After the deluge, a palaeogeographical reconstruction of bronze age West-Frisia (2000-800 BC)

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AFTER THE DELUGE

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A PALAEOGEOGRAPHICAL RECONSTRUCTION OF BRONZE AGE WEST-FRISIA (2000-800 BC)

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Photograph cover: On the night of 13 on January 14 1916, a severe north-westerly storm ravaged the coast along the Zuiderzee. Dikes breached and large areas were flooded during the night. 51 people were killed and many were injured. The economic damage was huge. It is the first flood covered photographically by the press. The weekly "De Prins der geïllustreerde bladen" opened the first number after this deluge with a dramatic scene of a farmer and his cattle wading through the flooded fields, leaving his flooded Haubarg in the background. *(De Prins der geillustreerde bladen January 22 1916, 37)*

The photo in the background is one of the 4000+ arial photographs of West-Frisia by Wil Metz. It shows a former creek which became visible after ploughing.

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EARTH
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SAXION

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Preface

In 1974 my father was appointed as town clerk of Medemblik, a small medieval town in eastern West-Frisia. Our family moved from the village of Rozendaal in the central part of the Netherlands to Medemblik. My mother started to work as a teacher in history at the local high school. Visiting relatives and friends complained to my parents that they had moved to "the end of the world". No wonder, from the city of Hoorn they had driven over an 18 kilometers long brick road through a flat seemingly endless open landscape, divided by a myriad of canals disrupted with lines of characteristic Haubargs. As townspeople, they didn't grasp the fascinating beauty of West-Frisia. A region co-created in the Middle Ages by God, man and nature. A region where the wind always blows, where you can see beyond the horizon in all directions, where the skylines of towns are identified by their church towers, a region that smells of rotten cabbages in the fall.

After my sixth birthday in august 1975, I went to the primary school in Opperdoes, a small nearby hamlet. The first day I drove on my brand new *Piet Pelle* bike to school together with my older brother Jan. We cycled along the railway track of the local steam train through the open fields with cabbages, potatoes, carrots, beetroots and onions. In Opperdoes, after crossing the railway by the sauerkraut factory, we passed Mr. Smit's farm on the main street of Opperdoes. Countless times I saw Mr. Smit, or Smitje as he was called by the villagers, trying to get his young stock onto his barque and lifting the milk cans from his barque to the quay.

Back from school, during dinner, my father often spoke about the land consolidation projects. I remember my mother complaining about the slippery and muddy roads due to the land consolidation works, especially about the new road to Enkhuizen. I remember my father telling the mayor had visited farmers and forced them to clear the roads of mud. I remember the new asphalt roads to Hoorn, Enkhuizen and Opperdoes and of course the opening of McDonalds in 1978. That is all I remember from the land consolidation projects.

After the land consolidation projects, the typical barques disappeared slowly. Farmers replaced their two wheel tractors by "real" tractors, John Deere's were my favourite. The traditional wooden crates for potatoes were replaced by plastic crates. In 1981 I started working during holidays and later on in weekends at Jan Klaver's farm. Jan grew onions, carrots, beetroots, brussels sprouts and, of course, the tasty potato "Opperdoezer Ronde". This potato was harvested by hand. I crawled up and down Jans fields many times, sowing, planting, weeding and harvesting. During those years I never found anything of archaeological interest. In 1984, on my way to Jan, I passed the excavation in Opperdoes (Woltering 1985) many times without even knowing it was there.

In 1987 I left West-Frisia and moved to the city of Utrecht to study physical geography. In Utrecht I met people who couldn't distinguish white from green cabbages, people who didn't know the way sprouts grow on a plant. I even met people who couldn't recognize a potato plant. It was a different world. In Utrecht I joined a symphonic orchestra and a student association and learned to enjoy the

attractions of the city. I promised myself never ever to go back to that end of the world called West-Frisia.

During my study in Utrecht Leendert Louwe Kooijmans gave a lecture as alumnus of Utrecht University. He inspired me to start a second master, prehistoric archaeology, at Leiden University. One thing led to another and after my graduation in 1993 I started a career as physical geographer in the field of archaeology. From 2000 onwards I was involved in more and more excavations in West-Frisia: *Grootebroek* (Lohof 2001), *Schagen* (Gerrets and Schutte 2003), *Hoogwoud* (Lohof and Vaars 2005), *Zwaagdijk* (Van der Meij 2007), *Medemblik* (Van Benthem 2007), *Opmeer* (Bouma *et al.* 2008) and so on. In 2004 I visited an excavation of an Iron Age settlement site in Opperdoes (Jongste and Knippenberg 2005) to sample a soil section for pollen and micromorphology. I didn't recognize the location at first, they were the fields right next to those of Jan Klaver! How many times had I missed prehistoric pottery, flint and so on between the carrots, potatoes and onions? It was then and there that my interest in the archaeology and landscape of West-Frisia became an obsession. In 2006 I was asked to investigate a development site in Enkhuizen (Van Zijverden 2006). It turned out to be a well preserved Bronze Age settlement site which is nowadays known as the site *Enkhuizen-Kadijken* (Roessingh and Lohof 2011; Van der Linde and Hamburg 2014).

During and after the excavation of this site by Wouter Roessingh and his team many questions were raised (Van Zijverden 2013). How was it possible that the site had survived the period of land consolidation? Why was it not situated at a creek ridge? Why were there so many indications of woodlands? Why the lack of any indications for peat growth? How to explain the huge amount of eel and the presence of European flounder when there was no connection to the coast at all? All these questions and the large amount of unpublished data of excavations from the decades of the land consolidation projects inspired Harry Fokkens to begin the "*Farmers of the Coast*" project. When Harry asked me to participate in this project I didn't hesitate. For a period of five years I have been back to the land of my youth. However a lot has changed since then, the wind is still blowing in your ears, the smell of rotten cabbages in the fall is as strong as ever. Only some weird flats in Medemblik, the tallest windmill of Western Europe and the orange glow at night of an immense greenhouse complex named Agriport are new and unfamiliar landmarks on the horizon. Being in West-Frisia is one of those inevitable special geographical experiences which are described by Koppen (2012) and Hospers (2013). To me it feels like home.

Prologue

The amount of data on the subsurface of West-Frisia is overwhelming, at least for the first 120 centimeters. This is – not coincidently – the length of a classic *Edelmanboor,* the standard manual coring equipment of an earth scientist in the Netherlands. Below this depth, the amount and detail of data rapidly decreases. The processed subsurface data is easily obtainable in standardized soil, geomorphological and geological maps and used widely within the field of archaeology. These maps reflect the ideas and traditions of earth scientists of the seventies and eighties of the 20th century. Not all archaeologists ***and*** earth scientists are aware of this mind-set and the research traditions in both fields. One of the main challenges during this project was to breach these traditions mutually. For example it took me more than a year to understand why archaeologists think that the habitation of Bronze Age West-Frisia took place in a tidal marsh environment. With a parable in the tradition of Flannery (1976) starring my good friend the field archaeologist (FA) and a well-meaning earth scientist (ES), I will try to clarify the crux of the matter.

Once upon a time in West-Frisia

"So if I understand it right, you are able to reconstruct the environmental conditions by analysing the molluscs and other fossil organisms in the sediment", said FA standing in front of a neat soil section. "Yes, that is possible. For instance, these *Scrobicularia plana* are typical for a shallow brackish environment" ES said, pointing out a layer of molluscs in the soil section. "So this clay represents a brackish environment?" FA asked thoughtfully. "Sure it does." ES said, "One can find this type of mollusc nowadays in sheltered shallow tidal flat environments like "*De Slufter*" at Texel or "*Het Verdronken Land van Saefthinge*" in the Province of Zeeland. Furthermore this typical sedimentary layering, fining and thinning upwards, is characteristic for sediments influenced by tidal movement." "Wow, amazing what you can tell from a few shells and some clay!" FA said in admiration. "Why do all these *Scrobi*-something appear in a single layer?" "It is some sort of mass-extinction", ES explained picking a few molluscs out of the soil section. "Well, because most individuals are adults and all individuals are in living position there are three options. First the molluscs died because of a change in salinity of the water. Second the organisms died due to a high sedimentation rate, for example during a storm surge. Third the molluscs died due to a change in water movement caused by a change in gully pattern", ES rattled. "Most plausible is a change in salinity, hence the fining- and thinning upwards sequence." ES organized his thoughts and said: "It is a very common pattern in marine wetlands when tidal flats develop into tidal marshes." "So it is a tidal marsh!", FA concluded. "Right, it is a tidal marsh deposit", ES replied.

And this is where the confusion starts.

"In order to pinpoint the exact environment it would be wise to sample the sediment", ES said. "For instance, you could analyse the environment of the upper part of the section by an analysis of a soil sample for molluscs, diatoms, ostracods and foraminifera. A sample for a thin section could inform you about the influence by man, like burning vegetation, ploughing, and so on." "You guys have an interesting job, it's just like Crime Scene Investigation!", FA sighed. "Is it also possible to get information on the vegetation during the habitation?" "That is less easy. The soil is rich in calcium carbonates and aerated. Therefore, pollen is badly preserved or not preserved at all and charred botanic remains only provide information of the local vegetation or crops. You could try to sample the fill of a ditch or other deep features for pollen", ES suggested. During their conversation, FA had taken notes for his daily technical report. In the distance the excavator honked for a break. ES and FA made their walk for the construction trailer and a well-deserved hot cup of coffee talking about the weather, gossiping about colleagues and so on.

Three months later ES and FA meet again during a project meeting with amongst others the archaeobotanist AB and many other specialists.

AB starts with a presentation of her results on the vegetation. "Based on low percentages of tree pollen in the assembled pollen data the environment can be characterized as almost treeless. The macrobotanical remains consist largely of charred grains and spikelets of barley and some seeds of weeds indicating the presence of arable land. Barley is the only cereal that withstands very low salinity rates, contrary to other cereals. Interesting is a seed of pickle weed we found in a soil sample from a water pit. This illustrates the tidal marsh environment very well." At this point FA nudges ES saying: "Great huh, fits the picture perfectly." ES pops promptly the question: "Why do you think it is a tidal marsh during the period of habitation?" FA replies: "You said it yourself! Furthermore the geomorphological map shows a plain of tidal deposits, the geological map presents Dunkerque 0 deposits. Last time I checked, it is a lithostratigraphical unit for marine deposits which are described for this specific location as tidal flat and tidal marsh deposits." "That is all true", ES replied "But after the closure of the inlet or after silting up to a level above MHW, the tidal marsh is outside the reach of marine flooding and within a short period, say 10 years, the area can be characterized as an freshwater environment. Woodlands will develop as well as freshwater swamps and fens." "But the results of AB? What about her observations?" FA asked less confidently. "Small pollen catchment areas represent small surfaces, as is shown by studies of Sugita, Broström and many others. One wouldn't expect a forest or woodland in a settlement site would you?" ES replied. "Certainly not", said FA. "But the seeds of pickle weed cannot be denied, right?" "The seeds of pickle weed are well preserved beneath the groundwater level in the natural sediment as well as in the infill and can be explained as contamination." FA processed the information. In all the publications about West-Frisia the environment was described as an open landscape characterized by creek ridges and tidal marshes. At last FA grasped the idea: "So it is some kind of post-tidal marsh situation" he summarized. ES sighed: "No! During the habitation in the Bronze Age it is a tidal marsh in a geomorphogenetical sense but not in an environmental sense. Although the word tidal marsh is the same, it points to something completely different." As if struck by lightning ES stopped talking. Damn right it ***is*** confusing to use one word for two different concepts!

In the world of ES it makes sense, a levee and a levee deposit. The levee stays a levee long after the abandonment of the riverbed. The levee in an environmental sense is flooded yearly. The levee after the abandonment of the riverbed, in a geomorphogenetical sense, is just a piece of land with a characteristic morphology and lithology. The implications for the exploitation possibilities and thus the archaeological appearance are huge. A river dune in the Rhine Meuse delta stays a river dune until over 10.000 years after the active phase. And a crevasse splay…

FA interrupted the thoughts of ES: "Let's score some beers in the pub and I'll show you an interesting proposal for an excavation of a Bronze Age settlement at a crevasse…"

Postscript

Like ES I am just one of many physical geographers blinded by certain conceptual frameworks and traditions in my field of expertise. In this thesis I have tried to be as unambiguous as possible when it comes to terminology. Nevertheless, time will tell if I have succeeded.