The organization of research work in South-West Jutland

By Niels Nielsen

Abstract

An outline of Skalling-Laboratoriet and De Danske Vade- og Marskundersøgelser as a Danish centre for the studies of landscape elements characteristic of West Jutland and the coasts of Western Europe: tidal-flat, salt-marsh and dune.

Skalling-Laboratoriet was founded in the summer of 1930 as a modest field laboratory on the peninsula Skallingen. The object was to create a centre for the studies of the combination of landscape elements characteristic of West Jutland and of the coasts of Western Europe: tidal-flat, salt-marsh and dune.

The laboratory on Skallingen was in function until it was laid in ruins by military operations in 1944. In the years 1947-1949 it was reconstructed farther to the north, immediately to the south of the village Ho; however, the buildings kept the name *Skalling-Laboratoriet*. They comprise a number of wooden houses with habitation for about ten scientists, a kitchen and rooms for research work.

In 1938 a branch of Skalling-Laboratoriet was established in the port of Esbjerg, whose authorities placed at our disposal a house previously used in the service of the port. While the laboratory on Skallingen is almost exclusively adapted to field-work, the building in Esbjerg is provided with laboratory equipment in view of the execution of sedimentological and biological experiments and hydrographic analyses. This laboratory has room for four scientists. Further, it possesses a motor boat with equipment for work in the Wadden Sea.

Both the laboratory on Skallingen and that in Esbjerg principally serve scientific purposes; however, they are also used as centres for students' courses, and they receive and house foreign guests.

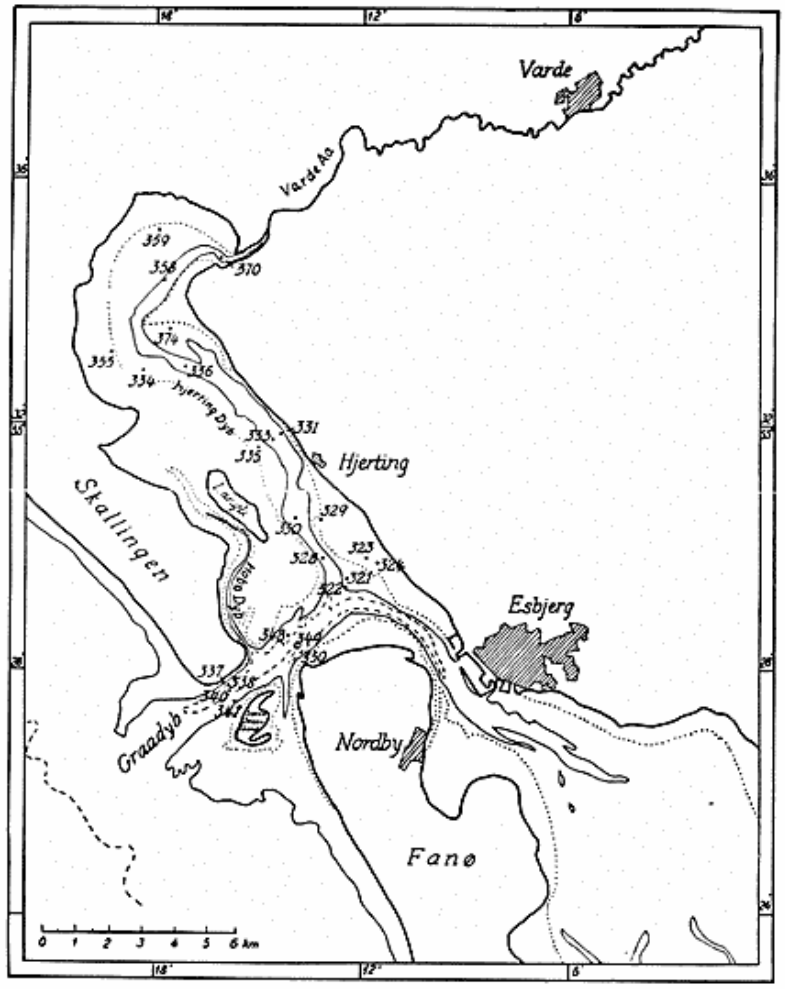

Fig. 1. The Graadyb tidal area, localities and sample stations 1941.
K. Hansen, Medd. f. Skall.-Lab. XIV.

Since 1930, Skalling-Laboratoriet has treated a great number of research objects, among which may be mentioned:

1): natural formation of salt-marsh;
2): biological conditions in dune, salt-marsh and tidal-flat;
3): sand-drift and sand-deposition;
4): tidal processes;
5): transport of materials;
6): soil conditions;
7): habitation;
8): general coastal evolution;
9): formation of channels.

The results of these investigations have been published in »Meddelelser fra Skalling-Laboratoriet«, volumes I-XVI. Thanks to annual

Fig. 2. Dense *Obione*-marsh near the coast, especially on the edge of the little creek *Obione* is very high. B. Jakobsen, Medd. f. Skall.-Lab. XIV.

grants from the *Carlsberg Foundation* and to the favourable attitude which we have met from the part of the Esbjerg authorities and from a number of other institutions it has been possible to carry on these researches and to maintain the two laboratories.

These many-sided researches have enabled us to accumulate, in the course of the years, a certain quantity of knowledge of the processes determining the evolution along the coast of South-West Jutland — the morphological as well as the biological processes — and the intimate collaboration between scientists with different spheres of interests proved to be very fruitful because the close connection between the physical processes and conditions and the biological-ecological conditions provided results of a rather far reaching significance.

During the years 1938-1941 we succeeded in carrying through comprehensive hydrographical examinations of the tidal-area between Esbjerg and the frontier to Germany; we also established a systematic, quantitative analysis of the sediment-drifting and, especially, of the sedimentation in the areas close to the coast, more particularly the beach meadows.

The experiences gained through our researches naturally resulted in an attempt of planning and carrying through a number of practical works. To this effect was established, in 1941, at the instigation of the Ministry of Public Works the so-called *Vadehavsudvalg* with the object of executing certain researches and practical works in the Wadden Sea especially in relation to the conditions reigning around

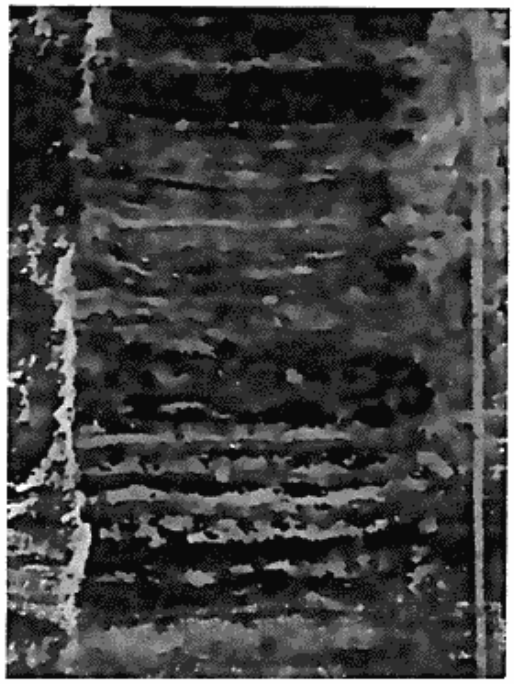

Fig. 3. Profile of the salt-marsh, foreland type. Notice the alternating layers of sand and clay. N. Kingo Jacobsen, Medd. f. Skall.-Lab. XV.

the dam which, at that time, was under construction between the mainland and Rømø.

In the years following the second World War appeared, from various circles, a wish of carrying out the necessary measures for land-reclamation and for rationalization of the economical life and the habitation conditions in this region; to this purpose was appointed, in 1953, the *Samordningsudvalg* (Co-Operation Commission) under the auspicies of the Ministry of Agriculture. However, the competent authorities realized that it was indispensable, in the first place, to carry out a fundamental research work to be combined with a rational, experimental work in order to arrive at the methods which would serve the purpose.

The management of this preliminary work was entrusted to Professor *Niels Nielsen;* the Tønder county and the Danish government granted a 5-year appropriation towards the execution of the preliminary researches; these started the 1st of August 1953, and by the end of the year 1958 the programme had almost been carried through.

The work was organized as follows: a co-operation was established between Skalling-Laboratoriet, which undertook the solution of the tasks in the northern part of the Wadden Sea, and *De Danske Vade- og Marskundersøgelser,* which was in charge of the investigations

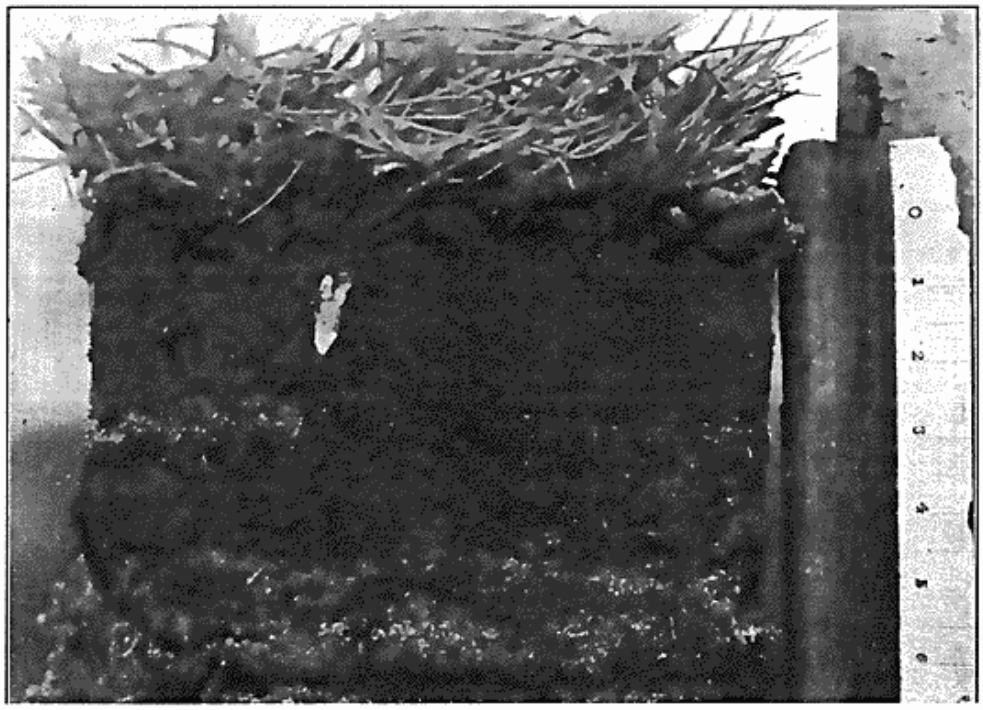

Fig. 4. Exact measurement of sedimentation 1931-1935. Block of salt-marsh clay from sample-area on Skallingen. The light layer at 30 mm. of the scale is red-coloured sand laid out 1.8.1931. Niels Nielsen, Medd. f. Skall.-Lab. I.

in the region from the isle of Mandø to the frontier. Two centres were established with their seat in Skærbæk and in Tønder, respectively, and combined with the laboratories in Esbjerg and on Skallingen.

The daily management of the two departments in Southern Jutland was delegated to *Børge Jakobsen,* M. Sc., and *Niels Kingo Jacobsen,* M. Sc., respectively, with the assistance of a considerable number of young scientists and students. In the Skærbæk department the studies of the tidal-flats were concentrated, while the Tønder department had the task of examining the diked-in salt-marsh areas (polders; Danish: kog). Both departments were provided with the necessary equipment of instruments, means of transport and utensils, and working rooms were hired in both Skærbæk and Tønder. The treatment of the material has for the greater part taken place in the Geographical Institute at the University of Copenhagen, who has placed special rooms at our disposal for this purpose. Further, the necessary team of unskilled labourers was engaged for the execution of digging-work etc.

The results of our combined efforts have been represented in reports to the Danish Ministry of Agriculture, and our researches

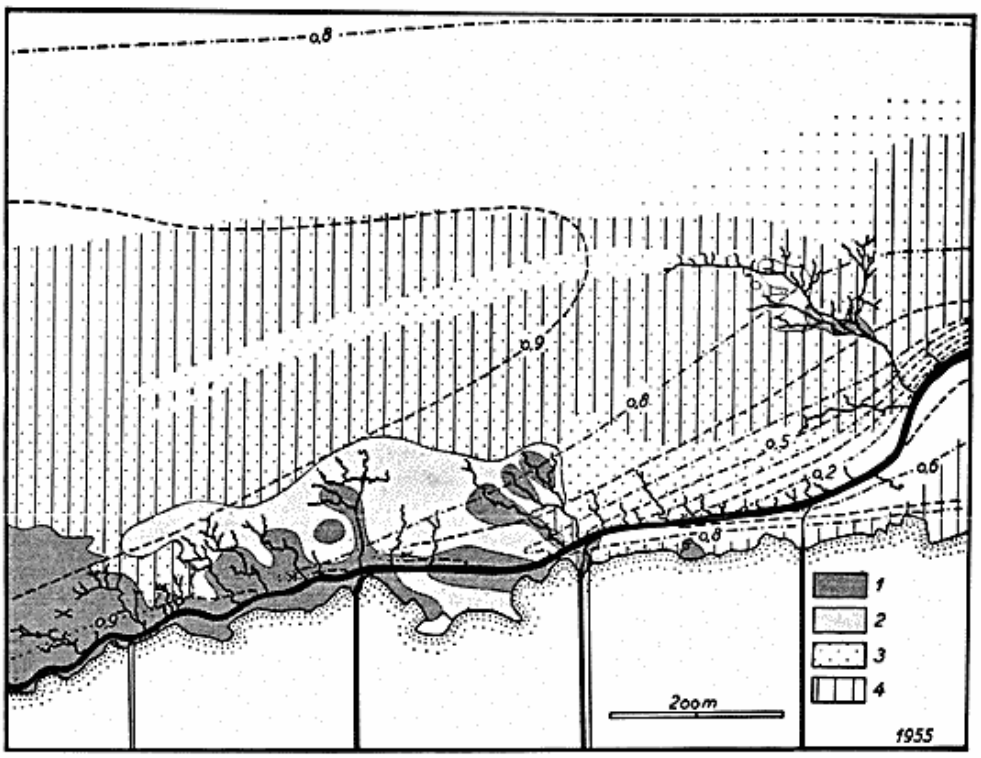

Fig. 5. Vegetation map, showing a tidal flat facing west, situated at the Højer canal. The curves are indicated in metres in proportion to DNN.

1. A dense vegetation with *Glyceria (Puccinellia)* as a predominant plant; further, *Spartina* and *Salicornia* occur.
2. A more sparse vegetation cover consisting of the same plants.
3. *Spartina* in a rather sparse growth.
4. *Salicornia.*

The map shows to which extent the plants — especially *Glyceria* — are dependent on a good drainage; thus, at many places along the well developed priels the annel grass descends below high tide level. Mean high tide level is here about 95 cm. above DNN. B. Jakobsen & Kr. M. Jensen, Medd. f. Skall.-Lab. XV.

are published in the Royal Danish Geographical Society's publications. All the fundamental material is filed in the Geographical Institute of the University.

After 1958 the above-mentioned works have been divided into various enterprises: The research-work proper is continued with the four stations as bases. We have established a special experimental field for land-reclamation close to the village Rejsby and a special department for surveyings under the leadership of *Jens Tyge Møller*, M. Sc.

In the region surrounding the Rømø Dam we have initiated a close co-operation with *Statens Vandbygningsvæsen* (The Department of Hydraulic Engineering); here we have carried on the studies which started in the period 1939-1941 with the purpose, among others, of

Fig. 6. The ditching-plough, drawn by a caterpillar-tractor. The ditch is dug so as to have an obliquely declining border; the material is thrown to both sides, forming a slightly curved field ridge. B. Jakobsen, Kr. M. Jensen & Niels Nielsen, Medd. f. Skall.-Lab. XV.

Fig. 7. The lee-bank behind a fascine fence. This bank provides good conditions for the growth of *Salicornia*. The erection of the fascine fence took place in the autumn 1953, and the photo was taken in the summer 1954. B. Jakobsen & Kr. M. Jensen, Medd. f. Skall.-Lab. XV.

Fig. 8. Air photo of the canal area at the mouth of the Rejsby river. B. Jakobsen & Kr. M. Jensen, Medd. f. Skall.-Lab. XV.

following the morphological alterations which inevitably arise when a dam is built across a tide-water area.

After the achievement of our research programme we have now succeeded in organizing a number of big land-reclamation enterprises. As one of the first steps towards the realization of this scheme it was decided, in 1958, to make an attempt of preparing a basis of a new polder between the frontier and Emmerlev. We have entered into negociations with the competent authorities in Schleswig-Holstein in view of a co-operation in order to establish a corresponding polder between the Danish-German frontier and the Hindenburg Dam. The Danish polder has been planned to be about 1.000 hectares. The establishments are supposed to be finished about 1961. However, we shall not be able to determine the date of diking until we have followed, for some years, the tempo of the land-formation. The land-reclamation at the frontier is under supervision of a special commission, of which Professor *Niels Nielsen* is chairman.

Another big land-reclamation enterprise is going on on both sides of the Rømø Dam. Here, an area of about 1.000 hectares is under treatment, and the development is absolutely satisfactory with formation of new land to a considerable extent on both sides of the dam along the coast of the mainland. This land-reclamation is under the

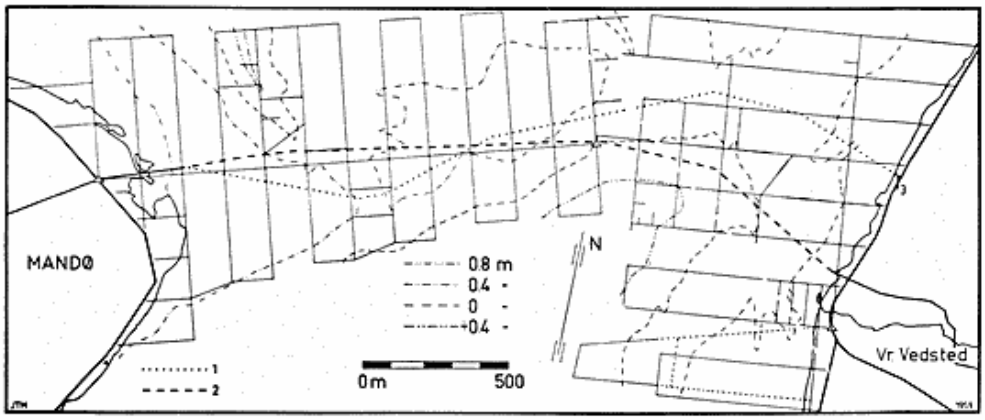

Fig. 9. Sketch-map of the surveying along the ebb-road to Mandø.
J. Tyge Møller, Folia Geogr. Danica VIII:2.

leadership of *Statens Vandbygningsvæsen,* who is in charge of the work of securing and maintaining the Rømø Dam.

A third land-reclamation field, of an extent of 100-150 hectares, is the above-mentioned experimental field at Rejsby. Among the great number of problems which we have encountered should be mentioned the drainage across the tidal-flats. In this relation too the Rejsby field has proved to be very useful; here we have carried through a number of systematical investigations of the possibilities of constructing drainage channels.

In the years 1958 and 1959 a special examination has been carried out of the area between Mandø and the mainland, where we are facing a series of problems of a particular character, attached to the maintenance of the transport on an ebb-road. From ancient time the connection has been kept up by means of horse-drawn vehicles; however, the motor-traffic of our time is so heavy that it destroys the surface of the tidal-flat and, thereby, gives rise to changes which cause certain worries.

LITERATURE

Meddelelser fra Skalling-Laboratoriet I-XVI, 1935-1959. København.

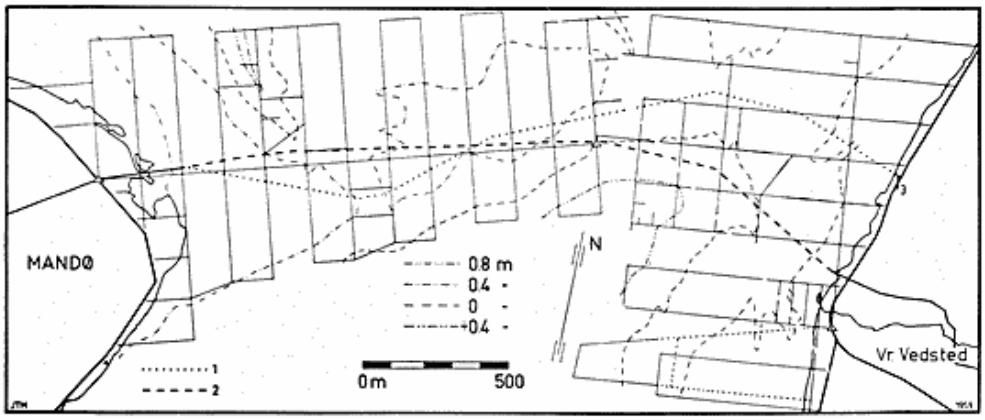

Fig. 9. Sketch-map of the surveying along the ebb-road to Mandø.
J. Tyge Møller, Folia Geogr. Danica VIII:2.

leadership of *Statens Vandbygningsvæsen,* who is in charge of the work of securing and maintaining the Rømø Dam.

A third land-reclamation field, of an extent of 100-150 hectares, is the above-mentioned experimental field at Rejsby. Among the great number of problems which we have encountered should be mentioned the drainage across the tidal-flats. In this relation too the Rejsby field has proved to be very useful; here we have carried through a number of systematical investigations of the possibilities of constructing drainage channels.

In the years 1958 and 1959 a special examination has been carried out of the area between Mandø and the mainland, where we are facing a series of problems of a particular character, attached to the maintenance of the transport on an ebb-road. From ancient time the connection has been kept up by means of horse-drawn vehicles; however, the motor-traffic of our time is so heavy that it destroys the surface of the tidal-flat and, thereby, gives rise to changes which cause certain worries.

LITERATURE

Meddelelser fra Skalling-Laboratoriet I-XVI, 1935-1959. København.