhaven 130,000. Other major cities with more than 50,000 inhabitants were Esbjerg, Cuxhaven, Delmenhorst, Wilhelmshaven, Emden, Leeuwarden, Den Helder, Alkmaar and Hoorn. Additionally, the towns of Elmshorn, Stade, Aurich, and Drachten also were strong growers. As regional centers the towns of Varde, Ribe, Husum, Heide, Itzehoe, Uetersen, Wedel, Buxtehude, Langen, Nordenham, Brake, Varel, Wittmund, Norden, Leer, Winschoten, Veendam, Hoogezand-Sappemeer, Delfzijl, Heerenveen and Sneek became more important. As a consequence, the urban population completely outnumbered the people living in rural areas, which can be estimated at about 1.0 to 1.5 million (depending on the demarcations chosen). The coastal marshes and fenlands only count for 7 to 800,000, the islands for another 100,000.

The islands and the neighboring mainland districts took the most important benefits from the urban-based economic development, as they developed into major holiday-resorts for the urban population. High society tourism started in the 19th century on the islands of Norderney, Wangerooge and Föhr (where the royal families resided), followed by Sylt and the other German islands. Important mainland resorts were Dangast, Büsum and Sankt-Peter-Ording. In Denmark and the Netherlands bathing culture started not before the 20th century. In the second half of the 20th century, however, seaside tourism became a mass phenomenon, spilling over to the mainland districts. Several islands experienced a rapid population growth during the 20th century. The islands of Sylt, Sankt-Peter-Ording, Norderney and Borkum as well as the bathing resorts of Wyk-auf-Föhr and Sankt-Peter-Ording became more or less urbanized. In fact, the total island population tripled during the 20th century.

The 19th century constituted the high-days of large-scale modern agriculture. Corn, particularly oats, was exported in large quantities to Britain, Belgium and France, where it fed the horses that pulled the industrial revolution. By the middle of the 19th-century 60 to 80% of the coastal acreage was used for arable farming. The grazing districts were prospering as well, as they profited from the rising export of fattened cattle, horses and dairy products. The typical farms can be described as agrarian capitalist enterpris-



es. The typical farmer was a modern entrepreneur, who refrained from manual labor. Most of the work was undertaken by living-in servants and farm-workers, whose numbers rose considerably. The towns and villages bordering the polderlands and high-farming districts developed into working-class centers, with rows of cottages along their lanes and alleys (e.g. Wesselburen, Marne, Norden, Bunde, Uithuizen). Other working-class families settled on the poor soils of the Pleistocene fringe, where genuine squatter villages emerged, acting as a labor reserve for the marshes. The villages in the Kornkoog district as well as Sankt-Peter-Ording, Sankt-Michaelisdonn, Varel, Moordorf, Muntendam, Zwaagwesteinde, Harkema and Houtgehage became notorious for their obstinate working-class population.

The mounting wealth of the farming population, on the other hand, resulted in a semi-urban way of life. Their splendid farmhouses were built in a neo-classical style, with luxuriously furnished parlors and English gardens with a summerhouse, French roses, and foreign fruit-trees, as well as with separate garage for their gigs and coaches. Cast iron ornaments attested their progressive attitudes. Since the 1860s the most successful farmers started to build urban villas in front of their farms, particularly in liberal strongholds such as Dithmarschen, the Elbe and Wesermarschen, Groningen and Noord-Holland. In Germany, this resulted in a new type of farmhouse: rectangular brick-built buildings with shallow roofs, typical of the so-called foundation age around 1900. In Ostfriesland, Groningen, and Friesland, the traditional type farm-buildings were enlarged, sometimes supplemented by large open barns or huge haystacks.

The agricultural boom was enabled by huge investments in hydrology, infrastructure and machinery. The fields were marled more intensively and drained better by means of deeper ditches, larger canals and bigger sluices. The Hadelner Sietland, for instance, was transformed from a wetland area to a flowering agricultural district thanks to the construction of a canal in 1856. Another canal relieved Butjadingen of perennial drinking-water shortages by diverting fresh-water from the Weser River in 1822. Several lakes and wetland areas that had been drained before were reclaimed again. Until then, it had been the rule that the fenlands and graz-



Fig. 2.18:  
Tuunwallen on Texel,  
The Netherlands  
Photo: D. Marrewijk

ing marshes were inundated each winter, but at the end of the 19th century this had become restricted to extremely rainy periods and specific low-lying areas. Arable fields were drained more effectively as well. Brickwork drainpipes were introduced in the 1850s, enabling extensive leveling operations that enlarged the available acreage. Their introduction on heavier soils was delayed, because the first pipes tended to silt up.

Extensive polder areas such as Anna-Paulownapolder, fairly comparable to their 16th and 17th-century forerunners, were embanked in the 19th century, usually by private firms. Dykes were further heightened and secured, whereas the number of drainage-mills was rising rapidly. The first steam-propelled pumping-engines were introduced in the Netherlands in the 1840s, supplemented by Diesel and electric engines since the 1920s. Traditional drainage-mills were replaced and supplemented by American wind-engines, which led to the establishment of hundreds of additional drainage districts. As a consequence, water-management became increasingly complex, leading sometimes to chaotic situations. This was particularly the case in the low-lying parts of Fryslân, which were burdened by recurrent inundations. In Germany, however, artificial drainage was restricted to specific districts largely below MOD, such as the Wilster Marsch, Wesermarsch, Krummhörn and Rheiderland. Natural drainage prevailed here until the 1950s and 1960s, due to the lower tide and the shorter distance towards the coast. Nevertheless, recurrent inundations had to be reckoned with.



Nowadays, the artificial lowering of the water table during large parts of the year is considered indispensable. Huge sluices and pumping-engines, fed by a web of additional pumps and canals, guarantee a rapid rainwater discharge.

Generally, 19th-century agricultural progress was more profound in the Netherlands and Schleswig-Holstein than in Jutland or Lower Saxony. Particularly the districts of Groningen and Dithmarschen counted to the strongholds of modern arable farming. Fundamental for agricultural progress were iron foundries, of which the first has been built in Rendsburg 1827. In the 1850s, most coastal districts had their own iron foundry, for instance in Højer, Husum, Heide, Itzehoe, Varel, Augustfehn, Norden, Leer, and Martenshoek. Soon the first items of mechanization, such as acrobat rakes, eagle-plows, sowing and threshing machines began to be used. The sandy marshes and polder areas concentrated on arable farming, whereas the older marshes and fenland districts reverted to grazing and dairy farming, exporting their products directly to Britain. The Jutland coastal districts, Eiderstedt and the Wesermarschen developed into major exporters of fattened cattle, transported directly to Britain with the help of steam-ships from Ribe, Tönning, Elsfleth and Brake. Fryslân also exported large quantities of dairy, shipped from the booming port of Harlingen. The internal markets, however, were growing in importance, particularly since the 1870s, when new industrial centers such as Braunschweig, Hannover, Osnabrück, the Ruhr district and Twente emerged.

The 19th-century was also the high-days of coastal shipping. Coastal contacts became more frequent and flexible, smoother, faster and safer. The number of ships in the Wadden Sea Region can be estimated at 3 to 5,000 at least. Especially medium-sized sailing-ships such as koffs, tjalks, schmacks and galliasses were successful, often measuring 125 to 250 tons. Faster sailing ships such as frigates, brigs and schooners were more popular in the western districts and larger ports, whereas the relatively small everts remained dominant in the eastern Wadden Sea. Most ships for coastal traffic came from the Groninger Veenkoloniën, Papenburg, the Elbe and Weser River marshes and the island of Fanø, but the other coastal ports had a modest fleet as well. Newly established seaports such as Den Helder (1811), Bremerhaven-Geestemünde (1828), Wilhelmshaven (1853) and Esbjerg (1874) played a major role as transit harbors,

supplemented by Brake (1790), Nordenham (1857), Brunsbüttelkoog (1895) and the older ports of Stade, Cuxhaven, Vegesack, Emden, Leer, Delfzijl and Harlingen. Bremerhaven became the springboard for hundred thousands of emigrants departing for the United States and Canada. Major waterways with huge sluices, such as the Eiderkanal (1784), Noordzeekanaal (1876) and Nord-Ostsee-Kanal (1895) provided shortcuts between the North Sea and the Baltic. Docks, bridges, cranes, beacons, and lighthouses such as the Alte Liebe in Cuxhaven (1802/03) testify the high-days of coastal shipping.

Railroads, roadways and inland canals, however, outdated coastal traffic. The first railroads merely connected the seaports with their economic hinterlands (Amsterdam 1839, Hamburg 1842, Altona 1844, Glückstadt 1845, Tönning 1854, Harlingen 1863, Den Helder 1865). Subsequently the links with the inland railroad nets were made. The national railroad systems were interconnected in the 1870s, regional offsprings reached almost every coastal district in the 1880s. Additionally, the main roadways connecting the coastal districts to their hinterlands were paved with gravel or stones, providing another alternative to coastal shipping. Local canals such as Fehntjertief (1799), Noordhollands Kanaal (1825) and Hadler Kanal (1853) opened up the coastal hinterland, whereas the Noord-willemsvaart (1861), Bederkesa-Geeste-Kanal (1862), Eemskanaal (1876), Ems-Jade-Kanal (1887), Weser-Ems-Kanal (1893), Dortmund-Ems-Kanal (1899), Küstenkanal (1935), Van Starckenborghkanaal (1938) and Prinses Margrietkanaal (1951) offered a direct connection between different districts as well as an passageway towards the booming inland centers, making coastal shipping largely redundant. Many ship owners reverted to tramping and bulk-transport, but the introduction of iron steam-ships in the 1890s drove most of them out of competition. Only the province of Groningen harbored a substantial number of motor-coasters until the 1960s. Inland shipping flowered around the turn of the century, but it hardly survived the changeover to the mass road-transport in the 1960s. Many 19th-century canals with their monumental sluices, bridges, quays, granaries and warehouses are now outdated and largely deserted.

The upland districts were escaping from their age-old poverty, though the marshland farmers remained skeptical about their modest neighbors for long. Many commons were enclosed during

the 19th century, whereas the number of cotters and smallholder grew. As soon the upland districts were connected to modern roadways and railroads, their rural economy began to boom, increasingly thriving on butter and bacon. The Jutland peninsula recovered after centuries of neglect ('Dark Jutland'), as the Danish government tried to redirect its economy from Hamburg towards Copenhagen.

The Wadden Sea islands, on the other hand, had a difficult time before the modern bathing culture arrived. Heavily populated islands such as Rømø, Föhr and Borkum lost many inhabitants, partly due to emigration. The population of Sylt became dependent on homegrown potatoes. Only Fanø succeeded in restoring its fleet, providing transport facilities for the Jutish west coast and switching over to tramping. Norderney and Helgoland had a substantial fleet of fishing shallops. The island of Wieringen harbored a significant fishing fleet as well.

Additional income came from harvesting sea-grass, which was used for filling mattresses.

Rural change was accelerated in the 1880s. The Great Depression meant a major impetus to agricultural modernization. Railroads and steam-ships made it possible that huge quantities of Russian and American grain reached the European markets, resulting in rapidly falling grain-prices. In order to check wage-costs threshing was fully mechanized in the 1880s, when steam engines were introduced. This caused serious seasonal unemployment and political upheaval, particularly in Dithmarschen, Hadeln, Krummhörn, the Dollard marshes and Het Bildt. Many farm-workers became redundant, they fell back into poverty, moved to the cities or emigrated abroad. The farmers reacted variously. The German government took protective measures on behalf of the grain-producing farmers, thereby linking the fate of the arable farmers to the conservative Prussian landlords. Cattle-farmers, on the other hand, took a more liberal stance, as they were profiting from foreign fodder-imports. In Denmark and the Netherlands most arable farmers remained liberal-minded.

Farmers diversified and reverted back to mixed or pastoral farming: pig-breeding was introduced, dairy-farming could intensify due to

the establishment of local dairy factories that made an end to home-processing. Around 1910 virtually every coastal district had its own butter- and cheese-producing companies. The dairy industry opened up new prospects to smallholders. Other smallholders devoted themselves to



Fig. 2.19:  
Fishing harbor on Texel,  
The Netherlands  
Photo: D. Marrewijk

horticulture or fruit-growing. Their numbers grew considerably since the 1880s. The remaining arable districts partly switched over to market-crops such as flax, sugar beets, potatoes, cabbage, and bulbs. Oilseed rape disappeared due to the completion of tropical oils. Additional processing industries enabled the farmers to keep up arable farming. Groningen got a series of strawboard factories, which made it possible to compensate falling grain-prices by marketing straw. The poor soils at the edges of the marshland districts were planted with new brands of potatoes, suited for the potato-flour mills. Major sugar refineries were built in Dithmarschen, Groningen and Amsterdam. Dithmarschen specialized on cabbage and sauerkraut for the urban market. Cattle farming became often redundant due to the introduction of artificial fertilizers.

The construction of railroads opened up many new possibilities for the fishing industry as well, as the catch could be transported towards the urban centers within hours. Not only large fishing ports such as Esbjerg, Cuxhaven, Bremerhaven and Den Helder took their share. Also dozens of smaller harbors such as Tönning, Friedrichskoog, Neuharlingersiel, Norddeich, Greetsiel, Termunterzijl, and Den Oever began to participate in the fishing trade. Esbjerg concentrated on seine fishery for plaice. Soon it became

the main fishing port of Denmark, harboring many supportive industries as well. The fishing activities in Fryslân declined, as the local fleet was largely destroyed in two storm surges. About one hundred Dutch fishing families settled down in Elsfleth, others in Emden, Vegesack and Geestemünde, where new herring companies were founded.

The introduction of motor cutters after 1900 inaugurated a decisive turn towards commercial shrimp fishing in the Wadden Sea, which became the leading industry in many smaller harbors. Part of these shrimps were dried, the rest was sold to the cities and in the surrounding districts. Since the 1970s competition became fierce. Many smaller cutters were dismissed, particularly in the Denmark and the Netherlands. Huge industrial trawlers from Esbjerg and Urk (partly operating from Lauwersoog and Eemshaven) began hunting the Northern Atlantic for all sorts of fish, which were frozen on board and subsequently processed, largely into fishmeal and fish oil. In the Wadden Sea, mechanical fishing on cockles and other sorts of shellfish was introduced in the 1980s, leading to extensive ecological damage. De damming of the Zuiderzee in 1932 had negative side effects as well, due to the fact that the Zuiderzee served as a childbed for several fish species such as anchovy. A local subspecies of herring, related to local popula-

tions in the Hobugt and the Elbe area, has become extinct.

Agricultural mechanization and scaling up went on in the 20th century, leading to the replacement of foreign workers by family members. Living-in male servants disappeared around World War I, the last farm-workers in the 1970s. Horsepower was replaced by tractors in the 1940s and 1950s. Cattle farming was modernized since the 1950s, herds of 50 to 100 cows were to become the rule. Mixed farming tended to disappear, most smallholders terminated their farms in the 1960s or 1970s. Distant pastures and meadows got into the hands of upland farmers. Changes were most profound, however, in the arable districts, which became completely dependent on modern machinery, as well as fertilizers, herbicides, insecticides and growth suppressors. Traditional crops were replaced by vast acreages of winter wheat, supplemented by barley and oats. Broad beans and flax disappeared, but in several districts farmers concentrated on special crops, among which plant potatoes were the most important newcomers.

The effects on landscape values were dramatic. Re-allotment schemes, infrastructural programs, and hydrological measures, such as the Program Nord (1953), the Ruilverkavelingswet (1954), and the Küstenprogramm (1955), had a profound influence. Ditches were filled up, fields

leveled and improved with subsoil ploughs. The water table was lowered considerably.

The remaining salt marshes were embanked, dykes heightened to unprecedented levels, canals straightened and rivers dammed. In large parts of the Dutch coastal area the original parceling completely disappeared. In the grazing districts the original grass cover was replaced by standardized brands. Still, farming is largely dependent on EU subsidies. Arable farming is hardly competitive due to the tough soils and the high costs of hydraulic management. Moreover, the costs of maintaining the

Fig. 2.20:  
Haubarg, Schleswig-Holstein  
Photo: W. Raabe



remaining farm buildings, ditches, hedgerows and other traditional landscape elements are relatively high, leading to gradual decay.

On the Halligen farming became marginal. Several Hallig islands have been abandoned, whereas the remaining population is dependent on tourism and employment at land-reclamation projects. The original farm-buildings have partly been replaced by modern buildings, better suited to storm-surges.

In the marshland districts the heritage of earlier working-class deprivation can still be observed, sometimes manifesting itself in a grudge against the farming population. Particularly in those districts where the redundant farm-workers could not be sufficiently absorbed by other sectors, several generations have been faced with unemployment, underschooling, and lack of initiative. Some of these districts tend to become depopulated and burdened by an aging population. In the fenland and upland districts, on the other hand, the effects of recent developments have been more balanced.

Many towns and villages still reflect the 19th and early 20th-century agricultural wealth. Spatial patterns and general views are determined by 19th-century architecture. The more recent extension schemes usually took place outside the former village cores. Red brick and pantiles are prominent, though the more robust buildings in Denmark and Germany are contrasting with the subtlety of Dutch architecture, which is characterized by large sash-windows with white-painted frames. Since the 1870s national and international architectural styles predominate. This is particularly the case with communal buildings, such as town halls, co-operative banks, storehouses and dissident churches. Many traditional market-place inns, former groceries and former artisan workshops have been preserved. Several villages were provided with an elegant estate where retired farmers built their villas. Public housing schemes, on the other hand, resulted in sober housing-blocks, but also in special working-class neighborhoods where houses stood alone amidst substantial gardens for self-supporting.

The most important 19th-century industries were windmills, shipyards, and brickworks. Hundreds of new brickworks were built in the Friesische Wehde (brick-pavements) and in Kehdingen, the latter due to the reconstruction of Hamburg after the 1842 great fire. Traditional kilns were replaced since the turn of the century by round kilns with chimneys, allowing a more permanent

production process. Most of them closed down in the 1960s. Hardly any kilns or drying-sheds have been preserved. Since the 1850s and 1860s, several local works have started using steam engines. Flax, sugar, tobacco, ship's biscuits, rapeseed oil were processed industrially. Dairy, sugar, potato-flour, strawboard, and fish-processing factories often reached a considerable scale after 1900. In the 20th century, rural artisan production largely came to an end. Only the blacksmiths held out somewhat longer. Many local shops survived, providing their owners a meager subsistence, but most of them had to shut down in the 1960s, due to urban competition. In the Netherlands, local groceries disappeared completely, making the villages fully dependent on motorized traffic.

Political developments resulted in the full integration of the coastal population into the modern nation-state during the 19th century. The relations with the central government were at first personal and fragile, but gradually becoming smoother. Coastal autonomy was abolished or exchanged for a more standardized form of municipal self-government. In general, the farming population became liberal minded, perceiving traditional self-government as the forerunner of modern democracy and cherishing local identities as an essential component of national values. Fryslân even saw a revival of the Frisian language, due to the struggle by competing elites for popular support. Yet, the liberal triumph also led to a protest movement in the Netherlands and Ostfriesland, as conservative Calvinist smallholders, artisans, and farm hands left the public church for independent free churches.

The insurrection of Schleswig-Holstein (1848/49), its annexation by Prussia (1864/65), the Prussian annexation of Hanover (1866) and the German-French war of 1870/71 lead to a stronger identification with the nation as a whole and a weakening of cultural ties with neighboring districts. Minority languages tended to disappear. Several 19th-century forts such as Grauerort (Landkreis Stade) and Fort Kijkduin (Den Helder) as well as cazemattes and naval strongholds have remained intact.

During the early 20th century many farmers chose for right-wing protest-movements, particularly in Dithmarschen, the Krummhörn and the Groninger Veenkoloniën. They felt threatened by working-class demands as well as by the growing power of financial and commercial elites. Remarkable were the propagandistic attempts by



## 2.7 Frontiers and boundaries

the NS-regime to depict the ongoing embankments of the Wadden Sea as a heroic struggle for additional living space for the German people. Polders such as Dieksanderkoog (Adolf-Hilter-Koog) were constructed by unemployed workers and populated by farmers and farmhands loyal to the regime.

In the wake of World War II many bilateral contacts between the three countries temporarily broke off. Nowadays, most coastal districts are governed by labor politicians, particularly in Ostfriesland and the adjoining parts of Groningen.

To a large extent, the Wadden Sea landscape is the product of the 19th- and 20th-civilization. Modern civilization, however, tends to jeopardize its own existence. Human intervention created a unique niche in which cultural richness and natural diversity could thrive. Ongoing developments threaten to reduce these values to a situation in which diversity is rapidly decreasing. The effects of mechanization and large-scale planning constitute a major threat to civilization. Rising sea levels and changing temperatures may even increase the risk of unwarranted actions. Thus, caution and care are the only effective solutions for preserving the cultural landscape in its unique natural settings.

## 2.7 Frontiers and boundaries

### 2.7.1 Political territories

#### 2.7.1.1 Denmark

Unambiguous frontiers in the modern sense did not emerge before 19th century. Until 1864, when Prussia incorporated Schleswig-Holstein, the kingdom of Denmark stretched down as far as the Elbe river. The Danish crownlands, however, were restricted to the political districts north of the Kongeå (Vester Horne, Skast and Gørding herred) and several southward enclaves on the mainland (the city of Ribe, Lø herred with Ballum and Møgeltønder Birk) as well as on the islands (Mandø, Rømø Sønderland, List-auf-Sylt, Westerland-Föhr and Amrum). These enclaves were united 1440 under the rule of the bishop of Ribe and incorporated into the Danish state in 1536. During the late 17th century they were pawned to the count of Schackenborg. The other districts south of the Kongeå (including Hviding, Højer and Tønder herred) belonged to the duchy of Schleswig since the 13th century. The only privileged cities in the area were Varde, Ribe and Tønder. The market town of Højer had the jurisdiction over the surrounding countryside (Højer herred).

The duchies of Schleswig and Holstein as well as the royal enclaves were occupied by Prussia, until a plebiscite in 1920 established the present borderline. Only the city of Ribe and its surroundings (Ribe herred) were left to Denmark. Following the plebiscite, the districts north of the river Vidå (Widau) were (re)united with Denmark as well. From 1940 to 1945, Denmark was occupied again by German troops. The harbor of Esbjerg was founded on Danish territory in 1868.

Originally, the whole of Jutland fell under the jurisdiction of the Jyske Lov of 1241. In the duchy of Schleswig (Sønderjylland) it remained operative until 1899. In the royal parts (Nørrejylland) medieval Jutish law gave way to the Danske Lov (Danish Law) in 1683, though the prevailing egalitarian inheritance customs remained intact.

#### 2.7.1.2 Schleswig-Holstein

The duchies of Schleswig and Holstein were united in 1386 and associated to the Danish kingdom in 1460 by means of a personal union. As the king bestowed the duchies upon his younger brothers and their descendants, their



political history took an independent course. They had a distinct royal chancery as well as a diet, largely dominated by the German speaking nobility.

Both duchies, separated by the Eider river, had a very different ethnic background. The duchy of Holstein was part of the German Empire and is considered the ancient homeland of the Saxons. The duchy of Schleswig was originally a part of the kingdom of Denmark. The area has been colonized in the Early Middle Ages by Danish and Frisian immigrants. The latter fell under royal jurisdiction until 1435. Only the small districts of Schwabstedt and Stapelholm (Kreis Nordfriesland) as well as the main cities were populated by Saxon newcomers from the south.

The ethnic divisions were quite pronounced in matters of law and administration. Schleswig's civil law has been dominated by the traditional Jyske Lov of 1241, which was replaced by the 1899 Prussian Bürgerliches Gesetzbuch. In the Holsteinian upland districts traditional Saxon law applied, which restricted inheritance customs by favoring one successor. Similar restrictions were introduced in Schleswig in 1777.

Most coastal districts as well as the cities had their own statutes, privileges, and institutions (including egalitarian laws of succession) that set them apart from the Jutish and Holsteinian hinterland. This applied to the Frisian districts of Wiedingharde, Bökingharde, Sylt, Osterland-Föhr, Nordstrand, Pellworm and Eiderstedt as well as Stapelholm, Norder- and Süderdithmarschen and the riverbank districts of Wilster and Kremper Marsch. Additionally, many newly reclaimed 17th- and 18th-century polder-districts were conferred with special privileges. The privileged cities were Husum, Tönning, Garding, Friedrichstadt, Wilster, Krempe, Glückstadt, Itzehoe and Altona, whereas Lunden and Meldorf lost their privileges in 1559. The upland districts Karrharde, Norder- and Südergoesharde (i.e. (Süd-)Tondern, Bredstedt and Husum) that were colonized by Frisians at the end of the Middle Ages remained under Jutish law.

The political history of Schleswig-Holstein is complicated by several divisions of the royal and ducal estates. In 1544, a separate duchy of Gottorf came into existence that centered around the towns of Tönning, Schleswig, and Tønder. The districts south of the Eider river (including most Frisian territories) were returned to Denmark in 1721, the districts south of the Eider river (including Norderdithmarschen) not before 1773. Dithmarschen has been an independent

republic and a member of the Hanseatic confederation until 1559, when it was conquered and divided between Denmark, Gottorf and the duchy of Haderslev (1544-81). The unique clan system was abolished then. The seigniorship of Pinneberg (with the city of Altona) was part of the Westphalian county of Schaumburg until 1640. Several parts of the seigniorship were passed on to the territorial county of Ranzau until 1726.

### 2.7.1.3 Lower Saxony, Hamburg and Bremen

The state of Lower Saxony, installed in 1946, has been created from the former kingdom of Hanover, the grand duchy of Oldenburg and two minor states, which, in turn, have been constituted from different territories. Hanover was incorporated by Prussia as an additional province in 1866. The state of Hamburg (Freie und Hansestadt Hamburg) conveyed the city of Cuxhaven (Amt Ritzbüttel) to Prussia in 1937, but it kept the authority over the island of Neuwerk. The city of Bremerhaven, founded 1827, is part of the state of Bremen (Freie und Hansestadt Bremen). The Prussian naval harbor of Wilhelmshaven has been established on Oldenburg territory in 1852.

In Lower Saxony national boundaries tended to be fuzzy. Though the political frontier between Germany and the Netherlands dates from the 16th century, the western border region and the city of Bremen (imperial since 1618) were part and parcel of Dutch civilization until the 19th century. The eastern parts, on the other hand, were dominated by aristocratic government, hanseatic culture, Low Saxon language and Lutheran religion.

The fenland districts behind the Elbe and Weser riverbanks, including the Elbe River marshes in Holstein, have been reclaimed by 12th- and 13th-century immigrants from Holland. Their distinctive cultural heritage has, however, dissolved at an early age. It only survived in matters of common law and administration. Most riverbank districts (Altes Land, Kehdingen, Hadeln, Osterstade) and several villages and towns (Buxtehude, Ostemarsch, Osten, Neuenkirchen) had special privileges and semi-autonomous institutions until the 19th century. Hadeln and Wursten had their own diets. Popular culture was mainly inspired by the Hanseatic cities. Only the district of Stedingen (including Moorriem en Wüstenland) had its autonomy restricted, due to authoritarian Oldenburg rule.

Circumstances were different in the Frisian coastal area, reaching from the mouth of the Weser river into the Netherlands. Here popular culture and civil law contrasted sharply with the feudalized and largely catholic Westphalian hinterland. Dutch influence was profound. As in most other coastal districts, distinctive privileges, customs and institutions survived until the 18th and 19th centuries. Frisian common law (including egalitarian laws of succession) was replaced by the French Code Civil as late as 1811.

The Frisian districts east of the Weser river comprise Wursten and the upland villages of Lehe, Stotel and the district of Vieland (now Bremerhaven), which had more or less the same privileges as the river-bank districts mentioned above. In Oldenburg most Frisian districts have been part of the medieval district of Rüstringen. Among these Butjadingen and Stadland as well as the island of Landwürden kept special statutes and privileges, in contrary to Jader Marsch and the upland district of the Friesische Wehde (Varel). In Jever (covering the medieval districts Östringen and Wangerland) and Harlingerland local autonomy was more or less restricted. The rest of Ostfriesland, however, had a powerful diet, dominated by the semi-autonomous city of Emden. Here we find the geographical districts of Norderland, Brookmerland, Krummhörn, Moormerland, Overledingen, Rheiderland as well as the upland districts around Aurich (including Uplengen).

The political history of Lower Saxony not very impressive. State formation began rather late and was dominated by foreign powers. Before the 19th century the area had only a few privileged cities: Buxtehude, Stade, Otterndorf, Oldenburg, Jever, Aurich, Norden and Emden. The archdiocese of Bremen covered most of the area east of the Weser river. It was governed by Danish princes since 1585, occupied by Sweden in 1645, subsequently transformed into a royal duchy and conveyed to Hanover in 1720. The republic of Land Wursten has been conquered by the archbishop in 1525. The semi-independent Land Hadeln (with its capital Otterndorf) was added to Hanover in 1731, after the ducal family of Sachsen-Lauenburg had become extinct. In fact, the electorate of Hanover may be considered a British colony, as the king resided abroad until 1837, whereas he left actual government to the regional aristocracy.

The county of Oldenburg became part of Denmark in 1667 and was reinstated as a grand duchy in 1774. The seigniory of Jever (acquired

1575) was split off in 1667 and allotted to the Prince of Sachsen-Anhalt. Subsequently it was inherited by the Russian czarina in 1793 and returned to Oldenburg in 1818. The estates of Varel and Kniphausen remained to the last Count of Oldenburg's natural son, the Count of Aldenburg. They passed over to the Dutch patrician family Bentinck and were returned to Oldenburg as late as 1854. The county of Ostfriesland evolved in the 15th century from several smaller territories. It was extended with the seigniory of Esens (Harlingerland) in 1581, promoted to a principality in 1654 and transferred to Prussia in 1744. Administration was complicated by the survival of a handful of semi-independent baronies. The Vienna congress of 1815 granted Ostfriesland to Hanover.

Following the Napoleonic wars, Ostfriesland and Jever became part of the kingdom of Holland in 1807. Subsequently, all coastal territories west of the Elbe River, as well as the city of Hamburg, were briefly incorporated into the French empire in 1810. Nevertheless, Dutch annexation plans after World War II made no sense, as the region was effectively germanized since the 1840s.

#### 2.7.1.4 The Netherlands

The Netherlands came into being in the 16th century, when various provinces were melted together into the Hapsburg-Burgundian state. Its dissociation from the German Empire took place gradually, beginning in 1548, speeding up during the revolt against Spain from 1568 onwards and being completed by the Westphalian peace treaty in 1648. Seven out of the initial seventeen provinces signed the actual declaration of independence in 1579 (Unie van Utrecht), among which Groningen, Fryslân and Holland. In fact, the Dutch Republic was a loose federation of towns and districts under the direction of the province of Holland. Until 1795 actual power was shared with the prince-stadholder and his political allies. After the French military invasion the Batavian Republic became a unified state in 1798 and was converted into the Kingdom of Holland in 1806. The Netherlands was part of the French Empire between 1810 and 1814. From 1940 to 1945 they were occupied by Germany.

Originally, the town of Groningen was an imperial city with intensive links with its Westphalian hinterland. The city and its surrounding Frisian districts (Ommelanden) were incorporated

by the Count of Ostfriesland in 1506, subsequently conquered by the Duke of Gelre and integrated into the Hapsburg Empire in 1536. After backsliding into Spanish rule, Groningen was conquered by Republican troops in 1594. The city had the jurisdiction over the Oldambt district, Veenkoloniën and the seigniorship of Westerwolde until 1798. The city of Groningen and the autonomous districts of Fivelgo, Hunsingo and Westerkwartier constituted the province Stad en Lande. The provincial diet, which was dominated by the local gentry, was presided by the prince-stadholder of Groningen and Fryslân until 1795. The province was temporarily extended into the Département de l'Ems Occidental (1810-14) and subsequently reinstated under the name of Groningen.

The province of Fryslân formally became part of the Hapsburg-Burgundian empire in 1498, but until 1515 actual rule was bestowed upon the Dukes of Sachsen-Meißén. After a period of civil war the province was effectively incorporated into the Hapsburg state in 1524. The rural districts of Oostergo, Westergo and Zevenwouden joined the Dutch Republic, together with eleven privileged cities. Until 1795 actual political power was in the hands of the local gentry under the direction of the prince-stadholder, who resided in Leeuwarden. In 1747 the Frisian stadholder was elected to stadholder of the other provinces as well. The district Westergo had been cast out of the medieval districts of Vijfdelen, Wonseradeel and Wagenbrugge. The island of Ameland was a free imperial barony until 1795. Terschelling was an independent seigniorship until 16th century, when it became a Burgundian loan. The island was incorporated into the province of Holland in 1615. Terschelling and Vlieland belonged to the province of Holland until 1942, when they were returned to Fryslân by the German authorities.

The county of Holland was one of the core areas of Burgundian power, extended by the newly conquered district of West-Friesland in 1289. Only the cities of Alkmaar, Medemblik, Enkhuizen and Hoorn played a minor role in the provincial government, which was dominated by a few large cities such as Amsterdam and Leiden. Several rural districts, such as Texel, Wieringen, Schagen, Barsinghorn, Hoogwoud and Grootebroek had urban privileges as well. The province of Holland was split up and subsequently reunited in the years 1798 to 1814 under the names of department of Texel, Amstelland and Zuiderzee.

It has been divided into Zuid- and Noord-Holland since 1840.

Groningen, Fryslân and Noord-Holland were dominated by Frisian common law, which was replaced by the French Code Civil in 1811. Groningen had official statutes. In Fryslân and Holland common law was heavily influenced by the principles of Roman law.

### 2.7.2 Language and religion

Coastal culture has been molded by Jutish, Low Saxon, Frisian and Dutch influences. Until the 17th century, Low Saxon served as the lingua franca of the whole Hanseatic realm from Kampen and Deventer to Bergen, Kaliningrad and Tallinn. The dialects of Jutland and Nordfriesland were only used as a vernacular: either Standard Danish or Low Saxon served as the written language. During the 16th and 17th centuries, however, Low Saxon and the other Frisian dialects were reduced to vernacular as well. Low Saxon (Niederdeutsch, Nedersaksisch, Oost-Nederlands) is still widely spoken in Schleswig-Holstein, Lower Saxony and Groningen. Its official role, however, has been taken over by Standard Danish, High German and Dutch. The first two became the languages of Lutheranism, the latter the language of Calvinism and dissent. The reception of urban culture from centers as Copenhagen, Hamburg and Amsterdam has largely been determined by the official language chosen.

The remaining dialects have been strongly influenced by the official languages, causing a decline of mutual understandability across the borders. Yet, most dialects are in retreat, due to mass-media domination, increasing mobility and the massive influx of German refugees from Eastern Europe after 1945. The distinctive island and border dialects are bound to become extinct.

In Schleswig the Southern Jutish dialect was pushed aside since the Late Middle Ages by the more esteemed Low Saxon and High German. A plebiscite established the present borderline in 1920. Since then, the ethnic minorities on both sides of the border have been protected by special statutes. While the Danish minority south of the border ('Sydslesvig') could assert itself, partly because of the highly esteemed school system, the German (Low Saxon) speaking minority in Sønderjyllands Amt ('Nordschleswig') gradually dissolved. The largely German speaking border towns of Tønder and Højer (as well as the ethnic Frisians of the Tønder Marsk) became entirely

Danish (Jutish) speaking. Political activists in both countries even pleaded for shifting the border further southward after World War II. The Southern Jutish dialect (Sønderjysk) is widely used as a vernacular, but south of the border it tends to be replaced by Standard Danish (Rigsdansk, formerly known as Kjöfenhawnsk).

The Frisian-speaking minority in Schleswig-Holstein is shrinking. About 5 to 10,000 people are speaking nine different dialects, some of them mutually incomprehensible. The Frisian dialects on the peninsula of Eiderstedt and the islands of Nordstrand and Pellworm have been replaced by Low Saxon in the 17th and 18th centuries, which is still widely spoken. In all the Low Saxon and Frisian speaking areas (except for List) as well as in several Jutish parishes the official church, school and state language has been High German since the 17th century. Due to intensive maritime contacts, there was also a strong impact of Dutch culture in Nordfriesland.

In Lower Saxony the Frisian language has been superseded by Low Saxon between the 15th and 17th centuries, except for the island of Wangerooge, where it died out around 1900. In the neighboring province of Groningen, it disappeared even earlier. As a last resort, the Westphalian enclave of Saterland (Landkreis Cloppenburg) harbors a rapidly shrinking Frisian speaking community, descending from high medieval fenland colonists from Ostfriesland.

Language and religion were often linked up. Lutheran state churches have dominated Denmark and most of Northern-Germany since the Reformation. They dictated the transition from Low to High German in the 17th century. The influence of pietism and 19th-century revivalism was more obvious in the north. In Holstein and Lower Saxony, on the other hand, orthodox theology and Enlightenment ideas from Hamburg had a stronger impact.

Only the Hanseatic city of Bremen and its rural domains slipped over to Calvinism. Several villages around the city and in the Bremerhaven area are reformed up to this day. As a consequence, the members of the urban elite were accessible for Dutch culture. Parts of the elite wrote Dutch until the 19th century. Religious dissent has been restricted to Dutch colonies in Sande-Neustadtgödens (1544), Altona (1601), Glückstadt (1617) and Friedrichstadt (1621) as well as the island of Nordstrand (1654). Education in the Dutch language was customary here until the middle of the 19th century. The largest group of dissenters were the Mennonites, sup-

plemented by Arminians (Friedrichstadt), Calvinists, Catholics and members of the Old Roman Catholic Church residing under the Chapter of Utrecht (Nordstrand).

The Dutch impact was very profound in the border districts around the city of Emden (Krummhörn, Moormerland, Rheiderland), where Calvinism became the dominant religion. The area harbored some Mennonites and members of other sects as well. Here the official language became Dutch, which was taught in schools from the 17th century until the 1850s. Additionally, the neighboring Lutheran districts were influenced by Dutch culture as well. During the 18th century, growing numbers of Jews and Catholics were allowed to settle down in Ostfriesland, Jever and Oldenburg. Subsequently, 19th-century revivalism resulted in the foundation of minor Baptists and dissident reformed churches (Altreformierten).

In the province of Groningen, the official language was Low Saxon until the 1640s, when Dutch was introduced. The province of Fryslân switched over to High German under the Duke of Saxony in 1498. The Middle Dutch spoken in the county of Holland became the official language in 1515. Though Frisian survived as a written language, it had only a marginal existence until the 19th century. Due to a 19th- and 20th-century revival movement the Frisian language regained its position. It is now spoken by about 400.000 people, taught in schools, used in the media and accredited by the Dutch government as the second official language within the province. The official name of the province has been changed in 1997 from Friesland into Fryslân, and so were many village names.

The population of the larger cities in Fryslân speaks a mixed Dutch-Frisian dialect known as Stadsfries since the 16th century. Additionally, several islands (Ameland, Midland on Terschelling) and newly reclaimed polder districts (Het Bildt, Kollumerland) have switched over to mixed dialects as well.

In Noord-Holland Frisian gave way to Middle Dutch dialects as early as the 13th century, followed by the islands of Texel, Wieringen and Vlieland. In West-Friesland and on Texel the local dialects or regiolects are still very much alive.

Religious diversity is more pronounced in the western districts than in the eastern parts of the Wadden Sea. Substantial catholic and Mennonite enclaves can be found in Groningen and Fryslân, dating from the 16th and 17th centuries. In

## 2.8 Institutions

West-Friesland whole villages have remained catholic. A true multi-confessional culture developed in the cities and villages around the Zuider Zee and on the islands. Though the official church remained reformed (Nederlands Hervormde Kerk), other groups such as Catholics, Jews, Lutherans, Arminians (remonstranten) and members of different Mennonite sects (doopsgezinden) often incorporated more than half of the population. The provinces of Fryslân and Groningen, on the other hand, harbored many religious conservatives who reverted to 18th-century pietism and 19th-century revivalism, finally organizing themselves into local congregations of the so-called Gereformeerde Kerken, the more dogmatic Gereformeerde Kerken (vrijgemaakt) or in different splinter groups such as the Baptists. The number of Mennonites, Arminians and Lutherans has been rapidly shrinking during the 20th century, whereas most of the Jews have been liquidated during World War II. In the Netherlands secularization has spread rapidly during the 20th century, partly due to the emergence of the socialist labor movement since the 1890s, partly following the disintegration of the liberal wing of the reformed church.

### 2.8 Institutions and collections

Research on culture, language and history of the Wadden Sea Region is concentrated at specialized institutions, namely the Center for Maritime and Regional History in Esbjerg, the Institute for Grænseregionsforskning in Åbenrå, the Nordfriisk Instituut in Bredstedt, the Ostfriesische Landschaft in Aurich and the Fryske Akademy in Leeuwarden, as well as at the Syddansk Universitet and the universities of Kiel, Oldenburg, Groningen and Amsterdam. Specialized archaeological research is also conducted by the Niedersächsisches Institut für historische Küstenforschung in Wilhelmshaven (founded 1938) and the Forschungs- und Technologiezentrum Westküste in Büsum (1988). The Wilhelmshaven institute is responsible for the publication of a yearly bibliographical survey on the Lower Saxony coastal area (Nachrichten des Marschenrates 1964 ff.). General interest in the coastal heritage is promoted by the Landschaftsverband Stade and the Oldenburgische Landschaft, as well as by a range of regional historical associations with picturesque names. Among them, the Fries Genootschap in Leeuwarden (1819) and the Verein für Hamburgische Geschichte (1839) are the oldest ones.

Regional museums in Husum, Meldorf, Hamburg-Altona, Stade, Bremerhaven, Oldenburg, Jever, Emden, Groningen, Leeuwarden and Hoorn take a professional interest in the coastal cultural heritage. The state open-air museums in Lynby, Kiel, Cloppenburg, Arnhem and Enkhuizen reconstructed several farms and other buildings, including tools and furniture. Material culture is also documented by the Museum für Kunst- und Kulturgeschichte in Schleswig.

Specialized archaeological museums can be found in Ribe (Ribes Vikinger, Den antikvariske Samling), Skærbæk (Hjemsteds Oldtidspark), Heide, Bad Bederkesa, Oldenburg, Ezinge (Wierdenland) and Den Oever (Huis van de Aarde). The regional museums Groningen and Leeuwarden accommodate extensive archaeological collections as well. Professional shipping and fishery museums are located in Esbjerg, Husum, Bremerhaven, Groningen, Sneek, Enkhuizen and Lelystad, with minor collections at Büsum, Wischhafen, Bremen-Vegesack (Schloß Schönebeck), Brake, Rhaderfehn, Moddergat, West-Terschelling, Den Hoorn and Den Helder. The agricultural museum in Meldorf focuses primarily on 20th-century modernization, whereas smaller agricultural collections are exhibited in Jever, Krummhörn-Campen, Leens and Exmorra. Historical farms can be seen at Niebüll, Wyk-auf-Föhr, Husum, Witzwort, Meldorf, Bremerhaven-Speckenbüttel, Bunde, Warten, Stroe on Wieringen, De Waal on Texel, Hoogwoud, Schagen and Beemster. The city of Alkmaar has its own cheese-making museum, Hindeloopen a small museum showing the production of skates. Dyke-building techniques are documented in Husum, Dorum and Petten, recent developments in Lelystad (Nieuw Land Poldermuseum). Working industrial windmills can be found at the open-air museums of Enkhuizen, Arnhem and Zaandam, an oilmill in Roderwolde (near Groningen). Aristocratic culture is documented at manors in Breitenburg, Hagen, Dornum, Krummhörn-Pewsum, Slochteren, Uithuizen, Leens, Veenklooster and Ysbrechtum.

Among the natural museums those in Ribe (Vadehavcentert), Tønning (Multimar), Balje (Natureum Elbemündung), Wilhelmshaven (Wattenmeerhaus) and Texel (Ecomare) are the most important ones. Several artists working in the Wadden Sea Region are commemorated with specialized museum, namely the painters Emil Nolde, Otto Modersohn and Franz Radziwill as well as the writers Theodor Storm, Gustav Frenssen, Klaus Groth, Friedrich Hebbel and Gys-



## 2.9 References

bert Japicx. The painters working in Worpswede and Fischerhude did a lot of work on the moors and bogs around Bremen. The regional museum in Groningen has a large collection on the painters collective 'De Ploeg'.

Subsequently, there is a host of local museums, covering virtually every island and most of the larger towns. Among these the most interesting are the museums of Rømø (Kommandørgarden), Højer (Mølle- og Marskmuseum), Wykauf-Föhr (Dr. Carl-Häberlin-Friesenmuseum), Sandstedt-Rechtenfleth (Hermann-Allmers-Heim), Fedderwardersiel (Nordseehaus), Wilhelmshaven (Küstenmuseum), Carolinensiel (Sielhafenmuseum), Warffum (Openluchtmuseum Het Hogeland), Harlingen (Hannemahuis), Allingawier (Aldfaers Erfroude) and West-Terschelling ('t Behouden Huys).

The most important historical associations are: Historisk Samfund for Ribe Amt, Historisk Samfund for Sønderjylland, Nordfriesische Verein für Heimatkunde und Heimatliebe, Heimatbund Landschaft Eiderstedt, Verein für Dithmarscher Landeskunde, Heimatverbund für den Kreis Steinburg, Verein für Hamburgische Geschichte, Stader Geschichts- und Heimatverein, Heimatbund der Männer vom Morgenstern, Landesstube des Alten Landes Wursten, Rüstringer Heimatbund, Historische Gesellschaft Bremen, Wittheit zu Bremen, Die Maus (Bremen), Jeverländische Althertums- und Heimatverein, Gesellschaft für bildende Kunst und vaterländische Altertümer zu Emden, Upstalsboom-Gesellschaft (Aurich), Vereniging Stad en Lande (Groningen), Fries Genootschap voor Geschied-, Oudheid- en Taalkunde, Historisch Genootschap 'Oud West-Friesland' and Kring 'Vrienden van de Hondsbosche' (Petten).

## 2.9 References

### General

- Abrahamse, J., et al. (eds.) 1976. Vadehavet. Et dansk-tysk-hollandsk naturområde, Esbjerg 1976 = Wattenmeer. Ein Naturraum der Niederlande, Deutschlands und Dänemarks, 1976, 4th ed. Neumünster. 1984 = Waddensee. Natuurgebied van Nederland, Duitsland en Denemarken, Harlingen.
- Abrahamse, J., J. van der Wal, 1989. De Waddensee, kustlandschap met vijftig eilanden, Harlingen.
- Arends, F., 1833, repr. 1974. Physische Geschichte der Nordsee-Küste und deren Veränderungen durch Sturmfluthen seit der Cymbrischen Fluth bis jetzt, Leer.
- Aubin, H., 1965. Der Nordseeraum - eine frühe Geschichtslandschaft, in: Jahrbuch der Gesellschaft für bildende Kunst und vaterländische Altertümer zu Emden 45, pp. 91-102.
- Borchling, C. & R. Muuß, 1931. Die Friesen, Breslau.
- Fischer, L. (ed.), 1997. Kulturlandschaft Nordseemarschen, Bredstedt/Westerhever.
- Folkers, J. U., 1956. Vom Wesen des Friesentums, in: Jahrbuch der Gesellschaft für bildende Kunst und vaterländische Altertümer zu Emden 36, pp. 7-38.
- Heemskerck Düker, W.F. & S.J. van der Molen, 1941. Friesland, Friezenland. Den Haag.
- Homann, H., 1983. Die deutsche Nordseeküste. Inseln, Meer und Küstenland, Warendorf.
- Keuning, H. J., 1957. Geest und Marsch, (= Wilhelmshavener Vorträge, nr. 23). Wilhelmshaven.
- Knottnerus, O. S., 1996. Structural Characteristics of Coastal Societies: Some Considerations on the History of the North Sea Coastal Marshes, in: J. Roding and L. Heerma van Voss (eds.), 1995. The North Sea and Culture (1550-1800). Proceedings of the International Conference held at Leiden 21-22 April 1995, Hilversum, pp. 41-63.
- Knottnerus, O. S., 1999. Das Wattenmeer als kulturelle Ausgleichszone: maritime Gesellschaftsformen im Bereich der Nordseemarschen (1500-1900), in: H. Gerstenberger and U. Welke (eds.), 1999. Zur See? Maritime Gewerbe an den Küsten von Nord- und Ostsee, Münster. pp. 31-50.
- Kossack, G., et al. (eds.), 1984. Archäologische und naturwissenschaftliche Untersuchungen an Siedlungen im deutschen Küstengebiet vom 5. Jh. v. Chr. bis zum 11. Jh. n. Chr., Weinheim.
- Rohde, H., 1976. Die Geschichte des deutschen Küstengebietes. The History of the German Coastal Area, in: Die Küste 32, pp. 6-29.
- Tacke, B. & Lehmann, B. Die Nordseemarschen, Bielefeld/Leipzig.
- De Vleet, 1997, 2000. CD-rom encyclopedie over de Noordzee, het Waddengebied en de kust. De Koog.
- Het Waddenboek, 1964. Zutphen.
- Wagret, P., 1966. Polderlands, London.
- Wiemann, H., 1964. Der Nordseekulturräum. Kurze Einleitung zum Hauptthema des Friesenkongresses 1964, in: Friesisches Jahrbuch), pp. 7-13.
- Woebcken, C., 1932. Das Land der Friesen und seine Geschichte, repr. 1973 Walluf bei Wiesbaden.
- Workshop on The Cultural Heritage in The Wadden Sea Region, 1997. Ribe September 10th-12th 1997. Abstracts and Lectures, Copenhagen.

### Denmark

- Grau Møller, P., 1997. Kulturhistorisk inddeling af landskabet, Copenhagen.
- Guldberg, M., et al. (eds.), 1993. Facing the North Sea: West Jutland and the World, Esbjerg. Hjorth Rasmussen A., 1973. Frisiske kulturelementer. En introduktion og forløbig oversigt, in: Folk og kultur. Årbog for Dansk Ethnologi og Folke-mindevidenskab, pp. 75-85.
- Jensen, S. (ed.), 1998. Marsk, land og bebyggelse: Ribeejeren gennem 10.000 år, Aarhus.
- Meesenburg, H., 1982. 'Sydvestjyske erhvervskulturer', in: Bygd 13 nr. 3, pp. 2-31.
- Sørensen, H. E., 1985. Vadehavet og vesteregnet, Skærbæk.
- Stoklund, B., 1972. Grænsen i grænselandet, in: Bygd 3, nr. 4, pp. 3-17.

### Schleswig-Holstein

- Bantelmann, A. et al., 1995. Geschichte Nordfrieslands, Heide.
- Becker, M. (ed.). Historische Kulturlandschaften in Schleswig-Holstein, Neumünster.
- Gietzelt, M. (ed.), 2000. Geschichte Dithmarschens, Heide.
- Heimatbuch des Kreises Steinburg, 1924-26. 1981 repr. Glückstadt.
- Kohl, J.G., 1846. Die Marschen und Inseln der Herzogtümer Schleswig und Holstein. 1973 repr. Walluf bei Wiesbaden.
- Meier, D., 2001. Landschaftsentwicklung und Siedlungsgeschichte des Eiderstedter und Dithmarscher Küstengebietes als Teilregionen des Nordseeküstenraumes, Bonn.
- Müller-Wille, M. et al., 1988. Norderhever-Projekt, Neumünster.
- Steenen, Th., 2000. Das große Nordfriesland-Buch, Hamburg.
- Stewig, R., 1978. Landeskunde von Schleswig-Holstein, 2nd ed. 1982 Stuttgart.

### Lower Saxony, Hamburg and Bremen

- Allmers, H., 1858. Marschenbuch. Land- und Volksbilder aus den Marschen zwischen Weser und Elbe, repr. 1979, Osnabrück.
- Behre, K.-E. & H. van Lengen (eds.), 1995. Ostfriesland. Geschichte und Gestalt einer Kulturlandschaft, Aurich.
- Bierwirth, L., 1967. Siedlung und Wirtschaft im Lande Hadeln. Eine kulturgeographische Untersuchung, Bad Godesberg.
- Dannenberg, H.-E. (eds.), 1988. Kulturlandschaft zwischen Elbe und Weser. 25 Jahre Landschaftsverband der ehemaligen Herzogtümer Bremen und Verden, Stade.
- Dannenberg, H.-E., and H.-J. Schulze (eds.), 1995. Geschichte des Landes zwischen Elbe und Weser, Stade.
- Eckhardt, A. & H. Schmidt (eds.), 1987. Geschichte des Landes Oldenburg. Ein Handbuch, Oldenburg.
- Francksen, H. H., 1985. Butjadingen. Eine Führung durch die Geschichte von Land und Landschaft, Oldenburg.
- Hagen, D., H. Schmidt & G. Köning, 1999. Oldenburg. Land zwischen Nordsee und Dammer Bergen, Hannover.
- Lehe, E. von, 1973. Geschichte des Landes Wursten, Bremerhaven.
- Linde, R., Die Niederelbe, 1908. repr 1979, Prato.

Meyer, G. (ed.), 1998. Nordkehdingen. Tradition und Geschichte, Freiburg (Elbe).

Ohling, J. (ed.), 1969. Ostfriesland im Schutze des Deiches. Beiträge zur Kultur- und Wirtschaftsgeschichte des ostfriesischen Küstenlandes, Pewsum/Leer.

Riehl, W. H., 1854. Land und Leute, vol. 2: Wanderbuch, 12th ed. 1925 Stuttgart.

Seedorf, H. H., & H.-H. Meyer, 1992-96. Landeskunde Lower Saxony. Natur- und Kulturgeschichte eines Bundeslandes, Neumünster.

### The Netherlands

Barends, S. et al. (eds.), 1986. Het Nederlandse landschap. Een historisch-geografische benadering, 8th ed. 2000. Utrecht.

Bremer, J. T., 1985. De Zijpe, bedijking en bewoning tot omstreeks 1800, Schoorl.

Es, W. A. van et al. (eds.), 1988. Archeologie in Nederland. De rijkdom van het bodemarchief, Amsterdam/Amersfoort.

Feddes, F., 1999. Belvedere. Beleidsnota over de relatie cultuurhistorie en ruimtelijke inrichting, Den Haag.

Formsma, W.J., 1976. Historie van Groningen, 2nd ed. 1981. Groningen.

Frieswijk, J. et al. (eds.), 1998. Geschiedenis van Friesland 1750-1995, Meppel.

Hendriks, J. A., 1989. De ontginning van Nederland. Het ontstaan van de agrarische cultuurlandschappen in Nederland, 2nd ed. 1998 Utrecht.

Hofstee, E. W., 1937. Het Oldambt. Een sociografie, repr. 1990 Groningen.

Kalma, J.J., et al. (eds.), 1968. Geschiedenis van Friesland, Drachten.

Kelder, P., 1984. Landschappen rondom de Zuiderzee, Enkhuizen.

Langen, G. J. de, 1992. Middeleeuws Friesland. De economische ontwikkeling van het gewest Oostergo in de vroege en late middeleeuwen, Groningen.

Knottnerus, O. S. et al. (eds.), 1992. Rondom Eens en Dollard. Rund um Ems und Dollart. Historische verkenningen in het grensgebied van Noordoost-Nederland en Noordwest-Duitsland (...), Groningen/Leer.

Lambooij, H., 1987. Getekend land. Nieuwe beelden van Hollands Noorderkwartier, Alkmaar. Mörzer Bruijns, M. F. & Bentem, R. J. (eds.), 1979. Spectrum atlas van de Nederlandse landschappen, 4th ed. 1982, Utrecht/Antwerpen.

Piket, J. J. C. et al., 1987. Atlas van Nederland in 20 delen. Deel 16: Landschap, Den Haag.

Schroor, M., 1993. De wereld van het Friese landschap, Groningen.

Schroor, M. & Meijering, J. 1989. Het Groninger landschap, Utrecht.

Schoorl, Henk, 1999-2000. De convexe kustboog: Texel, Vlieland, Terschelling.

Ven, G.P. van der (ed.), 1993. Man Made Lowlands. History of Water Management and Land Reclamation in the Netherlands, Utrecht.

Waddenfolklore, 1973. (= Neerlands Volksleven, vol. 23, no. 1/2)