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Mussel Culture in the German Wadden Sea.

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Since several years one is seriously endeavouring, to develop in Germany a mussel culture according to the Dutch pattern. Although there were great difficulties at the beginning, partly owing to the general lack of interest, partly owing to deficient experience, but last not least because of an insufficient organization, it might be said, that these difficulties have now been eliminated.

There exist already single enterprises but also groups with enough capital, who are ready to perform pioneer work in this field of fisheries which has up to now been neglected in Germany, and who have already begun with cultivating mussel beds. Among these people there are even some fishermen and groups of fishermen.

A considerable number of mussel beds have already been cultivated and protected. Most of them can be harvested this year.

Finally it was also possible to unite all enterprises in a selling centre, so that it is guaranteed that the marketed mussels are of good quality, carefully assorted and free from sand.

Since the Mytilicola disease in the East-Frisian Wadden Sea is not yet finished, we confine the cultivating of mussel beds to the Wadden Sea area off the west coast of Schleswig-Holstein, and to the Flensburg Förde off the eastside of Schleswig-Holstein, which are free from the disease. As soon as the disease is over, we intend also to cultivate mussel beds off the East-Frisian coast, where smaller mussel beds had already existed prior to the war.

I. In the Flensburg Förde 4 larger mussel beds had been cultivated and protected during the recent years. One of these mussel beds had already been harvested in the fall of 1953. The mussels were 55-70 mm in size. The output amounted to about 1000 to. In spring 1954 the beds were again stocked with 1000 to of half-grown mussels which shall be harvested now. As these mussels have not grown in the tidal area and

as the water of the Flensburg Förde is of lower salinity than the North Sea, the mussels of the Flensburg Förde distinguish in their quality from those of the North Sea. They grow more quickly, have thin valves and a different taste. As this mussel reaches 70 mm in size, it is too large for export. It is therefore in the first line used for home consumption.

- II. During the last two years, mussel beds have been cultivated in about 10 - 15 areas off the west coast of Schleswig-Holstein. All of them are protected by the North-Frisian isles and situated at the slopes of larger channels (Priel) with favourable currents from NNW. Only the beds off the outer Elbe area in the Wadden Sea off Büsum and Friedrichskoog are situated off the open shore and are partly endangered by the current and the sand carried with the flood. The cultivators of the mussels have therefore the intention, also to transfer these mussel beds to the area protected by the isles north off Büsum.

The mussel beds can be divided into the following districts (see picture 1):

- 1) district: Mainland- Isle of Sylt,
- 2) district: Mainland- Isles of Langeneß and Föhr,
- 3) district: Mainland- Isles of Nordstrand and Pellworm,
- 4) Wadden Sea area off Büsum,
- 5) Wadden Sea area off Friedrichskoog (east off the outer Elbe).

It is difficult to give data on the size of the cultivated mussel beds. They are not sub-divided into parcels as in Holland and their size is very differing. The possible yield of these mussel beds can also not yet be estimated. It is, however, supposed, that the total output will at least reach 10.000 to this year, viz. approximately the total production of the recent year. Losses by the hard winter are scarcely noticed, as the mussel beds are situated relatively deep. They are also completely free from *Mytilicola*. An investigation made in the middle of September indicated an average size of 50-60 mm and a meat portion of 33 %.

- III. Beside these cultivated mussel beds there exist a considerable number of productive natural mussel beds. Most of them have, however, seriously suffered from the rough winter. The greatest of these natural mussel beds is the so-called "Gelbsand" in the Elbe-estuary. Owing to the good food conditions, there grows a wild mussel with an extremely great meat portion (30 % meat portion). But owing to its thin valves, this mussel is not appreciated for commercial utilization. Moreover, there exist trouble about the ownership of this sand bank between Schleswig-Holstein and Niedersachsen. Other productive natural mus-

ssel beds are situated off Cuxhaven near Scharhörn and Neuwerk on the western side of the outer Elbe. Here too we have large areas with well developed mussels, but they are not free from Mytilicola and can therefore only be utilized for home consumption.

IV. Beside the above mentioned mussel beds there exist cultivated or natural mussel beds in the following areas of the East-Frisian Wadden Sea:

- 1.) district: Mainland - Isles of Wangerooge and Spiekeroog,
 - 2.) district: Mainland - Isles of Norderney and Juist
 - 3.) district: Mainland - Isle of Borkum.
- (see picture 2).

As far as these are cultivated mussel beds, they existed already before the war. To-day they are not so important, as they are heavily infested. Moreover, most of them are situated on high ground, so that they have badly been damaged by the winter. The mussel stocks of that area are equally only suitable for German home consumption.

According to our experience the Wadden Sea area off the East-Frisian coast and also off the West coast of Schleswig-Holstein are at any rate extremely suitable for cultivating mussel beds. There exist a great number of channel-systems, the flood conditions are very favourable and the food value of the water in the German Wadden Sea is particularly great owing to the rivers Elbe, Weser, Ems and some other smaller rivers. According to the investigations made by Kühl and Mann (1,2) of my Institute of Inshore and Freshwater Fisheries, which belongs to the "Bundesforschungsanstalt für Fischerei" (Federal Institute of Fisheries Research), the river Elbe transports annually about 600 to and the Ems 65 to of Phosphor as dissolved PO_4 . There is probably another unknown amount of Phosphor connected with organic substances. Thorough investigations have shown that this fertilizing effects an extraordinary production of plankton, which amounts in this area, as stated by Thienemann (3), to 100.000 vegetable cells per litre. Considering that the mussels have an excellent filtering ability (a mussel filters in the average two litres of water per hour), and that, according to Linke's (4) estimate, a moderately stocked mussel bed is filtering the total water content of that Wadden Sea area free from bacteria within 1 1/2 month time, one can judge the importance which the additional fertilizing by the rivers has for our mussel beds.

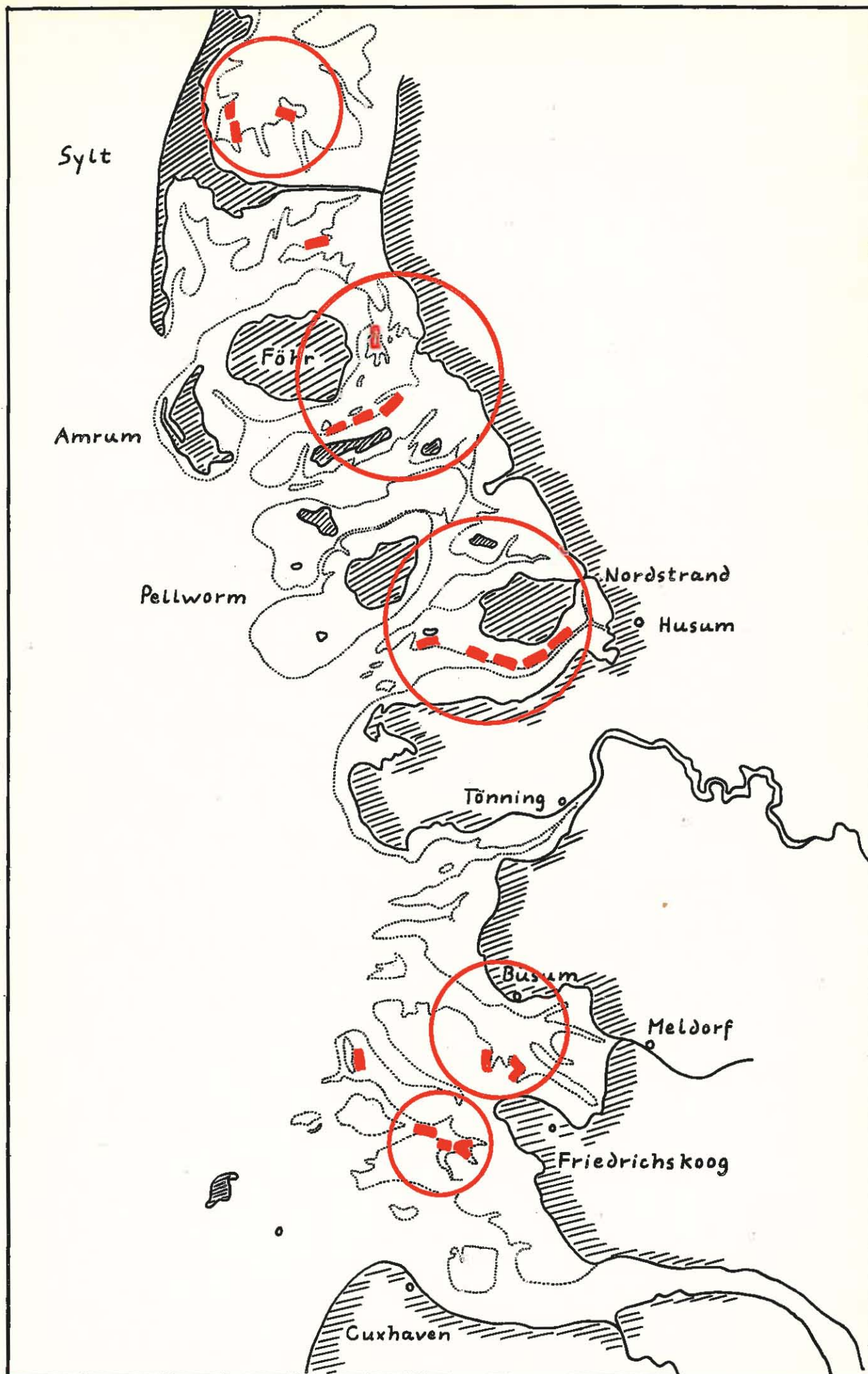
Summary.

The hitherto success in mussel fisheries has encouraged Germany, now to cultivate mussel beds according to the Dutch pattern. They are situated off the west coast of Schleswig-Holstein and are partly harvested already this year. In the East-Frisi-

an Wadden Sea area no mussel beds are cultivated at the present time, because the Mytilicola disease is still in existence. Investigations have proved that the German Wadden Sea is very suitable for mussel culture, owing to its structure as well as to its hydrographical and biological food conditions.

Literatur:

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- 3) Thiemann, K.: (1934) Das Plankton der Flußmündungen. Meteor, Bd. 12/1, S. 199-273.
- 4) Linke, O.: Die Bedeutung der Miesmuscheln für die Landgewinnung im Wattenmeer. Natur und Volk. 34. H. S. 253-284, 1954.



-  Kulturmuschelbänke
-  Wildmuschelbänke

