

Diskussionen

5000 Heuneburgians?

A critical evaluation of the estimated population size of the exceptional early Iron Age settlement complex of the Heuneburg

By Robert Schumann

Introduction

Whereas in later prehistoric Europe communities mostly lived in isolated farmsteads or small hamlets and population sizes rarely exceeded more than 30–40 inhabitants, based both on settlement and cemetery evidence, in some rare cases large-scale agglomerations appear. Among these are the well-known mega sites of the Trypillia Culture in the Ukraine with settlements of up to several 100 hectares in size, several thousand inhabitants and a structured settlement layout. They date roughly into the first half of the 4th millennium BCE (see MÜLLER ET AL. 2016 for a recent overview). But population sizes or archaeological estimates of population sizes rarely reach four-digit numbers (NIKULKA 2016, tab. 26). Another context in which such large scale agglomerations occur is the later early Iron Age of southern central Europe in the context of the late Hallstatt and early La Tène periods. Here, one could mention the princely seats and comparable sites, hilltop settlements partly accompanied by outer settlements and interpreted as centres of complexity and proto-urbanity, for example Bourges, Mont Lassois (see e. g. MILCENT 2014 on these two sites) or the Heuneburg. In the last two decades estimates of population sizes for such sites have shot up to several thousand inhabitants and have led to far-reaching interpretations. In this paper, I will critically discuss the population estimates for one of the most prominent early Iron Age sites in southern Germany and beyond: the Heuneburg on the upper Danube.

The Heuneburg – a (very) short overview of the site and the investigations

While a comprehensive overview on research into the Heuneburg and the settlement complex is beyond the scope of this paper (see FERNÁNDEZ-GÖTZ 2016 for a broader overview), it still seems necessary and useful to shortly introduce the site and the research conducted before moving to the actual topic of this paper – its size in terms of the number of inhabitants.

The Heuneburg is situated on the Danube in south-western Germany near Hundersingen on a plateau of roughly 3 hectares in size. It is considered as one of the most important sites of early Iron Age Central Europe. Apart from early investigations and the excavation of the Hohmichele burial mound during the “Third Reich”, the major excavations on the plateau lasted for three decades from 1950 to 1979 and brought to light an immense amount of finds, features, and information on this site (see KIMMIG 1989 for the older excavation history). During these excavations around one third of the plateau was unearthed. Amongst the features uncovered is the well-known mud brick wall that has been discussed in the context of large scale interactions, ever since (see DEHN 1957, as well as BURKHARDT 2010, and HAILER 2010 for the most recent evaluation of this feature). Due to the carefully conducted excavations, the Heuneburg plateau revealed an important stratigraphy that is a reference point for chronology far beyond south-western Germany. Beside the earlier and later settlement activities on the Heuneburg, period IVa/b is of particular interest in this paper because in this period the Heuneburg settlement complex expands to its maximum (GERSBACH 1989) both in size and estimates of the population size (*Fig. 1*).



Fig. 1. Settlement topography and development of the Heuneburg settlement complex with the Heuneburg plateau, the outer settlement (*Außensiedlung*), and the *Vorburg*. a phase 1 in the late 7th century BCE; b phase 2 around 600 BCE; c phase 3 around 530 BCE (after KRAUSSE / EBINGER-RIST 2018, 142).

Even though the scientific excavations solely focused on the plateau, it has long been known that an outer settlement is also part of the Heuneburg settlement complex (KURZ 2000), as traces had been documented in the course of the excavations of the later burial mounds erected above it. A systematic approach to the outer settlement only evolved much later, especially in the last decades. These excavations revealed the astonishing dimensions of the outer settlement (KURZ / WAHL 2005), beginning with estimates of some hectares and ending with a total extent of over 100 hectares loosely inhabited by around 50 farmsteads (KURZ 2010).

Another astonishing discovery was the dating of the *Vorburg*, a large defensive system upstream of the plateau that was long thought to date to the Middle Ages (KRAUSSE ET AL. 2015, 73). At the start of the millennium several excavation campaigns revealed that these structures also date to the early Iron Age (REIM 2003) and that the area of the *Vorburg* was densely settled in the later part of the early Iron Age Heuneburg (BOFINGER / GOLDNER-BOFINGER 2008; STEGMAIER 2010). Thus, the Heuneburg settlement complex is made up of at least three separate settlement areas sufficiently investigated so far.

The last few years have seen another expansion of the focus as a large-scale research project was started (but see the earlier project on the surrounding settlements, e. g. KURZ 2007) that focuses on sites surrounding the Heuneburg, such as the exceptional Alte Burg near Langenenslingen (e. g. DÜRR 2014; HANSEN ET AL. 2014; 2018), as well as rural settlements (HANSEN ET AL. 2016) in an area up to 20 km around the Heuneburg. This ensures a better regional contextualisation of the Heuneburg and will clearly lead to new insights not only into the Heuneburg itself but into the area's early Iron Age more widely (see e. g. HANSEN ET AL. 2017). Furthermore it will surely help to understand the formation of the Heuneburg in its spatial context.

Apart from this rather descriptive overview of the Heuneburg settlement complex, as already indicated in the introduction the Heuneburg is a reference point for many discussions beyond the

site itself. It is probably best known as the key example of a princely seat according to the definition of Wolfgang Kimmig (1969; see Eggert 1989 for a harsh criticism of the concept) and the best researched princely seat in the Hallstatt sphere, a reference point for relative and absolute chronology, a key example for contacts with the Mediterranean world (Kimmig 1983a), and more recently a key to urbanisation and centralisation in the Hallstatt world (e.g. Fernández-Götz / Krausse 2016), and probably the most prominent archaeological site in south-western Germany. As such, the Heuneburg receives much attention both from the scholarly community and from the public. And one aspect that makes the Heuneburg almost unique is the sheer size and with it the estimated population, setting the site apart from other contemporaneous settlements.

Population size and demography – estimates at the Heuneburg

While we generally have to acknowledge that demographic calculations in prehistoric archaeology are always rather rough sketches and educated guesses between minimum and maximum numbers based on certain assumptions (see Nikulka 2016 for a recent overview), archaeological demography is a rather young approach at the Heuneburg as well as generally in the archaeology of the early Iron Age (Müller-Scheessel 2007; Wendt et al. 2010). There are many methods for addressing prehistoric demography, like evaluations of the carrying capacity (see for the Heuneburg area Fischer et al. 2010), estimates of the population derived from the number of burials in single cemeteries, small regions (Wendt et al. 2010), or larger areas (Müller-Scheessel 2007), the use of calibrated ¹⁴C dates as population proxies (see e.g. Timpson et al. 2014 for the European Neolithic), to name the most frequent. One of the classic approaches evaluates settlement sizes, house numbers, and the density of settling in settlements and regions (Nikulka 2016). For the Heuneburg settlement complex, this method seems most appropriate, as the excellent state of research concerning settlement archaeology offers detailed insights into the early Iron Age in this region and as such, this approach offers the narrowest band width for demographic estimates. The following estimates never reach the maximum inhabitants as indicated by analyses of the carrying capacity of the Heuneburg region (Fischer et al. 2010).

Wolfgang Kimmig, who spent decades researching the Heuneburg plateau, already saw the Heuneburg and the outer settlement as proto-urban with a dense population, but he avoided concrete demographic estimates (Kimmig 1983b, 86), probably mostly because the extent of the outer settlements was barely assessable (Kimmig 1969, 99). But still, he supposed hundreds if not thousands of helpers were necessary to construct the wall (Kimmig 1983b, 65–66)¹, although he did not specify where these were supposed to have lived. Egon Gersbach, the excavator of the Heuneburg plateau, who also investigated housing there (Gersbach 1995; 1996; 1997) similarly interpreted the Heuneburg as a proto-urban centre but also avoided concrete numbers (Gersbach 1976, 39). Early estimates came rather from the anglophone archaeological tradition. For example, Heinrich Härke suggested between 1000 and 2000 inhabitants as early as 1982, only for the plateau and the hardly known outer settlement, though he only extrapolated from the excavation plan of the plateau without further calculation or discussion (Härke 1982, 193). Bettina Arnold called this a “rather generous” estimate (Arnold 1982, 184). In contrast, Peter Wells suggested “several hundred” inhabitants on the Heuneburg plateau some years later (Wells 1985, 72; 83). As shown below, more realistic estimates for the plateau seem to lie somewhere in the middle between these extremes. With advances in fieldwork in and around the Heuneburg, especially in the outer settle-

¹ Though see the estimates for the constructions of the different walls on the Heuneburg by Peter Trebsche (2019), which draw a completely

different picture of the labour invested into the fortifications.

ment, estimates of the population size became more frequent and part of the re-emerging investigation of the Heuneburg and its surroundings. Siegfried Kurz estimated around 1000 inhabitants in the Heuneburg and the outer settlement based on his intensive works on the latter (KURZ 2000, 165). However, only a small part of the whole outer settlement was known at all. Thus he later corrected his estimates first to between 1500–2000 inhabitants (KURZ 2006, 178) and some years later to 5000 inhabitants for the whole settlement complex on and around the Heuneburg (KURZ 2010, 249). Furthermore he connected these numbers with different families and clans living at the Heuneburg. This number was further raised to “at least” 5000 inhabitants by Manuel FERNÁNDEZ-GÖTZ and Dirk KRAUSSE (e. g. 2017, 322) without further arguments.

Since then, the estimated number of at least 5000 inhabitants is the population size most mentioned in literature about the Heuneburg (for the corresponding settlement phase). To my knowledge, the only exception is an estimate of 3000–4000 inhabitants recently published by Dirk KRAUSSE and Nicole EBINGER-RIST (2018, 130). The estimate of at least 5000 inhabitants has been published several times in scientific papers and popular-scientific overviews (e. g. FERNÁNDEZ-GÖTZ / KRAUSSE 2012) and seems to be generally accepted, as it is used in wider discussions as well (e. g. MÜLLER 2016). What needs to be kept in mind when thinking about the Heuneburg and this surprisingly high number of inhabitants is that this estimate applies only for a short period of time, roughly half a century, of the 200 years of occupation at the Heuneburg. After the maximum extent of the Heuneburg in the first half of the 6th century BCE and the large fire, the outer settlement seems to be largely abandoned and the population on the plateau is less dense (see GERSBACH 1996 for an in-depth discussion of the features on the plateau). On the other hand, the *Vorburg* seems to be more densely settled at this time (STEGMAIER 2010; STEGMAIER forthcoming). Thus, the estimates only apply to one settlement phase of the Heuneburg complex, in the other phases, the population size is definitely much smaller. The significance of this high estimate becomes evident when Dirk Krausse and Manuel Fernandez-Götz compare the size of the Heuneburg with contemporary Athens, which would roughly be the same size, and discuss the Heuneburg as on a par with the Etruscan cities Tarquinia, Vejo, and Orvieto (KRAUSSE / FERNÁNDEZ-GÖTZ 2012, 120). Hence, this estimate is not only a simple number but linked to wider aspects of the interpretation of the settlement complex of the Heuneburg. Furthermore it also connects early Iron Age societies north of the Alps with Mediterranean cultures in terms of complexity and social as well as political structure. As such, the estimate is most important not only for the site but also generally for early Iron Age archaeology. However, the calculations presented here indicate much lower numbers.

5000 Heuneburgians? A critical evaluation of the most prominent estimate

When considering the estimated 5000 inhabitants, first the calculations need to be critically evaluated. As far as I am concerned, the only justified calculation has been published by Siegfried Kurz (although rarely cited in the last years). Kurz’ estimate is a rather rough calculation. He takes into account that the outer settlement houses around 50 units of 1 to 1.5 hectares and transfers the population density of the plateau onto these units. For the plateau, he is working with eleven household units per hectare and thus estimates 500 households of seven people (three children, two parents, and two grandparents) for the outer settlement with a total of 3500 inhabitants. He then adds the inhabitants of the plateau, the *Vorburg*, and the terraces on the northern slope of the Heuneburg and rounds his 3500 inhabitants of the outer settlement up to 5000 total inhabitants of the Heuneburg complex (KURZ 2010, 249).



Fig. 2. Excavation plan of a part of the outer settlement at Ertingen-Binzwangen, “Großer Brand” (after KURZ 2010, 166 fig. 2).

Despite the fact that the whole calculation is rather roughly sketched, it is interesting that Kurz supposes an equally dense population in the outer settlement and on the plateau that justifies his high number. This is a viewpoint that does not take the dynamics of a large scale settlement, different modes of urbanity and centrality, and settlement geography into account. Indeed, it has been revised in the last years by the excavators and the teams working at the Heuneburg and has been challenged by the excavations conducted by Kurz himself. The outer settlement is no longer seen as densely populated but rather as a loosely inhabited area of farmsteads that are separated by wall and ditch systems (see e. g. KRAUSSE ET AL. 2015, 79–81). The modern 3D-reconstructions and the excavated sections rather indicate that we should expect mostly one and in exceptional cases probably two farmsteads within these units of 1 hectare. The best insights into the outer settlement are probably afforded by the excavations in the early 2000s in Ertingen-Binzwangen (Fig. 2). Here a farmstead structure with fences was excavated that indicates loosely scattered housing in the outer settlement (KURZ / WAHL 2005; the same situation is documented in the older excavations in the southern settlement, see KURZ 2010, 176 fig. 8). It also needs to be kept in mind that the rather loosely arranged buildings in the excavated area do not necessarily need to be contemporaneous. As Kurz excavated seven phases of fences (KURZ / WAHL 2005, 80), this indicated place continuity but also probably more than one period of house-building. An in-depth analysis of these excavations might give a better insight into the chronology of this specific part of the outer settlement. Based on these investigations the excavators calculated around 25–40 farmsteads in the outer settlement, then thought to be 50 hectares in extent (KURZ / WAHL 2005, 81). As revealed later, the outer settlement occupies around 100 hectares, doubling the estimated number of farmsteads to around 50–80, but Kurz eventually decided 50 farmstead units were the most appropriate number.

Using this basis and the seven inhabitants per household, we would arrive at a population much lower than the 3500 inhabitants Kurz expects. If we take one household per unit as the bare minimum, we end with 350 inhabitants of the outer settlement. An average of two households per unit seems to be more realistic, but then we still would end up with some 700 inhabitants and even if we round up to ten inhabitants per household (as suggested e. g. by NIKULKA 2016, 130) we still only scratch the mark of 1000 people. Less conservative calculations could also work with three households per unit, but this would still only lead to a maximum of around 1050 inhabitants with seven people per household and 1500 with ten people per household; we would then approach the 1500–2000 inhabitants recently suggested by Dirk KRAUSSE and Nicole EBINGER-RIST (2018, 130). In this work, the authors calculate with 70 units with at least 20 inhabitants (hence minimum 1400 inhabitants) and a higher but unspecified number for the more densely settled units and those with more prestigious buildings. However, the argument that the large buildings, such as that under Giesübel-Talhau mound 4 (already interpreted by SCHIEK 1959, 131 as the stately home of a member of the upper-class of the Heuneburg, who was later buried there), housed more inhabitants than smaller buildings does not match the overall interpretation of these houses as representational buildings (KRAUSSE / EBINGER-RIST 2018, 130). These would then rather be communal buildings and this would take the overall interpretation into a completely different direction.

After the discussion of the outer settlement, we need to return to the Heuneburg plateau itself. In the settlement phases of interest here (IVa/b), we have, as outlined above, dense housing on the excavated part of the plateau. In these phases, around 50 houses were documented in the excavated areas (*Fig. 3*). As around one third of the plateau was excavated, we can obtain a rough idea of the overall number of houses on the Heuneburg if we transfer the density of the excavated areas onto the rest of the plateau, although probably not the whole Heuneburg was populated as densely, especially if we take different functions like the so called *Handwerkerviertel* (craftmen's quarter) into account. Nevertheless, if we accept a similarly dense population the whole plateau would have housed around 150 buildings. This would lead to a maximum of around 1050 inhabitants, if we calculate with Siegfried Kurz' number of seven people (three children, two parents and two grandparents) per house. Still, we need to consider that his estimate of seven people was not meant per house but per household in the outer settlement, which consists of several buildings. So this estimate would take into account that proto-urban living was much more crowded than the more rural areas in the outer settlement and needs to be seen as an absolute maximum. If some of the smaller structures were auxiliary buildings of a dwelling (see e. g. GERSBACH 1997, 241) and there were different activity-zones, this would lead to less crowded living conditions in some parts. Estimates would then stay under 1000 inhabitants on the plateau and more realistically settle between the extremes proposed by HÄRKE (1982) and WELLS (1985), even if we calculated with ten persons per household.

Beside the outer settlement and the plateau, the *Vorburg* also needs to be included when discussing the demography of the site. But first of all, the chronological relationship between the *Vorburg* and the outer settlement needs to be outlined. The area of the *Vorburg* was only loosely settled in the earlier phase of the early Iron Age Heuneburg and the enclosure was built only in period IVb (STEGMAIER 2010, 265). In the aftermath, the *Vorburg* was densely settled until the end of the early Iron Age occupation of the Heuneburg, whereas the outer settlement was already mostly abandoned much earlier (KURZ 2000, 158–159). Hence, the large-scale outer settlement and the *Vorburg* only partly overlap chronologically and it is only for a very short period of the Heuneburg that both areas were settled. Nevertheless, if we consider the inhabitants of the *Vorburg* and think of an equally dense population as on the plateau, we might, based on the size of the *Vorburg*, suggest another 200–300 inhabitants as a maximum figure.



Fig. 3. The Heuneburg plateau and the housing in the phases IVa1–IVc (after VAN DEN BOOM 1995, 197 fig. 3; 201 fig. 4; 205 fig. 5; 209 fig. 6; 215 fig. 7; 219 fig. 8).

Summing the inhabitants in the three major areas of the Heuneburg settlement complex, we arrive at a different estimate of the population size. If we calculate with 1000–1500 inhabitants in the outer settlement, 500–1000 inhabitants on the plateau, and 200–300 inhabitants in the *Vorburg*, numbers between 1800 and at most 2800 inhabitants are generated. It seems more realistic to think in the lower part of that range because first of all, large parts of the Heuneburg settlement complex are not investigated and it is not clear whether all areas were actually settled at the same time, and furthermore the maximum numbers were already calculated with rather non-conservative foundations in comparison to calculations at other sites. As such, a total population of around 2000–2500 inhabitants in the whole Heuneburg settlement complex in the first half of the 6th century BCE seems a realistic suggestion. But this number is only relevant for the periods of the greatest extent of the whole settlement complex and not for the whole 200 years of early Iron Age occupation at the Heuneburg. It is only fair to point out that other settled areas might still be hidden in the landscape (as suggested by KRAUSSE / EBINGER-RIST 2018, 130). Further research therefore might lead to higher numbers as is the case with every incompletely excavated site. Yet for the moment, the figure must be revised.

Summary and outlook

Compared to the previously suggested 5000 inhabitants, around 2000–2500 inhabitants seems a rather mediocre number, shearing off half of the inhabitants of the settlement complex in the calculations presented in this paper. Still the Heuneburg completely outstrips all other kinds of settlements that existed prior to the early Iron Age in southern Central Europe north of the Alps. The Heuneburg and other comparable sites mark a clear cut in central European prehistory with the first attempts of urbanisation and a considerable centralisation. As such, the Heuneburg does not lose any of its significance as one of the most important sites for later prehistory in southern Germany. Furthermore, the current research in the surroundings and the hinterlands of the Heuneburg will also lead to a contextualisation of the Heuneburg in its settlement system, which also adds to the demography of the wider region.

Still for many aspects that go way beyond the narrow scope of this paper, such as the carrying capacity of the landscape (see FISCHER ET AL. 2010), the question of further contextualising the Heuneburg into its surroundings (see HANSEN ET AL. 2018), the territoriality of hilltop settlements and other central places (see amongst others NAKOINZ 2010; 2013), or assessing its importance compared to other proto-urban settlements (see KRAUSSE / FERNÁNDEZ-GÖTZ 2012), it is vital to calculate with numbers that are as realistic as possible. The vast range of figures proposed for the Heuneburg population do not only show the evolving state of research but also educated guesses only partly based on actual archaeological evidence.

Beside research concerning the Heuneburg itself, all numbers discussed here as realistic raise further questions concerning early Iron Age societies. For example, the numbers presented here contradict the assessment that in the later Hallstatt period all members of society were buried in the known burial grounds (MÜLLER-SCHESSEL 2007). At least at the Heuneburg, the number of burial sites, mounds, and known burials (KURZ / SCHIEK 2002 beside the more recent investigations on barrows around the Heuneburg, e. g. in the Bettelbühl necropolis: KRAUSSE ET AL. 2017) are far too small to contain all inhabitants. So alongside unknown flat graves and burial activities further away from the Heuneburg we might need to acknowledge that not all inhabitants at the Heuneburg were buried in an archaeologically detectable manner.

Furthermore, an agglomeration of around or above 2000 inhabitants clearly evoked new conflicts and ways of social interaction previously unknown in temperate Europe before the early Iron

Age (described for the Heuneburg by MÜLLER 2016, 119–120). As such, of course, far-reaching questions are connected with the number of inhabitants at the Heuneburg, for instance aspects of tension rising and struggles for power in such agglomerations (e.g. STEGMAIER 2018) or new mechanisms of decision making at the site. Moreover, much wider questions concerning the social structure of early Iron Age societies are connected with these population figures and we still need to debate if we see a vast step in the social and political structures in the early Iron Age (SCHUMANN 2015) or only an attempt to introduce new structures, which did not lead to long-term social change. After all, most of these sites only existed for a very limited period, with the site discussed here lasting for only two generations in its maximum extent. The Heuneburg takes a most prominent position in this discussion. This was recently pointed out by Oliver Nakoinz, who argued that internal crises connected to the large number of inhabitants and the lack of strategies for reducing social complexity led to tension, civil war, and ultimately the massive decrease of the population of the Heuneburg settlement complex (NAKOINZ 2017). In other words, the Heuneburg was too successful for early Iron Age societies to handle the immense agglomerations at this specific site. Be this as it may, as the scope of this paper is not to evaluate social interactions and developments. The demography of the Heuneburg is nevertheless connected to much wider issues.

All these questions remain fascinating and debatable and provoke interesting research and insights into the early Iron Age, no matter if we are talking about 2000 or 5000 inhabitants. Thus, the Heuneburg loses nothing of its significance for later prehistory in Central Europe. But that does not relieve us from the burden to estimate and work with numbers that are as accurate and realistic as possible. The award for the first settlement with approximately 5000 inhabitants north of the Alps goes to some other, later site, at least at the current state of research. Still, the Heuneburg will keep stimulating further research and the ongoing fieldwork in the region will offer many new answers and questions concerning the developments at the Heuneburg and in the early Iron Age in general. As such the Heuneburg remains one of the most exceptional and important sites of the 1st millennium BCE in Central Europe with a number of inhabitants previously unknown in these regions.

Size matters – A re-evaluation of the Heuneburg demography

By Dirk Krause, Manuel Fernández-Götz, Andreas Gutekunst and Leif Hansen

Introduction: Challenges and Possibilities of Prehistoric Demography

Demographic estimates are among the most difficult aspects of archaeological interpretation. While many scholars remain sceptical of any attempt to estimate past population figures, these calculations represent an important element when it comes to discussing aspects such as the scale of communities, socio-economic parameters including production and consumption, human impact on the environment, or the nature of internal and external conflict. Attempts to systematise the reconstruction of past population figures gained popularity after the rise of processual archaeology (HASSAN 1981), and in recent decades we have witnessed a renewed boost (cf. BOCQUET-APPEL 2008; CHAMBERLAIN 2006; NIKULKA 2016). In addition to the traditional estimation methods based on cemeteries (most notably the analysis of the number of graves by generations) and settlements (houses, overall settlement sizes), we can highlight the increasing application of demographic models using radiocarbon-based simulation (CREMA ET AL. 2017). Although later prehistoric and historical periods generally provide a better database (see BURMEISTER / GEBÜHR 2018 for a recent summary on the Iron Age), demography has become a fashionable research topic even