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Breed and "Booze", naval demand and early modern production

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1. Introduction*

During the 17th and 18th century naval expansion became important for European states with an ambition to act as great powers in European politics. Participation in this race towards a position in (Northern) Europe had a prize; the capital needed and the supply of both skilled and unskilled labour was high. There was a need of production facilities of a certain standard and a bureaucracy with a degree of professionalism. The states with a capability to face those standards were at the time not the old maritime states in Europe with a long tradition in naval warfare. Instead this became a competition between the forerunners in the state building process in Europe. The strong state was a precondition for the possibility to reach a position in the European concurrence. One important skill that divided the states in this competition was the capacity to mould cannons at a large scale. Some states in the 17th and 18th century could meet this standard others failed. Among the states that took the lead in this expansion were Portugal, England, France, Denmark-Norway and Sweden. Sweden was an early exporter of cannons.¹ Naval cities became important nodes in this concurrence between the states, and in the state building process. A number of naval cities like Chatham, Portsmouth, Lorient, Brest, Toulon and Kronstadt expanded at the time, cities that increased during war and decreased with more peaceful times. All those cities were heavily dependent on state financing.² Karlskrona was one example among those expanding naval cities.

The naval cities that developed in early modern time had some characteristics that are of special interest. Those cities could not be supplied only from the surrounding rural area, the naval city had to be in constant contact with a much wider area in order to supply the city, the shipyard and the fleet. Naval city had as many other cities higher up in the countries city hierarchy an inflow of skilled people, lawyers, doctors, merchants and administrators. Another variable that had to be considered was the number of skilled technicians and engineers present in this environment. These cities were also a meeting place between local burghers and state power. Those tendencies were probably stronger in the naval city compared to other early modern cities at the time.³ To use two anachronistic concepts, the naval city was an "entrepreneurial city" in its time and a place for the "creative class". People with certain skills were driven to this kind of city by a combination of force and peoples own ambitions to take advantage of the possibilities opened up at places like this.

The aim of the investigation presented in this paper concern the problem related to how the state at the time could carry out and supply the need connected to the expanding Swedish fleet. One side of this problem concern the technical skill and capability to organise production at a large scale, another side is how this process of change effected and confronted older structures of relations in

* This investigation is part of a bigger research project presented in a book, Pest, produktion och politik, studier i statsbildning och den tidigmoderna örlogsstadens historia, Mackadam 2012 (Plague, production, politics, studies in state formation and the history of early modern Naval city).

¹ Jan Glete, *War and the State in Early Modern Europe, Spain, the Dutch Republic and Sweden as Fiscal-Military States, 1500–1600*. London 2002, *Warfare at Sea, 1500–1650. Maritime conflicts and the transformation of Europe*, London 2000.

² Peter Clark, *European Cities and Towns 400–2000*, Oxford 2009, s. 135

³ Clark 2009, s. 135-144, 154, 202-206. Sven Lilja, *Tjuvehål och stolta städer, Urbaniseringens kronologi och geografi i Sverige (med Finland ca 1570-tal till 1810-tal)*, Stockholm 2000, s. 255, 258–59, 261.

the society. Finally did this bold venture result in any kind of long term effect for a growing modern industrial landscape. This interest in the effects of the early modern concentration on naval expansion could also, on a more general level, be expressed as an interest for the "modern" elements in the early modern and the relation between a military authoritarian past and the modern society. One way of carry out investigations like this is to use a theoretical perspective including concepts like "proto industrialisation" or "early industry". But concepts like these have been criticised for the lack of focus on the societal context. Concepts as "developing block" or "complementary" have then been used to meet this kind of critique.⁴ The debate how suitable these concepts is when it comes to explaining the industrialisation process is comprehensive and it is not possible to discuss this topic in a deeper way. The aim here is more limited and I will not cover the research discussion in this field. I would like to open for a discussion if and where appropriate how military production during the time of Sweden as a Great Power have resulted in a modern industrialisation landscape. For that purpose the concept large scale production will be used. An interesting approach in this debate about industrialisation patterns has put the light on the capability to create strong institutions as a precondition for industrialisation, which is of interest for this investigation.⁵

The focus in this investigation is not directed towards the production of guns, armour and more obvious military material. Instead the production of more ordinary goods in form of bread and liquor will be investigated. I have used the slang word booze in the title. What we are dealing with here are different types of drinks, mainly the production of liquor but also a discussion between representatives for the fleet and the city inhabitants about what in Swedish is called "dricka", a beer like drink.

2. Why breed and "booze"?

When it comes to land based armies and the supply of bread, this topic is well investigated. Martin Van Creveld has discussed the huge supply problems for early moderns armies. Still during the Napoleon war a major strategy was to live on what could be taken from the conquered land, the armies could not be supported from the home base. This strategy had its problems, for instance how to handle logistic problems and warehousing.⁶ The Swedish historian Jan Lindegren has estimated the need for food for Charles XII:s Norway war 1718, with 40 000 man, to 2 050 000 Swedish "lispund", which in modern figures is nearly 17,5 tons of food. The food for the 27 000 horses uncounted. In this case 60 % of the bread involved in the food had to come from the home country. Christer Kuvaja has investigated the supply problem that meet the Russian army during the Nordic war 1700-21.⁷ Also in the later case, with figures that challenge our imagination.

The meaning of bread could be expressed in another way. In august 1710 the Swedish fleet picked up a roamer from a merchant who had been in Danzig. According to that roamer a great number of soldiers were gathering in the city and that the Danes had ordered two million bread to be baked and delivered fourteen days later.⁸ It seems as it was this number of ordered bread that materialised the Danish treat and made it understandable.

⁴ Lennart Schön, *En modern svensk ekonomisk historia: tillväxt och omvandling under två sekel*, Borås 2000, s. 21f. (A modern Swedish economic history: expansion and change during two centuries)

⁵ Sheilagh C. Ogilvie, "Social institutions and proto-industrialization", i S. C. Ogilvie & Markus Cerman (red.), *European proto-industrialization*, Cambridge 1996, Schön 2000, s. 19, 28, 30.

⁶ Martin Van Creveld, *Supplying War. Logistics from Wallenstein to Patton*, Cambridge 2004 (second Edition, first publ. 1994)

⁷ Christer Kuvaja, "Provisioning of the Russian army in Finland during the occupation 1713–1721", *Scandinavian journal of history* 27:1, 2002.

⁸ Konceptprotokoll, Kansliet A I:2, Amiralitetskollegium, KrA, pag. 670, 1022.

Bread provided for the main part of the energy in the soldiers food. An investigation, a rough calculation, over the energy content in food for the Swedish main army that marched towards Norway 1718 indicates that almost 55% of the energy intake came from bread. And for the smaller part of the army that attacked Norway from the north, the intake of energy from bread represented almost 64 %. The main part of the bread produced for the army was a compact and dry rye bread, called "succarie" bread, a kind of compact biscuit.⁹ Those numbers is thrilling and it challenges our imagination: how was it possible to produce and transport those volumes and how to get control over the production in a way that the military ambitions could be reached?

The case described so far concerned the army, What about the supply of the fleet. The fleet had, at an even larger extent, to be supplied from the home base. Figures picked up from lists of equipment for the Swedish war ships could give us an imagination of volumes needed. One war ship, *Wasa*, loaded 59 000 kg bread, over 13 000 litre of beer, almost 9 500 litre of Swedish liquor and over 5 000 litre of French liquor. All the other ships were registered for about the same volumes.¹⁰ In the year 1689 the Swedish fleet consisted of 39 ships of different size with a total crew of 12 425 men.¹¹

3. From home brewing and small scale baking to production at large scale

The Swedish naval base Karlskrona was established 1680 in the former east Denmark, conquered from Denmark 1658. The city was founded on an island in the archipelago named Trossö, at the time only one farmer lived at the island. During the first ten years burghers from the nearby town Ronneby were forced or enticed to move to Karlskrona. The main purpose was to contribute to the building of a naval city and a shipyard.

For this first period the Admiralty had to rely on the cooperation of these burghers for both baking and brewing. This production was mainly on commission, meal could be picked up at the naval storehouse and baked bread was delivered back. Then the money should be regulated between producers and the navy. These procedures took its time and it was not without conflict, the contrary was more common. Protocols from the town court during the 1680s and 1690s are full of evidence of disputes, conflicts and problematic affairs around baking and brewing. It is obvious that the burghers were aware of their important position in this process. Even trade with a small quantity of bread or brewed products could be an opportunity for a burgher to start discussing the meaning of different privileges, or to start questioning the volume of ordered goods. In other cases the quality of delivered goods from the warehouses were questioned. Hardly one session at the court went on without the naval representatives presence caused by a conflict concerning baking or brewing.¹²

Meal was hard currency and the trade and baking had to be supervised. When the Swedish army had taken over the town and garrison Kristianopol north of Karlskrona from the Danes 1669 the regulation around meal and bread was one problem to solve. The sources reveal how small portions of grain were delivered to the burghers who used small hand mills to produce meal and then bake the bread. The mills in the burghers home was sealed when not in use and only opened by a custom servant or a soldier. The amount of bread from each volume of grain was controlled and recipe for the best bread was spread from the military to the burghers.¹³ This was a form of small production with complicated administrative and secure problems.

⁹ Jan Lindegren, "Bröd som vapen: Karl XII och succariebrödet", *Saga och sed: Kungl. Gustav Adolfs akademis årsbok* 2000, s. 46-47, 57 ("Bread as weapon : Charles XII and the succariebread")

¹⁰ Sjöutrustningslistor, Örlogsflottans räkenskaper 1790, KrA, pag. 107-110.

¹¹ Marinens ritningar Serie A XVII, omslag 174, Krigsarkivet Stockholm.

¹² For a detailed description of those conflicts see Karl Bergman, "Bröd och brännvin", *Svensk Historisk tidskrift* nr 1, 2007 (Bread and booze).

¹³ Skånska kommissionen 1669-70, Äldre kommissioner nr 629:1, RA, pag. 120f.

The Admiralty with its ambition in the Baltic Sea could not have been satisfied with the situation. To some extent the expansion of the Swedish fleet was in the hands of dealing conscious burghers. It is likely that this situation was discussed at the admiralty: how to get control over the production, how to increase the production and how to secure delivery of those strategic goods.

Supply for the war ships was not the only problem, it was also about supply for the soldiers and boatswains that constantly was arriving or leaving the naval base. Groups of boatswain up to ten or twenty arriving to Karlskrona was something common, the arrival of groups of hundred was not rare. Sometimes groups of one or two thousand man arrived after marching for days. In the autumn 1710 the Admiralty in Karlskrona discussed how to take care of the 778 soldiers that had just arrived after marching for eight days. Major Silversparre reported that he was standing just outside the town with a contingent and that the men had neither shoes nor stockings.¹⁴ This situation meant huge stress for the navy and for the town, but it was also an opportunity for the burghers to make business with the admiralty.

During the period studied here the admiralty always complained over lack of money. There were always a problem with paying soldiers, officers and boatswains in real cash. This was more obvious then else during times of crises, like for instance the plague year 1710-12.¹⁵ One way of dealing with this problem was to offer food instead of money, something that became common during the plague year. The sources reveal that it seems as the navy always could provide food for men and families under the admiralty, at least at a minimum standard.¹⁶ An interesting question, not further discussed here, is if the Naval city, or more precise the Admiralty in crises could provide a basic "well fare system" on a another level then for instance rural areas or other small towns.

Several different cases indicate that food could be offered to recompense for default of payment or other obligations that the navy could not accomplish. This means that somehow the navy succeeded to fill its warehouses with food. It is not likely that dealing and trading with the burghers according to the situation in the 1680s and 1690s alone could provide for the quantities needed. It is more likely that the navy had managed to take control over some of the main production lines.

The situation outside the naval base, in the town, was probably a lot harder and it is obvious that the navy first of all looked after its own personal and only at rare occasions and under the pressure of a severe crises could agree to support the inhabitants in the town.¹⁷

3.1. Large scale baking

At the end of the 17th century a crown bakery was founded on military property and in the 1730s a larger facility was established.¹⁸ Account from the year 1752 and 1754 could be used to exemplify the capacity of the bakery. For September 1752 there are 17 days notified as working days in the bakery. The common figure for each day is 100 000 "dice" of "succarie" bread, the lowest figure is 76 506 dice. For the same month 1754 there is 23 work days registered and a common figure is 80 000 dice, but for some single days the production went down to 20 000 or 40 000 dice. Besides the baking of this kind of biscuits a loaf of black bread called "anchor-stock" was produced. The production of this bread was for September, the years mentioned above, 14 993 and 5 079 pieces.¹⁹

¹⁴ Konzeptprotokoll 1710, Kansliet A I:2, Amiralitetskollegium, KrA, pag. 520, 529, 538, 604, 647, 654, 666, 708, 719, 759, 1047.

¹⁵ Karl Bergman, "Staden, pesten, renhållning och modernitet, Karlskrona 1710-1712", *Karolinska förbundets årsbok* 2011 ("The city, plague, cleaning and modernity, Karlskrona 1710-12").

¹⁶ Protokoll, 7/11 s. 1467, 21/11 s 1610, 25/11 s. 1691, 1710, 14/12, s. 1958, 29/12, s. 2024, 1711, KrA AmPr.

¹⁷ 504. Protokoll, 7/11, s. 1467, 21/11, 23/11, s. 623, s. 1610, 25/11 1710, s. 1691, 14/12 1711, s. 1958 KrA AmPr.

¹⁸ Ove Holmqvist, "Marinens livsmedelsindustrier och proviantboden i Karlskrona", *Aktuellt/Marinmuseum, Karlskrona*, 1979 (Naval food industri and the supply booth in Karlskrona); Ritning, Bageriet, Marinens ritningar AXVIII, omslag nr 248, ac nr 1, KrA.

¹⁹ Räkenskaper kronobageriet, Kansliet J:1, Ekonomikontoret, Amiralitetskollegium, KrA.

The Source from the bakery reveals how systematic the admiralty handled production issues. Large scale test baking were performed, there were instructions how to bake, tables for handling different volumes was used and there were strict security instructions for how to transport and handling over the raw material and how to secure the finished products. Every link in this chain was completed by written documents.²⁰

The meal needed was mainly produced at Malmö mill and transported, by sea or over land, to Karlskrona. Which means a transport length at 205 km over land. Controlling the transports, together with unfair competition, seems to have been a problematic link in this chain of the production. There was complains about illegal transportations from the rural areas in to the town, merchants could buy the meal before it had reached the town and there was dealing with meal in the harbour. Merchants in the nearby town Ronneby, which had lost its town privilege when the naval city was founded, was accused for handling with meal from the ships that was passing on its way from the southern parts of Sweden towards Karlskrona.²¹

The struggle over mills and monopoly over the milling process has a long history. This was a struggle over resources between different main figures in the local community and the state. The mills have often been used as a symbol representing power and richness.²² In this sense trying to control the mills in an area was to involve in a well-known structural conflict. Trying to control this link in the production must have been of severe importance for the admiralty.

The year 1731 an inventory of the river (Lyckebyån) just outside Karlskrona was made on initiative of the Swedish parliament. A map that was a result of that inventory shows several minor mills along the river and one crown mill. Other sources from 1704 reveals two crown mills along the river. Preserved accounts from those two mills shows that the supply of meal for the mills came in small quantities from peasants in the immediate surroundings.²³

Later on a drawing of a bigger mill from 1715 with six millstones reveals that something important have taken place at the outflow of the river. The drawing was made after a renewing of the mill. Drawings from the renovation of the dam 1772 that was part of this facility complete the picture of more advanced approach towards mills.²⁴ This plant with its dam was constructed with a work force consisted of boatswains and soldiers from the shipyard.²⁵

The crown mill was a complex project. Capital for the project came from the state and the facility was then least to an entrepreneur. Though the technical system was still under supervision of the navy. Protocols from inspections shows how, the chief shipbuilder at the time Sheldon, made those controls and at other time a "mecanicus" from the ship yard could perform the inspection. According to these protocols the project was followed by technical problems and it is not plausible that the mill ever worked in the way it was intended. A repeating problem concerned the third mill stone which did not work properly and there where other examples of "twin stones" that did not

²⁰ Förteckning, Kammarkontoret B V 1689:1, Amiralitetskollegium, Krigsarkivet (KrA).

²¹ Protokoll, 13/12 1686, 19/2, 9/3, 9/3, 4/4, 27/6 1687, KaR.Pr.

²² Bosse Sundin, "Att få vatten på sin kvarn: om kvarnar i historien", i Boel Berner & Bosse Sundin (red.), *I Tekniken backspegel: antologi i teknikhistoria*, Stockholm 1987, s. 9 (To get water on ones mill)1; Bengt Ankarloo, *Att stilla herrevrede: trolldomsdöden i Vegeholm 1653–54*, Malmö 1988, s. 69–82, 152–155 (To calm the masters anger: witchcraft and death in Vegeholm 1653-54); Sven B. Ek, "Vingar och vattenhjul", *Humaniora och Teknik*, Göteborg 1992, s. 90 (Vings and waterwheel); Adam, Robert, Lucas, "Industrial milling in the ancient and medieval worlds", *Technology and culture* 45, 2005, s. 23f.

²³ Karta, Lyckebyån, Lösens socken 1731, LMK, akt 123-1:1;Räkenskaper kronokvarnen i Lyckeby, Kammarkontoret G IV:1–2, Amiralitetskollegium, KrA.

²⁴ Marinens ritningar AXVIII, omslag nr 206, e nr 3, 5, 6, 8,11; omslag 249a, ad nr 2:1, 2:2, KrA.

²⁵ Handlingar, 12/9, 13/9 1752; 31/8 1754, Ekonomikontoret J:1, Amiralitetskollegium, KrA.

work as it was intended. At one time the control resulted in a remark with the meaning that the holder of the mill did not have the mathematical competence to handle and understand the technique with cogwheels used in the mill.²⁶ The control was in the hands of the navy, but at some occasions special competence was needed and a master miller was consulted, who then had to put his signature under the investigation protocol.²⁷ The Navy could not solely rely on its own competence, some kind of interaction with experts outside was needed.

This production facility was established outside the guild system but this did not mean that the admiralty could act without the influence of the guild. The problem with millstone showed that the admiralty, at least partly, still was in the hands of the guilds. Worn out mill stones could only be ordered through merchants in the town. The millstones, named as Rhein stones was ordered from Amsterdam and was preceded by letters sent between merchants in Karlskrona and Amsterdam. The navy needed access to a network of merchants to complete the deal. When the stone arrived to Karlskrona it had to be handled over to a guild for the preparation of the stone, and it was the craftsmen that installed the stone in the mill. One example shows that a millstone arrived in the autumn at the 12th of October, the navy representative asked when it could be prepared and delivered to the mill. The answer from the craftsman was vague and he mentioned: sometimes in spring when the ice was gone.²⁸ Maybe this was an ordinary discussion between two representatives, but the situation could also be understood as a way for the craftsmen to signal the position of the craftsman and the guild he belonged to.

Another problem that appeared now and then originated when it was time to shift between tenants. Every time this situation were at hand a careful investigation protocol had to be set up. Often this caused disputes about what to repair and who should pay. When the complaints directed towards the admiralty were legitimate the problem was how to finance investments or bigger repairs. In these cases the admiralty had to get money through the ordinary system, which could involve a decision in the parliament, or to be financed through the Navy budget.²⁹ In both cases this took its time and the mill could stand still or only be partly used.

Finally, repeated examinations of the dam showed some severe problems. The spring flood caused damages and there were problem how to properly regulate the amount of water that should pass in to the millstones. Sometimes there were too much water in the mill and the stones stopped working.³⁰

To summarise, this investigation of the crown mill, it seems as the six stones in the mill never worked properly together at the same time. Mill technique was an old technique and big millstones connected in series are known since ancient time. Still though it seems as trial and error was mainly used when the mill was constructed, to a lesser extent it was the use of a general knowledge implemented in a specific case. There were more of craft than a work of scientific logic in a modern sense. And there seems to have been structural problems involved that was hard to overcome in this case. Financing through the state system, as it worked at that time, was one example. Private entrepreneurs were partly inside and partly outside a very regulated system, this was hardly a flexible system. Another question is if the entrepreneurs had the knowledge and the skill for such large-scale project. Then the influence on the process that came from craftsman and the guilds, which stood in the way for a more efficient handling of the mill.

²⁶ Lyckeby kronokvarn, Varvskontoret F V:6, Amiralitetskollegium, KrA, pag. 21,35, 329, 387, 389, 399, 1029, 1064.

²⁷ Lyckeby kronokvarn, Varvskontoret F I:6, Amiralitetskollegium, KrA, pag. 1–30, 35, 50–54, 99, 1064–1071.

²⁸ Lyckeby kronokvarn, Varvskontoret F V:6, Amiralitetskollegium, KrA, pag. 341.

²⁹ Lyckeby kronokvarn, Varvskontoret F V:6, Amiralitetskollegium, KrA, pag. 373–385.

³⁰ Lyckeby kronokvarn, Varvskontoret F V:6, Amiralitetskollegium, KrA, pag. 153, 303, 311, 401.

The bakery seems to have worked in a better way but the manufacturing of meal was another issue. In the later case, during the time investigated here, the Navy never did get a complete control over the production. A related topic was the logistic problem with long transports. The raw material, the grain, was mainly produced outside the nearby area.

3.2 Production of liquor

During the 18th century the Swedish state encouraged cultivation of hops in the area. In the next century barley became the common crop. Then at the end of the 19th century and in the 20th century potatoes was favoured by the farmers. All those crops are related to production of alcohol and they were of interest for the Navy. In the 17th century the home production of "dricka" that the burghers in Karlskrona delivered to the fleet was calculated in cans and barrel.³¹ The units of measurement used at the time, indicates a limited production and there were many small producers involved.

A map from 1778 show us a crown brewery in Karlskrona, established just opposite the canal that separated the brewery from the naval bakery, in something that looks like a early modern industry block. A drawing of the brewery from 1779 indicates what had taken place when small-scale home owned breweries became large-scale production controlled by the navy. The drawing shows a plant with 8 brewing pans and 12 pans for the rest product draff ("drank") that was used by farmers for feeding cattle. The exact figures of production for this plant is not available but if we compare this plant with a similar but smaller unit from 1777, based on the same type of drawing, where we have figures, than an estimation could be done. The calculation from the 1777 plant is based on a production on grain. It was estimated that in home production it was possible to produce 12 cans from one 1 barrel of grain. The larger unit in Karlshamn 1777 had the possibility to produce 18 cans out of the same amount of grain.³² It is likely that the plant in Karlskrona used the same raw material, although we are coming closer to the point where potatoes took over. A rough estimation should be that the unit in Karlskrona could produce 427 000 litre of liquor a year and that it needed 9 000 barrels of grain for the production.

In the year 1749 there were 4056 person registered as brewers in the county Blekinge, the county in which the naval base was situated. In the 1790s potatoes was mentioned by the authority as common in the county. The use of potatoes as the base for production of liquor increased over the years and 1850 it was estimated that 18 000 barrels of grain and 160 000 barrels of potatoes was used for production in 1 065 liquor pans. Between the year 1829 to 1900 the number of breweries decreased but at the same time the production in litre increased. The year 1900 there were 13 breweries on farms or co-operative breweries. Together those units produced 4 million litre of liquor. During the 19th century Blekinge, due its small size, become one of the largest producers of liquor in Sweden. By 1900 it was the second largest producer in Sweden, only the county Kristianstad next to Blekinge had a larger production and it was the biggest producer in Sweden.³³ (In 2008 the last state owned brewery, "crown brewery", Nöbbelöv in the county Kristianstad, that produced Absolut vodka, was sold to the French company Pernod Picard).

It was the western part of the county that took the lead in this development. This production affected other industrial areas, the mechanical industry related to handling potatoes and brewing

³¹ According to the statute of 1665, one can is the same as 2,617 litre and one barrel could vary between 146, 6 and 164,9, depending on whether the measurement was used as fixed or not. Nationalencyklopedin

³² Bengt Gabrielson, "Regale bränneriet i Karlshamn", *Karlshamniana 2006*, Kristianstad 2006, s. 67, 74, 78 (The crown distillery in Karlshamn).

³³ Sven Björnsson, *Blekinge, En studie av det blekingska kulturlandskapet*, Lund 1946, s. 168–172; Ivar Wenster, "Den raffinerade potatisen: om stärkelsefabrikation i västra Blekinge under 1800-talet", *Blekingeboken 1995* (The refined potato: about starch industry in western parts of Blekinge during the 19th century).

expanded, the harbours expanded and shipping companies could profit on this development. The commercialisation of farming in the western parts came to be heavily connected to the production of liquor. A home industry was established and developed in to large-scale industrial production. In a five year report from the county governor, the year 1827-1832, concluded that production of liquor had been so deeply involved in farming in the county that it had become the main goal for farming.³⁴ Later on in the 20th century potatoes became the base for the starch industry in the area, an industry with considerable importance for the industrial development in Blekinge county. The area just outside Karlskrona in the eastern part had other advantages from their location close to the naval base. In this area the dairy industry had a stronger hold than in the western part.³⁵

4. The naval city, shipyard, technique and large-scale production

There are lots of drawings produced at the shipyard in Karlskrona, left at the Swedish War Archive. Drawings that mainly have something to tell about early modern thinking on technique and production. Drawings that include measurements, the use of standards and scale could be interpreted as a step away from traditional craft towards a systematic more scientific behaviour. The shift towards a common use of drawings at English ship yards could be dated to 1586, according to David Mc Gee. Experiences from different areas was systematised and transformed to drawings. The driving force behind this development were the huge costs involved in building of war ships, which also meant huge risks of failure and loss of money. On the drawing board it became possible to make experiments, to calculate costs and to deal with constructions of a higher complexity, at least to a much higher degree than earlier.³⁶ The drawings from the shipyard bear witness of this process. The crown mill is an excellent example, and there are other examples often related to the main problem in Karlskrona, which was water. Many drawings are related to water, water on the wrong place, to much water, or bad water.

An obvious example of the use of planning and experiment developed inside the shipyard is the baking process. The sources from the bakery reveals how tests of different mix of meal are accomplished and how to make the most out of a given amount of meal is valued. Those experience, tests and evaluations are then transformed in to instructions. Everything careful written down in records.³⁷

Logistic was a problem that involved risk and the long distance trade needed to supply the navy was a problematic area. Orders placed at merchants and entrepreneurs in different countries must be precise as possible to avoid costly returns due to a defective delivery. The supply of wood was one difficult area to control in this sense. Oak-wood was ordered in parts prepared to fit different use in the construction of a ship and it could be ordered from different areas on the other side of the Baltic. Big orders were for instance placed in "Swedish Pomerania". An order placed 1777 included 286 320 cubic foot, the order was followed by a detailed catalogue with templates (mall?) that described each part that was ordered and in what numbers they were wanted. Standardisation and systematisation was tools to control the risk involved and to avoid costly mistakes. Each part was controlled when they arrived and stored at the shipyard in Karlskrona.³⁸

Administration and the creation of system for control was a way of reduce the risk involved in large-scale projects. The military ambitions, and first of al the creation of a fleet that could compete on a European level was a risky project and the risks involved had to be controlled. Mistakes could be costly. A Staff of skilled workers, engineers and administrators was involved in this process.

³⁴ Björnsson 1946, s.169.

³⁵ Björnsson 1946, s. 173, 176, 237.

³⁶ David Mcgee, "From Craftsmanship to Draftsmanship: Naval Architecture and the Three Traditions of Early Modern Design", *Technology and Culture* 40.2 (1999), s. 2-4, 8, 11-13, 19-20.

³⁷ Handlingar rörande brödbakningen i Karlskrona 1750-1829, Amiralitetskammarkontoret, Blekinge Museum, passim.

³⁸ Skeppsbyggnadsdetaljer, Marinens ritningar A XVI, omslag 173, litt. A, B, KrA.

Technical products, inventions, administration routines and systematising skills were produced. The knowledge involved in this process was of a kind that could be spread in to different areas outside the immediate use at the shipyard. The shipyard and the naval city was in this sense a node for technical knowledge and invention that could be used in new large-scale production.

The development investigated involved both state and private involvement. I allow my self to, again, use an anachronistic concept. The development could be described as dealing with private-public-partnership (PPP). The states that took the lead in maritime war fare during the 17th and 18th century was not the old maritime nations in the Mediterranean it was the states that at the time was able to developed a strong state power that was successful.³⁹ It was more of the capability to collect taxes and customs, to organise large-scale production and to transform this to resources that could be used by the Navy without too much turmoil in the society, more than a question of maritime experience. Behind the technicians, engineers and entrepreneurs stood institutions with a long-term commitment and with goals fare beyond the immediately need of bread and liquor.

This investigation has revealed something that could be understood as a pattern that connect the Swedish military past, naval demands, and a modern industrial landscape in the area investigated. But a sequence of events that follow each other does not mean that we have clear evidence of cause and effect, although the chain of circumstantial evidence is strong. Further research is needed, one questions worth investigating is path-dependency and to what extents this could explain the connection between the military past and modern industrial patterns. Another question of interest is the meaning of institutionalisation both in more formal and informal ways for this development.

³⁹ Glete 2002, s 53, 67.