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**THE BAKERY AT KALISZ CASTLE
IN THE YEARS 1343-1537 AGAINST A BACKGROUND
OF OTHER CASTLE AND VILLAGE BAKERIES FROM THE SAME PERIOD**

Making bread from sourdough is one of the oldest biotechnological means of processing food to be eaten by humans. In truth, the process in question has not changed much since it was first applied by people. This is why the baking stove has accompanied man since the invention of bread. At first, the stove was a simple one- or two-chamber structure with the fireplace separated from the baking chamber or the fireplace, placed underneath the baking chamber. In modern times, that is to say, since the nineteenth century, the development of baking technology has consisted in introducing new and new heating materials: from wood, charcoal and coal to electricity and gas energy. The same is true of bread production conditions, which have developed from house production and simple bakeries to commercial mass production technologies, providing bread for the inhabitants of large urban agglomerations. It should also be noted that house and small bakery production has survived. Home-made bread and small bread traders can still compete with the fast growing baking industry. In addition, more and more bread is currently made at local bakeries. What is more, some developed countries, such as France, have revived the technology of charcoal bread production.

An interesting source of knowledge about the history of bread making are surveys of royal castles in the provinces (województwo) of Great Poland and Kujawy from the years 1564-1565¹. There were bakeries at eleven² out of sixteen

castles. Five castles, Kalisz Castle³ included, had no bakeries. A bakery consisted of two rooms: a bakery and a hall; a room and a hall; a kitchen and a hall; a hall and a hall. The stoves were placed in different rooms depending on the castle. They stood in the bakery⁴ proper at six castles; in the hall⁵ at four castles and in one case, in the kitchen⁶.

Castle bakeries were usually built in the courtyard. In the case of two castles, in Wieluń and Inowrocław, the bakery was located in the farmyard. They were separate, detached buildings or part of the farm complex, but they always had a separate entrance. In Wieluń, the bakery was adjacent to the bathhouse and in Łęczyca, it stood next to the kitchen. The bakery at Poznań Castle had a unique location: it was situated on the ground floor of a two-storey building, just above the cellars. On the first floor, there were a number of rooms, accessible by means of a roofed, wooden staircase.

The equipment of only three castle bakeries is mentioned in the survey records. In Międzyrzecz, the facility was equipped with a table and baking vessels⁷; in Pyzdry, there were two tables and two cupboards for storing vessels⁸; in Poznań, there were a special trough used for making dough, a flour pot, a table, baking vessels and a chest used for storing the bread⁹.

The record surveys comprised mainly descriptions of castle buildings. The situation was

¹ *Lustracja województw wielkopolskich i kujawskich 1564-1565 (The Survey of 1564-1565 of the Provinces of Great Poland and Kujawy)*, Part 1, ed. A. Tomczak, Cz. Ohrysko-Włodarska, J. Włodarczyk, Bydgoszcz 1961.

² *Ibidem*, pp. 3-4 (Poznań), 10 (Kościan), 13 (Międzyrzecz), 28 (Wieleń), 36 (Konon), 43 (Pyzdry), 72-73 (Wieluń), 89 (Łęczyca), 101 (Przedecz), 109 (Brześć Kujawski), 117 (Inowrocław).

³ *Ibidem*, pp. 17-20 (Drabim), 31-33 (Kalisz), 54-55 (Sieradz), 65-66 (Bolestawiec), 77-78 (Grabów).

⁴ Brześć, Konin, Łęczyca, Międzyrzecz, Poznań, Pyzdry.

⁵ Inowrocław, Kościan, Wieluń, Wieleń.

⁶ Przedecz.

⁷ *Lustracja...*, p. 13.

⁸ *Ibidem*, p. 43.

⁹ *Ibidem*, pp. 3-4.

different and unique in the case of the castle at Łęczyca, where the buildings were not only listed and described but where their exact measurements were also recorded¹⁰. The source says that the bakery at Łęczyca was 15 and 5/8 ell long, 11 and 7/8 ell wide and 5 and 7/8 ell high. Using the metric system, the bakery was 9.37 m in length, 7.12 m in width, 3.52 m in height. Thus, the building, situated in the courtyard, occupied an area of 66.71 square metres.

The information found in the records quoted above leads to the conclusion that there existed a certain freedom of decision regarding the location of the bakery at a royal castle. Consequently, both the bakeries and their stoves might have varied in size as well. Let us begin by examining the only castle bakery stove the ruins of which had survived to 1987 and which dates back to the period roughly corresponding to the time when the above inventories were made.

During the excavations at Kalisz Castle¹¹, in the southern section of the western wing, where this wing meets the southern wing, in the area bordered by the wall surrounding the gateway on the eastern side, the outer wall of the southern castle wing on the southern side and the outer wall of the castle western wing on the western side, the bottom part of a large bread stove was unearthed (Fig. 1). The stove must have been a dome-shaped structure as heaps of burnt clay were found around it¹².

The bottom of the stove, 3.5 m by 4 m in size, had rounded corners and was covered with seven layers of thin patches of clay. The clay inside the stove was beaten and burnt. Between the layers of clay, there were thin layers of humus with pieces of charcoal and sand. The footprints of a piglet which had run across the wet clay (Fig. 3) had survived in the upper, that is to say, the last, layer of clay. Two rows of vertically protruding burnt sticks, 4 cm in diameter, had survived around the stove. Thus the stove dome would have been made of clay and supported by the stick structure. On the northern side,

it would have been additionally strengthened by stones and bricks. The stove was built directly on a sand mound without any brick foundation. It should also be noted that the stove was the first and the only structure built in the corner of the room in question (Fig. 2). It took up the entire room, which was separated from the other section of the western wing by a wooden wall. The room was about 70 square metres big, 7 metres wide and 10 metres in length. As the bakery at Łęczyca was 66.71 square metres in area, both the bakeries were similar in size.

The bottom of the stove was about 14 square metres in area, that is to say, it took up about 1/5 of the room. The remaining part of the room could have been some sort of utility room with the equipment needed to make dough and store the bread made at the bakery.

A storehouse and granary complex, about 23 metres in length, might have been adjacent to the bakery on the northern side. Inside the buildings, four layers of burnt wood, lying one above another, were discovered during the excavations and interpreted as burnt timber ceilings. They were found directly on a sand mound dating back to the time of the castle's construction. The burnt remains were dated to the year 1537, when Kalisz Castle was completely destroyed by fire. Only the outer walls of the wings remained undamaged. In the western wing, the remnants of the two uppermost storeys fell on the bakery floor and the stove. Thus, one can assume that the bakery with the dome stove situated at Kalisz Castle was a two-storey building, about 7 metres in height. There were probably two upper floors of the neighbouring granary above it. Both the bakery and the granary were built directly on a mound dating back to the time of the castle's construction and they were both destroyed by the fire of 1537.

The castle is known to have been erected by King Casimir the Great. Its construction was completed in 1343¹³. Therefore, one can assume that the dome bread stove situated in the south-western corner of the castle was built just before 1343 and was in Use for about 200 years. Its bottom was covered with fresh clay seven times, that is to say, it was renovated every 28 years on average. This corresponds to the situation at the castle in

¹⁰ *Zamki środkowopolskie (Castles of Central Poland)*, Part I, ed. T. Poklewski, Łódź 1977, pp. 81-83.

¹¹ The excavations of 1981-1987 were conducted by the Department of Central Poland of the Institute of the History of Material Culture, Polish Academy of Sciences, headed by Tadeusz Poklewski; The documentation in the archive of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences, Branch in Łódź.

¹² T. Poklewski-Kozieł, *Średniowieczne zamki między Prosną a Pilicą (Medieval Castles between the Proсна and Pilica Rivers)*, Łódź 1992, pp. 32-33.

¹³ T. Poklewski-Kozieł, *Rubież Proсна i Baryczy 1333-1401. Fortyfikacje stałe. (The Proсна and Barycz Border in 1333-1401. The Permanent Fortifications.)*, Łódź 1994, pp. 44-47.; by the same author, *La résidence royale à Kalisz en Pologne (XIV-XV siècles)*, "Château Gaillard", Vol. 20, 2002, pp. 201-205.

Bolesławiec-on-Prosna, where, according to our previous calculations, the tile stoves were used for a similar period of time and broke in the twenty-fifth or the thirtieth year of use. This hypothesis regarding the length of time a particular layer of clay lasted is supported by the chronology of the bread stove from Kalisz Castle¹⁴.

According to the inventories, in the single-storey, 3.5 m high, bakery at Łęczycza, there was a large tile stove¹⁵ while the two-storey, 7 metres high, bakery at Kalisz Castle had a large dome stove. Consequently, one may assume that the height of a bakery depended on the technical parameters of its stove.

The location of the bakery at Kalisz Castle, inside a wing, is not exceptional as a similar location is mentioned in the survey record of Poznań Castle¹⁶.

The state of preservation of the stove remains at Kalisz Castle makes it possible for the researcher to find out about its construction and function. Information of this sort cannot be obtained through observation of stoves which have survived up to our times. Any retrogressive procedure would involve at least partial destruction of the structure.

As was stated above, no bakery was mentioned in the survey summary of 1564 of Kalisz Castle, because the surveyors did not see it¹⁷. During the excavations, the archaeologists found out that it had been completely covered by fire debris at that time.

Regrettably, Polish archaeological sources offer no information about any other castle bread stoves the remains of which have been subject to examination regarding their form and the technology used. Thus, no Polish analogues are quoted here. However, two well examined French stoves, namely the stoves at Petit Koenigsburg, Alsace¹⁸, and at the village of Montmayeur, Savoie¹⁹, can serve as comparative examples here.

The castle at Petit Koenigsburg was built in the Vosges Mountains in the middle of the eighteenth century. Originally, it was at least a two-storey donjon surrounded by a defensive wall, which was partly adjacent to the tower and formed a small courtyard. The second stage in the development of the fortress is connected with the year 1318, when the Bishop of Strasbourg's right to the castle, to its fief and land was confirmed. It was then that the castle was enlarged. A storey was added to the donjon and a single-storey castle house appeared, which had a reinforced defensive wall on the eastern side. A couple of farm buildings were erected next to the donjon and the defensive wall. A kitchen with a kitchen stove and a stone bread stove, most probably covered with a stone dome, was located on the ground floor of the castle house (Fig. 4). The bread stove stood directly on the kitchen's dirt floor. It was renovated only once and subsequently raised about 60 cm above the stone slabs level of the kitchen floor. In addition, the side walls were removed and the stove was enlarged. All three fireplaces were paved with flat stone slabs (Fig. 6).

At the third stage of its development the castle became a residence. The fortress was most probably rebuilt about 1420. Among other things, the yard was divided into two parts: the official courtyard and the farmyard. The castle house was also rebuilt and above all wide windows were added in the southern façade. The old bread stove was replaced by a bigger facility. A large brick dome supported by two outer walls of the old stove appeared. The bottom of the stove was covered with small river pebbles and a layer of clay. The fireplace was covered with two layers of clay, using a similar technique. The renovated stove was bigger, about 3.5 metres in diameter. It was 12 square metres in area and took up 1/3 of the kitchen, which was 37 square metres large (Fig. 5).

The third stage of the castle's development lasted to the year 1462, when the fortress was destroyed during the expedition of the government and local government forces of Alsace against the robber knights living at Haut Koenigsburg Castle. Bearing in mind the character of the castle, we can assume that the stove was used to supply the needs of the owner's family and their few servants for about forty years. This seems to support our hypothesis about the stove in Kalisz stating that a facility of this type had to be renovated approximately every thirty years²⁰.

¹⁴ M. Żemigala, *Ogrzewanie piecowe na zamku w Bolesławcu nad Prosną XIV-XVII w. (Stove Heating at the Castle in Bolesławiec-on-Prosna in the Fourteenth-Seventeenth Centuries)*, Wrocław-Warszawa-Kraków-Gdańsk-Łódź 1987, pp. 70-73.

¹⁵ *Lustracja...*, p. 89.

¹⁶ *Ibidem*, pp. 3-4.

¹⁷ *Ibidem*, pp. 31-33.

¹⁸ Ch.-L. S a l c h, *Nouveau dictionnaire des Châteaux forts d'Alsace*, Strasbourg 1991, pp. 178-181.

¹⁹ J.-M. P o i s s o n, *Montmayeur (Les toures de Montmayeur, Villard-Sallet, Savoie). Château et bourg castral (XII^e-XVII^e s.)*; Fouille programmée 1995, compte-rendu d'opération, Lyon 1995 (tapescript). I would like to thank Mr J.-M. Poisson for allowing me to use his unpublished discoveries.

²⁰ T. P o k l e w s k i - K o z i e ł ł, *Le Château du Petit*

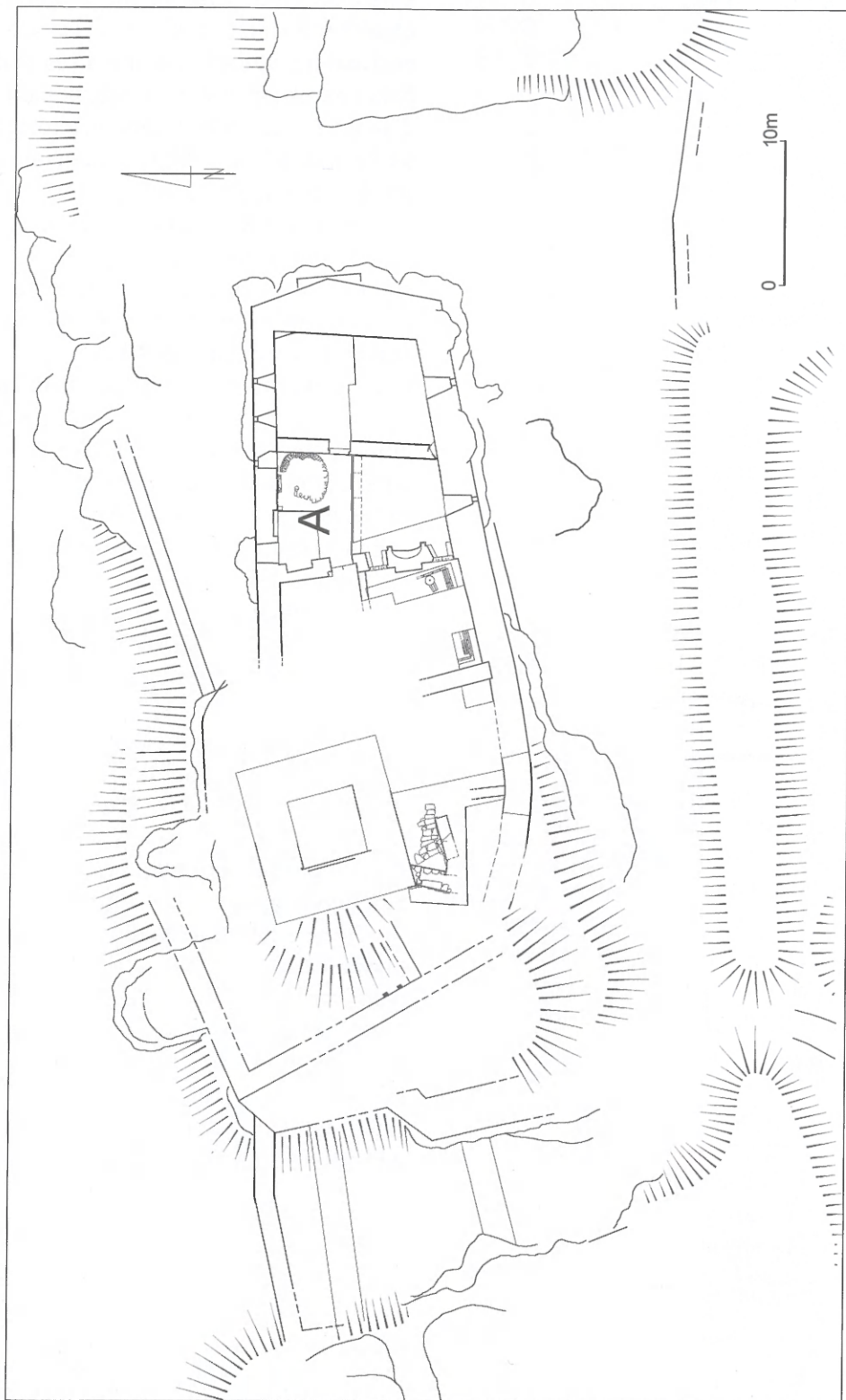


Fig. 4. Petit Koenigsbourg, Alsace, the castle. Plan of the castle: A – baking stove in the kitchen. Drawing by E. Wtorkiewicz-Marosik.

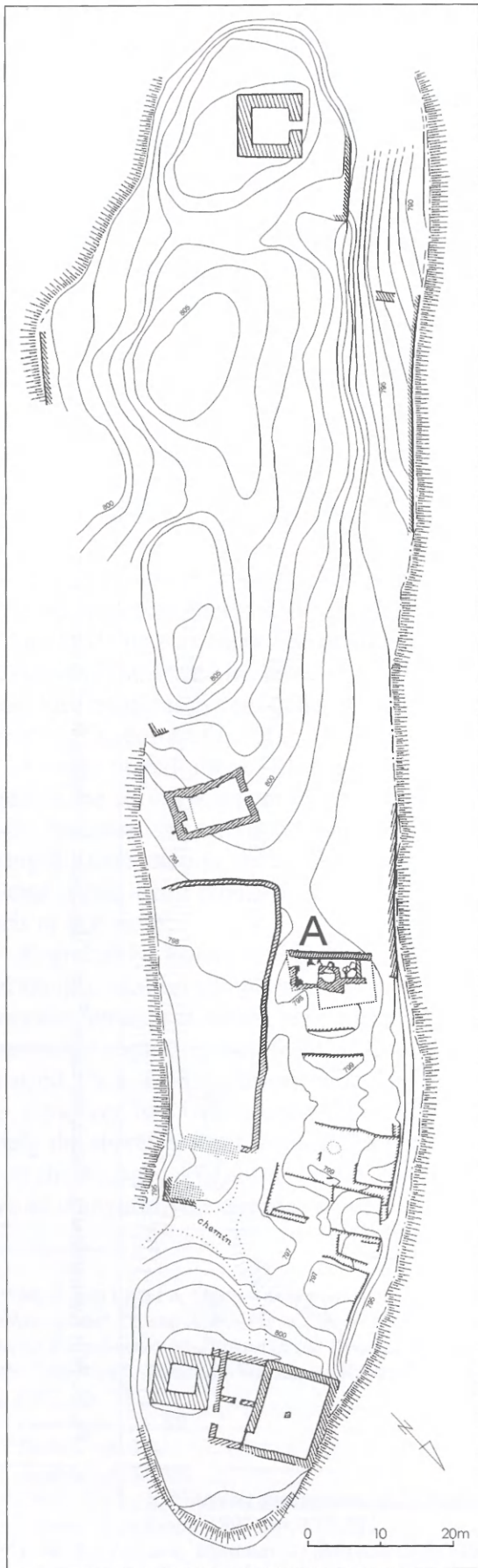


Fig. 7. Montmayer, Savoie, the village. Plan of the village: A – bakery building with the baking stove. Documentation after Jean-Michel Poisson. Graphic design by E. Wtorkiewicz-Marosik.

The most recent find is the bread stove excavated by Jean Michel Poisson in Montmayer, Savoie²¹. The village of Montmayer consisted of three basic parts: the castle with farm buildings situated at one end of the mountain ridge, the church with the priest's house standing at the other end and about ten peasant houses, with a common bakery situated in the middle, lying below (Fig. 7). Thanks to the archaeological excavations we can assume that the village came into existence at the end of the thirteenth century and was finally abandoned during the sixteenth century. In the bakery building, a round, dome-shaped bread stove was unearthed (Fig. 8). Although it is not a direct analogue of the aforementioned castle stoves from Poland and France, it was built and used in the fourteenth, fifteenth and the beginning of the sixteenth centuries and thus it is undoubtedly contemporary to those stoves. Its technical parameters and function are also identical to those of the above mentioned structures. This is why it can be considered a well justified analogue of the Polish and French baking facilities discussed in the present paper.

The bakery building at Montmayer is 66 square metres in area and it consists of two rooms (Fig. 9). The stove is situated in the smaller room. Its outer walls are about 2.5 metres in diameter while its inside is slightly smaller. It is 6.25 square metres in area, which corresponds to 1/10 of the total area of the two rooms of the bakery (Fig. 10). Thus it is relatively smaller than the stoves at Petit Koenigsbourg and at Kalisz Castle.

The spatial arrangements of the aforementioned castle bakeries in Poland and in France as well as of the town bakery at Montmayer seem to suggest that those bakeries did not differ much from modern, local bakeries in respect of their functional arrangement. A bakery operates as follows: The first section of the building is the place where the dough is prepared and the loaves made. This function is best illustrated by the survey of

Koenigsbourg, du logis à la résidence, XIII^e-XV^e siècles, [in:] *La vie de château. Actes du colloque "Architecture, fonctions et représentations de châteaux et des palais du Moyen-Âge à nos jours", des 13-15 mai 1996*, F.-X. Cuche dir., Strasbourg 1998, pp. 102-104; The excavations of 1991-1993 managed by Tadeusz Poklewski. The material at Centre d'Archéologie Médiévale, Strasbourg and at the Institute of Archaeology and Ethnology of the Polish Academy of Sciences, Branch in Łódź.

²¹ Cf.: note 18.

1565 made at Poznań Castle²². The second section is the baking stove, where the bread is baked. The examples of the castles at Kalisz and Łęczyca suggest that in the fourteenth, the fifteenth and the sixteenth centuries, at Polish royal castles, the baking section and the preparation section were in the proportion 1:4. In a bakery, there seems to have worked one man, called a *pistor* in the account of an incident of December 1282 found in the chronicle by Jan of Czarnków²³. In the case of the “family” castle at Petit Koenigsbourg the baking stove and the kitchen itself were in the proportion 2:5 while in the village bakery at Montmayeur, the preparation space, which must have served the whole village and must have been divided into separate, family working sections, was much larger than the area of the stove and the two parts of the bakery were in the proportion 10:1.

The results of Polish research into the structure of the fourteenth-sixteenth century staple diet, the amount of food eaten in a day by a contemporary person and the calorie structure of their daily diet suggest that bread or, generally speaking, any type of food made from cereal flour was an important ingredient of a daily food ration and that it constituted more than 1/3 of its calorie structure²⁴. This is why the baking stove should be considered one of the most important food production facilities. The stove was so important that it was usually situated in the very centre of a royal or a nobleman’s abode despite the threat of fire. The loaves of bread baked in present-day, local bakeries in Poland usually weigh 400 g, 600 g or 800g, which roughly corresponds to the traditional loaves weighing one pound, one and a half pounds or two pounds. Given a round loaf of bread about 25 cm in diameter, weighing 800 g, that is, 2 lbs, we come to the conclusion that the stove at Kalisz Castle could hold 150 such loaves at one time. The castle stove at Petit Koenigsbourg might have had a similar batch capacity and the stove at the village bakery at Montmayeur probably held about

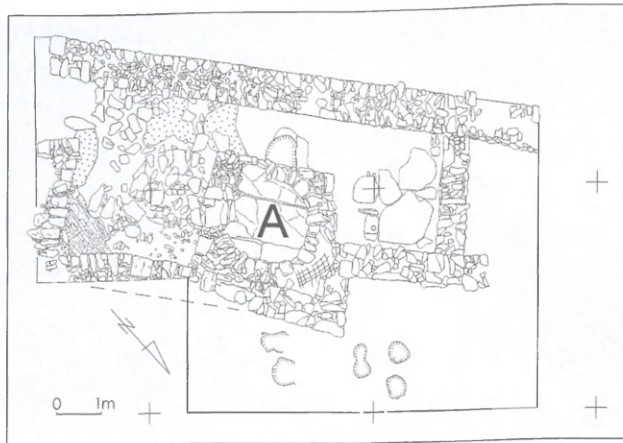


Fig. 8. Montmayeur, Savoie, the village. Common village bakery: A – baking stove. Documentation after Jean-Michel Poisson. Graphic design by E. Wtorkiewicz-Marosik.

a hundred such loaves of bread.

Let us therefore try and find out to what extent and within what time span the baking stoves discussed above could supply their user’s needs in respect of bread production. Research into food consumption in Poland in the period in question shows that an adult needed about 800 g, that is, two pounds of rye bread a day. This corresponds to 1600 calories, which is enough to supply a contemporary person’s daily needs in respect of flour and cereal. However, their daily diet was complemented by other grain products, particularly cereals. If we compare this daily ration of a bread loaf weighing two pounds to the capacity of a baking stove, it becomes clear that each of the castle stoves could provide a maximum of 150 bread rations at one time and that the village stove could provide a hundred rations per batch.

Unfortunately, the survey of Kalisz Castle from 1564-1565 shows a ruin and provides no information about the users of the castle kitchen and bakery. Let us consider the data found in the same survey record in its part concerning the castle at Łęczyca²⁵, where there sat up to twenty-six persons at table each day. Thus, if the bakery at Łęczyca Castle, which was similar in size to that at Kalisz Castle and had a similar capacity, could yield a maximum of 150 loaves of bread, the amount of bread produced in a day lasted for five days. Consequently, we can assume that a castle baker worked every fifth day making bread as it took him about sixteen hours to prepare the

²² *Lustracja...*, pp. 3-4.

²³ Jan of Czarnków, *Kronika (The Chronicle)*, ed. J. Szlachetowski, [in:] *Monumenta Poloniae Historica*, Vol. 2, ed. A. Bielowski, Lwów 1872, pp. 724-725.

²⁴ *Historia Kultury Materialnej Polski (A History of the Material Culture of Poland)*, Vol. III, ed. A. Keckowa, D. Molenda, Wrocław-Warszawa-Kraków-Gdańsk 1978, 309-310 [after A. Wyczański, *Studia nad konsumpcją żywności w Polsce w XVI i pierwszej połowie XVII w. (Studies in Food Consumption in Poland in the Sixteenth and the First Half of the Seventeenth Centuries)*, Warszawa 1969.

²⁵ *Lustracja...*, p. 89.



Fig. 9. Montmayeur, Savoie, the village. Bakery room with the baking stove. Documentation after Jean-Michel Poisson.



Fig. 10. Montmayeur, Savoie, the village. Baking stove. Top view. Documentation after Jean-Michel Poisson.

dough, wait for it to prove and bake the bread. This hypothesis seems to be supported by the fact that a chest for storing bread was found in the bakery at Poznań Castle. This bread production cycle does not rule out the possibility that baking stoves at castles were also used for baking rolls and cakes, mentioned in written records, as well as for preparing meat on other days of the week.

The situation at Montmayeur was different. The village stove had a much smaller capacity than its castle counterparts but the preparation section of the bakery was larger. What is more the village stove had many users, which required some sort of timetable. It should also be assumed that a bread ration was smaller in the case of a family than in the case of a castle inhabitant. The preparation space was most probably permanently divided between individual users, who kept their equipment there. If we assume that the average peasant family needed five loaves of bread weighing two pounds each daily, the bread baked in a day lasted for twenty days. Excavations seem to suggest that there were usually about ten houses in a village. In addition, there was the lord and his men from the castle, who may have used the village stove as well, and undoubtedly the parish priest and his men had their bread baked there too. Therefore, we can assume that in Montmayeur, the stove was used in ten-day rotation: by two peasant families at the same time and by the lord or the parish priest on their own. If this was the case, bread was baked in the stove every day. In a cycle like that, the stove was not used on Sundays, the senior used it twice a week, the parish priest could make bread once a week and the peasant families had access to the facility in pairs on the remaining days.

Looking at the map of Montmayeur, one is struck by the central and prominent location of

the bakery. The above evaluation of the nutritional value of bread in the fourteenth, fifteenth and sixteenth centuries and our attempt to reconstruct the working cycle of castle and village bakeries lead to the conclusion that the facility must have occupied a central position within a contemporary settlement. As a general rule each castle had a series of architectural and functional features and the bakery must have been an important and noticeable place. Contemporary castle inventories support this assumption. Similarly, in Montmayeur, the bakery was the third most dominant building in the topography of the village. We can quote yet another French example here. In the second half of the fourteenth century, in the village of Dracy, Burgundy, the baking stove was the only communal facility. Most probably it was a bakery similar to the place functioning at Montmayeur. In the survey record, the position of particular peasant houses is described using this facility as a central point. In the village there was no other prominent and dominant structure.

Finally, the great importance of cereal and grain products in food consumption in the period in question should be stressed. This phenomenon is noticed by archaeologists, particularly during excavations conducted at castles in Poland. In fact, every single castle was equipped with a granary and a bakery. There was usually a *molendium farinale* in the vicinity. Therefore, the grain storage and corn processing cycle seems to have been directly connected with the castle itself and not with the nearby castle farm. This assumption proves justified as grain could easily be stored for a long time and was a more convenient food reserve than meat, dairy produce and many vegetables.

Translated by Zuzanna Poklewska-Parra



Fig. 2. Kalisz, Great Poland. S-N cross section of the room with the baking stove: A – southern wall of the castle; B – fireplace of the stove; C – remains of the stove. Drawing by E. Wtorkiewicz-Marosik.

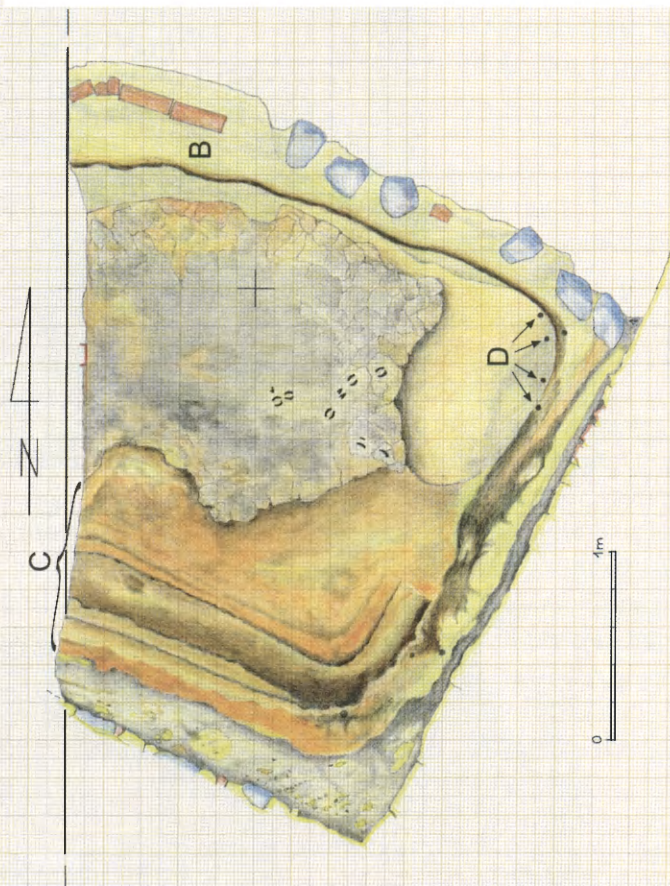


Fig. 3. Kalisz, Great Poland, the castle. Baking stove and its structural elements: B – Remains of the dome made from brick, clay and stone; C – Seven successive phases of the fireplace with the footprints of a piglet in the surface layer; D – Burnt sticks from the dome structure. Drawing by E. Wtorkiewicz-Marosik.



Fig. 5. Petit Koenigsbourg, Alsace, the castle. Kitchen with the baking stove. Western view. *Photo by the author.*



Fig. 6. Petit Koenigsbourg, Alsace, the castle. Baking stove and its two phases visible in cross section: the older stone and the later clay stages. *Photo by the author.*