

## POLISH STUDIES OF IMPRESSED BUILDING CERAMICS FROM NOVAE

AN ATTEMPT TO DETERMINE THE CHRONOLOGY  
OF OCCURRENCE OF THE 1<sup>ST</sup> ITALIAN LEGION STAMPS

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The remnants of the ruins of Novae are to be found in northern Bulgaria, ca. four kilometres east of the town of Svištov (СВИЦОВ).<sup>1</sup> They are located on a high bank, in a place where the Danube reaches the southernmost limit of its course.<sup>2</sup> In the Antiquity, a convenient crossing existed here, and Romans recognized its strategic assets.<sup>3</sup> In order to secure the frontiers against belligerent tribes from the north, a military camp was erected there in the middle of the 40s of the 1<sup>st</sup> century AD, where the 8<sup>th</sup> Augustan legion was initially stationed,<sup>4</sup> to be replaced by the 1<sup>st</sup> Italian legion in 70 AD.<sup>5</sup> The latter garrisoned in Novae until Late Antiquity,<sup>6</sup> while from the times of Septimius Severus, when the legionaries were given the ability to leave the fortresses and enter into legal marriages, a gradual process began in which Novae transformed into a thriving late Roman and early Byzantine civilian-military centre.<sup>7</sup>

The 1<sup>st</sup> Italian legion produced building ceramics, which they subsequently utilized as construction material for many buildings within the camp. The manufacturing process took place in brickyards, where the employed legionaries would use a stamp to mark the products they had turned out. An impress-inscription with an abbreviated name of the legion would be left on the surface of bricks and roof tiles. Thanks to that practice, the archaeologists investigating the remnants of Novae since 1960, have a tool which gives the possibility of dating many buildings in the area of the antique locality, and thus enables one to study the history

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<sup>1</sup> Majewski 1969, 57.

<sup>2</sup> Dyczek 2007, 10.

<sup>3</sup> Press and Sarnowski 1987, 289 and 294.

<sup>4</sup> Dyczek 2008, 67.

<sup>5</sup> Mrozewicz 2010, 278.

<sup>6</sup> Sarnowski 1977, 50.

<sup>7</sup> Mrozewicz 2010, 281–284.

of Novae, the military one in particular.<sup>8</sup> It is no surprise then that already during the first excavation seasons, tegular material attracted the attention of archaeologists,<sup>9</sup> as well as architects, epigraphers and military historians later. The aim of this paper is to attempt a summing up of the results of research conducted to date on the chronology of artefacts of the kind, as well as to characterize briefly the course and development of studies of stamped building ceramics so far.<sup>10</sup> It needs to be mentioned that research material originates largely from excavations of Polish expeditions, including two organised by the University of Warsaw and one by the Adam Mickiewicz University in Poznań.<sup>11</sup>

Before the attempt at putting individual stamp pattern into chronological order was undertaken, one had had to embark upon studies in tegular epigraphy, a new field of research for Polish scholars. Jan Trynkowski made the first inventory of brick stamp types in three papers with identical titles: *Stemplowane cegły i dachówki [Stamped Brick and Tiles]*.<sup>12</sup> In these, he included one hundred nine stamp imprints, chiefly of the 1<sup>st</sup> Italian legion, ordered in a catalogue with find specifications originating from excavation. These entail coordinates of the artefact discovery according to the archaeological layout and data such as: dimensions (of the object and the stamp imprint), type of the artefact, content of the inscription. Additionally, photographs and drawings of the stamps were provided, which facilitates correct identification of an object. However, due to the state of research at the time, it is difficult to find any information on the chronology of individual stamp patterns in Trynkowski's articles. The greatest difficulty stemmed from the degree to which the excavation works, being in their initial stage, had advanced.<sup>13</sup> At the time, there was no possibility of performing a proper stratigraphic analysis. What is more, bricks and tiles with the stamp of the 1<sup>st</sup> Italian legion were being discovered in late Roman civilian buildings, which clearly pointed to their secondary use.<sup>14</sup> Apart from that, the very inscriptions impressed on bricks and tiles did not make the task any easier, as their content

<sup>8</sup> The scientific value of tegular inscriptions is discussed by: Kolendo and Żelazowski 2003, 170–171.

<sup>9</sup> Majewski 1969, 57; Press and Sarnowski 1987, 289.

<sup>10</sup> Majewski 1969, 66.

<sup>11</sup> The above expedition teams published stamped bricks and tiles in two ways. Foremost, in the regular archaeological reports appearing in the periodical *Archeologia*, also published for a spell by the Poznań scholars in a separate publication entitled: *Novae — Sektor Zachodni. Wyniki badań wykopaliskowych ekspedycji archeologicznej Uniwersytetu im. Adama Mickiewicza*. The reports featured also in other periodicals, such as *Balkanica Posnaniensia*, *Novensia*, while of the foreign one should mention *Izvestija na Balgarskija Arheologičeskija Institut Archaeologia Bulgarica* and *Arheologija*. Stamped bricks and tiles were also a subject of separate studies appearing as separate papers.

<sup>12</sup> Trynkowski 1964; 1965; 1966.

<sup>13</sup> Progress of archaeological excavations in Novae: Dyczek 2008 [2009], 31–70.

<sup>14</sup> Sarnowski 1983, 19–20.

was largely limited to simple abbreviations of the full name of the legion, without providing additional information which would have been helpful in determining the period of their occurrence. Despite serious handicap, Trynkowski dated several cases, with two of them precisely located in time. This concerned building material bearing stamps which read *GIITALG* and *GIITALANT*.<sup>15</sup> The former was deciphered by Trynkowski to mean [*LE*]G(*io*) I *ITAL(ica)* G(*ordiana*) and should be dated for the times of Gordian III (238–244).<sup>16</sup> However, the letter *G* at the end of the inscription arouses some doubt; possibly, it is a parenthesis which was to emulate *tabula ansata*,<sup>17</sup> and then we lose the possibility of chronological placement of these imprints. Such doubt is absent with regard to the second type of stamp imprint reading: *GIITALANT*. As Trynkowski observed, the letters *ANT* are in ligature, while the whole is interpreted as follows: [*LE*]G(*io*) I *ITAL(ica)* *ANT(oniniana)*.<sup>18</sup> In his opinion, the appellation *Antoniniana* was used by the 1<sup>st</sup> Italian legion during the reign of Septimius Severus and Caracalla.<sup>19</sup> Later research reassessed this dating to some extent.<sup>20</sup>

Jan Trynkowski's work was continued by Włodzimierz Pająkowski, who, thanks to the initiative of Stefan Parnicki-Pudęłko – consisting in establishing a separate Adam Mickiewicz University expedition in Novae<sup>21</sup> – took part in archaeological works with designation from that institution. Włodzimierz Pająkowski participated in five excavation seasons, in 1970, 1972, 1974, 1976 and 1978. As a result, four papers were published, three with an identical title of *Stemplowane cegły i dachówki* [*Stamped Bricks and Tiles*]<sup>22</sup> and one entitled *Ceramika budowlana z odciskiem stempla* [*Building Ceramics with a Stamp Imprint*].<sup>23</sup> In his research, Włodzimierz Pająkowski placed the main emphasis on the edition of inscriptions impressed on building ceramics. He continued in the manner of publishing artefacts initiated by his predecessor, consisting in cataloguing.

A similar scholarly approach, also in terms of epigraphy, was employed by Leszek Mrozewicz, who, in his article entitled *Odciski stempli na ceramice budowlanej z Novae* [*Stamp Imprints on Building Ceramics from Novae*]<sup>24</sup> described thirty eight items of stamped building ceramics. Seven of the ceramic plates he discussed had been discovered *in situ*.<sup>25</sup> As later archaeological research demon-

<sup>15</sup> Trynkowski 1964, 257, Tab. IV.

<sup>16</sup> Trynkowski 1964, 257, n. 14.

<sup>17</sup> Sarnowski 1983, 55.

<sup>18</sup> Trynkowski 1964, 257.

<sup>19</sup> Trynkowski 1964, 257, n. 13.

<sup>20</sup> Sarnowski 1983, 55.

<sup>21</sup> Dyczek 2008 [2009], 39.

<sup>22</sup> Pająkowski 1973; 1975; 1979.

<sup>23</sup> Pająkowski 1981.

<sup>24</sup> Mrozewicz 1984.

<sup>25</sup> Mrozewicz 1984, 150, Tab. II.

strated, the floor in which they were found is dated for the period between the reign of Caracalla and Gordian III.<sup>26</sup> The information carries a substantial value for the estimation of the chronology of individual matrix patterns being utilised by legionary brickyards.<sup>27</sup>

A different view on the discussed issue was entertained by Stanisław Medeksza and Ryszard Massalski. The former, associated with the Poznań expedition, presented it in two articles with identical titles: *Ceramika budowlana* [*Building Ceramics*],<sup>28</sup> in which he did not examine the very imprints of stamps, but focused his attention on building ceramics. Nor did he omit to discuss the method of its production<sup>29</sup> and its use in the architecture of Novae.<sup>30</sup> Also, he characterised the ornamental carving found on the surface of bricks and tiles analysing its shape<sup>31</sup> and the practical function it was supposed to perform.<sup>32</sup> The latter of the aforementioned, Ryszard Massalski, was associated with the Warsaw expeditions, and wrote the text entitled: *Dachówki z najniższej warstwy wykopu sondażowego we wnętrzu G budowli z portykami* [*Tiles from the Lowest Layer of Sounding Excavation inside the G Building with Porticos*],<sup>33</sup> in which, on the basis of three well-preserved specimens, he examined the manner of arranging *tegula* and *imbrices* tiles of the roof slopes in Novae.<sup>34</sup> He did not omit the run of the *tegulae* production process, either.<sup>35</sup> He also paid attention to the stamps impressed on the surface of the studied tiles, trying to determine the cause behind the variation in size between them, as well as behind the small palaeographic differences.<sup>36</sup> He concluded that the cause might be looked for in the material from which the stamp matrices were made. Simultaneously, he demonstrated which particular material was used to make them: wood, clay and metal.<sup>37</sup> It needs to be stressed that the findings of both architects, despite the lack of chronological deliberations on the stamps, have a considerable significance in the reconstruction of the organisation of labour in military brickyards. They broaden our knowledge concerning Roman architecture of the limes, of which bricks and tiles were an important element.

<sup>26</sup> Biernacki 1988, 169, n. 38.

<sup>27</sup> Similar imprints to the ones published by L. Mrozewicz discussed by Matuszewska (2006, 47, Taf. I), include types: IV-12/a and VI-6/b.

<sup>28</sup> Medeksza 1975; 1979.

<sup>29</sup> Medeksza 1975, 150.

<sup>30</sup> Medeksza 1975, 177, fig. 134; 1979, 48.

<sup>31</sup> Medeksza 1975, 167-175.

<sup>32</sup> Medeksza 1979, 50-52.

<sup>33</sup> Massalski 1977.

<sup>34</sup> Massalski 1977, 183-184.

<sup>35</sup> Massalski 1977, 184-185.

<sup>36</sup> Massalski 1977, 186-187.

<sup>37</sup> Massalski 1977, 186.

After twenty years from the commencement of archaeological excavations in Novae, Tadeusz Sarnowski's *Die Ziegelstempel aus Novae I. Systematik und Typologie*<sup>38</sup> came out, which combined the previous findings of archaeological, epigraphic and technological-architectural studies of stamped building ceramics. The author succeeded in expanding the issue, also thanks to a thorough analysis of documentation from archaeological excavations in 1960–1979 and 1981, taking into consideration the collection of the Museum of History in Svistov and materials published by the Bulgarian expedition.<sup>39</sup> The paper consisted of six parts, yet two of them play a very prominent role in our deliberations. The first, entitled *Typologie der Ziegelstempel*<sup>40</sup> contains a typology of brick and tegular stamps discovered in Novae, devised on the basis of the content of tegular inscriptions. In its development, Tadeusz Sarnowski was guided to a lesser extent by palaeographic criteria, as, in his opinion, it would have been difficult to systematize such an abundant material on these grounds. Consequently, he specified thirty six types, marked in a Roman numerical system.<sup>41</sup> Further, the types were divided into variants numbered with Arabic numerals. For example, type VI is divided into 174 variants, while in type I there is only one. Group VI (*LEG I ITAL*) was additionally subdivided with respect to the form of framing. This typology became a foundation for deliberations on chronologic estimations of the occurrence of individual stamp types and variants. In the subsequent, and the last part of the paper, entitled *Datierung*,<sup>42</sup> Tadeusz Sarnowski attempted to date the separate stamp types and variants he had distinguished. Unfortunately, only few may be dated with some degree of precision without incurring the risk of a serious error. This applies to stamps reading *LEG I ITAL ANT*,<sup>43</sup> dated for the times of Caracalla (212–217) or Elagabal (218–222),<sup>44</sup> *LEG I ITAL ALE* (230–235)<sup>45</sup> and the imprint with the consular date of *Marulo cos.*,<sup>46</sup> a unique one in Lower Moesia. The remaining stamps of the 1<sup>st</sup> Italian legion are hard to define, mainly due to the fact that building ceramics was often put to secondary use.<sup>47</sup> Still, this did not hinder Sarnowski from embarking on a first attempt at stamp periodization on such a scale:

First half of the 2<sup>nd</sup> century: types I, II, IV 1, 3–5.

Fourth quarter of the 2<sup>nd</sup> century – first quarter of the 3<sup>rd</sup> century: VI 159–174.

<sup>38</sup> Sarnowski 1983, 17–61.

<sup>39</sup> Sarnowski 1983, 17; Matuszewska 2006, 45.

<sup>40</sup> Sarnowski 1983, 41–45.

<sup>41</sup> Sarnowski 1983, 41.

<sup>42</sup> Sarnowski 1983, 55–61.

<sup>43</sup> Sarnowski 1983, 55.

<sup>44</sup> Sarnowski 1983, 55.

<sup>45</sup> Sarnowski 1983, 56.

<sup>46</sup> Sarnowski 1983, 55.

<sup>47</sup> Sarnowski 1983, 20.

First quarter of the 3<sup>rd</sup> century: types VI 107–118, VI, XII.

First quarter of the 3<sup>rd</sup> century – Second quarter of the 3<sup>rd</sup> century: types V, VIII, IX.

Third quarter of the 3<sup>rd</sup> century – Fourth quarter of the 3<sup>rd</sup> century: types VI 35, 65–67, 123, 124, XI, XIII.

310–340 types XV–XVIII.<sup>48</sup>

Sarnowski reviewed his own chronology of stamp types XV–XVIII in the article: *Die legio I Italica und der untere Donauabschnitt in der Notitia Dignitatum*<sup>49</sup> as follows:

XVI, XVII: for 316–317 AD.

XV and XVIII: for 324–339 AD.<sup>50</sup>

Another important paper among Sarnowski's achievements is the work entitled: *Stemple „okrętowe” legionu I Italskiego na ceglach i dachówkach z Novae* [*The “vessel” Stamps of the 1<sup>st</sup> Italian Legion on the Bricks and Tiles from Novae*],<sup>51</sup> written in collaboration with Jan Trynkowski. In the article, the authors analyse the characteristic group of stamp imprints in the shape of ships, denoted in the typology as type VI 165–169. In their opinion such stamps were used in the 2<sup>nd</sup> century, with the reservation that such dating is severely undermined by the presence of building ceramics marked with the stamp *LEG(ionis) I ITAL(icae) ALE(xandrianae)* from the years 230–235 in the rubble.<sup>52</sup>

It needs to be emphasised that in many papers, tegular material plays a significant role in the scientific work of Tadeusz Sarnowski. It is a valuable source of information on the basis of which he entered upon research on the reconstruction of the military past, not only of Novae, but also Roman provinces situated on the lower Danube. His studies are crowned by the book entitled *Wojsko rzymskie w Mezji Dolnej i na północnym wybrzeżu Morza Czarnego* [*Roman Army in the Lower Moesia and on the Northern Coast of the Black Sea*],<sup>53</sup> which in detail addresses the issue of Roman military deployment by making specific reference, among other things, to stamped bricks and tiles.<sup>54</sup>

The Poznań centre is represented by Andrzej B. Biernacki, author of a number of papers devoted to the discussed issue,<sup>55</sup> including six in which one may find – apart from the “standard” specifications of artefacts – information on

<sup>48</sup> Sarnowski 1983, 61.

<sup>49</sup> Sarnowski 1985, 107–127.

<sup>50</sup> Sarnowski 1985, 117.

<sup>51</sup> Sarnowski and Trynkowski 1990, 251–263.

<sup>52</sup> Sarnowski and Trynkowski 1990, 253, Sarnowski 1983, 56.

<sup>53</sup> Sarnowski 1988.

<sup>54</sup> The list should also include: Sarnowski 1987; 1991.

<sup>55</sup> Apart from the ones discussed here see also: Biernacki 1979; 2003.

the chronology of individual patterns of stamp imprints. In the first of these, entitled *Zespół odcisków stempli i napisów legionu I Italskiego na posadzce ceramicznej basenu w termach legionowych w Novae* [*Assemblage of Stamp Imprints and Inscriptions of the 1<sup>st</sup> Italian Legion on the Ceramic Floor of Legionary Baths in Novae*],<sup>56</sup> the stamped building ceramics was systematized on the basis of typology of Tadeusz Sarnowski, referred to earlier. Thanks to the fact that the examples discussed in that article had been discovered *in situ* in a floor built in the period between the reigns of Caracalla and Gordian III, Biernacki succeeded in dating stamps of type VI 10, 60, 94–97, 148–149<sup>57</sup> for the period of the rule of Caracalla and Gordian III.<sup>58</sup> Subsequent papers include *Odciski stempli na ceramicznej budowlanej* [*Stamp Imprints of Building Ceramics*]<sup>59</sup> and further four with identical title *Stamps on the building ceramics elements from Novae*.<sup>60</sup> They contain numerous new chronological estimations of the stamped ceramics, although, in the majority of cases, the dating overlaps with the proposals of Sarnowski's. Nevertheless, in the papers, Andrzej B. Biernacki published three hundred seventy five stamp imprints, of which he briefly characterised the noteworthy specimens and provided the following dating:

First half of the 2<sup>nd</sup> century: VI 9,<sup>61</sup> VI 97<sup>62</sup>

First half of the 3<sup>rd</sup> century, types: VI 35, 65–66<sup>63</sup>

Fourth quarter of the 3<sup>rd</sup> century – first quarter of the 4<sup>th</sup> century, types: VI 165–169?, 172–173?<sup>64</sup>

In five papers of Biernacki's, there was no shortage of new stamp imprints which had no equivalent in Sarnowski's typology. They would be found later in Marta Matuszewska, dated for the 1<sup>st</sup> half of the 2<sup>nd</sup> century; these are: IV 11a,<sup>65</sup> VI 80b.<sup>66</sup>

More or less at the same time, Piotr Dyczek directed archaeological works in Novae in sector IV, with the ruins of military infirmary built at the beginning of the 2<sup>nd</sup> century, while underneath there were remains of baths which functioned during the reign of the Flavian dynasty.<sup>67</sup> The obtained findings were sys-

<sup>56</sup> Biernacki 1988b, 169–172.

<sup>57</sup> Biernacki 1988b, 169.

<sup>58</sup> Biernacki 1988b, 170.

<sup>59</sup> Biernacki 1988a, 161–168.

<sup>60</sup> Biernacki 1992, 107–112; 1994, 45–49; 1995, 56–61; 1996, 76–80.

<sup>61</sup> Biernacki 1995, 56–57, Fig. 2.5, 2.11.

<sup>62</sup> Biernacki 1995, 56–57, Fig. 2.12–14.

<sup>63</sup> Biernacki 1992, 107.

<sup>64</sup> Biernacki 1994, 45.

<sup>65</sup> Biernacki 1996, 76, Fig. 7.3; Matuszewska 2006, 47, Taf. I.

<sup>66</sup> Biernacki 1992, 111, Pl. II.12–14. The type was presented by Matuszewska 2006, 56, Taf. VIII. The stamp imprint displays substantial palaeographic similarity to types VI–66 and 121 in the typology of Sarnowski's 1983, 36, Taf. III; 37, Taf. V.

<sup>67</sup> Dyczek 2001, 18–22.

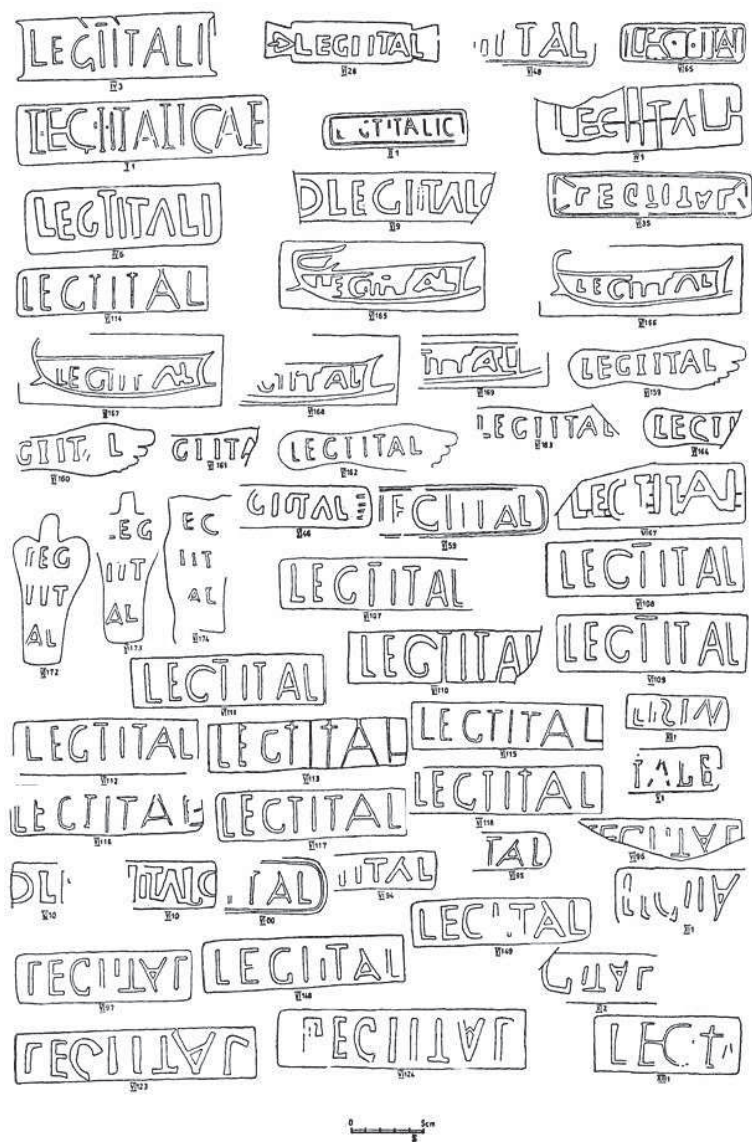


Fig. 1: Brick stamps of the 1<sup>st</sup> Italian legion (by Sarnowski 1983, 34–38).





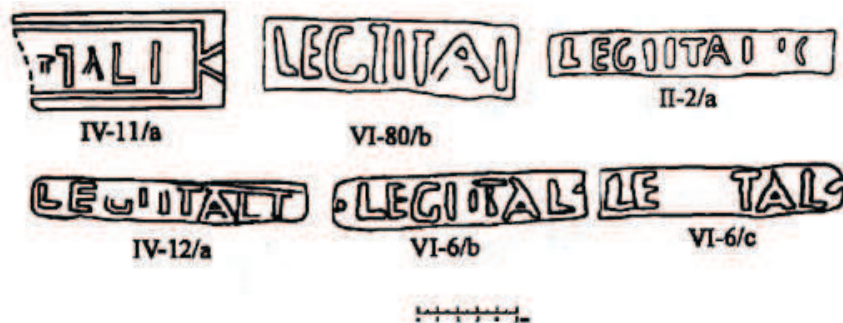


Fig. 3: Brick stamps of the 1<sup>st</sup> Italian legion (by Matuszewska 2006, 45–63).

few adjustments in this systematics. Namely, she adopted Sarnowski's typology, with the modification that she introduced not two- but three-tier division system. Stamp imprints were classified into types, variants and subvariants, e.g. type "IV-1/a/b, 2/a, 3/a, 4/a, 5/a, 6/a, 7/a-f, 8/a, 9/a, 10/a, 11/a, 12/a".<sup>72</sup> The author's intention was to create a transparent typology, which would enable one to follow the development of stamp matrices. She dated only one imprint which presented a new variant, i.e. type II-2/a, estimated for the 2<sup>nd</sup> half of the 2<sup>nd</sup> century.<sup>73</sup> Consequently, apart from certain corrections, it is still the typology of Sarnowski's.

Below is the current state of our knowledge concerning the chronology of occurrence of individual types and variants of brick stamps of the 1<sup>st</sup> Italian legion: Following the typology by Tadeusz Sarnowski (Fig. 1-2):

The Flavian times (from 70 to 96 AD), types: IV 3, VI 28, 48, 651.<sup>74</sup>

First half of the 2<sup>nd</sup> century, types: I, II, IV 1,<sup>75</sup> IV 6,<sup>76</sup> VI 9,<sup>77</sup> 35,<sup>78</sup> 114,<sup>79</sup> 165–169.<sup>80</sup>

Fourth quarter of the 2<sup>nd</sup> century – first quarter of the 3<sup>rd</sup> century: VI 159–164, 172–174.<sup>81</sup>

Early 3<sup>rd</sup> century, types: VI 46, 59, 67,<sup>82</sup> 107–113, 115–118, XII.<sup>83</sup>

First quarter of the 3<sup>rd</sup> century – second quarter of the 3<sup>rd</sup> century: type V.<sup>84</sup> Caracalla

<sup>72</sup> Matuszewska 2006, 45.

<sup>73</sup> Matuszewska 2006, 50.

<sup>74</sup> Dyczek 1997, 44.

<sup>75</sup> Sarnowski 1983, 61.

<sup>76</sup> Dyczek 2000, 95.

<sup>77</sup> Biernacki 1995, 56–57, Fig. 2.5, 2.11.

<sup>78</sup> Dyczek 2000, 95.

<sup>79</sup> Dyczek 200, 95.

<sup>80</sup> Dyczek 2000, 95; Palaeographic similarities between the "vessel" stamps may indicate the same period of their occurrence: cf. Sarnowski and Trynkowski 1990, 253.

<sup>81</sup> Sarnowski 1983, 61.

<sup>82</sup> Dyczek 2000, 95.

<sup>83</sup> Sarnowski 1983, 61.

<sup>84</sup> Sarnowski 1983, 61.

(212) — Gordian III (244): VI 10, 60, 94–97, 148–149.<sup>85</sup>

Third quarter of the 3<sup>rd</sup> century — fourth quarter of the 3<sup>rd</sup> century: types VI 123–124, XI, XIII.<sup>86</sup>

184 AD: type XIX.<sup>87</sup>

212–222 AD: type VII.

222–235 AD: types VIII, IX.<sup>88</sup>

316–317 AD: XVI, XVII.

324–339 AD: XV i XVIII.<sup>89</sup>

From Marta Matuszewska's typology (Fig. 2):

First half of the 2<sup>nd</sup> century, types: IV–11a,<sup>90</sup> VI–80b.<sup>91</sup>

Second half of the 2<sup>nd</sup> century: II–2/a.<sup>92</sup>

First half of the 3<sup>rd</sup> century, types: IV–12a and VI–6/b–c.<sup>93</sup>

For almost fifty years, stamped building ceramics has been studied by specialists in various fields. However, many scientific problems are still in evidence. In particular, this concerns chiefly the bricks and roof tiles stamped by the 1<sup>st</sup> Italian legion in the 1<sup>st</sup>–3<sup>rd</sup> century. Not all variants from this stamp group may be precisely located chronologically. The greatest difficulty in that respect arises with the examples of type VI,<sup>94</sup> as they had been appearing in Novae for almost three centuries. This hampers the study of the letter shape transformation and the stamp form across several centuries. Our knowledge of the chronology is slightly more extensive with regard to late Roman bricks of the 1<sup>st</sup> Italian legion. In the case of this kind of artefacts the difficulty lies in deciphering the inscription on the imprints. The excavations in Novae are still being conducted. This means that the volume of stamped building ceramics will continue to grow. Perhaps new finds will throw more light on the issue, and above all will permit one to answer the question concerning the significance of ceramics produced by military brick-yards in the economic life of Novae and the entire province. In all probability, the typology of ceramic stamps will also be perfected.

<sup>85</sup> Biernacki 1988b, 169.

<sup>86</sup> Sarnowski 1983, 61.

<sup>87</sup> Sarnowski 1983, 55.

<sup>88</sup> Sarnowski 1983, 55–56.

<sup>89</sup> Sarnowski 1985, 117.

<sup>90</sup> Following Biernacki 1996, 76, Fig. 7.3; Matuszewska 2006, 47, Taf. I.

<sup>91</sup> Biernacki 1992, 111, Pl. II.12–14.

<sup>92</sup> Matuszewska 2006, 50.

<sup>93</sup> Following Mrozewicz 1984, 150, Tab. II.

<sup>94</sup> In both typologies, Sarnowski's 1983 and Matuszewska's 2006, it is a very extensive group of stamp imprints.

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