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Tar Production in Colonial North America

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SUMMARY

It was only natural for the large countries and colonial powers of the 18th century to employ their heavily wooded areas and possessions as sources of forest products. This is how the French wanted to use Canada, the British, America and the Swedish, their eastern half, Finland. It was not solely the natural environment that determined the choice of these areas, however, but also other aspects of the environment: political, military, economic and colonial. To illustrate this, we will examine the example of tar-making.

QUESTIONS

Naval stores are a group of products which a naval power needs to construct, repair and maintain its fleet. When navies grew bigger and countries' own resources became overstrained, it was necessary for them to import some stores from abroad. This gave an important strategic role to the areas which produced these necessities, e.g. the Baltic states and American colonies.

One of these stores was tar, of which, in the 17th century, Finland was the most important producer. Most of the tar was made in Finnish Ostrobothnia, bought by the Swedish Tar Company – which had the monopoly – and sold to the British Royal Navy, which was the chief buyer in Europe. At the end of the 17th century the Royal Navy purchased practically all of its tar from Sweden, but in the 18th century a change was made. England started naval-stores production in its North American colonies, and soon imported most of its tar from there. This tar policy was continued despite criticism from the Royal Navy. It came into effect with the Naval Stores Act of 1705 and was forcibly ended by the American Revolution, in 1775.

The British wanted American tar to be made in New England, but it was nevertheless produced in the Carolinas; there is some irony in this, since the Swedish wanted their tar produced in southern Finland but, as I have already stated, it was actually made in Bothnia.

The questions I want to ask are as follows: why was it so important to the British to produce tar in the colonies? Why was American tar inferior to the Swedish (Finnish) product? Why was the Royal Navy so hostile to the American tar production? And finally: why was tar produced in certain areas despite all the efforts of the British and Swedish governments to relocate production to New England and South Finland?

To answer these questions I must examine the environmental and political contexts of the subject.

TAR-MAKING

Resinous pine trees were needed for tar-making. In Finland tar-makers used Scotch pine (*Pinus silvestris*). Trees were barked, meaning that bark was removed from a living tree to make it produce more resin. A thin strip of bark was left on the northern side of the tree so it would not die (and stop producing resin). Barking was repeated yearly. After either two or four years the tree was felled. Then it was cut into pieces and carefully piled up in a mound, which was covered with earth. This construction was called a kiln or a pit (Fi. *tervahauta*). The kiln was then burned slowly. The layer of earth made the burning last for several days and kept the temperature inside the kiln very high. This heat – the greater the better – produced tar, which ran out through a pipe and was collected in barrels.

Tar was then transported to the Swedish Tar Company, which sold it to the Royal Navy. It was used in dockyards to preserve ship timber or cordage, which was painted with it. It could also be boiled down into pitch, which was more solid and could be used to fill cracks in a ship's hull.

Tar-making was a laborious, forest-wasting and badly-paying industry. The farmer who made tar tried to do most of the job in a part of the year when there was no other work on the farm. The pine forest used in tar-making was commonly-owned village land; production was so forest-wasting that nobody wanted to do it on his own property.

To make tar, one needed a considerable number of pine trees which were too far from transport to be used for sawmill products. But not too far: tar was heavy and not very profitable. Near the Finnish coast there was a zone of sawmill production, behind it a tar zone, and still further away, an area that produced rye with slash-and-burn agriculture. Tar was not made in slash-and-burn areas, because both jobs required too much work during the summer time and could not be done simultaneously.

Another necessary condition was a particular kind of sandy soil. This grew more resinous trees and also made it easier to dig the kiln. In Finland these requirements were most easily met in Bothnia. Traditional research has underlined the good transport possibilities of the area: flat ground and navigable rivers (Kaila, 1931: 117-148). Later research has filled in the picture, noting the other conditions mentioned above (e.g. Åström, 1988: 24-27).

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The Swedish government favoured Southern Finland rather than Bothnia as a tar-producing area. Forest resources were diminishing, and wood-wasting processes like tar-making were seen as competing with more important industries, such as shipbuilding. The government considered Southern Finland unproductive and its forests as comparatively unused. That is why it wanted to move the tar industry there. The desires of the government could not, however, change the basic facts, which made Bothnia the most profitable tar-making area. Production was never moved to the South.

THE BRITISH TAR POLICY

The trade balance of the Baltic region was unfavourable to the British. Most tar and other naval stores (naval timber, hemp, flax, iron) were imported from the Baltic ports. Textile exports to the area could not match the imports.

The Swedish Tar Company tried to raise the price of tar by keeping the production low and the quality high. In wartime the Royal Navy needed more tar, which gave the Swedish a good opportunity to hold the British hostage: in 1703, during the War of Spanish Succession, they raised the price by about 50% (Åström, 1962: 123).

Sweden had difficulty, during its own wars, in producing tar and getting it out safely from her harbours, or through the Danish Belts. Such problems occurred during the Great Northern War (1700-1719), when Russia occupied large areas around the Baltic Sea. The British Board of Trade was forced to take note as the 'muscovites' destroyed most of the traditional tar-producing areas, and Finland was 'depopulated' (CO 5/912: Mar 26th, 1707; Journal of the Commissioners of Trade and Plantations: Feb 25th, 1717). The Board of Trade knew that most Swedish tar came from Finland. It suggested that the American colonies should produce the tar instead.

Navy Board officials, who actually bought the tar, continued desperately to seek it from the Baltic area. It seems they did not see any alternative to Swedish, Russian or Prussian tar. And so they called for merchants who were prepared to import tar from the Baltic (ADM 1/3613: Jan-Mar, 1710).

After 1710 American and Russian tar destroyed the Swedish monopoly. Between 1725-29 American tar merchants did not receive the bounty which was needed to balance the freight costs. This gave the Swedes an opportunity to recapture a share of the market. They did so, overtaking the sales of Russian tar. The Swedes held onto their market when the bounty was reinstated after 1729, because of the higher quality of their product (Åström, 1962: 129).

The Swedish tar trade was stable (in price and volume) during the War of Austrian Succession (1739-48) and the Swedish war of 1741-43 (Baugh, 1965: 279). In this sense we can say that the British tar policy was partially successful, eliminating the Swedish monopoly but not their power in the industry.

AMERICA AS AN ALTERNATIVE

The British Board of Trade and Plantations was established in 1696 to encourage useful trade, and to prevent it when it was harmful to the kingdom.

The American colonies were a source of trouble. They had a negative trade balance with the Mother Country. And certain of their industries, such as fishing, shipbuilding, and the manufacture of woollens – located largely in New England – competed with industries at home. Because the colonies did not produce and export enough, they could not import all they needed and were compelled to produce for themselves many things they could otherwise have imported from England.

The Board of Trade felt that if the colonies could produce naval stores, which were needed in England, they could export these, and import textile products from England. To accomplish this, it was necessary not only for the British government to restrict the colonial industries, as in the Woollen Act of 1699, but to encourage colonial naval-stores production (Williams, 1935: 170-171).

The Naval Stores Act (3 and 4 Anne, c. 10) was passed in 1705 to guarantee the stores necessary for the Royal Navy, to promote trade, to end British dependence on the Northern Crowns, and to put the colonies in their place. The act restricted the improper use of mast and tar trees and ordered bounties to be paid on the naval stores imported to England from the colonies. Even though the restrictions applied to New York as well, the bounties were paid only on New England products. (The original text of the act is published in *English Historical Documents IX*: 417-418).

Carolina was the only place in the colonies which produced large quantities of tar (Weir, 1983: 143). The merchants who offered tar to the Board of Trade were ready to produce it in Carolina or Virginia (*Journal of the Commissioners of Trade and Plantations*: Apr-May, 1704). The only man prepared to make tar in the North was Jonathan Bridger, who was appointed Surveyor-General of the Woods in America (*Ibid.*: May 2nd, 1704). Bridger was sent to America to organise naval-stores production. His first letter from New England contained a bitter attack on the woollen industry in New England (CO 5/912: Mar 5th, 1706). Bridger had very detailed orders for his assignment (*Ibid.*: Dec 19th, 1705; Feb 1st, 1706). Although the orders did not mention the industry at all, the unstated aim of the whole operation was to eliminate it. That is why the bounties were granted only in New England, despite the fact that the main tar-producing area was in Carolina.

Tar was one of the ‘enumerated commodities’, which meant that it should be sent directly to England. If an ‘enumerated’ product was actually going to France, for example, it still had to visit England first. The purpose of this enumeration act was to give the English first chance to buy colonial products; if the product ended up abroad, the English still got a commission. There was one

way to avoid the enumeration. If, say, a Virginian wanted to send his products directly to Portugal, without circulating them via England, he could send them first to New York, or some other colony. Since New York, like all of the colonies, was considered a part of England, this fulfilled the enumeration condition, and the product could continue on its way abroad. But in this case the Virginian had to pay the duty on trade between colonies. And so the English got their share anyway.

The Carolinians had two alternatives for exporting their tar. They could export it directly to England and be left without the bounty, since the bounty was paid only on New England tar. Or they could first ship it to New England and then to England with the bounty. The problem with the latter alternative was the duty on trade between colonies. It was ridiculous: the government gave the bounty with one hand and collected the customs duty with another. Because this made no sense, since the tar finally ended up in England, the Massachusetts legislature decided to abandon the customs duty on tar which came from an other colony, but continued to England.

Jonathan Bridger, the surveyor-general, insisted that the practise of transshipping should be forbidden, that it was cheating to produce tar in Carolina and then let it visit Massachusetts solely to achieve the status of a New England product. But the Board of Trade had no reason to complain. The aim was for New Englanders to produce something which was suitable for the colonies to export. If they did this by importing the tar from Carolina, it was their business. It seemed that Carolina was good at tar-making and New England at trade. (Malone, 1964: 37-38. Bridger's letter: CO 5/915, Feb 14th, 1717).

During the period of 1705-1775 about 80% of American tar exported to England was made in North Carolina. About 80% of all tar was made outside of New England, but exported to England via New England in order to get the bounty. About 90% of North Carolina tar visited New England before going to England.

As well as mediating the sale of Southern tar to England, New Englanders also exported an insignificant quantity of their own tar; they also imported some tar from North Carolina for their own use. If we take the small amount of tar which was actually made in New England and exported to England, and compare that with the tar which was made in North Carolina but used in New England, we can see that the latter amount was bigger. In other words, New England was a net importer of tar (Malone, 1964: 37, 44-46).

The Royal Navy had to pay a bounty on all tar which was of good quality, and came from (or via) New England. However, the Royal Navy did not use this tar, but let the merchant navy buy it. Only when wars or other emergencies stopped the Baltic imports completely was the Royal Navy forced to make use of American tar. This is why the Navy spent ten times more money on the bounties than on the actual purchase of American tar (Ibid.: 45). Still, for almost all of the

period between 1705-1775, England imported more tar from the colonies than from Sweden, although during wartime the Swedish share grew, because the Navy was using Swedish tar (Hautala, 1963: 180).

To sum up: the bounties guaranteed a cheap source of tar for the commercial navy; money for the New Englanders, who could thus buy textiles from England; a marketing area for the English textile manufacturers and a flourishing tar industry for North Carolina. And all this at the expense of the Royal Navy!

TAR-MAKING IN AMERICA

England planned for New England to become the tar-producing area in America. As we have already seen, this did not occur. The Northern colonies only transshipped Southern tar to England and actually imported more tar than they exported. What went wrong?

Lack of labour was a problem in the colonies. Since tar-making was a laborious and badly-paying industry, it did not attract the colonists. Other forest products were more profitable and so the presence of a sawmill always killed off the tar production, as was the case in Finland. New England concentrated on its sawmill industry.

The Finnish naturalist Peter Kalm visited North America in the middle of the 18th century. He had seen tar-making in Finnish Bothnia and described very carefully what he saw in America. According to him, tar was made in Canada and New Jersey in the same way and in the same kind of kiln as in Finland. The difference was that the colonists used dead trees instead of barking living ones to prepare them for the process. Oddly enough, the only tree that was said to be good for tar-making was 'pin rouge'. (Kalm II: 360; III: 5).

This tree, red pine, which is curiously known as 'Norway pine', is actually not a very good tar tree. This is because it is not very resinous (even though in Latin it is called *P. resinosa*). Why use this kind of tree instead of pitch pine (*P. rigida*), which is more resinous and was known to be an excellent tree for naval-store making? (Cronon, 1983: 109; Sarvas 1964). The answer is that pitch pine was superior not only as a tar tree, but also as sawn timber or firewood. It seems that pitch pine was reserved for these more important uses. This emphasises the secondary role of tar making in the North.

Most tar, as I have explained, was made in the Carolinas. Kalm met a man from that region who told him that pitch, tar and rice were the main products of the Carolinas. Tar was made there from dead trees, but otherwise in the same way as in Finland. If the Carolinians wanted to make better tar, they used living trees (that is why the quality tar was called 'green tar'). These were prepared by barking as in Finland, but for a period of only 6-8 months rather than two or four years (Kalm II: 222).

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Kalm mentioned the sandy soil and rich pine forests in Carolina and seemed to consider these sufficient to make it the main tar-producing area in America. We may add the navigable rivers for transport, and the shrubby pines which were not appropriate for sawmill products. Governor Burrington wrote to the Board of Trade that in North Carolina nineteen twentieths of the land was of this kind: worthless in an agricultural sense. The governors distributed this kind of land to the colonists in greater-than-normal pieces. Colonists needed a much greater amount of land for tar production than for cultivation (CO 5/293: 34).

Lack of labour was a great problem in all of the colonies, but in North Carolina slave labour was relatively cheap. In winter, when the land was too wet for cultivation, the farmer could switch to tar-making, thus making sure the slaves had work all through the year. One could produce naval stores year-round, collecting turpentine in summer, when the trees are most resinous (it would simply drip out of trees which were 'boxed') and in winter making tar and pitch (Hautala, 1963: 75-79; Lefler & Powell, 1973: 161-163). The pine trees in North Carolina are numerous and of resinous varieties like longleaf pine (*P. palustris*), slash pine (*P. Elliottii*) and Loblolly pine (*P. taeda*). Tar-making conditions were at their best in the Carolinas, especially in North Carolina.

The colonists were still unwilling to make green tar. The share of this quality product in colonial tar industry was always small. (Hautala, 1963: 62-63). This situation was the same in both North and South Carolina (Weir, 1983: 144-145, 150. Lefler & Powell, 1973: 163). The British parliament tried to favour green tar in the bounty system. Changes in the bounties did not make any difference in the North, but South Carolina switched into rice cultivation, although the tar industry remained in those parts of South Carolina where rice did not grow well. (McCusker & Menard, 1985: 179-180).

The problem with American tar was that it was too 'hot'; it burned the ropes which were painted with it (Malone, 1964: 20-27; Åström, 1988: 22). This was a crucial fault, since painting cordage was an important use for tar in the royal dockyards. What was this 'heat' and what caused it? Kustaa Hautala (1963: 57-58) takes it to be an acid-like quality and thinks it was caused by using dead trees, which lacked protective qualities in their resin. Colonel Dudley, the Governor of New England, understood similarly that 'heat' was caused by too hot a kiln and instructed the colonists to avoid hot temperatures in the process (CO 5/912: Feb 1st, 1706). This is contrary, however, to everything that we know about tar-making in Finland. Contemporaries who knew something about tar-making (Peter Kalm, John Bridger) did not mention this explanation. Amazingly, Timothy Silver (1990: 127-128) takes it seriously.

The 'heat' of tar does not refer to an acid-like quality. When rope was tarred, the tar was heated to be thin enough to penetrate into the rope. Bad tar was too thick. To make it thinner it had to be raised to a temperature which could actually burn the rope. So by calling tar hot, the dockyard workers actually meant it was too thick. (Falconer's Dictionary: 'Tarring of Yarn in Ropemaking').

There could have been two reasons to cause American tar to be thick. First, a kiln produces thick tar if the temperature inside the kiln is too low. The other reason is a lack of resin in the timber due to incorrect barking of the trees. Since the latter seems to have been the problem in the colonies, according to Kalm, Bridger and other observers, I shall go more deeply into this question.

The American tar-makers, like Colonel Johnson, the former governor of South Carolina, disliked the idea of barking the trees. They claimed that barking only kills the tree, but does not make the quality of tar any better (Journal of the Commissioners of Trade and Plantations: 18th Dec 1724). But if the barking killed the tree, it means it was done wrongly – in other words, the bark was removed without leaving a strip of bark to keep the tree alive. What, then, caused the colonists to fail in the barking? Ignorance? What did they actually know about tar-making?

Bridger distributed Finnish tar-making instructions in New England. Palatinate refugees who were settled in New York were given tar-making instructions, which the British got from Moscow (Journal of ...Trade and Plantations, 13th May, 1712). But the Americans did not have to content themselves with printed instructions. It is said that Finnish settlers (in New Sweden) introduced tar-making in America (Hautala, 1963: 19). Board of Trade reported that two Swedes had helped New Englanders to produce first-class tar and pitch. Later the Board planned to send half a dozen 'Finlanders or other Swedes, well skill'd in the making of pitch and tar' to America (CO 391/9, 14th Aug, 1696; Journal of the Commissioners of Trade and Plantations, Feb 10th, 1710).

It seems that the Americans had the knowledge; and the best tar was made in Carolina, in spite of the fact, that instructions were distributed in the North. According to Malone (1964: 31), the colonists (in New England) did not learn to produce rum following printed instructions, and so they did not understand Bridger's tar-making instructions either. Was the problem laziness or stupidity? This I find hard to believe. The problem, after all, was not in the making and burning of the kiln, which needed much skill, but in the barking, which was laborious, but not difficult.

The Board of Trade interviewed one tar merchant, a Mr. Carey. He told them that he had produced tar in Virginia from trees which were barked for two years. The tar was of first quality, but the process was so expensive that it was not economical. The locals avoided this laborious process, because employment costs were higher in Virginia than in Sweden (Journal of the Commissioners of Trade and Plantations, Dec 18th, 1724). The Board had earlier considered that cheaper labour was needed to produce tar which was thin enough for tarring of ropes (CO 391/10, Sep 1st, 1697).

The low quality of American tar, then, came from incorrect barking of the trees. This was because the Americans tried to skip the most laborious part of the process, to keep down the labour costs. This is a logical explanation, since lack of labour was a typical problem in the colonies. There was enough of the raw

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material, wood, and the colonists were anxious to use it as fast and as easily as possible. It was easier to cut a felled white pine into five pieces on the spot, and then take it to a sawmill, than to take it out of the forest as a single piece to be used as a mast. The colonial hemp was also inferior, because preparing it was considered dirty and time-consuming. (Cronon, 1983: 108-126, 169; Albion, 1926: 259-260; Malone, 1964: 43, 52-56; Crosby, 1965: 18, 23).

The colonists tried to solve the problem with the quality by turning their tar into pitch. Two barrels of tar made one barrel of pitch. Since the bounty for tar and pitch was the same, half of it was lost in this process. But the freight costs were also halved. The merchants favoured pitch over tar since pitch did not leak from the barrel during the voyage. The best reason to switch to pitch-making, though, was that poor tar made good pitch. Even the Royal Navy made its pitch from low-quality tar. So the pitch-making was a good solution.

Even though it made sense to produce pitch out of colonial tar, however, the British stopped this practise by lowering the bounty which was paid on pitch, until its production in the colonies ceased. The rationale here was that boiling tar into pitch was refining work and as such should be done in England, especially since pitch-making was important to domestic employment (Åström, 1988: 22; Hautala, 1963: 46, 64-69). Once more we can see the aim of the British naval-stores policy: keeping the colonies in their place.

CONCLUSIONS

England's need to import naval stores from her colonies was at first explained as entirely military. Some scholars still see the interests of the Royal Navy as the only rationale for the policy. No wonder they are hostile towards it, since the Navy itself was not at all contented. The Navy accepted the idea of having an alternative source for naval stores, but it did not like the notion of supporting an enormous amount of colonial production by the payment of bounties, especially when the Royal Navy did not want to buy the colonial tar; it went to the merchant navy.

The British tar policy served larger economic interests, which the Royal Navy did not want to fund. But why did it not want to buy this tar, after being forced to pay the bounty? The price is not the explanation, since American tar was cheaper than Swedish (excluding the bounty, since it was already paid and had no effect on the decision). The inferior quality of American tar does not explain the Navy's attitude either, because second-class tar could be used as well, on ships' bottoms or in the making of pitch.

As I stated earlier, Navy Board officials did not see alternatives to the Baltic production, but bought from there as long as it was possible. Their correspondence (ADM 1/3613) shows that they did not want to break contact with the merchants who sold them not only Baltic tar, but also timber, hemp, flax and iron.

The Board of Trade and Plantations favoured the naval-stores policy because it served British colonial and economic interests. Some aspects of the policy, like restricting the bounty system to New England, reveal the rationale behind the decisions. The Board of Trade got its policy through despite its generally small influence in the English government. This was because it was using the colonies as marketing areas and restricting their competition against English industries. This served the interests of English woollen manufacturers, shipwrights and many others, who were always ready to defend the Board when this policy was in danger.

Colonial tar production freed England from the Swedish monopoly. It also, it has been argued, made the English too dependent on the colonies. This caused a catastrophe when the American Revolution started (see Albion, 1926, or Malone, 1964). However, this interpretation has since been shown to be false (Knight, 1986). The English could (and did) switch back to Baltic imports, when the American source failed.

Certainly the British tar policy was a success in North Carolina. The Southerners happily participated in the English bounty-economy and sent their tar to the Mother Country via New England. They repaid the British with their loyalty during the Revolutionary War – an ironic circumstance, since the policy was meant to have nothing to do with the Carolinas.

However much the English wanted to locate tar production in New England, it stayed in the Carolinas, where environmental factors favoured it. Since tar-making was profitable only where forest resources could not be used in any other way, tar production always located itself in such remote or barren areas. That is why tar-making does not serve as a good example of how man changes his environment; other trades, like lumbering and agriculture, have made larger and more permanent changes. But it is a good example of how the environment sets limits on policies.

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