

## The beginning of the Neolithic in Austria – a report about recent and current investigations

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**ABSTRACT** – The “Earliest Linear Pottery-Culture” (LPC I) is to be seen as a synonym for the beginning Neolithic in Central Europe and therefore also in Austria. The distribution of this culture was limited by several facts of the natural environment, as its economic base was agriculture and stockbreeding. Traces are only to be found through Austrian territory outside the Alps in altitudes up to 400/450 m, on the best arable soils (mainly on loess base) and in the driest and warmest climatic zones with a clearly defined limit of tolerance. In the last two decades excavations of very different scale have been effected. A short overview is given upon the biggest ones and their main results. The first field researches had been between 1984–1986 within an international investigation project. Their results were analysed in detail and just gone into print. In this article they were presented shortly in a sort of summary. At least an outlook is given on current excavations and other projects.

**IZVLEČEK** – Najzgodnejša kultura linearnotrakaste keramike velja kot sinonim za začetek neolitika v srednji Evropi in zatorej tudi v Avstriji. Razširjenost te kulture so omejevali dejavniki naravnega okolja, saj je gospodarsko temeljila na poljedelstvu in živinoreji. Njene sledi v Avstriji smo našli le izven alpskega področja in na nadmorskih višinah do 400/450 metrov, na najbolj plodni prsti (pretežno aluvialnega izvora) in v najbolj suhih in toplih klimatskih področjih z jasno določeno mejo tolerance. V zadnjih dveh desetletjih pa smo opravili obsežna nova izkopavanja. V članku podajamo kratak pregled največjih izkopavanj in glavne izsledke. Med leti 1984 in 1986 smo v okviru mednarodnega raziskovalnega projekta opravili prve terenske raziskave. Rezultati teh raziskav so bili podrobno analizirani in so trenutno v tisku. V članku jih na kratko povzamemo in predstavimo. Pregledamo tudi izkopavanja, ki so v teku, in druge projekte.

**KEY WORDS** – distribution of LPC I in Austria; recent and current excavations; main results of analyses of two settlement sites

### THE MESOLITHIC BASE

Our knowledge of the Mesolithic in Austria still is very poor. The last statement upon this subject is by W. Antl-Weiser (1993), who named 10 sites for the whole territory. Only 5 of them lay in the northeastern region of Austria from where most of the early Neolithic places are known (see also Leitner 1989). Meanwhile there are some new mesolithic sites, but only in the alpine region due to more intensive field surveys and even excavations following the discovery of the famous “Ötzi” (Leitner-Stadler 1992; Schäfer 1998; 1999). Until now there are no excavations on Mesolithic sites in the east of Austria and all late Mesolithic flint industry is just known by surface

collections. This situation gives a very unsafe base for all research concerned with geneses of Neolithic in our region.

### THE EARLIEST LINEAR POTTERY CULTURE (LPC I) – FIRST TRACES OF NEOLITHIC IN CENTRAL EUROPE

Since H. Quitta (1960) published his fundamental study upon the “Earliest Linear Pottery-culture” this culture became a synonym for the beginning Neolithic in Central Europe and the number of findspots

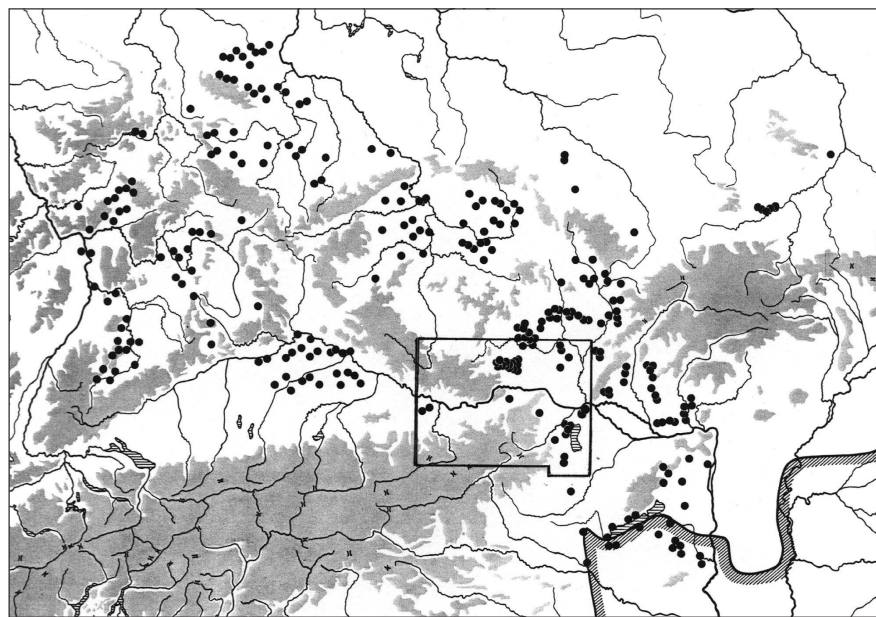
grew remarkably. By an increasing number of excavated sites we know quite a lot upon houses and settlements, economy and trade (*see for example Gronenborn 1999*) giving a picture of a fully sedentary life based mainly on agriculture and stock breeding, the hunt reduced to an unimportant role. The hamlets might have consisted of up to 3–5 contemporaneous houses only (*Modderman 1988,98*) and the number of settlement sites was much smaller than in the following younger *LPC* (*Petrasch 2001*). Also the whole territory of the *LPC I* is about half of that of the younger *LPC* (*Lüning 1988, Abb. 4; Pavlí 1998/99*). The Austrian sites are part of the eastern group within this territory, where most authors suppose to be the forming region of the *LPC* (Fig. 1). As recent  $^{14}\text{C}$ -dates suggest the *LPC* lived approximately between 5480/5450–5200 BC (*Lenneis, Stadler, Windl 1996*), the begin might even be more than 100 years earlier<sup>1</sup>.

#### DISTRIBUTION OF *LPC I* IN AUSTRIA AND THE RELATION TO THE NATURAL ENVIRONMENT

In 1960 H. Quitta only could mention 6 sites in Eastern Austria (*Quitta 1960, 153 ff.*). Since then their number is steadily increasing. While publishing the first excavated *LPC I*-material in 1976 from Austria E. Ruttkay knew 19 places yet (*Ruttkay 1976, 850, Abb. 3*), in 1989 my collection of that sort brought together 40 find-spots (*Lenneis 1989*), meanwhile their number doubled to 80 (Fig. 2 and register<sup>2</sup>). This new evidence shows a distribution pattern with some clustering, which should not be misunderstood as settlement clusters. The density of sites is mainly the result of the activity of even single persons or of intensive building activities leading to rescue excavations as for example

on the southern border of Vienna (Fig. 2: spots 67–74). The distribution pattern we see therefore may only indicate the different settlement regions of the beginning Neolithic not the density of habitation. For reconstruction that sort very intensive surveys and analyses would be necessary as was demonstrated recently by S. Ostritz (*2000*). What we can see in the here presented map scale is the restriction of the earliest Neolithic settlement to some extra alpine regions and within this to areas with special suitable conditions for these first agriculturists.

It is commonly known the most important facts for farmers are to have fertile soils and good climatic conditions. The problem is to find out which facts were most important and where was the limit of tolerance for this people while choosing their living places. I tried to find out the sought conditions for the whole *LPC* (phase I–III after R. Tichý 1962) in Austria nearly twenty years ago on the base of 240 sites and discussed there the problems of using recent soil maps and climate charts for the 6<sup>th</sup> millennium BC (*Lenneis 1982*). To summarise: the main relations were made to the soil bases, pointing out specially the loess and some other subsoil after the system of soil types by J. Fink (*1958*). As the climate was wetter and hotter during the 6<sup>th</sup> millennium



**Fig. 1. Distribution of the *LPC I* in Central Europe (after Petrasch 2001, Abb.1). The frame in the centre corresponds to the area given in more detail on Figures 2 and 3.**

<sup>1</sup> Unpublished dates of Brunn II (see later) – personal communication by P. Stadler

<sup>2</sup> In this register in the annex the thick black numbers are for sites with *LPC I* - material only, from the other younger *LPC* finds are also known. To shorten up the references all sites presented in some detail in my article of 1989 have as reference *Lenneis 1989*, in the other cases not all but the most informative reports are named. "FÖ" = Fundberichte aus Österreich. The references given only with an author's name and "FÖ..." are short find reports, some with drawings of single findings.

than today the absolute values of recent climate charts can't be used, but as there hasn't been any considerable change on the relief, the relative sequence of climatic zones gives useful information.

The localisation of all *LPC* sites has been done on maps with a scale of 1:50 000 and than put on a map with a scale of 1:500 000, the soil- and climate- charts were of the same scale. That way I found out for the whole *LPC* in Austria that the sought conditions were easy arable and most fertile soils (relevant soil types see Fig. 6) combined with the driest and warmest conditions. The tolerance border was 900 mm of recent average rainfall per year and 7°C of recent average temperature per year (after *Steinhauser s. a.; Lenneis 1982.9 ff; Karte 4-6, Abb. 1-3*). Figure 3 shows a map where the area limited by the above mentioned conditions is shown as "potential *LPC* settlement area". There are dotted zones indicating good soils with non-sufficient climatic conditions. The relevant areas south of the Danube are too wet, the ones in the north, close to the Moravian border indicate good brown earth but too cool conditions. Most of the meanwhile around 300 sites of the younger *LPC* lay within this "potential *LPC* settlement area" (see hatched zones "settlement area of the younger *LPC*"), only 6 find spots are outside, three of them are caves, the others may have had other special functions.

For the *LPC I*-sites I collected ecological data as follows: elevation above sea level (Fig. 4), situation in the climate zones (Fig. 5) and relation to soil types (Fig. 6). A detailed discussion will be given rather soon (*Lenneis 2003*) so I just present here the main results.

As to be seen in Figure 4 the main part of sites are in elevations between 200–300 m above sea level and not in the lowest zones of the country. The tolerance border is up to 450 m, 200 m higher than in regions of the *LPC* in Germany for example (*Sabel 1983, 160*).

There are only 21 places with only finds of the earlier *LPC* (*LPC I* only), the bigger part (59) are places with evidence also for the following younger *LPC* (*LPC I* pp.). To be able to compare the data I also gave here those of the whole *LPC* as published in 1982 (*LPC I/III*). The distribution of sites in the zones of recent average rainfall per year shows an increasing importance of the driest zones

while the tolerance border is going up from the line of 800 mm to the line of 900 mm with a very low percentage of the places.

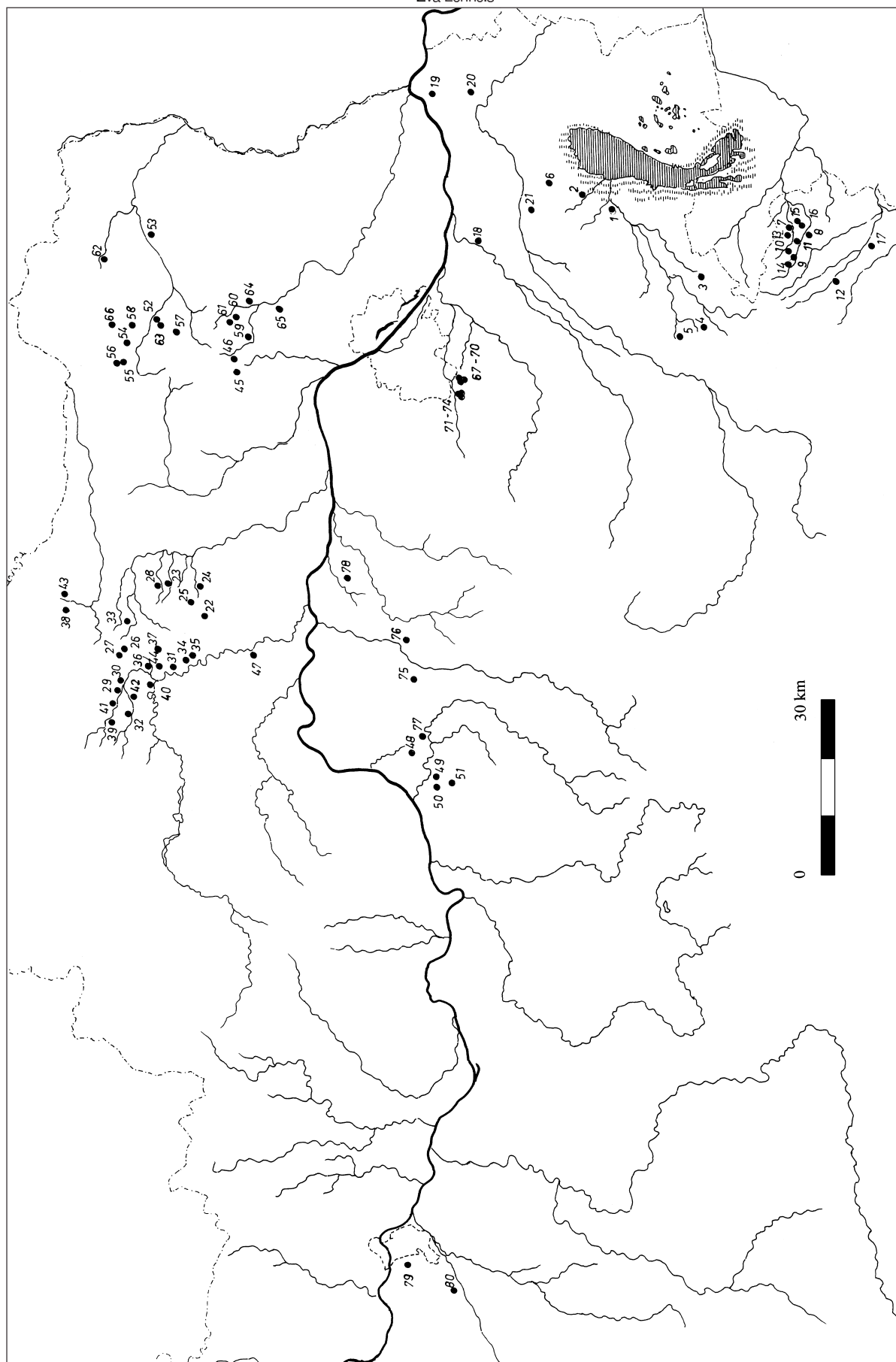
During the same time the preference concerning the temperatures changed from the hottest to the second hottest zone. The tolerance border of 7°C seems not to be crossed over during *LPC I*, while in the later *LPC* phases 3 sites are to be found just over this isothermal line in the northern region close to Moravia (*Lenneis 1982.Karte 6*).

The most important soil base for the earliest farmers in our region was the loess, having even an increasing values during the development of the *LPC I*. The average for the whole *LPC* was nearly 74% (*Lenneis 1982.Abb.1*). The absolute favourite type was the brown earth on loess (IV/1), also with increasing importance. The black earth "Tschernosem aus Tegel" (non-loess subsoil) is a slightly heavier soil with very high fertility, which seems to have lost of importance from the beginning with 19% to 12,8% for the whole *LPC*.

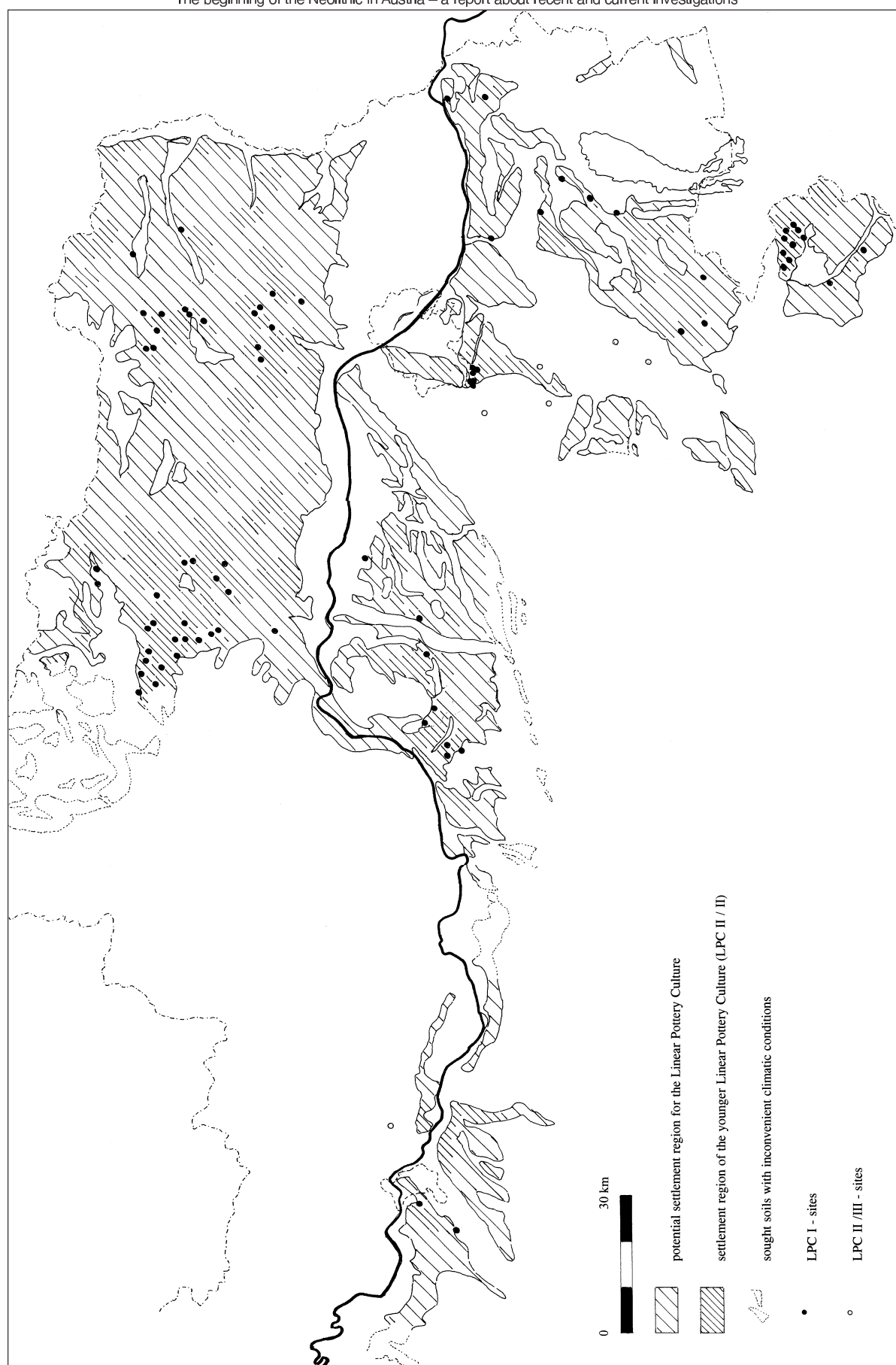
To summarise the evidence upon the relation of the earliest farmers to the natural environment on Austrian territory one get the impression of a cognisant choice for their living places, looking for them in the most suitable zones for agriculture. This zones seem to be strictly defined by light and most fertile soils (especially on loess-subsoil), very dry and warm climatic condition with a tolerance border of 900 mm recent average rainfall per year and 7°C recent average temperature per year just from the beginning. As there are plenty of watercourses in our region, their presence is not a restricting factor to the choice of settlement areas. There is only to point out that people avoided mainly the floodplains of the big rivers as the Danube and preferred the upper parts of streams and streamlets (see Fig. 2 and 3).

meters over sea level	LPC I only		LPC I pp.		LPC I total	
	number	%	number	%	number	%
100–150	1	4.76	2	3.38	3	3.75
151–200	2	9.52	7	11.86	9	11.25
201–250	8	38.10	17	28.82	25	31.25
251–300	7	33.33	20	33.90	27	33.75
301–350	2	9.52	6	10.17	8	10.00
351–400	1	4.76	5	8.47	6	7.50
401–450	0	0	2	3.38	2	2.50
	21	100.00	59	100.00	80	100.00

Fig. 4. Altitude of *LPC I*-sites in Austria.



**Fig. 2. Sites of LPC I in Austria. For the numbers see site-register in the annex.**



**Fig. 3. Sites of LPC I in Austria with relation to the natural environment.**

## EXCAVATIONS AT *LPC I*-SETTLEMENTS IN THE LAST TWO DECADES

When J. Lünig and I started in 1984 the first research excavation on a *LPC I*-site in Austria at Neckenmarkt within his international investigation project “excavations for the beginning Neolithic in Central Europe” we found the first house plans of this culture on Austrian territory. Since then – as if the ice were broken – there are investigations of different size for this time, some as rescue excavations and few as research projects (see site register for Fig. 2). I won’t be able to give here detailed information about all these field activities and only will refer about the biggest projects I am or was involved to some extent.

### *Asparn/Schletz, Lower Austria (Fig. 2 – point 52; plan Fig. 7)*

There is a very large-scale research project of the “Niederösterreichische Landesmuseum” going on under the direction of H. Windl since 1984. The main

interest of the large surfaces investigated was to uncover the late *LPC*-settlement with rests of an 8 m deep well and a very impressive ditch system, consisting of two parallel ditches describing an oval form with a maximum diameter of 330 m. The ditches with an average width of 4 m and 2 m depth contained more than 60 disturbed human skeletons-traces of a massacre at the end of the 6<sup>th</sup> millennium (Windl 1994; 1996; 1998). Beside these younger tra-

	LPC I only		LPC I pp.		LPC I total		LPC I-III	
	number	%	number	%	number	%	number	%
<b>climatic zones</b>								
average annual rainfall								
500–600 mm	8	38.10	26	44.07	34	42.50	109	45.04
600–700 mm	6	28.57	27	45.76	33	41.25	106	43.80
700–800 mm	7	33.33	4	6.78	11	13.75	22	9.09
800–900 mm	0	0	2	3.39	2	2.50	5	2.06
	21	100.00	59	100.00	80	100.00	242	100.00
average annual temperature								
over 9° C	13	61.90	14	23.73	27	33.75	88	36.36
8–9° C	6	28.57	28	47.46	34	42.50	100	41.32
7–8 ° C	2	9.53	17	28.81	19	23.75	51	21.07
under 7 ° C	0	0	0	0	0	0	3	1.23
	21	100.00	59	100.00	80	100.00	242	100.00

**Fig. 5. *LPC I*-sites and their relation to climatic conditions (after climate charts by F. Steinhauser; numbers and percentage for *LPC I*–III after Lenneis 1982).**

soil type	LPC I only		LPC I pp	
	number	%	number	%
loess-base				
I/7 Kalkige, vergleyte Lößkolluvien des Trockengebietes	1	4.76	0	0
III/4 Tschernoseme aus Löß	2	9.52	4	6.78
III/6 entkalkte (alte) und verbrauchte Tschernoseme	1	4.76	2	3.39
III/7 Lößrohböden	1	4.76	3	5.08
IV/1 Braunerden aus Löß	10	47.62	31	52.54
IV/3 Braunerden über Schotter	0	0	0	0
IV/4 Braunerden auf (früh trockenengefallenen Niederterrassen)	0	0	2	3.39
IV/5 leicht durchschlämmte Braunerden aus Löß	0	0	4	6.78
	15	71.43	46	77.97
other bases				
III/2 Übergänge kalkfreier zu kalkigen Tschernosemen	1	4.76	1	1.69
III/5 Tschernoseme aus Tegel	4	19.05	5	8.47
IV/2 Braunerden aus Sand	0	0	1	1.69
IV/12 alte Verwitterungsdecken, stark solifluidal durchmischt	1	4.76	2	3.39
VII/4 Braunerden aus Kristallin, im Wechsel mit alten Verwitterungsdecken	0	0	2	3.39
VII/5 Braunerden aus Kristallin, am Rand zum Trockengebiet im Komplex m jungen Staubdecken	0	0	2	3.39
	6	28.57	13	22.03
	21	100.00	59	100.00

**Fig. 6. *LPC I*-sites and their relation to soil types (after Fink 1958).**

ces of habitation in the northern part of this site a trapeze-form ditch of 400 m length was detected with an average width of 4 m and a varying depth up to 2 m. This ditch only contained *LPC I*-pottery and might be the last remain of an elder settlement. As this site is partly damaged by erosion there are no house plans for the *LPC I* habitation until now.

***Brunn, site I-IV, Lower Austria  
(Fig. 2 – point 67-70; Fig. 8)***

The beginning of the excavations at Brunn was due to roadwork beside the motorway A 2 at the southern border of Vienna (site I in 1989). Meanwhile the investigations under the direction of P. Stadler grew up to the biggest excavations for the beginning Neolithic in Austria. Until 1999 a surface of about 100 000 m<sup>2</sup> has been uncovered with the remains of 43 houses, which belong to 4 hamlets close to each other

(Stadler 1999). As series of <sup>14</sup>C-dates and the find material indicate there was a sequence of the habitation of these 4 sites which is subject of a big scale investigation being published soon (Stadler 2002).

The most important place of these excavations is certainly site II (Fst. II) with indications for more than 25 houses (part of them see Stadler 1996. Abb. 3). The house plans are not very well preserved, their length in average of 20 m and width of 7-8 m are mostly deduced from the long pits as only traces of the main posts and nothing of the walls remained. The findings indicate a very early datation within the *LPC I*: a high percentage of the ceramics is undecorated, reminding the forms of the *LPC* as well as the Starčevo Culture (Lenneis 2002. Fig. 8), a spectacular amount of flint (more than 6000) shows some Mesolithic characteristics and the <sup>14</sup>C-dates reach up

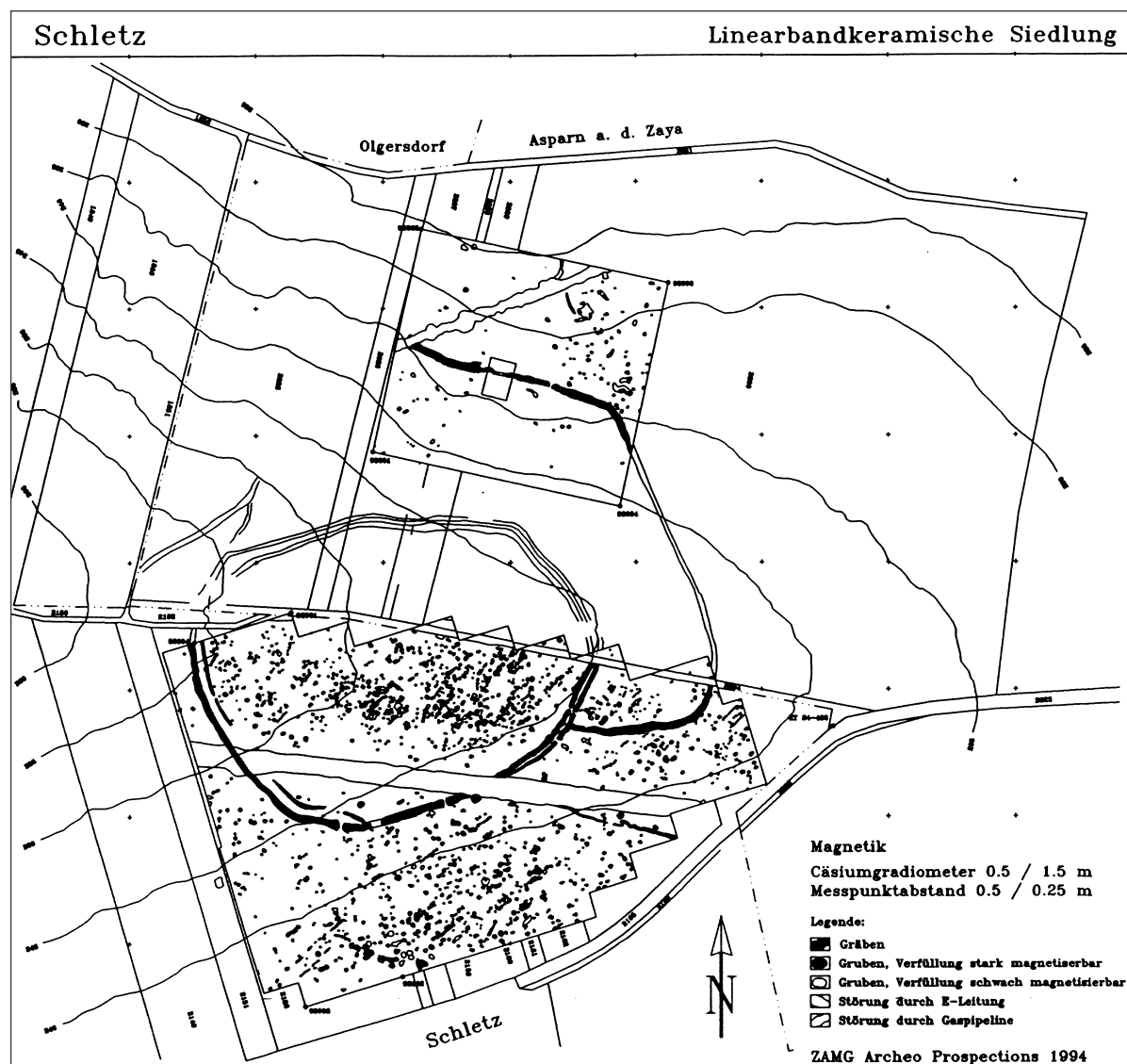


Fig. 7. Geomagnetic survey of the *LPC*-site at Asparn/Schletz, Lower Austria.

to 5620 BC. One gets the impression that on this site the formation process of the *LPC* might be to follow.

***Neckenmarkt, site NM 1, Burgenland***  
(Fig. 2 – point 9; Fig. 9 and 14)

Excavations have been effected in 1984 and 1985 under the common direction of J. Lüning and me, uncovering a surface of 2400 m<sup>2</sup> that was only a small part – as intended by the project – of the whole settlement with an estimated surface of about 28 000 m<sup>2</sup>. In the area under investigation we found parts of four and complete surfaces of two houses, one of them with a very well preserved nearly complete plan of the posts (Fig. 14 – house 1). This house had a slightly trapeze-form outline with a total length of 19,8 m and a width of 6,7 m at the southern, 5,0 m at the northern end (Lüning 2001, 330, Abb. 70, 71). The houses had been built partly so close together some of the long-pits have been in use from two sides, making the analysis of the situation and of the findings quite difficult. A detailed publication of this site is under print (Lenneis, Lüning 2001).

Recently made <sup>14</sup>C-analysis gave an approximately lifetime for the *LPC I*-habitation of this site within the frame of 5380–5200 BC (Lenneis, Stadler 2001). There are few traces of later use of the place at the end of the younger *LPC* and also at the end of the Neolithic.

***Mold, Lower Austria***  
(Fig. 2 – point 36; Fig. 10 and 11)

Investigations of this site started in 1995 and are still going on. They are effected with support and for the “Niederösterreichisches Landesmuseum” under my direction. Including the last campaign in summer 2001 we uncovered a surface of more than 8000 m<sup>2</sup> which only might be about 20% of the whole settlement, whose surface can be estimated of around 40 000 m<sup>2</sup>. The speciality of this place are partly wonderful soil conditions which resulted excellent preserved plans of houses, some of them being far the biggest houses of that time on Austrian territory (Lenneis 1997). The nearly complete plan of house 1 has a preserved length of 37,5 m, which originally might have been about 42 m, and a total width of only 6,5 m. The house plan belongs to a very small group of “Großbauten” of the *LPC*, charac-

terised by 4–5 rows of double/triple posts in the southern part. These additional posts are to be seen as supporting a granary, which in the case of house 1 must have been a divided one, a further speciality of this construction (Lenneis 2001 and Fig. 11). Within the area of the “Hofplatz” (homestead?) of this remarkable building were pits with partly extremely rich findings. Especially on the east side of the house we found animal bones in quantities and sizes I never have seen before.

The ceramics from the pits around house 1 – after a first glance – might date from the end of the *LPC I*. First unpublished <sup>14</sup>C-samples measured within a big project (Friesinger et al. 1999) of a pit not too close brought dates in the time span of 5300–5200 BC. There are more findings of the *LPC I* as well as of the younger *LPC* (phase II/III after Tichý 1962) so it seems this large settlement area of Mold was inhabited for a longer period, may be without any break.

***Rosenburg, Lower Austria***  
(Fig. 2 – point 40; Fig. 12)

Only 4 km west of the above-described site of Mold lies the settlement of Rosenberg. Originally it may have covered a surface of around 10 000 m<sup>2</sup> and therefore belongs to the smallest *LPC* places. I excavated the remaining part of 7400 m<sup>2</sup> between 1988–1993 also with the support and for the “Niederösterreichisches Landesmuseum”. The lacking part between the two excavation surfaces was destroyed while building a road over it many years ago. In 1994 we did geomagnetic prospecting on 14 000 m<sup>2</sup> looking for the southern end of the Neolithic hamlet, but the following excavation taught me all structures in this part were of late iron age or even younger.

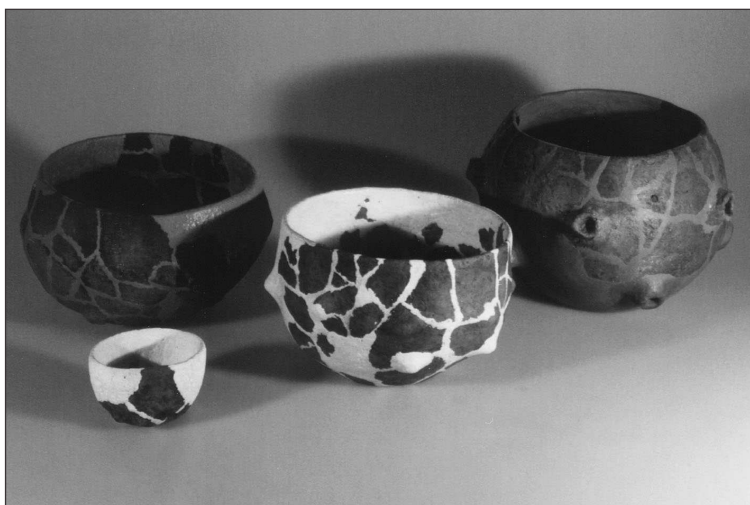


Fig. 8. Pottery from Brunn, site II, Lower Austria (photo: P. Stadler).

Seven house plans of the small hamlet of Rosenberg are preserved in varying quality, there may have been originally up to 10. As the  $^{14}\text{C}$ -dates indicate a rather long habitation time of 200–300 years (*Lenneis, Stadler, Windl 1996:104 ff*) further analysis of the findings will have to find out if there was more than one building existing at once. The rather unusual situation of this hamlet compared with “normal” *LPC* settlement situations within a small loess area surrounded even today by dense, natural forest supports the idea of a “special” place. Beside this situation there is also another speciality of this site: there were 21 (!) slit pits, most of them parallel on a line N to S between the houses 2 and 7 (Fig. 12). These slit pits are seen on the surface as on the average 2 m long and only 20–40 cm widths structures. Their depths can reach more than 1 m (for further details see *Lenneis 1992*). As the profiles are so extremely narrow, their construction and also their use is still a matter of discussion: most colleagues think they might have been tan pits (*van de Velde 1973*), but they also may have been used for cooling (*Struck 1984*), for hanging in loom weights (*Gronenborn 1989*) and so on. The exceptional high amount of snail houses in the pits of Rosenberg may even indicate a use as cages. An analysis of the snail rests showed species of forest and steppe together, probably caused by men (*Kuijper 1992*).

More than 2500 litres of sediments have been sieved to get botanical macro rests. Part of it, 55 samples



**Fig. 9. Neckenmarkt, Burgenland. Pot from pit 14, occupation phase 3.**

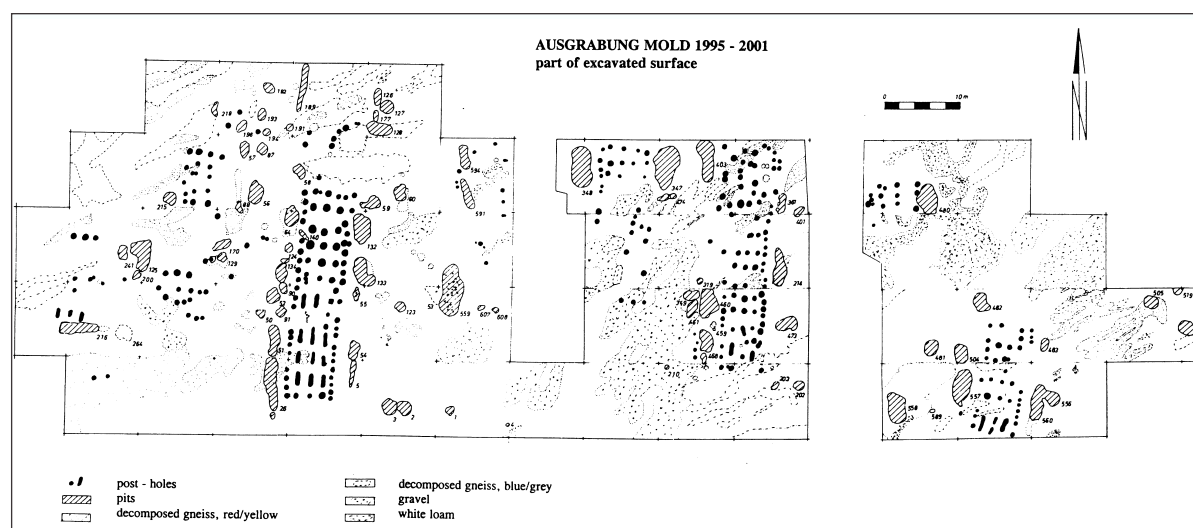
were analysed and published (*Kreuz 1990*), the bigger part of 127 samples did O. Brinkkemper, university of Leiden, with the support of an own research project. All cereals known for the *LPC* are proven but in striking small quantities, within the collected wild plants the high amount of carpinus seams to be also a speciality of this site.

To summarise the evidence of this site at the moment: there are some indications for a special function of this may be lonely farmstead within the *LPC* settlement cluster (“Siedlungskammer”) of that region. Final analysis and publication is planned for the next years.

### **Strögen, Lower Austria**

**(Fig. 2 – point 42; Fig. 13 and 15)**

Again within a distance of only a few kilometres the small site of Strögen lies in the area of the same set-



**Fig. 10. Mold, Lower Austria. Part of surface excavated between 1995–2001.**

tlement cluster in a rather unusual high position. This caused stronger damages by erosion than the geologist predicted after boring. The excavation in 1986 was also part of the above-mentioned project by J. Lüning, the work affected under our common direction. The investigated surface of 2100 m<sup>2</sup> uncovered totally the rests of this small hamlet.

We discovered the rests of 4 houses, three of them only indicated by one row of the deepest postholes. The plan of one house (Fig. 15 – No. 4) proves the construction of the southern and middle part, giving the first evidence for a southern part with double posts in Austria (*Stäuble 2001:430 f, Abb. 120*).

The analysis of the partly very rich and extraordinary well preserved ceramics (Fig. 13) proved all 4 houses existed one after the other (*Lenneis, Lüning 2001*).

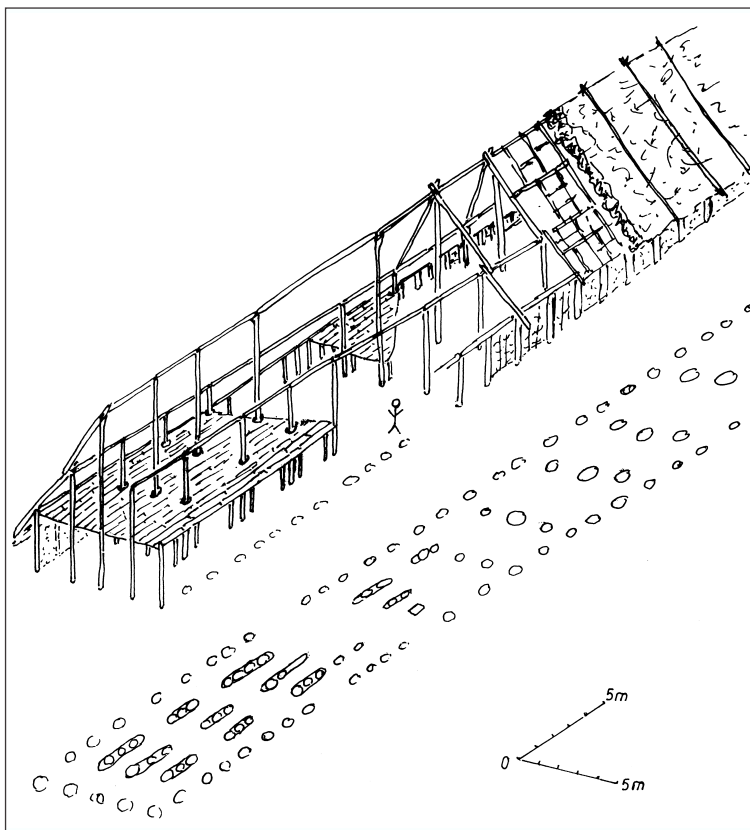


Fig. 11. Mold, Lower Austria. Reconstruction of house 1.

## MAIN RESULTS OF THE ANALYSIS OF TWO LPCI-SITES

### *Neckenmarkt and Strögen (Figs. 14 and 15)*

A short description of the situation and the excavations at the two sites has been given above. The analysis of house remains were done by J. Lüning (*Lüning 2001*), the ones upon all find inventories and the ceramics by myself (*Lenneis 2000*)<sup>3</sup>.

During the excavations, finds from the pits were recorded by metre squares and 10-cm thick layers. These recording units are the basis for the whole finds inventory. Decorated and undecorated pottery as well as burnt daub material were counted and weighed. Stone artefacts, animal bones and carbonised plant remains were listed and published by the respective specialists (*Gronenborn 1997; Kreuz 1990; Pucher 1987*), the relevant totals included in an overall inventory. This inventory was the basis for the statistical analysis of finds distributions carried out by P. Stadler with the help of his WinSerion 1.0 programme. The results presented on 20 plans of the different finds categories show very

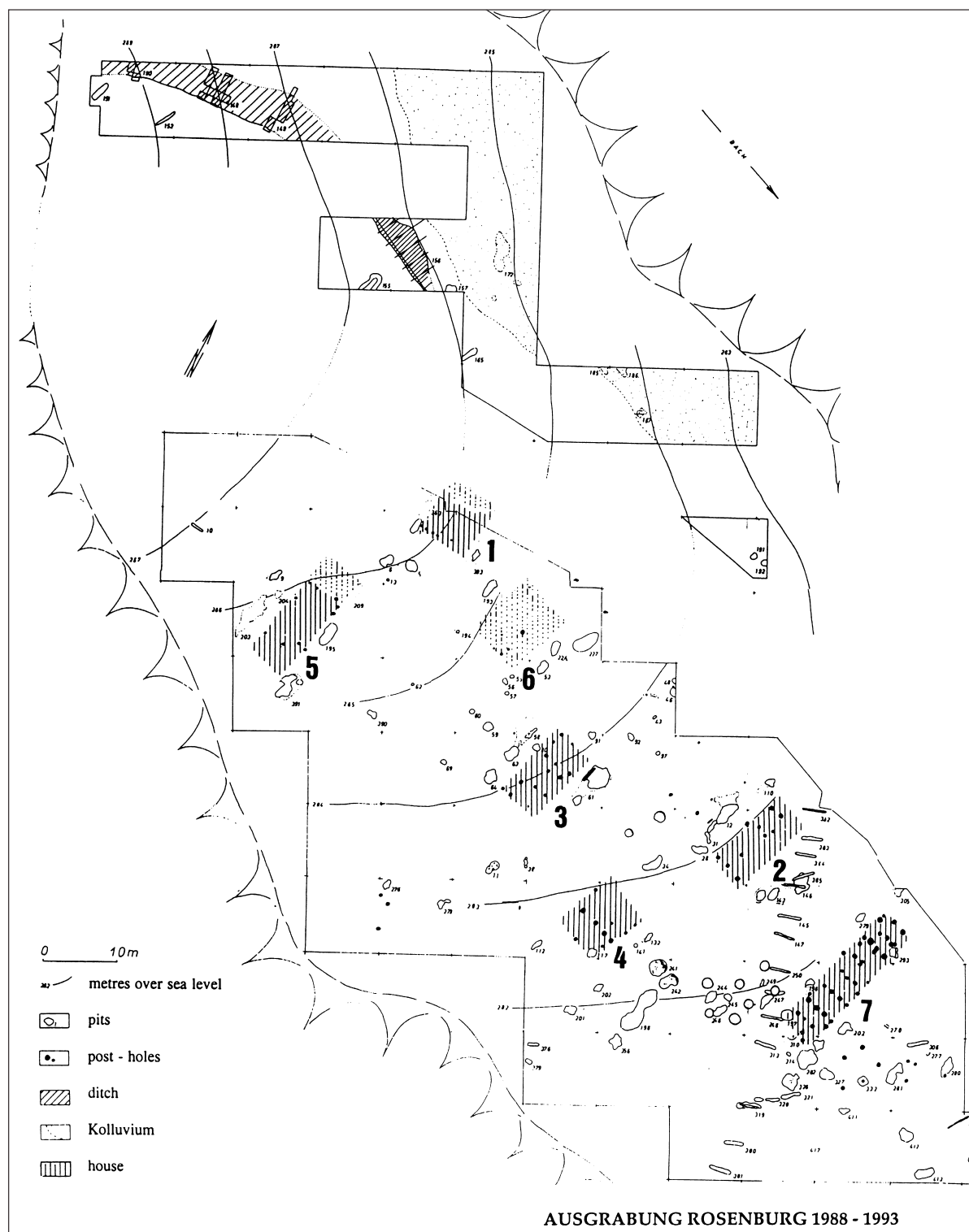
interesting distribution patterns. Their analysis gave the following main results:

- Clear concentrations of decorated pottery at the south-east end and east of the houses especially in the northern part of Neckenmarkt;
- Some indications of the burning of a house, seen in the unusually high weights of burnt daub material relative to sample size in two long-pits beside house 5 at Neckenmarkt;
- Indications of hearths inside the houses, suggested by burnt daub material in postholes of houses 3 and 4 at Strögen;
- A striking coincidence of the main foci of distribution of flint artefacts and animal bones, which could be the result of meat preparation.

Despite the low numbers of finds, indications that the area of the middle part of the houses was of some importance for the manufacture and/or use of hard stone tools (other than flint).

Comparison of these results with other Linear Pottery culture settlements from France to Southern Poland proved difficult due to the different kinds of finds recording in use. The few comparable distribu-

<sup>3</sup> The text given below follows in big parts the abstract kindly translated by A.Whittle.



**Fig. 12. Rosenberg, Lower Austria. Excavations 1988–1993.**

tional data, together with those of the two sites, suggest the following picture of the structure of early Linear Pottery culture settlements in central Europe. The model of defined activity zones in the immediate surroundings of the house (within the area of the so-called *Hofplatz*), which had been worked out on the basis of analysis of later Linear Pottery culture

sites on the Aldenhoven Plateau in the Rhineland, does not apply to the preceding earlier Linear Pottery culture. Some concentrations of finds in the southern surroundings of houses may indicate a special importance for the space immediately south of houses, but this observation does not allow a definition of different activity zones within this area.

All sherds, pit by pit (with the exception of the big long-pit between of house 1 and 5 at Neckenmarkt), were examined to see if they fitted or matched, and the recording of the pottery was done by the resulting 'vessel units'. These vessel units were recorded via a numerical code and all the data put into a Microsoft Excel dataset. The proportion of vessels put together from different recording units varied considerably from pit to pit. Graphs of matching sherds from the 10 cm layers and 1 metre squares from the various pits show clearly a very varied extent of mixing of the pit fills. Some big pits at Neckenmarkt show such extensive secondary mixing that their finds could only be evaluated individually and not in relation to their often disturbed contexts. Other pit contents are largely undisturbed, and the distribution of the individual vessels parts among varying

recording units is the product of the excavation method.

Two very different but in the event highly compatible methods were used for analysis of the pottery. The illustrated pottery was the sole basis of typological analysis. All attributes that have been suggested in the Linear Pottery culture literature as relevant to chronological development were taken into account, as well as the often secondary mixing of Neckenmarkt pits in the subsequent evaluation of relative chronology. The listing of the securely dated pieces for individual pits and parts of pits at Neckenmarkt confirmed the results suggested by vessel units. In this way at least two occupation phases could be recognised within the earlier Linear Pottery culture at Neckenmarkt. The great majority of the material

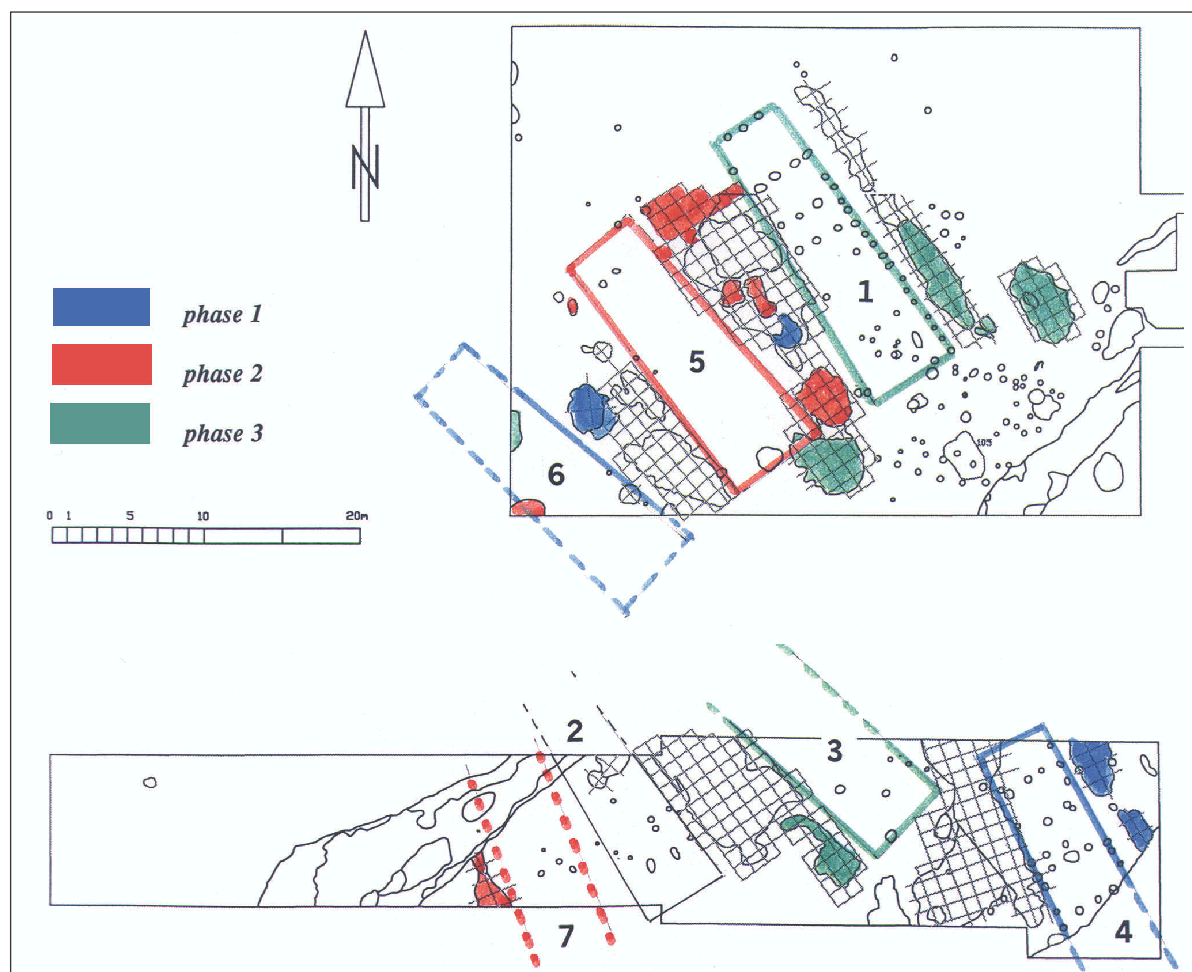
is assignable to the late phase of the *LPC I*. The few traces of late *LPC* settlement (*LPC III* after *Tichý* including some *Želiezovce* pieces) could be recognised only in mixed contexts including of the Late Neolithic, to which the whole contents of some pits also belonged.

In the pottery of Strögen two typological phases of the earlier Linear Pottery culture could be distinguished. About half of the material from this site belongs to the early phase of the earlier Linear Pottery culture (western long-pit of house 2). The inventory of one pit shows some characteristics of the later phase of the earlier Linear Pottery culture (western long-pit of house 3). None of the rest, belonging to the single better preserved house plan (house 4) could be precisely phased.

The basis of the seriation was the Microsoft Excel dataset with its numerically coded description of all 3237 ceramic vessels from both sites. Up to 40 attributes of form and 20 of decoration were considered for each pot. P. Stadler ran many seriations with his WinSerion 1.0 programme, and this began to give reliable



**Fig. 13. Strögen, Lower Austria. Ceramics from pit 5, occupation phase 1.**



**Fig. 14. Neckenmarkt. Occupation phases deduced from pottery seriation.**

results when we decided to include only those inventories that the analyses above had suggested to be homogeneous and to lump the data from both sites. That meant restricting analysis to the *LPC I* material, for which there now appeared to be three chronologically significant groups. The surprising result was the assignment of the pottery of both settlements to three phases within the *LPC I*, the imprecisely dated finds from the two long-pits beside house 4 at Strögen could then be clearly put with the latest group. This result is the first successful attempt with the pottery, in this international investigation project involving 10 sites in Germany and Austria, to define settlement phases within the *LPC I*. A very extensive but methodologically rather different effort on the 8 German sites had concluded that this was not possible, and instead interpreted all differences as regional or site-based.

The occupation phases deduced from the pottery analysis served as the basis for the description of the development of the two settlements (Figs. 14 and 15). According to this, occupation started in the

small-excavated part of the big Neckenmarkt settlement with 2 houses (late phase *LPC I a*). In the second phase there were only 1 or 2 houses (reconstruction of house 6 is quite unsure; beginning of phase *LPC I b*) and in the third phase there were 2 houses again (late phase 1b) There was no evidence of buildings from the excavated area for the fourth or late Linear Pottery culture occupation, and the finds from this were recovered from secondary, mixed contexts in the earlier pits. The structures in question probably lie in the space between Areas 1 and 2 and to their north. The finds suggest an occupation around 5000 BC. The next re-occupation, dating to the Late Neolithic/Early Bronze Age, came after a long hiatus of about two millennia, during which there were further significant changes to the natural surface. The evidence at this point consists of a few postholes and pits, as well as single sherd on the surface and in the fill of earlier contexts.

The pottery analysis of the small, totally excavated site of Strögen showed that there was a succession of houses (very poorly preserved). This is an *Einzel-*

*hof*, a single homestead or farmstead. Each successive building was always a little to the east of its predecessor. This is absolutely clear for the three, more or less parallel buildings (house 2–4) at Strögen (equivalent in date to occupation phases 1–3 at Neckenmarkt). The poorly preserved fourth house (Fig. 15 – house 1) lacked dateable finds, but since it occupied the westernmost position, it could have been the earliest structure on the site.

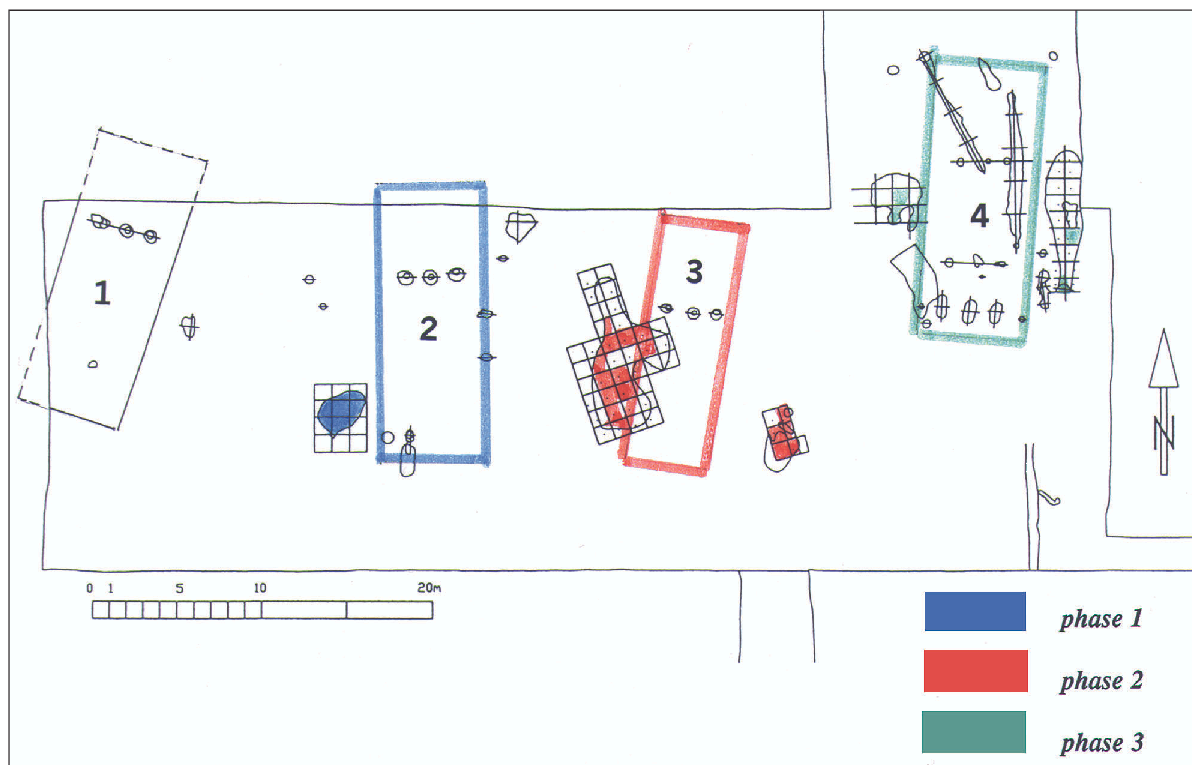
The two sites, Neckenmarkt and Strögen, not only represent a part of a big and a very small hamlet but also show a different sort of settlement structure. While in Strögen each house, even as belonging to only one homestead, has some empty area around, in Neckenmarkt some houses have been built so close together, the successors dug parts of their long-pit into an older one. By the analysis of all the data from the profiles and the plan of the pits of Neckenmarkt J. Lüning reconstructed their succession and came to a slightly different solution than me for the building phases of the houses in the northern part: house 5–1–6 (*Lüning 2001.414 ff.*). Anyway the houses turned around the space immediately south of the houses proven also as the most important activity zone by the find distribution. This sort of clustering of the houses within the “Hofplatz”-area has very seldom been observed yet. Comparable situations are known from Schwanfeld, Bavaria (plan see

*Gronenborn 1997.Abb. 2.14*) and from Brunn, site II (*Lenneis, Stadler, Windl 1996.Abb. 3*).

## CURRENT INVESTIGATIONS AND OUTLOOK TO THE FUTURE

Thus briefly described, the main results of the investigations concerning the settlements Neckenmarkt and Strögen and the insights which they provide into settlement structure have wider implications: first, for the analysis and evaluation of other settlements of the earlier Linear Pottery culture which have been excavated in the meantime in Austria by the author and by other colleagues, and secondly, perhaps, also for wider areas beyond. One hopes especially that more ceramic evidence recorded and analysed on a similar basis will produce a better relative chronology for the Early Neolithic of a wider region. This is vital for the understanding of economic development in this exciting period of change, as strikingly shown by the new interpretations, presented by E. Pucher (2001), of changes in the structure of the animal economy; these new insights rely on the inner chronology of the two sites (Neckenmarkt and Strögen) as outlined above.

At the moment systematic field research is going on in Asparn, Mold and may be later also in Brunn. As



**Fig. 15. Strögen. Occupation phases deduced from pottery seriation.**

geomagnetic prospecting in an area of about 50 000 m<sup>2</sup> showed structures of 15–20 more houses (*Stadler 1999 and personal communication*) some further investigations should be done.

As mentioned above large-scale analysis of the 4 sites at Brunn by P. Stadler are in preparation. A young colleague, Carina Grömer, doing the ceramics of site III with the methods applied in Neckenmarkt and Strögen for her thesis, should join him. I myself plan to effect similar analysis for the site of Rosenberg.

Since 1999 a large project for dating <sup>14</sup>C-samples from Austria and the neighbour states is running. It

includes samples especially for the beginning Neolithic but also from other times (*Friesinger et al. 1999*). Until the end of February 2002 about 1000 samples should be measured, 200/250 for the *LPC* (*personal communication P. Stadler*). One expects by the results of all these measurements a new, much more secure base for the chronology of the second half of the 6<sup>th</sup> and the early 5<sup>th</sup> millennium.

As to be seen, a rather good start of research upon the beginning Neolithic in Austria has been achieved. One hopes for further useful results of our investigations bringing at least a more accurate and vivid picture of this most interesting time.

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## ANNEX

SITE-REGISTER FOR MAP 2				
N°	commonalty	field name	provenience of finds	references
BURGENLAND				
district Eisenstadt-Umgebung				
01	Donnerskirchen	Weide ober der Trift	rescue excavation 1988	Lenneis 1989; Laue 1990
02	Purbach	Ried Fellner	rescue excavation 1984	Laue-Strohschneider 1988
district Mattersburg				
03	Draßburg	Taborac	excavations 1929–34	Lenneis 1989
04	Mattersburg	bei Bahnhof Wiesen–S.	surface	Lenneis 1989
05	Pöttsching	Ortsfriedh. Sauerbrunn	rescue excavation 1984	Lenneis 1989
district Neusiedl/See				
06	Winden	Kräftenäcker	rescue excavation 1948/49	Lenneis 1989
district Oberpullendorf				
07	Haschendorf	Kräftenriegel	rescue excavation 1998	Lenneis 2000
08	Horitschon	Rakitsch	surface	Lenneis 1989
09	Neckenmarkt	NM 1: Lackendorfer Feld	excavation 1984/85	Lenneis, Lüning 2001
10	Neckenmarkt	NM 2: Ziegelei	surface	Lenneis 2000
11	Neckenmarkt	NM 3: südl. Goldbach	surface	Lenneis 2000
12	Neckenmarkt	Ortsteil Samersdorf	surface	Lenneis 2000
13	Neutal	südlich Ort	surface	Lenneis 1989
14	Ritzing	südöstlich Ort	surface	Lenneis 2000
15	Unterpetersdorf	Ried Grübläcker	surface	Lenneis 2000
16	Unterpetersdorf		surface	Lenneis 2000
17	Unterpullendorf		surface	Lenneis 1989
NIEDERÖSTERREICH/LOWER AUSTRIA				
district Bruck/Leitha				
18	Enzersdorf /Fischa		single find	Lenneis 1989

19	Hainburg	Teichthal	single finds of excavation	Lenneis 1989
20	Prellenkirchen		rescue excavation	Ruttikay 1976; Lenneis 1989
21	Sommerein	Wolfsbründl	single finds of excavation	Lenneis 1989
district Hollabrunn				
22	Eggendorf/Walde	Kapellenfeld	surface	Maurer, FÖ.38, 1999, 743
23	Limberg	Heidenstatt	surface	Lenneis 1989
24	Obernavelsbach	Ried Urtfeld	rescue excavation 1992	Leeb 1992
25	Wilhelmsdorf	Moosang	single find	Lenneis 1989
district Horn				
26	Breiteneich	Kalkgraben	surface	Lenneis 1989
27	Breiteneich	Trift	surface	FÖ.30–38, 1991–1999
28	Etzmannsdorf	Stadtfeld	surface	Maurer, FÖ.35, 1996, 401
29	Frauenhofen	Neue Breiten	excavation 1975–1979	Lenneis 1986; 1989
30	Frauenhofen	Ried Milchtaschen	surface	Lenneis 1977; 1989
31	Gars am Kamp	Kleiner Teich	surface	Maurer, FÖ.32, 1993, 657
32	Groß-Burgstall	Preisenfeld	surface	Maurer, FÖ.37, 1998, 697
33	Kleinmeiseldorf		single find	Lenneis 1989
34	Maersch	Baugrund	surface	Lenneis 1989
35	Maersch	Stoßfeld	surface	Maurer, FÖ.32, 1993, 666
36	Mold	Im Doppel	excavation since 1995	first report: Lenneis 2001
37	Mörtsdorf	In der Au	surface	FÖ.29–36, 1990–1997
38	Obemixnitz	Hermannsdorf	single find	Maurer, FÖ.33, 1994, 484
39	Poigen	Bachrain	surface	Lenneis 1989
40	Rosenburg	Hofmühle	excavation 1988–1994	first report: Lenneis 1992
41	St. Bernhard	Teichbreiten	surface	Maurer, FÖ.33, 1994, 490; FÖ.38, 1999, 754
42	Strögen	Böhmerthal	excavation 1986	Lenneis, Lüning 2001
43	Untermixnitz	Hungerfeld	surface	Lenneis 1989
44	Zaingrub	Winkelthal	single find	Winter, FÖ.30, 1991, 243
district Korneuburg				
45	Lachsfield		surface	Lenneis 1989
46	Wetzleinsdorf		surface	Lenneis 1989
district Krems				
47	Langenlois	Ried Schenkerbühel	single find	Lenneis 1989
district Melk				
48	Lanzing		surface	Harrer, Lenneis 2001
49	Roggendorf	R 1 – Ort	surface	Harrer, Lenneis 2001
50	Roggendorf	R 2 – „Scheibn“	surface	Harrer, Lenneis 2001
51	Schollach		surface	Harrer, Lenneis 2001
district Mistelbach				
52	Aspam (+Schletz)	Am Wald	excavations since 1984	first report: Windl 1994; 1996
53	Bullendorf	Wiesental	surface	Adler, FÖ.30, 1991, 233
54	Friebritz	nördlich Ort	surface	Lenneis 1989
55	Gaubitsch	südlich Ort	surface	Lenneis 1989
56	Gaubitsch	Alpenberg	surface	Maurer, FÖ.33, 1994, 472; Hasenöhrl FÖ.36, 1997, 742
57	Grafensulz	Haltergarten	surface	Maurer, FÖ.33, 1994, 476; 35, 1996, 402; 36, 1997, 744
58	Hagenberg	Ziegelofenbreiten	surface	Lenneis 1989
59	Hornsbürg	Ritzenhof	surface	Schwammenhöfer, FÖ. 21, 1982, 224
60	Niederkreuzstetten		surface	Lenneis 1989
61	Oberkreuzstetten	südöstlich Ort	surface	Schwammenhöfer, FÖ. 35, 1996, 414
62	Poysdorf	Obere Lüz	rescue excavation 1994	Blesl, Neugebauer, FÖ.33, 1994, 579 ff
63	Schletz		surface	Lenneis 1989
64	Traunfeld	südlich Ort	surface	Lenneis 1989
65	Ulrichskirchen	südwestlich Ort	surface	Schwammenhöfer, FÖ. 35, 1994, 421 f
66	Wultendorf	Angerl	surface	Lenneis 1989
district Mödling				
67	Brunn/Gebirge	Wolfholz, Fst. I	rescue excavation 1989	Stadler 1999
68	Brunn/Gebirge	Wolfholz, Fst. II	rescue excavation 1990/92	Stadler FÖ.31, 1992, 395; Stadler 1996
69	Brunn/Gebirge	Wolfholz, Fst. III	rescue excavation 1999	Stadler 1999
70	Brunn/Gebirge	Wolfholz, Fst. IV	rescue excavation 1997	Stadler 1999
71	Perchtoldsdorf	Bachacker	rescue excavation 1993/94	Hermann FÖ.32, 1993, 708 FÖ. 33, 1994, 485
72	Perchtoldsdorf	Industriestraße	surface	Hermann, FÖ.31, 1992, 458
73	Perchtoldsdorf	Judenacker	rescue excavation 1990/91	Talaa, FÖ.29, 1990, 184 f; FÖ.30, 1991, 239
74	Perchtoldsdorf	Zwingen	rescue excavation 1995	Talaa, FÖ.34, 1995, 623
district St. Pölten				
75	Obermarnau	bei „Anwesen Nr.18	single find	Lenneis 1989
76	Pottenbrunn	Löberfeld	single find	Wallner, FÖ.29, 1990, 186
77	Wimpassing/Pielach	Kirchenfeld	surface	FÖ. 33, 1994, 498 ff; FÖ. 34, 1995, 632 f.
district Tulln				
78	Trasdorf	südöstlicher Ortsrand	rescue excavation	Neugebauer, FÖ.24/25, 1984/85, 219
<b>OBERÖSTERREICH/UPPER AUSTRIA</b>				
district Linz – Land				
79	Leonding	Gendarmerieposten	rescue excavation 1994	Grömer 2001
80	Rutzing	Schottergrube Rieder	rescue excavation 1968	Lenneis 1989