Between Frugality and Prosperity: Standard of Living and Consumption Patterns of Castle Personnel in Early 16th Century Sweden

Dag Retsö
University of Stockholm

ABSTRACT

The article assesses the nutritional standard of early 16th century Swedish castle personnel as a proxy for their standard of living. It draws on castle inventory lists to present the nutritional standard in terms of quantity and quality and from the standpoint of social differentiation as measured by calorie intake and monetary value. The study shows that nutritional standards of castle personnel were fairly high and class-differentiated, and interprets this as indicating a relatively high standard of living characterized by relative frugality within the upper class and relative prosperity among common castle personnel. The figures fall well in the range of the relatively high general nutritional standards between the late Middle Ages and the late 16th century found by previous research.

Introduction

A number of scholars have pointed to the 15th and 16th centuries as something of a golden age for peasants and wage earners in Europe. Lighter tax burdens, declining land prices and higher real wages following the decimation of the population by the Black Death in the 1300s contributed to a substantial rise in living standards which may have begun even before the plague.[1] In Sweden,

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[1] Abel (1980); Dyer (1988); Dyer (1989); Lardin (1999) ; Hatcher and Bailey (2001); Kitsikopoulos (2002).

this phase of improved living standards seems to have lasted longer than in the rest of Europe, largely because of the successful Engelbrekt peasant rising in the 1430s, which achieved a more prolonged lowering of taxes than did similar movements in continental Europe.[2] Although the price of grain kept increasing from the early 15th century onwards owing to stubbornly low productivity per capita and growing population, living standards were probably not seriously affected before the mid-1500s.[3]

By then, conditions had begun to change. Real wages fell or stagnated across Europe while grain prices continued to rise, in particular in relation to manufactured goods, and meat consumption began to decline, amplifying regional differences.[4] For Sweden, instead, Hans Forssell (1884) and Eli F. Heckscher (1935) found evidence of continued relative affluence, at least at royal institutions, in quantitative rather than qualitative terms. Subsequent research has modified the picture somewhat, but it still seems that consumption was indeed higher in the 1500s than in the following two centuries.[5] Forssell and Heckscher concentrated on the latter two-thirds of the 16th century, exploiting the abundance of sources from that period. By contrast, little attention has been paid up till now to the years 1500-1520, even though relatively rich source materials are also available for that period. This article explores these sources.

It has been suggested that real wages, land and capital should be treated as inputs to the standard of living, while demographic and anthropometric data such as longevity, health status, stature and consumption patterns are imperfect, or at least ambiguous, indicators of the standard of living.[6] Although real wages and prices cer-

[2] Forssell (1884); Heckscher (1935); Heckscher (1963); Myrdal and Söderberg (2002); Söderberg (2007); Myrdal (2012); Retsö and Söderberg (2015).
[3] Söderberg (1987); Myrdal and Söderberg (2002), pp. 130ff; Franzén and Söderberg (2006). For Europe, see Hoffman et al (2002); Özmucur and Pamuk (2002).
[4] Abel (1980), p. 133ff; Van Zanden (1999); Edvinsson and Söderberg (2011).
[5] Morell (1987).
[6] Van Zanden (1999); Koepke and Baten (2005). See, however, Komlos (1989) and Komlos (1994).

tainly are the ideal measures, nutritional standards no doubt are an indicator of the standard of living, and an important one at that. For example, previous studies have shown in detail a general tendency in the late Middle Ages for the role of grains in diets to decline and that of high-calorie meat and dairy products to increase, along with a concomitant rise in the relative importance of beer. A more varied diet and an improvement in the quality of foodstuffs consumed signal a relatively higher nutritional standard, which in turn can certainly be seen as a strong indicator pointing to a relatively higher general living standard.[7]

This article assesses the nutritional standard of early 16th century Swedish military personnel at castles (fortresses) as a proxy for that population's standard of living. No inferences can be made from this for lower classes, but it is commonly thought that their nutritional standard was well below that of the low-ranking personnel at state institutions examined here. I will present the nutritional standard in terms of quantity and quality, and from the standpoint of social differentiation as measured by calorie intake and monetary value.[8]

The article is organized as follows. It begins by describing the sources, then presents and analyzes the qualitative data on socially differentiated menus, and goes on to conduct an exercise in quantification of food consumption based on data in surviving inventory lists and castle bailiff reports. Complete tables of the data and a note on measures and weights are found in the appendices.

The sources

Medieval Swedish sources offer almost no continuous data series that can be used as proxies for living standards. There are a few account books for the period before 1500, ideal sources for investi-

[7] Dyer (1988); Söderberg (2015).
[8] See Söderberg (1987).

gating the material needs and consumption patterns in castles because they give a view of consumption on a current basis, but unfortunately no such records survive from the period examined here.[9] Consequently, we must try to obtain data from two other types of sources: castle inventory lists and reports by bailiffs on the supply situation of castles.

An inventory of the total stock of foodstuffs and equipment was taken whenever a castle was assigned to a new commander.[10] Two inventories of the kind survive from our period.[11] One was drawn up in September 1505 on the occasion of the substitution of a bailiff at the Stockholm castle, the most important of the realm and administered directly by the Crown. The other was compiled when Peder Turesson (Bielke), a knight and member of the council of the realm, was given the Stegeholm castle and the surrounding tax district on the southeastern coast as a fief in January of the following year.[12] There are also fragmentary inventories of the Stockholm castle from February 1508 and September 1509.[13]

Bailiff reports are found in relative abundance in the Sture collection, the archives of the appointed regents Svante Nilsson (1504-1512) and Sten Sture the younger (1512-1520). This collection consists mainly of letters from members of the council of the realm, military commanders and bailiffs of Crown-administered tax districts around the realm. Most often, the information on the supply situation at the castles comes in the form of reports on shortages, accompanied by petitions for what was lacking. Significantly, the provision shortages are precisely the reason why we are quite well-informed about normal diets among castle crews, inasmuch as the correspondence deals largely with the foodstuff supply needs of the

[9] See, for example, Dyer (1988); Söderberg (2015), p. 2.
[10] See, for example, BSH 5, no. 325; FMU 7, nos. 5522, 5694.
[11] RA Sturearkivet 11 September 1505; *Handlingar rörande Skandinaviens historia*, 19 (1834), pp. 165-168. See Hammarström (1956), pp. 88f, 89f.
[12] Retsö (2009), pp. 88, 209f, 394.
[13] Sjödin (1937), p. 288.

castles. This goes especially for the notoriously under-provisioned Stockholm castle.[14]

In their correspondence, military commanders normally, and naturally, paid less attention to economic matters than did the bailiffs. What is more, diplomatic and domestic political matters came to dominate the agenda of the ruling class in the 1510s. Coupled with the fact that the number of documents in the Sture collection decreases for the same period, this means that the information available to us on economic questions in general tends to decline, with the significant exception of reports on rising prices.

Like castle accounts of previous centuries, both inventories and bailiff reports from the early 1500s in general only concern the total provision needs of a castle; they do not specify which items were intended for everyone, or distinguish between the lord of the castle and the castle crew, or tell how many persons were supposed to consume the supplies and for how long.[15] These problems need to be addressed in different ways and the information that is lacking reconstructed using other contemporary documents.

Qualitative consumption patterns: The social dimension

Food stores at a castle were intended for consumption by the castle lord and his entourage, castle personnel, and visitors and their followers. As the recipients of provisions at a castle comprised individuals of disparate social status, the average consumption of castle personnel, based simply on total food quantities and total number of persons, normally does not allow us to come to any conclusion concerning the social profile of consumption patterns.

Although some foodstuffs were consumed by everyone, social differences did exist. For example, the 1505 Stockholm inventory mentions "master's bread" and "master's beer", meaning bread and

[14] Hammarström (1956), p. 85ff. About the Sture collection, see Retsö (2004).
[15] See also Dyer (1989), p. 64; Söderberg (2015), p. 3.

beer of better quality intended for the upper class. The inventory of the Stegeholm castle gives us an even more detailed glimpse of food consumption as a class marker.[16] It is divided into two parts, one enumerating quantities of food items for consumption by the castle crew, the other listing items for consumption by the new lord, his family and servants. The two lists are neither mutually exclusive nor complete. For example, the inclusion of "plain beer" in the castle lord's personal provisions suggests that the latter were partly allotted to those of lower status among his followers. The lord's personal provisions are also strikingly large – three times as great as those of the castle staff (see Appendix 1, Table 3). Furthermore, butter, a basic foodstuff in the Middle Ages, is mentioned only in the first inventory. But both lists include beer and its main ingredients, malt and hops, as well as salt, pork, smoked and brined beef, smoked mutton, cod, flour and bread. These items also turn up in a multitude of documents for different castles of the realm that do not specify class of consumer; they should be considered as part of the basic medieval diet.[17] Rye and barley, the main ingredients of both bread and beer, naturally belong to this category.[18] That these items are not class-specific is demonstrated by the fact that most of them, though mentioned as being part of the diet of miners in the Bergslagen mining

[16] *Handl. rör. Skand. hist.*, vol. 19 (1834), p. 165ff.

[17] Beer: RA Sturearkivet no. 1417; FMU 6, nos. 5033, 5039, 5099; Sjödin (1937), p. 288; malt: RA Sturearkivet no. 637; BSH 5 no. 272; FMU 6 nos. 5099, 5324; FMU 7 no. 5694; Sjödin (1937), pp. 288, 306, 320, 271; hops: RA Sturearkivet nos. 252, 573, 879a, 341, 1106, 1772, 1765, 1767; BSH 5 nos. 90, 92, 94, 277, 325, 377; FMU 6 nos. 5282, 5291; FMU 7 no. 5694; Sjödin (1937), pp. 59f, 180, 271, 288, 295f, 306, 341; salt: RA Sturearkivet nos. 573, 879a, 1106, 1765, 1772; BSH 5 nos. 60, 90, 92, 94, 191, 277, 326, 325, 377; FMU 6 nos. 5033, 5282; Sjödin (1937), pp. 59f, 180, 271, 288, 295f, 341; butter: RA Sturearkivet nos. 249, 714, 1006, 1076, 1768; BSH 4, no. 233; FMU 6 nos. 5033, 5039; FMU 7 no. 5694; Sjödin (1937), p. 288; pork: RA Sturearkivet nos. 637, 714, 760, 1006, 1076; BSH vol. 5 no. 326; FMU 6 nos. 5244, 5341; Sjödin (1937), pp. 271, 288, 295f, 306; beef: RA Sturearkivet 1108; Sjödin (1937), pp. 39, 59f, 288; Hansson (1993), pp. 76, 79; *Diplomatarium Norvegicum*, Vol. 22 (1990), no. 37; mutton: RA Sturearkivet nos. 714, 1099; FMU 7 no. 5694; cod: FMU 6 no. 5071; BSH 5 no. 191; Sjödin (1937), pp. 288, 341; flour: RA Sturearkivet no. 624; BSH 5 nos. 107, 272; Sjödin (1937), p. 288; bread: BSH 5 no 210.

[18] RA Sturearkivet nos. 624, 637, 714, 1076, 1417; FMU 6 nos. 5033, 5039, 5324; FMU 7 no. 5694; Sjödin (1937), pp. 295f, 306.

region and of hospital inmates, were also served at the meetings of the lords of the realm.[19] Poultry (geese and hens) was also consumed at castles regardless of class.[20] It is worth noting that we still detect no signs in our sources of a broad shift within the cereals category towards increased consumption of wheat; this is bound up with the general character of agriculture in Sweden, where wheat was relatively sparsely cultivated and barley and rye dominated as late as the late 16th century.[21]

The bailiff reports mention some foodstuffs only by broad categories such as "meat", "beer" and "fish". Most of the generic references to meat probably meant beef, which, as noted above, had no particular class profile.[22] Within the categories of beer and fish, there were social distinctions between different qualities, though we do not always find these distinctions in writing. There were at least three types of beer: master's beer, bailiff's beer and common beer. Beer imported from Reval (Tallinn) in Estonia was considered of good quality. Imported beer from Hamburg as well as Prussian wort beer and hops beer were considered the finest and were presumably consumed by the lords, whereas Finnish beer was probably consumed by the castle crew.[23] It is also likely that imported hops from Prussia were used exclusively for brewing master's beer.

Fish is frequently mentioned without any specification except whether it was dried (*spettfisk*) or fresh.[24] Common freshwater fish like pike and perch, as well as salmon and saltwater fish like Baltic herring, were probably items of general consumption. For example, Baltic herring appears in Peder Turesson's personal food list and is

[19] Söderberg (2015), p. 3; RA Sturearkivet no. 821; Sjödin (1967-1969), no. 252; Sjödin (1937), p. 365f.
[20] BSH 5 no 107; FMU 7 no. 5694; Sjödin (1937), p. 339. See also Hildebrand (1898-1903), p. 473.
[21] Myrdal and Söderberg (2002), p. 50ff.
[22] RA Sturearkivet nos. 879a, 1076; Sjödin (1937), pp. 271, 341.
[23] RA Sturearkivet nos. 291, 479, 611, 1006, 1127, 1153, 1417, Bunge and Hildebrand (1905), p. 584f, FMU 6 no. 5099; Sjödin (1937), pp. 187f, 298. See also RA Sturearkivet no. 1139.
[24] RA Sturearkivet nos. 48, 1765, 1772, 879a; BSH 5 nos. 272, 277, 325; FMU 6 no. 5033, 5282, 5324, 5341; Sjödin (1937), pp. 180, 288, 306, 341.

also mentioned as being consumed by miners.[25] Herring was commonly eaten in medieval Sweden, but herring imported from the Danish province of Scania (*skånesill*) seems to have been reserved for the upper class, for it is mentioned in connection with the lords' meetings but not specifically for other social groups.[26] Other freshwater and saltwater protein sources were eel, seal and seal blubber.[27]

Some geographical differences are to be expected and are reflected in the differences in taxes levied in kind. For example, animal products such as butter and pork were common items of taxes in kind in the provinces of Småland, Västergötland and Värmland, as was fish from Finland. Significantly, some of the items in the Stegeholm list also appear in tax registers from 1497 and 1512 as tax items in kind from the surrounding tax district.[28]

Exclusive upper class consumption is reflected in the list of supplies reserved for the new lord at Stegeholm in 1505, corroborated by surviving menu lists from the 1520s.[29] Clearly the castle lord's consumption was much more varied and included such delicacies as whitefish, venison (probably roe deer and hare), udder, tongues, steak, pork cutlet, muffle, goose offal, sausage and wheat. On the other hand, some items on the list, such as perch and bream, were easily caught by commoners, while whiting and other saltwater fish were probably part of the normal diet of coastal fishing communities. It also appears that supposedly sophisticated foodstuffs, for instance tongue, sausage, udder, fresh beef and goose, were consumed both by castle lords and by personnel in official institutions, but only on festive occasions.[30]

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[25] RA Sturearkivet nos. 253, 573, 611, 700, 1006, 1153, 1170, 1379, 1399, 1768, 1808; BSH 5 nos. 333, 379; FMU 6 nos. 5116, 5200, 5244; Sjödin (1937), pp. 187f, 288, 341; Hansson (1993), p. 80.
[26] RA Sturearkivet no. 253, *Diplomatarium Norvegicum*, Vol. 22 (1990) no. 82.
[27] RA Sturearkivet 11 September 1505, no. 48; BSH 4 nos. 226, 191; BSH 5 no. 191.
[28] *Handl. rör. Skand. hist.*, vol 18 (1833), p. 181ff; Retsö (2009), p 396ff; Hammarström (1956), p. 25.
[29] Hildebrand (1898-1903), p. 473ff.
[30] See Hildebrand (1898-1903), p. 473. The same is true of noble estates later in the 16th century; see Ferm (1990), p. 210f.

Items that undoubtedly belonged to upper-class consumption include fine beverages, spices and exotic fruits. Wine was a prerogative of the higher classes, and contemporary documents mention various qualities, among them claret, rumeny, Malvasia, and still others imported from France and the Rhine valley.[31] Mead, liquor, and fruit wines such as must and wine must were upper-class alcoholic beverages.[32] Similarly, foodstuffs such as roe deer meat, cheese, ling and eggs are only mentioned in connection with the upper classes.[33] The same goes for fruits, onions, honey and other foodstuffs rich in vitamin C. But many vegetables, such as onions and cabbages, and animal products like eggs and milk presumably were easily acquired in the vicinity and commonly consumed without leaving any trace in the sources.[34] In the Stegeholm list we find a number of live animals, including 30 cows as well as steers, sheep, goats, calves and pigs.[35]

Although exotic spices and other expensive items were consumed almost exclusively by the upper nobility, perhaps only by the rulers and their families, they probably did not form part of their regular diet in the early 16th century, but were consumed only in very small quantities and only on special occasions. For example, in December 1502 high-priced imported items such as sugar, pepper, saffron, raisins, ginger, cloves and mace were purchased in Stockholm for the lord high constable, Svante Nilsson, in the amount of 20 marks, a remarkably modest sum for such expensive goods, sug-

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[31] RA Sturearkivet nos. 255b, 253, 502, 1006, 1039, 1139, 1153, 1767; BSH 4 no. 203; BSH 5 no. 333; Sjödin (1937), p. 298.
[32] RA Sturearkivet nos. 245, 253, 291, 302, 700, 760b, 1052, 1153, 1259, 1417, 1767, 1770, Suppl 7; BSH 5 nos. 117, 287; FMU 6 no. 5291.
[33] RA Sturearkivet nos. 1076, 502; BSH 4 no. 177; FMU 6 no. 5041; Hansson (1993), p. 80.
[34] RA Sturearkivet nos. 502, 1012, 1076, 1426 (Supplement 6), 1765, 1799, Supplement 7. See also Dyer (1988), pp. 31, 37, and Ferm (1990), p. 87, on rents in kind at noble estates. The relatively large amount of vinegar in a Danish list of provisions for castle personnel from around 1500 may reflect its use as preservative, e. g. for pickled vegetables. See Galster (1944), p. 206.
[35] *Handl. rör. Skand. hist.*, vol 19 (1834), p. 167f.

gesting that the quantities were small indeed. The date 18 December also suggests that the dainties were intended for the private Christmas table of Svante Nilsson and his family.[36] On three other occasions he received shipments of claret wine, cinnamon, walnuts, raisins, almonds, mace and apples in the month of December.[37] Shortly after New Year 1501, small quantities of pepper, saffron and calamus were sent to him, and in September 1508 apples, pepper, ginger and almonds.[38] Vegetable oil used in bread and with fish, especially during Lent, is another item belonging to this category.[39]

Some of these luxury goods clearly reflect the living standard of the upper class and its globalized nature at a relatively early date for Sweden, as does the mention of silk and other fine fabrics.[40] Yet, it would be a mistake to regard them as signs of an incipient Renaissance extravagance. No doubt certain prestigious materials for clothing, like pine marten, stoat, lynx, fox and squirrel furs,[41] had been in rather exclusive use by the Scandinavian upper classes for centuries. Furthermore, we should probably interpret the occasional mention of oats both as a tax item in kind and as part of the provisions of castles as indicating a traditional fodder for the horses of the nobility.[42] But a list of belongings of Svante Nilsson, probably on the occasion of his appointment as national director, shows a rather modest, not to say frugal, standard of living. It includes towels (of which one made of silk), tin plates, wooden plates, tin jugs, squirrel furs and an unspecified number of 'golden fleece' blankets, silk canopy bed cur-

[36] RA Sturearkivet no. 291. See also FMU 6 no. 5295 on Christmas 1507. For example, the price of raisins at the time was 12 öre or 1½ mark per pound, equivalent to 42.6 grams of silver per kilogram. RA Sturearkivet no. 302; Edvinsson et al. (2010), p. 112.
[37] RA Sturearkivet nos. 760b, 302, 700. Almonds were also on the table of the bishop of Turku (Åbo) in Finland, FMU 6 no. 4940.
[38] RA Sturearkivet nos. 245, 1006b.
[39] RA Sturearkivet no. 253; Hildebrand (1898-1903), p. 476f.
[40] RA Sturearkivet nos. 268, 926, 1052; BSH 5 no. 333; FMU 6 no. 4940; Hansson (1993), p. 87. Cf McCants (2007); Heckscher (1935), pp. 42, 99.
[41] RA Sturearkivet no. 1380; BSH 4 no. 226; FMU 6 nos. 5019, 5099, 5116, 5200.
[42] RA Sturearkivet nos. 300, 478, 927; FMU 7 no. 5694.

tains, leather bedsheets, bed and chair pillows, wall textiles and floor furs, all contained in a total of eleven chests.[43] The number of eating plates shown (31) gives an idea of the size of his entourage of servants and squires. All in all, while the list certainly depicts the quite voluminous movable property of one of the highest officials in late medieval Sweden, it cannot be said to signal the opulence of a Renaissance prince. The same relative modesty of living standards even among the higher nobility has been pointed out for late 16th century Sweden and other parts of Europe, at least England.[44]

The castles: Food quantities

Calculating amounts and energy values of food consumption in the past inevitably involves estimations and great uncertainties. In using food consumption as a proxy for living standards in the Middle Ages, a major problem is to obtain a picture of per capita consumption. Although we have data on the amounts of food consumed at the castles, precise figures on the number of persons – the size of the crews – are often lacking. Usually, the number is not given, and even the regent himself was not always aware of how many people he had to provision.[45]

According to a report from a military commander during the siege of the Kalmar castle in October 1507, the besieging troops were calculated to consume one last (1,440 liters) of beer per day; another report states that as much as 14 lasts (20,160 liters) were consumed during Christmas, implying daily consumption of approximately the same amount if Christmas is counted as stretching from December 25 to January 6 (Epiphany).[46] The exact number of besiegers at the time the report was drawn up is unknown, but even the highest

[43] RA Sturearkivet no. 926. A similar list, but far more modest and limited to textiles, is found in the Stegeholm inventory, *Handl. rör. Skand. hist.*, vol. 19 (1834), p. 167.
[44] Ferm (1990), pp. 275, 310, 314, 360; Dyer (1989a), p. 91.
[45] See e. g. RA Sturearkivet no. 51; BSH 5 no. 95. For similar source problems, see Dyer (1988), p. 24f.
[46] RA Sturearkivet no. 878; BSH 5 no. 177.

known number – 200 soldiers (in August 1508) – would imply per capita consumption of as much as 7 liters of beer per day.[47] This figure, well above the already high figure of 2.6 liters that Forssell and Heckscher asserted was typical of the 16th century, is physiologically impossible, so the reports either overstate daily consumption or understate the number of soldiers.[48] Nevertheless, even if we cannot accept the figure at face value, it would appear to be in accord with the relatively high level of beer consumption found in previous research on the late Middle Ages.[49] It is also clear from other sources that beer was considered as much a sort of liquid bread, i.e. a substantial part of total carbohydrate intake, as a beverage. For example, beer represented between half and two-thirds of the value of foodstuffs consumed by Danish soldiers around 1500.[50]

A basis for assessing the information in Swedish sources is given by a Danish document containing a normative computation of the total annual foodstuff requirements for 100 persons, presumably a castle crew in Copenhagen around the year 1500 (Table 1).

Table 1
Food allowances per man-year and man-day, Denmark ca. 1500

Category	Weight, total, kilograms	Nutritional value, kcal, total	Nutritional value, kcal, percentage of total	Amount per man-year, kilograms	Amount per man-day, grams	Nutritional value, kcal per man-day
Grains, Flour	22,430	60,897,450	35	224.3	614.5	1,668
Malt	37,184	43,505,280	25	371.8	1018.6	1,192
Meat, Dairy	24,805	51,908,445	30	248.0	679.4	1,422
Fish	21,823	13,464,581	8	218.2	597,8	369
Other	16,856	3,007,152	2	168.6	461.9	82
Total	**123,098**	**172,782,908**	**100**	**1230.9**	**3,372.2**	**4,733**

Source: Galster (1944) p. 206. Percentages are rounded. For details, see Appendix 1, Table 1.

[47] BSH 5 no. 220. At other times, the number of besieging troops, excluding mercenary soldiers, is put at between 20 and 120, and the number of persons inside the besieged castle at around a hundred; RA Sturearkivet no. 1113; BSH 5 nos. 265, 266, 268.
[48] Forssell (1884), p. 121; Heckscher (1935), p. 96. See Utterström (1978), p. 131ff; Morell (1987), p. 101. See also Heckscher (1963), p. 21. For measures, weights and money values, see Appendix 2.
[49] Dyer (1986); Söderberg (2015).
[50] Galster (1944), pp. 102-105. See also Utterström (1978), pp. 158-161.

These figures are probably quite reliable for the actual intake per person, since they are explicitly calculated for 100 individuals during one year.[51] Furthermore, taken as norms they still reflect a nutritional standard that, if not attained, was at least considered possible or desirable.[52] The calorie intake of 4,733, almost one-third of which from animal products, is well above the expected daily calorie requirement for an adult person and higher than the 3,600 kcal at Stegeborg in Sweden 1487-1492,[53] but if the amount of malt is recalculated as brewed plain beer, daily calories per capita fall to 3,740.[54] This still exceeds the upper range per capita estimated for medieval England (2,300 kcal), but is far below the controversial figure of 6,015 calories per capita estimated by Heckscher for the latter half of the 16th century, as well as the revised figure of 5,061 calories.[55] The quantities of meat and beer per capita (see Appendix 1, Table 1) also exceed the levels of both late medieval and early modern Europe.[56] Furthermore, if the amount of hops is seen in relation to that of malt, the beer consumed in Denmark at the time seems to have been of a somewhat higher quality than the plain beer consumed at Stegeborg 1487-1492, with about 100 more grams of hops per hectoliter of beer.[57]

The Stockholm and Stegeholm inventories

The inventories from Stockholm and Stegeholm provide the following picture (for details, see Appendix 1, Tables 2 and 3).

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[51] Cf. for example Dyer (1988), p. 26.
[52] Cf. Utterström (1957), p. 355 note 504. See the discussion on similar matters in Morell (1987), p. 76ff.
[53] Söderberg (2015), p. 3.
[54] Calculation based on Morell (1989), p. 333.
[55] Campbell et al. (1993), p. 32; Heckscher (1935), App. III, p. 8ff; Morell (1987).
[56] Abel (1980), p. 264f; Dyer (1986), p. 35f; Myrdal and Söderberg (2002), p. 198; Pihl (2012), p. 180.
[57] See Söderberg (2015), p. 7.

TABLE 2
Stocks of foodstuffs at the Stockholm castle in September 1505 and the Stegeholm castle in January 1506: nutritional and monetary values (silver price in grams)

Place and year		Grains, bread	Beer, malt, mead	Meat, dairy	Fish	Other	Total
Stockholm 1505	Kcal	146,186,992	53,787,552	54,391,548	9,912,122	0	264,278,214
	% of kcal	55	20	20	4	0	100
	total price, marks	642	705	885	570	104	2,906
	total price, silver	9,245	10,152	12,744	8,208	1,498	41,847
	% of price	22	24	30	20	4	100
Stegeholm 1506	Kcal	98,126,405	35,973,758	21,298,208	3,935,534	0	159,333,905
	% of kcal	62	22	14	2	0	100
	total price	507	320	339	90	231	1,487
	total price, silver	7,048	4,448	4,712	1,251	3,211	20,670
	% of price	34	22	23	6	16	100

Sources: RA Sturearkivet 11 September 1505; *Handl. rör. Skand. hist.*, vol. 19 (1834), pp. 165-168. Percentages are rounded. For details, see Appendix 1, Tables 2 and 3. Prices are from unpublished database.

A preliminary analysis of the two inventories brings to light slight qualitative and quantitative differences. The proportion of meat and dairy products is somewhat greater at Stockholm and the proportion of grains is greater at Stegeholm, which is to be expected in view of the centrality of Stockholm in the realm, while that of beer (including malt and mead) is about the same at both castles. However, these findings need to be considered in the light of certain circumstances.

First, the lists are snapshots of the supply situation at a given moment, so we cannot be sure whether they photograph a situation of normality, abundance or shortage. For example, in the case of castles given as fiefs, like Stegeholm, we know that supplies sometimes might simply be stolen by the outgoing fief-holder, and in the case of Crown-administered castles, like Stockholm, it was not unusual for shortages to be due to sloppy administration on the part of the outgoing bailiff.[58] In both cases, an inventory list would not capture

[58] See, for example, *Handl. rör. Skand. hist.*, vol 19 (1834), p. 81ff; RA Sturearkivet 979.

the total food stocks. In fact, we have corroborating evidence that at least some of the Stockholm figures are too low. A report made in February 1508 by the bailiff at the castle gives a detailed account of quantities of some food items in stock at the time.[59] There was a shortage of "everything", and the quantity of each item is accompanied by the expression "not more than". The bailiff blamed the situation on deficient documentation by the castle scribe and on tax evasion by the peasantry. He specifically asked for more pork, rye, pike, malt and flour, as well as barrels for storage. Compared with the 1505 inventory, some items are indeed found in smaller or equal amounts (oxen, pork, butter, Baltic herring, pike, dried fish, hops and master's beer), but there are larger amounts of cod and salt (4,332 kilograms and 612 kilograms, respectively).[60] A similar report from September 1509 speaks of shortages of oxen, malt and beer, but the beer requirement stated (117,312 liters) widely exceeds the amount mentioned in the 1505 inventory list.[61] Even allowing for some exaggerations by the bailiffs, the quantities of cod, salt and beer in the 1505 Stockholm list are plausibly subject to upward revision based on this additional information.

Second, the 1505 Stockholm list was compiled in the month of September, when the larders presumably were full after harvest and the slaughter of oxen, while the Stegeholm list was compiled in January. Changes to the chief bailiff's post at Stockholm were usually made in the autumn and most documents referring to inventory lists are also dated in the autumn.[62] Consequently, payment of most ordinary taxes also fell due at that time of year, especially for taxes in kind, although some late payments could be made in the early winter, mainly in cash.[63] While some additional foodstuffs such as fish

[59] Sjödin (1937), p. 288.
[60] RA Sturearkivet nos. 979, 573.
[61] RA Sturearkivet 1078.
[62] Retsö (2009), p. 392ff; BSH 5 no. 325; FMU 7 no. 5694.
[63] See, for example, RA Sturearkivet nos. 1381 (early October), 1691 (September); FMU 7 no. 5694 (August-October); FMU 7 no. 5685 (July, September); Sjödin (1937), p. 322 (before 21 December); BSH 5 no. 237 (before Christmas); FMU 7 no. 5360 (mid-January).

and venison could be expected to come in during the year, the quantities involved were probably small. Consumption over the year also varied somewhat in connection with the Catholic calendar, peaking around Christmas and falling to a low during Lent, when meat, eggs and dairy products were not consumed for six weeks. But the large amounts of smoked, salted or brined animal product listed in the inventories reflect the storage economy dictated by long winters in a country like Sweden.

Since the periodization of the agricultural year, i.e. harvest time, coincides with the dating of most inventory lists or documents mentioning them, it is highly likely that the 1505 Stockholm inventory shows the stocks of foodstuffs at or near their maximum, for an entire year until the next harvest, and reflects expected total consumption by the permanent crew at the castle on a yearly basis. For example, the total stated amount of barley, bread and flour is perfectly compatible with the total of grains levied in taxes from the Stockholm tax district according to the 1497 tax register, amounting to an annual 57 lasts (115,710 kilograms).[64] On the other hand, we must bear in mind that the computed average level of consumption concerns persons of differing social status: a personnel list for Stockholm from 1505 or 1506 includes sixteen different occupations ranging from bailiffs and chaplains to stooges (see Appendix 3). We also know that certain items were transmuted into cash and traded for other goods; among the personnel at Stockholm we find a purchasing clerk ("*Sywrdh Bagge inköperen*").[65]

At any rate, these figures are far more plausible than the abovementioned one for beer from Kalmar in October 1507. The total kilocalories in the Stockholm supplies is equivalent to about 4,858 per capita per day if the malt is recalculated as ready beer. Assuming that the number of persons totaled 130 (see Appendix 3), this is well above the daily per capita intake both at other late medieval institutions and as derived from the Danish document discussed earlier,

[64] *Handl. rör. Skand. hist.*, vol 18 (1833), p. 181.
[65] Galster (1944), p. 163. See also Hammarström (1956), pp. 167-188.

but it is perfectly compatible with Heckscher's figures for the late 16th century as revised by Mats Morell (5,061 kilocalories).[66]

Even if we increase the stated amounts for Stegeholm by one-third so as to account for the foodstuffs consumed between September 1505 and January 1506, the total still only comes to between one-half and two-thirds of the amounts at Stockholm (Table 3). This is chiefly because the supply needs at castles varied with the size of personnel, which in turn was a function of the military importance of each castle in the light of its geographical location and position within the political geography of the realm. Stegeholm was militarily and politically peripheral, small and strategically quite unimportant, it was usually administered by a fief-holder, unlike Stockholm.[67] Because of the Stockholm castle's central importance, not only did it have a larger crew, but it often hosted meetings of the council and the lords of the realm, which put additional pressure on its provisions and required it to have a greater variety of foodstuffs and more sophisticated menus. Knight-lords and members of the council were invariably accompanied by squires and servants, sometimes in large numbers. If the limitations on entourages as stipulated by medieval Swedish laws were observed, council meetings entailed extra provisions for several hundreds of persons for a number of days several times a year. In the mid-16th century, a relatively marginal castle like Häme (Tavastehus) in Finland could sometimes host twice as many temporary guests as the number of soldiers and servants in its regular crew.[68]

It is well known that the Stockholm castle often suffered from shortages; indeed, most of what we know about the supplies at Stockholm comes from reports on shortages. Shortages of pike, rye, pork, hops, salt, malt, hay and flour were frequently reported.[69] It is

[66] Söderberg (2015), pp. 3, 9f, 12f; Morell (1987), pp. 69, 102.
[67] *Handl. rör. Skand. hist.*, vol 19 (1834), p. 167; Retsö (2009), pp. 83ff, 205ff, 392ff.
[68] Vilkuna (2001), p. 44. See also Ferm (1990), p. 306.
[69] RA Sturearkivet no. 637; Sjödin (1937), pp. 295f, 271, 288. Shortages of meat, hops, salt, oxen and fish, especially cod, Baltic herring and pike are also reported from other Crown-administered castles, e. g. the Västerås castle, RA Sturearkivet no. 1106; Sjödin (1937), p. 341.

TABLE 3
Estimated stocks of foodstuffs at the Stockholm castle and the Stegeholm castle in September 1505: nutritional and monetary values (silver price in grams)

Place and year		Grains, bread	Beer, malt, mead	Meat, dairy	Fish	Other	Total
Stockholm 1505	Kcal	146,186,992	63,334,944	54,391,548	24,990,380	0	288,903,864
	% of kcal	51	22	19	9	0	100
	total price, marks	642	955	885	667	123	3,272
	total price, silver	9,245	13,752	12,744	9,605	1,771	47,117
	% of price	20	29	27	20	4	100
Stegeholm 1506	Kcal	147,189,608	53,960,637	31,947,312	5,903,301	0	239,000,858
	% of kcal	62	22	14	2	0	100
	total price	760	480	508	135	346	2,229
	total price, silver	10,944	6,912	7,316	1,944	4,982	32,098
	% of price	34	22	23	6	16	100

Sources: RA Sturearkivet 11 September 1505; *Handl. rör. Skand. hist.*, vol. 19 (1834), pp. 165-168. Percentages are rounded. For details, see Appendix 1, Tables 2 and 3. Prices are from unpublished database. The Stegeholm figures are a hypothetical total as at September 1505 based on the inventory of January 1506.

in this context that the astonishingly large requirement of 700-800 oxen stated in 1507 or the normal stores of beer equivalent to 902,000 liters stated in 1508 must be understood.[70] Clearly, these figures do not reflect just the needs of 130 persons but the exceptional demands on food supplies at the kingdom's most important castle. Conversely, since Stegeholm never hosted such meetings, the amounts of foodstuffs in that inventory reflect consumption by the permanent castle crew alone.

Results and discussion

Although some uncertainties remain in our estimates, the two inventory lists from Stockholm 1505 and Stegeholm 1506 can be con-

[70] FMU 6 nos. 5264, 5282; RA Sturearkivet no. 1078; Sjödin (1937), pp. 320, 323f. See also RA Sturearkivet nos. 576, 1008, 1156; BSH 5 no. 306, Odelman and Wiktorsson (1996), no 228.

sidered to give a fairly good picture of food consumption by castle personnel in early 16th century Sweden. Taking into account the omission from the inventories of petty items like hens and eggs, the documented amounts can even be viewed as minimum total quantities. In their revised form, the lists can therefore be taken to represent planned total consumption at the castles on a yearly basis. Among other things, the findings point to a still high proportion of beer, as suggested by Hans Forssell and Eli F. Heckscher.[71] Calculating per capita consumption of beer is complicated because of the nature of the documentary information, but all estimates land at between 2.5 and 2.7 liters per day, comparable with the estimates from Stegeborg 1487-1492 (2.16) and Denmark ca.1500 (2.04), but lower than those for late medieval and early modern England (3.4-4.5 liters per day).[72]

Notwithstanding the difference in total quantities between Stockholm and Stegeholm, it is quite clear that the nutritional standard at this time was still high, particularly in quantitative terms as shown by the amounts of meat and dairy products and beer. Slightly more resources were spent at Stockholm on these foodstuffs. A greater share of resources went for fish at Stockholm than at Stegeholm, while the reverse is true notably in the case of salt and grain products (Table 3). Furthermore, beef accounted for more than 80% of total meat consumption at Stockholm, compared with less than half of that at Stegeholm. Yet, by comparison with Stegeborg some 15 years earlier, the results indicate an increase in the general importance of grains and a decline in the proportion of beer/malt and meat/dairy, although not such a significant one at the important castle of Stockholm (Table 4).

Despite the relatively high proportion of the latter products, the late medieval Swedish trend towards beer at the expense of animal products appears to have been beginning to break.[73]

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[71] See also Söderberg (2015), p. 8.
[72] Dyer (1988), p. 27; Harvey (1977), pp. 64-65.
[73] See Söderberg (2015).

Table 4
Comparison of food consumption at four castles in Sweden in the late Middle Ages: percentages of total price

Place and year	Grains, bread	Beer, malt, mead	Meat, dairy	Fish	Other	Total
Nyköpingshus 1365-67	15	26	52	7	-	100
Stegeborg 1487-92	10	48	30	10	2	100
Stockholm, Sept. 1505	20	29	27	20	4	100
Stegeholm, Jan. 1506	34	22	23	6	16	100

Sources: Söderberg (2015), p. 3; RA Sturearkivet 11 September 1505; *Handl. rör. Skand. hist.*, vol. 19, pp. 165-168. Percentages are rounded. Prices are from unpublished database.

Although the development of the standard of living is a central topic of research on economic history, there is no consensus on how best to measure it. There are relatively few studies on medieval nutritional standards as measured by calorie intake and monetary values. The present paper is meant to be an empirical stepping stone toward broad syntheses in the future and will only put forward a few preliminary and tentative comparative observations.

In monetary value, the share of grains, beer and meat/dairy products in total consumption at the two castles studied here is almost on a par with the consumption pattern in mid-15th century aristocratic English households.[74] Considering the known composition of food consumption, and especially the dramatically rising share of beer in the diet of English harvest workers in the late Middle Ages, the general living standard in Sweden plainly lagged behind that of England, which also explains the relative frugality of the Swedish upper classes. For example, in 1424 harvest workers in Norfolk consumed as many calories per man-day as the castle crews at Stockholm and Stegeholm, and while the share of beer was about the same, that of meat was up to twice as large.[75] At the same time, the

[74] Dyer (1989), p. 56.
[75] Dyer (1989b), p. 25. See also Archer (1991), pp. 191, 194, where the food budget of a late 16th century London pauper is estimated to have included roughly the same proportions of cereals, beer and meat/dairy products.

calorie intake of Swedish castle personnel was high compared with that of early 16th century Polish manor staff, for instance, and it was also of a more sophisticated kind, as the amount of meat was roughly double while the proportion of bread was about the same.[76]

That the overall nutritional standard of Europe, including Sweden, was high becomes readily apparent when we compare it with that of workers in the Middle East in the 14th and 15th centuries. In Syria and Egypt, the average proportions of cereals and meat in monetary terms were about the same as in England and Sweden (ranging from 20% to 42 % and from 32% to 63 %, respectively), but the quantities were dramatically lower. Ashtor (1970) estimates calories per day per capita at between 1,154 and 1,930, close to the subsistence level even allowing for the lower average height and body mass of adults.[77]

Conclusion

This study has shown that nutritional standards among the castle personnel were fairly high in early 16th century Sweden, although exact figures in terms of nutritional and monetary value are beyond reach owing to the nature of the sources. While the variety of foodstuffs was greater for the upper classes and menus were socially differentiated, some basic foodstuffs were common to all. Social differences were still not as pronounced as they would later become. Generally, one gets the impression of a continuation of the relatively high standard of living that had emerged in the wake of the plague of the 14th century. That standard can be described as relative frugality within the upper class and relative prosperity among common castle personnel. The figures fall well in the range of the relatively high nutritional standards between the late Middle Ages and the late 16th century.

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[76] Wyczański (1968), pp. 66f, 70.

[77] Ashtor (1970), p. 10f, 13. Cf. Campbell et al. (1993), p. 32; Fogel (1997), Clark (2007), p. 23. See also Özmucur and Pamuk (2002), p. 306, for somewhat better-off construction workers in Istanbul.

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Appendix 1

Percentages are rounded in all tables.

TABLE 1
Food allowances per man-year and man-day, Denmark ca. 1500

Category	Item	Weight, total, kilo-grams	Nutritional value, kcal, total	Nutritional value, kcal, percentage of total	Nutritional value, kcal per man-day	Amount per man-year, kilograms	Amount per man-day, grams
grains, bread	flour	20,400	55,386,000	32	1,517	204.0	558.9
	grits	2,030	5,511,450	3	151	20.3	55.6
beer, malt	malt	37,184	43,505,280	25	1,192	371.8	1018.6
meat, dairy	pork	6,000	16,728,000	10	458	60.0	164.4
	oxen	13,080	19,672,320	11	539	130.8	358.4
	mutton and lamb	3,000	5,085,000	3	139	30.0	82.2
	butter	2,725	10,423,125	6	286	27.2	74.5
Fish	herring	4,774	6,740,888	4	185	47.7	130.7
	salted fish	9,549	6,273,693	4	172	95.5	261.6
	whiting	7,500	450,000	<1	12	75.0	205.5
Other	peas	2,448	1,321,920	1	36	24.5	67.1
	vinegar	9,024	331,632	<1	9	90.2	247.1
	salt	2,448	0	0	0	24.5	67.1
	mustard	2,256	1,353,600	1	37	22.6	61.9
	hops	680	0	0	0	6.8	18.6
Total	**123,098**	**172,782,90**	**8**	**100**	**4,733**	**1,230.9**	**3,372.2**

Table 2
Inventory list of foodstuffs at the Stockholm castle, September 1505

Category	Item	Weight, total, in kilograms	Nutritional value, total, kcal
Grains, bread	barley	2,030	5,073,970
	master's bread	9,928	26,574,774
	flour	42,187	114,538,248
Beer, malt	master's beer	112,800	20,868,000
	beer	13,536	1,245,312
	malt	27,072	31,674,240
Meat, dairy	oxen, live	21,800	32,781,750
	beef, salted	3,488	5,245,080
	pork	5,272	14,697,018
	butter	5,668	1,667,700
Fish	Baltic herring	10,608	6,969,456
	cod	297	627,732
	pike	2,992	933,504
	eel	88	159,849
	dried fish	15	25,065
	salmon	707	928,200
	Scanian herring	28	38,816
	fish, Bergen	100	167,100
	fish, other	200	62,400
Other	hops	2,543	0
	salt	102	0
Total		**261,461**	**264,278,214**

TABLE 3
Inventory list of foodstuffs at the Stegeholm castle, January 1506

Category	Item	General part		Peder Turesson's part	
		Weight, kilo-grams	Nutritional value, kcal	Weight, kilo-grams	Nutritional value, kcal
Grains, bread	flour	2,482	6,738,630	28,543	77,494,245
	bread	2,482	6,644,314	2,482	6,644,314
	wheat	-	-	111	302,451
	wheat flour	-	-	111	302,451
Beer, malt	malt	4,512	5,279,040	22,560	26,395,200
	[plain] beer	13,645	1,255,340	4,512	415,104
	master's beer	-	-	13,536	2,504,160
	mead	-	-	327	124,914
Meat, dairy	pork	300	836,400	3,736	10,415,968
	beef, smoked	1,000	1,504,000	1,100	1,654,400
	beef, brined	400	601,600	960	1,443,840
	mutton, smoked	100	150,000	750	1,125,000
	mutton, brined	-	-	80	96,000
	venison	-	-	400	420,000
	tongues	-	-	24	31,680
	udder	-	-	30	27,000
	steak	-	-	160	240,640
	pork cutlet	-	-	30	55,350
	muffle	-	-	60	132,720
	offals	-	-	300	291,000
	goose offals	-	-	30	34,440
	sausages	-	-	400	735,200
	tallow	-	-	136	669,120
	butter	218	833,850	-	-
Fish	cod	264	558,360	808	1,708,920
	herring, Scanian	-	-	44	62,128
	herring, smoked	-	-	28	39,536
	Baltic herring	-	-	264	173,448
	eel	-	-	128	230,520
	pike, dried	-	-	196	61,152
	whitefish	-	-	119	812,175
	perch	-	-	136	87,720
	salmon	-	-	116	139,178
	bream	-	-	30	23,175
	blue whiting	-	-	8	4,860
	flounder	-	-	44	31,020
	dried fish, unspecified	-	-	2	3,342
Other	hops	68	0	408	0
	salt	374	0	1,360	0
Total		**25,845**	**24,401,534**	**84,069**	**134,932,371**

Appendix 2 - Measures and weight

In medieval Sweden, larger amounts of grains, malt, flour, bread, butter, beer and fish were measured in lasts (*läster*). One last is calculated here to be equivalent to 2,030 kilograms for grains, 2,256 kilograms for malt, 2,482 kilograms for bread, 1,744 kilograms for butter, 4,512 kilograms for beer and 1,061 kilograms for fish. Smaller amounts of these items were measured in barrels equivalent to 102 kilograms for salt, 88 kilograms for fish and 109 kilograms for butter, or *skeppund*, equivalent to 136 kilograms for fish and pork, taking regional variations in barrel size into account and using the oldest known sizes (Morell (1987), p. 93ff; Morell (1988); Leijonhufvud (2001), pp. 48ff, 267f). Liter-weights have been calculated from Morell (1989), p. 333. The proportion of malt and hops in beer has been adopted from Söderberg (2015), roughly equivalent to the measure used by Dyer (1988), Appendix 1. The weight of the edible parts of animals has been calculated at 109 kilograms for oxen and cows and 5 kilograms for sheep.

Throughout, calorific values have been taken from Almén (1879), Almén (1885), and Morell (1989), pp. 317-56, and have been reduced by 25% to allow for waste, as recommended by Utterström (1978), p. 132 and Morell (1987), p. 92.

Money values are expressed taking into consideration the debasement of the *mark penning*. One mark varied between 15.0 grams of fine silver in 1500 and 12.1 grams in 1520; Edvinsson et al. (2010), p. 112.

Appendix 3 - Calculating the number of persons to be fed at castles

The number of castle personnel differed according to the military status of the castle and the military situation. At the Borgholm castle, under siege for almost a decade, there were at one point 72 soldiers, and when it was conquered it had 133 squires plus the commanders. Likewise, at the besieged Kalmar castle, there were between 100 and 120 soldiers.[78] The approximate size of castle crews can also be surmised from other information, such as the delivery of 60 pairs of shoes and 10 belts to the crew at the Nyköping castle in April 1503 and the number of hand cannons and halberds (11 and 22, respectively) at the Kastelholm castle in June 1504.[79] The holder of the Stegeholm castle claimed in September 1512 that the incomes from the surrounding tax district only made it possible to staff the castle with 10 soldiers.[80] The most informative document is a list, probably from 1505 or 1506, of 130 persons as the permanent roster at the Stockholm castle, including six units of eight soldiers each, scribes, tailors, cooks, blacksmiths, etc.[81] The military personnel at Stockholm thus represented 37 % of the total number of staff. Applying the same proportion to the other castles gives us a total staff of 60 for Nyköping (assuming that clothes were provided to the entire castle[82]), 90 for Kastelholm and 27 for Stegeholm. All of these figures reflect the military and political importance of these castles, and in the case of Stegeholm they accord perfectly with the statement of the fief-holder in September 1512.[83] The figures are also rea-

[78] Wegener (1866-1870), p. 345; BSH 5 no. 330. Hildebrand (1884), p. 818, confuses the castle crew with the entire defense forces of the city of Kalmar; cf. Styffe (1884), p. xxiv.
[79] BSH 4 no. 226; *Handl. rör. Skand. hist.*, vol. 19 (1834), p. 83.
[80] BSH 5 no. 410; *Handl. rör. Skand. hist.*, vol. 18 (1833), p. 192; Retsö (2009), p. 398. See also BSH 5 no. 475.
[81] Galster (1944), p. 161ff. About the dating, see Hammarström (1956), p. 70. In 1521, the military staff at Stockholm amounted to as many as 900 men, but that was in an exceptional political and military situation, Allen (1867), pp. 281-2.
[82] See Bjarne Larsson (2015).
[83] Retsö (2009), pp. 125ff, 313ff, 205ff.

sonable considering what we know about the size of crews later in the 16th century at royal castles, when militarization and the administrative and economic centralization of the realm's resources had increased the importance of the castles, as well as about the number of staff at private noble estates. At Häme castle (Tavastehus) in Finland, in the mid-1500s the permanent crew numbered 100.[84]

[84] Vilkuna (2001), p. 44. The number of persons at a noble estate ranged between 15 and 60; Ferm (1990), pp. 210, 296, 314.