

THE NORTH SMELTER AT TITELBERG:
POST-IMPERIAL BRONZE RECYCLING IN BELGIC GAUL

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by
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The undersigned, appointed by the dean of the Graduate School, have examined the thesis entitled

THE NORTH SMELTER AT TITELBERG:
POST-IMPERIAL BRONZE RECYCLING IN BELGIC GAUL

presented by Matthew L. Shaw,

a candidate for the degree of Master of Arts,

and hereby certify that, in their opinion, it is worthy of acceptance.

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Cette recherche est dédié à ma chère femme, Roxie. Sa patience et support m'a aidé plus que je peux dire, et je suis toujours dans sa dette.
Merci une mille fois.

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ABSTRACT

The Titelberg in modern Luxembourg was not only the largest oppidum of the late Iron Age in Gallia Belgica, but the most long-lived, with occupations from La Tène II continuous for centuries, ultimately prospering due to copper and iron ore resources as a mint and industrial center before and after Gallo-Roman contact, until eclipsed by larger centers. During the middle of the first century AD, the mint was razed, not to be rebuilt, and the population dwindled. After an interval of perhaps three hundred years, a new smelting furnace was built into the remains of the Gallo-Roman Minting Foundry; excavation shows this smelter was used to melt down bronze coins and artifacts for reuse or as bullion.

The questions arise from this, then: who was doing this and why? In the latter fourth century, were Franks moving into the territory and exploiting easy resources, or was this another example of continuity? Was the recycling process due to economic and political woes or was there a deeper reason. There is sufficient evidence to hypothesize continuity, with a local populace accustomed to accommodation, and a burgeoning economy fueling itself through a hunger for metal.

INTRODUCTION

A Prefatory Note on Chronology

Much of the following discussion will predicate upon understood terminology relative to chronology; therefore, a brief clarification is in order, particularly for the designations used for the Iron Age. The second half of the Iron Age in western Europe, pertinent to this study, will be broken down as follows, using French terms (adapted from Hamilton 1996:23):

Iron Age Gaul:	La Tène I	480-300 BC
	La Tène II	300-100 BC
	La Tène III	100-20 BC
Roman Conquest of Gaul		58-51 BC
Augustan/Early Gallo-Roman		20 BC- AD 70
Imperial/Gallo-Roman		AD 70 -mid 4th century AD

The literature can be confusing with variations in usage, as La Tène I, II and III may be called Early, Middle and Late La Tène in some French and English publications, and La Tène A, B, C and D in German (with A and B corresponding to halves of La Tène I), while Dutch and Flemish authors will label La Tène I the Middle Iron Age, and La Tène II and III the Late Iron Age. These variations will be avoided in this paper .

A. Titelberg

The river Chiers, called *Korn* in German and *Kuer* in Luxembourgish, flows west and north through Luxembourg, France and Belgium as a tributary of the Meuse; along it, near Pétange in the southwestern corner of the Grand Duchy of Luxembourg, looms the 100 m. Titelberg, which is topped by a fortified enclosure. Reaching 9 m. in height, the rampart contains a 50 hectare area within which continuous occupation spanned the late Iron Age, Augustan and Imperial Gallo-Roman periods, eventually dwindling to archaeological invisibility during the early fifth century AD (Rowlett, *et al.* 1982:301-2). Due to this continuity of occupation, Titelberg has maintained prominence for studies of the Romanization that occurred during and following the Conquest of 58-51 BC, as well as dynamics of adaptation following the lapse of Roman centralization in the third and fourth centuries AD (Hamilton 1996:1; Rowlett 1988:31). That the Titelberg hill lies near the end of a range of steep hills along the southern border of modern Luxembourg, it is strategically positioned to dominate the low-lying areas north and east of it; more significantly perhaps, it is centrally located in the iron ore deposit-rich area that, until relatively recently, formed a significant part of local economy (Wightman 1970:31). These factors contributed to the site functioning as a chiefly *oppidum*, or fortified, permanent urban settlement typical of the late iron Age in western Europe, often associated with the administrative seat of a chieftain during the latter Iron Age (Rowlett

1988:33; Wells 1999:28), and, as shall be demonstrated below, an administrative and economic center during the Roman occupation.

While having experienced some antiquity-looting over time, the Titelberg site was largely spared destructive excavation during the somewhat less-rigorous and poorly documented attempts at archaeology during the nineteenth and early twentieth centuries (Wightman 1970:31; Rowlett 1988:31). Thus intact, Titelberg was subject to recurrent excavation from the late 1950s by teams from the Luxembourg State Museum, leading to such publications as Metzler's monumental, two-volume compendium of the Luxembourgish finds (1995), and from the University of Missouri-Columbia through the 1970s until 1982. While Metzler discusses work from many areas of the hilltop, including trenches through the rampart itself, demonstrating its *muris gallicis* construction by which some sense of the date of construction can be assayed (1995; also Rowlett, *et al.* 1982:311), excavations undertaken during the 1970s by the team from the University of Missouri were located near the center of the enclosure, immediately adjacent to units containing Gallo-Roman houses unearthed by the Luxembourg State Museum (See Figure 1). These University of Missouri excavations exposed a series of fourteen directly-overlapping stratified living floors, which date back to the mid-La Tène Iron Age, underlying a structure of the first century AD built with a substantial stone foundation; the upper strata exhibited significant evidence of a coin minting facility for the later pre-Roman decades and Roman Augustan period until the mid-first century AD, when razing of the structure brought the sequence to an end (Rowlett, *et al.* 1982).

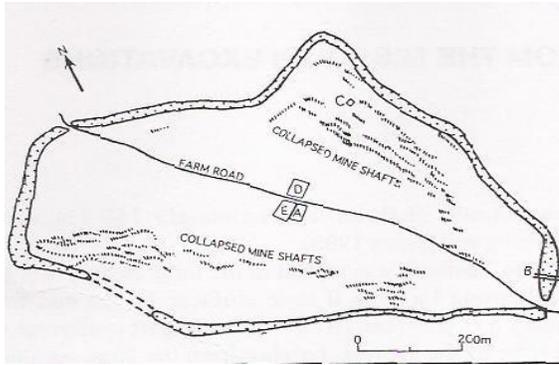


Figure 1
 Plan of Titelberg enclosure, showing University of Missouri excavation (A) near center. (From Thomas, *et al.* 1976)

Though the stratified Iron Age and Gallo-Roman occupational levels have been of central interest to scholarship relative to Titelberg (i. e., Hamilton 1996), two much earlier levels dating to the late Neolithic were found below those and reported (Rowlett, *et al.* 1980) and a feature dating to end of the fourth century was found intrusive into the first century structure. That feature and its contents will be the focus of this discussion, following further description of the cultural contexts.

B. Gallia Belgica and the Treveri

It is deceptively convenient to use Caesar’s terminology to designate the territory north of the Seine, stretching from the Rhine to the shores of the Channel in the west, as *Gallia Belgica*, or Belgic Gaul, as his intent was to describe an ethnic region that perhaps lacked the identity he chose to portray. King (1990:31-33) cogently considers Caesar’s assessment of the tribes of northernmost Gaul as the furthest removed from and most resistant to the civilized ways that “tend to make men soft”, an assessment that augmented his high opinion of these tribes as the most dangerous foes in Gaul,

yet even Caesar noted more complexity. His descriptions seem to use the Somme as a line of demarcation, with the Belgae proper between it and the Seine, and a more nebulous set of peoples from the Somme to the Rhine; the Belgae proper were more closely related to the Celtic Gauls, and more likely speaking a Celtic language, while the others were portrayed as more like the Germanic tribes across the Rhine (Hamilton 1996:24-26; King 1990:30). This confusion was no doubt exacerbated by Caesar's apparent insistence that Germans only inhabited the lands across the Rhine, and yet Hamilton cites scholarly debate arguing how specific Caesar's use of "*Germani*" was (1996:25). Suffice it to say that the early textual documentation on the ethnic or linguistic nature of the tribes of this area in the Late Iron Age is problematic.

Archaeology has painted a somewhat more clear, if different, picture of the cultural map of Belgic Gaul. King's summary contrasts Caesar's perceived east-west differentiation between Celtic Belgae and Rhenish Germani with a gradual shift from more recognizably Gaulish phenomena, such as oppida and minted coinage, in the southeast part of this area, to cultural manifestations in northern Gallia Belgica that much more closely resemble Europe north and west of the Rhine, lacking in oppida and Mediterranean trade goods (1990:32). This presents a frontier zone along what is now northern France, cross-cutting Caesar's described variation, but very much in keeping with Wells' model of the "frontier" as a zone of Romanization (1999:125-132), an area in which a process of interaction shapes the political and economic reality, rather a line marking a real boundary. Titelberg falls squarely within this zone, and demonstrates a complexity for which King's model does not account.

The Titelberg is recognizable as a significant oppidum by La Tène III, and was located in the area occupied by the Treveri (See Map 1), whose



ancestry remains something of a puzzle (Wightman 1970:16, 31). Not only do the Treveri fall into Caesar’s category of tribes towards but on the near side of the Rhine, but he waffles on whether he considers them more Germanic than Belgic

(Hamilton 1996:25; Wightman 1970:16, 17); more than a century later, Tacitus adds that the Treveri actively foster a Germanic heritage as they “aspire passionately to the reputation of being descended from the Germans; since by the glory of this original, they would escape all imputation of resembling the Gauls in person and effeminacy” (Medieval Sourcebook:II). While Tacitus’ statement perhaps tells more of Romans in the late first century AD than it does of the Treveri, and despite Caesar’s puzzlement on the topic, it is tilting at windmills to ponder the ultimate origins of the Treveri, as the archaeological record demonstrates clear continuity into the past in this region, and the likelihood stands that the Treveri had held the territory for centuries.

Wightman explains the persistence of characteristic cultural elaborations in the area of the Treveri, such as burials accompanied by wagons and, later, chariots, back into the first half of the Iron Age, the Hallstatt Culture Period, which spanned roughly from 800-480 BC (1970:17-18; 1985:6-10). The Hunsrück-Eifel Subtradition of the western European Iron Age, centered on the Moselle region and the high-quality iron and copper ores in its volcanic hills, is recognizable, arguably, by the sixth century BC and persisted into the middle of the third, and Wightman asserts that there is no significant discontinuity with the preceding Bronze Age that cannot be accounted for by intrusive elements from the Urnfield Bronze Age culture to the south (1970:14, 17). The Hunsrück-Eifel culture did share a good deal of contact with the Hallstatt culture that dominated central Europe, as evidenced

by rich wagon burials that included the coral-inlaid, bronze beaked flagons from the northern Italian peninsula that were such a hallmark of the Hallstatt prestige good trade. Hunsrück-Eifel did, however, maintain its regional identity despite the influences through trade and contact; the poor and acidic, if well-drained, soil was less favorable to agriculture than to livestock raising, and the presence of iron and copper ores stimulated metallurgy and trade.

Unlike the greater part of the Hallstatt culture area, marked by a select number of extremely rich, aristocratic burials, burial customs do not betray an obvious chiefly class in early Hunsrück-Eifel, with a broader scope of graves of very respectable, if not princely, wealth (Wightman 1985:6-7). This begins to change somewhat after 500 BC when the rise of La Tène groups shifts the balance of power, based upon control of trade of Mediterranean finished goods and northern resources, more to the north and west, thus bringing the Hunsrück-Eifel area into a more favorable position (Cunliffe 1994:346-350; Wightman 1985:6-10).

The fifth century BC saw an increase in the population of northern Gaul, a trend that continued well into the fourth century, and a continuation and increase of trade contact with the Mediterranean. Archaeologically, the Marnian and Hunsrück-Eifel Variants of La Tène I, stretching from the Paris Basin to the vicinity of Trier along the Rhine, are noted for elaborate burials, including the chariot burials of the Marnian Variant but for southern Champagne (Hodson and Rowlett 1974). Throughout this range, distinctive funerary ceramics were produced by wheel-thrown manufacture, and interred in number. Relatively high quality, black Belgic

Ware was also produced through this time until the end of the first century BC, as well as ochre-colored wares; these seem to have served a wide range of uses (Bretz-Mahler 1971; Brogan 1974). This continuity was interrupted by the advent of the Roman presence by 40 BC, and Belgic pottery gave way to Gallo-Belgic, such as *terra nigra* and *terra rubra*, which were dominant by about 10 BC; these wares in turn were superseded by the second century AD by the *terra sigillata* that becomes characteristic of the provincial Empire for about two centuries (Brogan 1974). Wightman insists, though, that continuity in local production, styles and burial practices remained, despite the augmented warrior aristocracy and increasing disparity in wealth distribution which came with the waxing of the La Tène Iron Age that subsumed the Hunsrück-Eifel variant following the end of La Tène I (1985:8).

This is prelude to the state of affairs at the approximate time of the settlement of the Titelberg during the Iron Age; during the third century BC, people, presumably of that region and not immigrants from abroad, based upon the combination of La Tène II artifacts and deep fireplaces, established the earliest of the consecutive occupations unearthed by the Missouri excavations (Hamilton 1996:33; Rowlett, et al 1982:309). This settlement was then followed by a phase of rapid growth. By the middle of the first century BC, Titelberg was not only the largest settlement of the Treveri (Hamilton 1996:33), but the presence of many coins and the mint foundries that produced them indicate its status as an oppidum close to the seat of power (Rowlett, *et al.* 1982:302). Indeed, Rowlett, *et al.* cite

descriptions of Titelberg as the central oppidum itself of the Treveri at the time (1982:302). Wells goes further, noting that a mint at Titelberg was producing coins of Hirtius, governor of Gaul following the Gallic Wars, thus indicative of political support for the Romans on the part of local authorities (1999:136-137). Should Wightman's conviction that the Treveri, as named in Caesar and Tacitus, represent a population that had occupied the valleys between the Meuse and the Rhine since the late Bronze Age while maintaining a battery of regional cultural continuities, this demonstrates a culture group able to accommodate outside influences both economic and political.

Wells describes the Titelberg situation as a prime example of his model of interaction of Roman troops and indigenous inhabitants along the frontier zone; he notes little change for several decades, due to the readiness of the Roman sympathizers to suppress rebellion, until a profound increase in Roman goods, especially luxury goods such as the *terra sigillata* ceramic ware mentioned above, mark the increased presence of more troops, of Roman infrastructure, or both (1999: 136-137). His discussion centers upon the sea-change in goods, with local manufacturers switching to the Roman styles, especially in metal goods and ceramics over the now-unfashionable ornaments and coarse wares; yet, while Wells discusses domestic coarse wares in terms of their use and diminishing continuity in household use during this time (1999:197), he portrays the Roman styles as completely supplanting native, and the Titelberg as dwindling in population and industry until abandonment in the second decade BC. The archaeology does not

support either of these positions.

Hamilton remarks that, while the Titelberg did indeed lose its central role in the area after 30 BC as the Romans shifted their military and administrative center to the Rhine, the demotion was but to a prosperous town (1996:33). Minting continued until about 50 to 70 AD, and manufacturing in ceramics, glass and iron continued well after that. An interesting continuity is one of the very coarse wares Wells would have in extinction.

Shell-tempered ceramic sherds were also recovered at Titelberg by the Missouri excavations, in three artifact-rich strata dating to La Tène II and III, of the last two centuries BC; a wall of Augustan-period manufacture interrupts the floors of which these levels may well be part, so clear context is difficult (Thomas, *et al.* 1976). The shell-tempered wares would have been of limited aesthetic value, as shell particles inevitably migrate to the surface of the ceramic wall, precluding painting or glazing in most cases, and the process would have involved increased cost in manufacture through acquisition of marine shells or the admixture of salt to fresh-water shells (Rowlett and Shaw 2004:158). However, they represent a significant proportion of the whole assemblage at Titelberg, accounting for 28% of the ceramic assemblage of the uppermost stratum, 30% of the earlier, perhaps terminal La Tène II stratum, and 44% of the earliest, Middle La Tène stratum. The association of *terra belgica* and traces of *terra sigillata* with the uppermost stratum, also the lowest percentage, indicates the increasing Roman presence, and is interpreted as a measure of acculturation of the inhabitants to the Roman

occupation (Thomas and Rowlett 1979). Even more striking than the presence of the shell tempered pottery itself at Titelberg, however, is the evidence for its production there as late as the fourth century AD in some quantity; a kiln for its manufacture, and accompanying shells, were unearthed by the Luxembourg State Museum (Metzler 1995; Thomas and Rowlett 1979), and do seem to represent continuity in the very local manufacture Wightman championed, beyond the more widely disseminated coinage and metal and beyond the period of florescence.

2.

THE MISSOURI EXCAVATIONS

Prior to the involvement of the University of Missouri, the State Museum of Luxembourg had already conducted excavations in three separate locations on the summit of the Titelberg, as well as having cut a trench through the rampart itself to expose its cross-section (Thomas and Rowlett 1979:52). While verifying that the current farm road through the enclosure (See Fig. 1) keeps very nearly the same course as the Roman road through the oppidum, closely along this road the Luxembourg team excavated a glass factory, a smithy, a number of cellars dating to the third and fourth centuries AD, and the Gallo-Roman pottery workshop that produced the shell-tempered ceramics, complete with wheel and cellar-like kiln that closely resembles a hypocaust (Rowlett 1988:33-35). Neolithic and Upper Paleolithic surface finds were occasionally brought to the attention of Gérard Thill, the Curator-Director of the Luxembourg State Museum, suggesting that there was a deeper antiquity to the occupation of the site than Gallo-Roman times (Thill 1965).

With the authorization of the State Museum, the University of Missouri undertook excavations at the Titelberg during the summer seasons of 1972-1974, 1976-1978 and 1982, using multi-disciplinary teams lead by Ralph and Elsebet S-J Rowlett, and Homer L. Thomas (Hamilton 1996:34-35; Rowlett 1988:32). The surface finds and primary surveys had indicated many reoccupations; Thomas and

Rowlett state that the primary goal asked of the Missouri team by the Luxembourg hosts was to establish the “sequence and character of the successive occupations,” and they were invited to excavate just south of the enclosure’s center, along the main road and near the State Museum excavation units (1979:52). The Missouri team did indeed unearth structures, and they were able to greatly augment the evidence for depth of occupation.

The excavation unit opened by the Missouri dig teams was an irregular trench, roughly 19 m. by 13 m., and is centered upon the sequence of overlapping two-roomed structures discussed above; at least the most recent seven strata contain sufficient coins and coin molds to accept the structures as minting facilities (Thomas and Rowlett 1979:55). The salient features uncovered in this unit include, in reverse chronological order (Following Hamilton 1996; also see Figures 2 and 3):

- * A smelting furnace (the North Smelter; to be discussed in detail below) from the late fourth century AD, filled with rubble, burned debris and a mixture of heat-damaged artifacts. This is the only feature that is intrusive into the Augustan structure with the stone foundation.

- * A non-occupation scatter of coins and other artifacts, dating from the late first century AD until the fourth, that may represent an open market area. No subsequent structures were erected until the North Smelter.

- * A paved side-street from the first century that joins the main road to the north of the excavated unit.

* The foundations of the two-room, Augustan period structure, used as a mint, destroyed in the middle of the first century. This is called in the literature the “Foundation House Mint Foundry” due to it having the substantial stone foundation (Rowlett, *et al.* 1982:302).

* A copper-metal based smelting furnace, apparently used for bronze casting, used briefly and filled in circa 1 AD, then covered over by the side-street (Thus invisible in Figure 3). This smelting furnace is filled with residual clay luting and slag, many coin molds, a tuyère tip and the remains of an infant; Stout reports in Rowlett, *et al.* (1982:312) that a similar and contemporary child burial was discovered at Manching under a roadway, and may represent a ritual event rather than an unceremonious deposit.

* The succession of fourteen floors beneath the Augustinian structure, beginning with the Dalles Floor, the first flagstone-paved floor, reaching back through Roman contact times into the third century BC (La Tène II). These are also indiscernible in Figures 2 and 3, as they all so nearly follow the foundations of the later structures. The structures and floors were regularly renewed, as Hamilton points out (1996:36), but the foundations and hearths are almost precisely superimposed.

* Two Neolithic levels, one barely separated from the Iron Age strata, and the earlier another 20-25 cm. below; the upper and more recent dates to approximately 2000 BC.

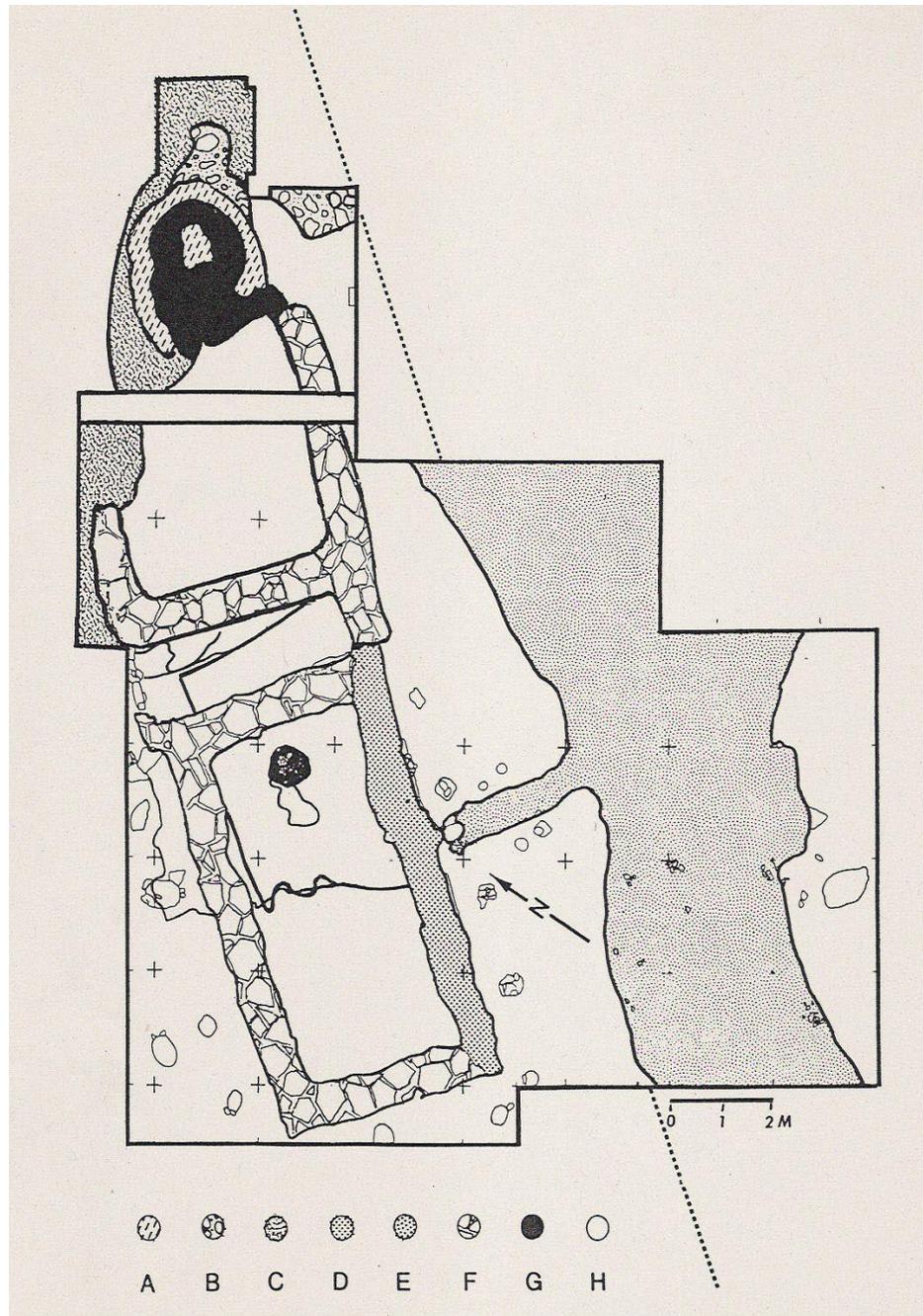


Fig. 2 Plan of Mint Structures and Side Street.
 A - clay around 4th century smelter, B - stone rubble associated with 4th century smelter, C - compacted rubble associated with 4th century smelter, D - gravel-paved side street, E - plaster filled robber trench, F - foundation of Augustan period mint, G - fireplace of Augustan mint, H - exterior levels. Heavy lines show limits of Dalles Floor; large, dark feature is 4th century Northern Smelter. (From Thomas and Rowlett 1979)



Fig. 3
Overhead photograph of Foundation House, looking at Dalles Floor walls. Northern Smelter is at top. (Photo courtesy of Dr. Ralph Rowlett)

To correlate the chronology for occupations and the relevant strata and activities that the University of Missouri found relative to the structures, this profile diagram depicts the overlapping layers.

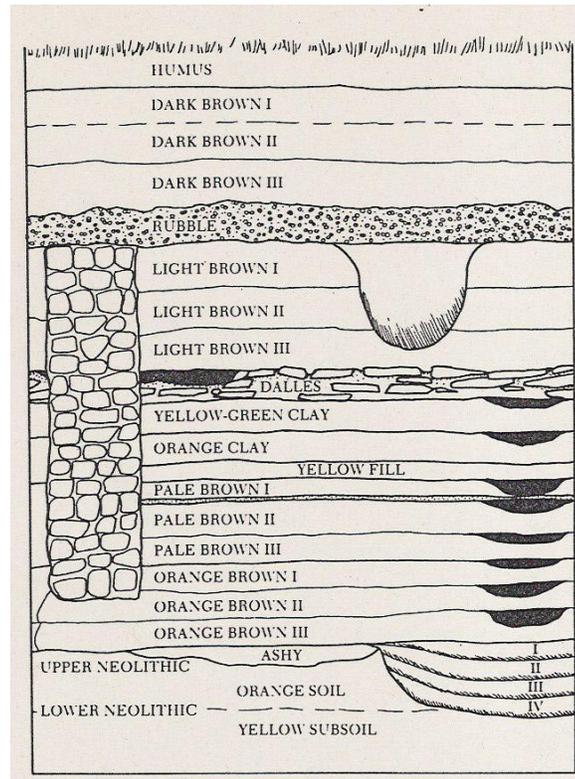


Fig. 4 Diagram of superimposed occupational floors.. (From Rowlett 1988)

Stratum

Dark Brown I-III
 Rubble
 Light Brown I-III
 Dalles
 Yellow-green clay
 Orange clay
 Yellow fill
 Pale Brown I-III
 Orange-brown I-III
 Ashy (Ashy I-IV)
 Neolithic

Date

ca. AD 70 - AD 400
 ca. AD 70 (Mint destruction)
 ca. AD 1 - 70 (Foundation House)
 30 BC - AD 1 (Flagstone flooring)
 pre- 55 BC - 30 BC (These mark Roman contact)

 100 BC-ca.55 BC (minting begins)
 2nd century BC (late La Tène II)
 3rd century BC (early La Tène II)
 pre-2000 BC

The strata of the structures, and the minting facilities associated with the last century of their existence, have been well documented, and the industries described. The North Smelter, though described in vague terms, has not been approached in print as a phenomenon itself as yet; it should be noteworthy if only because it is the only edifice erected in this area of the Titelberg after the mid-first century AD razing of the Foundation House, despite the central location within the rampart and the continuing activity in the town demonstrated by the archaeology (Metzler 1995; Rowlett 1988). In addition, Rowlett (1988:39) suggests that the unidentified operators of the smelter, which was apparently used for the melting down of bronze items including obsolete coins, knew somehow to position their operation over the long-defunct Foundation House Mint Foundry; it is impossible to tell if this was coincidental, or if there had been continuity in this industry that has remained hidden to archaeology,

As an alternative hypothesis, we can begin with the given that the Titelberg had risen to prominence in the La Tène Iron Age due to the iron and copper resources it could command, and served as a prosperous minting (as well as mining) center in early Gallo-Roman times. After a hiatus of two centuries, the North Smelter represents the recycling of bronze into bullion for alternate uses or export. Interestingly then, in her study of copper-alloy artifacts from Titelberg using proton-induced X-ray emission spectroscopy (PIXE), Hamilton has demonstrated by trace-element analyses that one Phase V (AD 70-400) fibula in that group was of recycled metal (1994:859), and in a later study, that 28% of Phase V copper-

alloy artifacts were of “opportunistic smelting together of bronze, copper and brass scrap pieces” (1996:51). While she speculates on regional recipes for alloys and the tailoring of alloys for intended use, she notes that the “opportunistic” commingling of alloys increased through the third and fourth centuries, and the wide-ranging trade in ores that had marked the Gallo-Roman heyday had ceased about the time the Foundation House was razed and subsequent metalsmiths had to make use of a more limited range of materials. The economy of the late fourth century may have made bronze recycling a desirable, even profitable pursuit.

3.

THE NORTH SMELTER

Uncovered during the excavation season of 1977 as an extension to the north and east of the original excavation unit, the North Smelter was the focus of field research in 1978 for the University of Missouri team (Rowlett, *et al.* 1978:223). Again, the North Smelter is the only feature to disturb the Mint Foundry since its razing in the mid-first century AD. To construct it, a pit 1.10 m. deep was dug into the northernmost floor of the Foundation House and lined with stones averaging 30 cm. in diameter; the feature has a diameter of about 2 m.. While the northern half seems to have been filled with a tumble of large stones absent loose dirt fill, the southern half exhibits stratified charcoal and clay deposits, suggesting separate dumping episodes that may or may not have been immediately consecutive (See Figures 5 and 6). Three column base fragments and a column drum are among the stone fill in the northern half (Rowlett, *et al.* 1978:223-224).

While the charred layers contain many artifacts that will merit description below, a collection of carbonized plant remains also were recovered and analyzed by Dr. Maria Hopf of the Römisch-Germanisches Zentralmuseum in Mainz. Of the fourth-century grains, 88.6 % were of bread wheat, 7.9% were of einkorn and emmer, and 2.8% represented the first recovered spelt from Titelberg; five barleycorns, an unspecified though small number of vetch seeds and one sloe pit were also

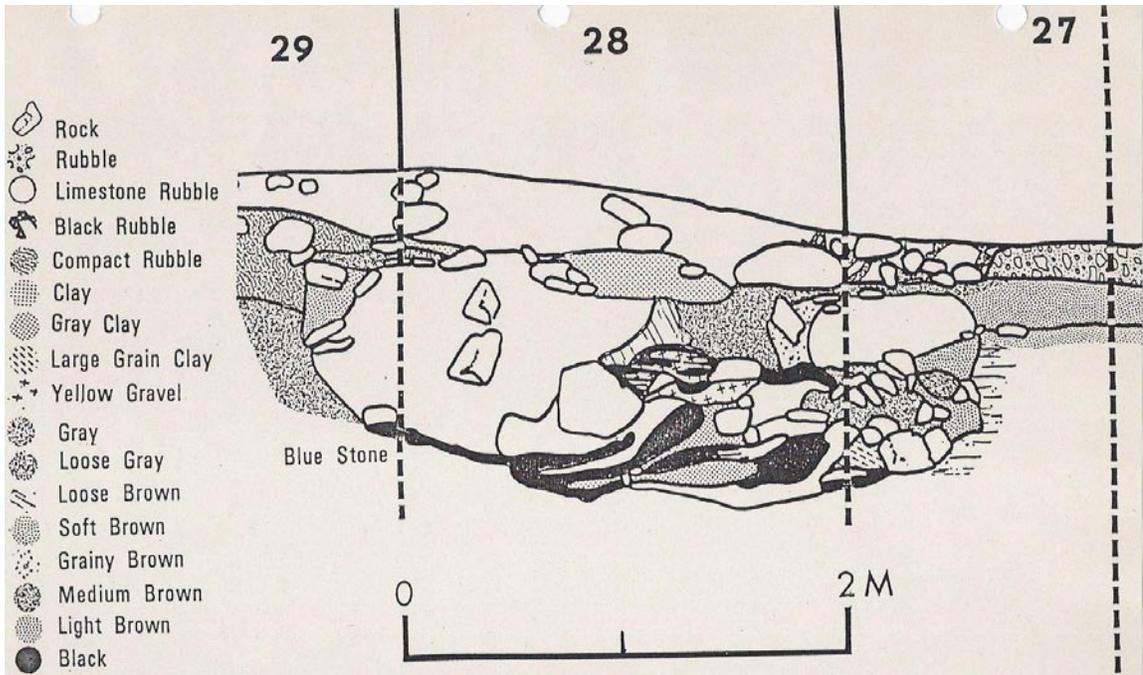


Fig. 5 Profile plan of North Smelter, facing east. (From Thomas and Rowlett 1979)



Fig. 6 Photograph of profile of North Smelter, facing east. Note blackened, charcoal deposits in lower right of fill. (Photo courtesy of Dr. Ralph Rowlett)

recovered. These remains served to complement the previously described paleobotany of the Neolithic, Iron Age, and Gallo-Roman occupational strata at Titelberg, as the fourth century is little documented.

Even with the rubble and detritus fill, most likely the furnace's own remains pushed in upon itself, it is slightly odd in form. It seems too large to be of the bowl or dome-type copper and copper-alloy furnaces as discussed in Hodges (1981:67-68), and is decidedly larger than most Roman smelters; Jackson, *et al.* note that typical large, iron smelting furnaces of Romano-British manufacture have an internal diameter of no more than 0.5 m. (1988:275). The series of furnaces they describe from Northamptonshire have internal diameters between 1.0-1.4 m., which seems much more in keeping with the diameter of the North Smelter's pit and the structural fill which could represent the remains of the tall shaft such a wide bore would require (1988:279-286; Tylecote 1987). Several of the furnaces Domergue describes at Martys in southern France, however, seem of similar construction and diameter, despite the earlier date (1991:109-111).

Weiller published a complete catalog of the coins, all bronze, recovered from the North Smelter in the festschrift for Homer L. Thomas, identifying as many as possible and using them to establish chronology. His task was made particularly difficult not only by the incinerated structural remains filling the pit, but also by the traumatized state of the coins. Of the 218 recognizable coins recovered from the pit, many were fragmentary and 192, or 88% of the total, were fire damaged by the heat of the oak charcoal found to have fueled the furnace (Rowlett 1988:39;

Weiller 1993). As the coins have all been published elsewhere, it is not necessary to list any more of them than the most recent datable coin: #82 was minted in Lyon with the likeness of Constantinus II, putting its minting and the *terminus post quem* for the North Smelter between 337 and 340 AD (Weiller 1993). Some of the more tortured coins are presented in the Plates for reference (See below).

Hobbs (2006) has prepared a rather comprehensive catalog of precious metal caches over a broad area and sweeping time frame. Though he concentrates on gold and silver hoards in western Europe, he often finds bronzes in the same contexts and includes them; his focus is on grave deposits, which he considers ritual acts with no intent of recovery, though he notes the prevalence of stashed hoards of late Roman goods and coinage, such as that at Hoxne, UK, which is contemporary with the North Smelter. He describes the period 318-410 AD as characterized by an increased concentration of caches in northeastern France and Belgium, suggesting a perspective of Rhineland deposits as an extension of British behavior, with whom they share the largest concentration of such hoards in Europe. Noting the radical increase in localization through the fourth century, as Roman centralization became a thing of the past, he credits it to social behavior based upon some economic force he makes no attempt to plumb; he sees a fundamental economic difference between third century Gaul and subsequent centuries and associates this with burgeoning prosperity (2006:125-127). Though there is no such hoard of lucre at Titelberg from the late fourth century, there was obviously a concentration of specie and other bronze goods. While he states no conclusions,

he suggests a growing economy accompanying increased localization, a step that may at first sound counter-intuitive.

The artifacts from the North Smelter are of stone, bone, glass, ceramic and metal (iron, bronze and a gold inlay), and several are characteristic enough to illustrate cultural affiliation and chronology; some comparative materials from other sites will be shown. Though any stratigraphy for this filled pit is artificial and speaks more of backfill than deposition, the smelter occupies seven two-by-two meter grid squares (29K, 28J, 28K, 28L, 27J, 27K, 27L: See Figure 7); it seems more organized to describe them in those groups, and by material.

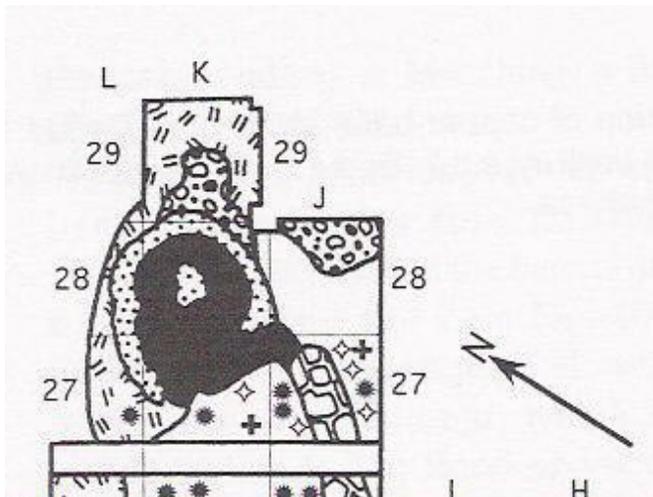


Fig. 7
Grid plan for units
involving the North
Smelter. (From Hamilton
1996)

LE MOBILIER

A. Description of Assemblage

All artifacts will be presented in the Plates in photograph or illustrated form in a 1 x 1 scale, unless otherwise stated. All artifact illustrations are courtesy of Dr. Ralph Rowlett and the Department of Anthropology, University of Missouri-Columbia.

Unit 29K

Iron:

Catalog #33-77. Small iron knife blade, akin to paring knife. The point is upwards in the photograph, and the lower end shows signs of hafting or handle attachment.

Stratum: Rubble V. Plate 1, A; in left of set..

Catalog #115-77. Iron bellows nozzle, wide aperture. Found near edge of smelter, and at point farthest from rake-out access, so it could well be in its business location.

Stratum: Rubble V. Plate 1, A; in right of set.

Catalog #868-78. Iron ring or belt buckle, broken. Rectilinear configuration in illustration is deliberate, as object would have appeared octagonal. Stratum: Black IXa. Plate 1, B.

Catalog #117A-77. Iron object, unknown use. Not a broken strike-a-light as may appear, since broad, curved edge is sharp. Stratum: Rock, near top. Plate 1, C.

Catalog #117B-77. Iron object with broken shaft or handle, slightly concave on one side, flat on the other. Stratum: Rock. Plate 1, D.

Ceramic:

Catalog #239-78. Terra sigillata sherd with curvilinear motif above a linear band. Stratum: Soft Brown VIc. Plate 2, A.

Unit 28L

Bronze:

Catalog #525-76. Bronze ring piece, fragmentary. Stratum: Compact Brown IIIa. Plate 2, B.

Catalog #33-78. Flat broken iron piece with curved edge. Stratum: Rubble V. Plate 2, C.

Unit 28K

Iron:

Catalog #594-78 Iron belt ring, intact, with beveled edges to a flat back. Stratum unknown. Plate 3, A.

Catalog #535-78. Stout iron hook. Stratum: Rubble V. Plate 3, B.

Catalog # 55-78. Iron object, similar to bracket or sconce. Stratum: Black VI. Plate 3, C.

Catalog # 780-78. Iron pin with thick round section. Stratum: Black VIII. Plate 3, D.

Catalog # 464-78. Iron awl or projectile point with triangular cross-section. Stratum: Compact Rubble IVb. Plate 3, E.

Catalog #105-78. Iron gouge, well-preserved. Stratum: Rubble IX. Plate 3, F.

Catalog #461-78. Iron awl or projectile point. Stratum: Compact Rubble IV. Plate 3, G.

Catalog #886-78. Gilded iron ring, Gold inset clearly visible. Stratum: Crumbly IX. Plate 4, A

Catalog #908-78. Rectangular iron blade, truncated at one end and notched at the other. Stratum: Black IXd. Plate 4, B.

Catalog #864-78. Iron finger ring, mounting lost. The exterior circumference is recticular. Diameter of wire: 3.5 mm. Stratum: Black IXa. Plate 4, C.

Bronze:

Catalog #605-78. Coin # 306. Warped badly by burning, nearly doubled over. Indeterminate dating for numismatics. Stratum: Black VI. Plate 4, D.

Catalog #627-78. Coin #307: one-quarter of a coin.. Burned. Stratum: Black VI. Plate 5, A.

Catalog #635-78. Coin #309. Heat damaged. Stratum: Black VI. Plate 5, B.

Catalog #1230-77. Coin #201. Badly burned, warped and broken into two pieces. Completely indeterminate. Stratum: Black VIII. Plate 5, C.

Catalog #1231-77. Coin #202. Badly burned. Obvious dish-shape may be intentional rather than heat-modification. Stratum: Black VIII. Plate 5, D.

Catalog #1163-77. Coin #196. Burned and warped nearly in half. Found Daliesque, melted over a stone. Indeterminate. Stratum: Black VII. Plate 5, E.

Catalog #1173-77. Coin #198. Burned and defaced, but flat. Stratum: Black VII. Plate 5, F.

Ceramic:

Catalog # 887-78. Mayen Ware, Cloverleaf pitcher rim. Very characteristic artifact. Stratum: Black IXd. Plate 5, G.

Catalog #598-78. Pitcher rim; 3/9 grey-black rim, 2/9 grey interior, 1/9 grey body. Stratum: Black VI. Plate 5, H.

Catalog 869-78. Pink and cream potsherd, probable Cloverleaf fragment. Stratum: Soft Ochre IXa. Plate 6, A.

*catalog number missing Terra argonnen, (Sigillata from the Argonne). Very characteristic, matches well with materials from Breisach: see comparative plate of Terra sigillata from Argonne at contemporary Breisach. Decoration formed by rolling with a mollette. Stratum: unknown. Plate 6, B.

*catalog number missing Terra sigillata or Argonne sigillata, difficult to tell. Stratum unknown. Plate 6, C.

Unit 28J

Bronze:

Catalog # 934-74. Coin #408, Badly burnt, indeterminate dating for numismatics
Lower part of coin in photograph droops away from viewer. Stratum: Black IXd.
Plate 7, A.

Catalog #902-74. Bronze belt tab, fragmentary and burnt. Stratum: Black IXa.
Plate 7, B.

Lithic:

Catalog #823-78. Burnt flint strike-a-light with obvious use-scarring. Left very
near the rake-out access of smelter, so it could well be in its business location.
Stratum: Black VIII. Plate 7, B, top.

Catalog #821-78. Same as above, as they were found in close association. Plate 7,
B, bottom.

Unit 27L

There are no artifacts from Unit 27L

Unit 27K

Iron

Catalog #115-77. Short fragment of iron bar, similar to pry bar; lacks sharp edges.
Stratum: Rubble IV. Plate 7, C.

Catalog #431-76. Scalene cutting tool. Blade end intact, back broken or corroded
away. Similar pieces found in the floor of the Foundation House, first century
AD, and assumed to be for cutting coin dies. Stratum: Dark Brown II. Plate 7, D.

Bronze:

Catalog #542-78. La Tène III bronze fibula foot, dating to mid-first century BC.

Stratum: Loose Brown Va. Plate 7, E.

Catalog # 106-78. Coin #228, warped due to burning. Indeterminate dating for numismatics. Stratum: Rubble IX. Plate 7, F.

Bone:

Catalog #211-77. Bowl of bone spoon, pictured upside down with handle broken at bowl junction. Only spoon in North Smelter, it is highly polished and well-made. Stratum: Rubble I. Plate 8, A.

Unit 27J

Iron:

Catalog #494-78. Iron blade, possibly either knife or spearhead. Thick, diamond-shaped cross-section. Stratum: Dark Brown III. Plate 8, AB

Catalog # 507-76. Iron fragment of harness or scabbard. Sketch shows cross-sections and measurements in millimeters. Stratum: Compact Brown IIIb. Plate 8, C.

Glass:

Catalog #498-78. Claw beaker fragment, slightly greenish. No longer translucent. Stratum: Dark Brown III. Plate 8, D.

Catalog #62-78. Melted dirty pale green claw beaker fragment; perhaps same material as 498-78, but exposed to high heat. Stratum: Black. Plate 8, E..

Catalog #486 78. Clear claw beaker fragment, smooth and ovoid. Stratum: Black IV. Plate 8, F..

Unknown Provenance

Bronze: Paw of bronze lion statue sawed off at wrist. Failed to make it into furnace, but the rest of the lion apparently was not so lucky. Scale unknown. Plate 9, A.

B. Discussion of Assemblage

While the assemblage recovered from the North Smelter appears to be wholly unremarkable, it stems from its nature as materials sufficiently durable to withstand a bronze-melting furnace: stray, small pieces of iron, coins that may have had too high a trace element content (zinc, antimony) to melt at given temperatures or simply fell through cracks, and a few sherds of ceramic that were more than likely simply backfill. That so many coins survived to bear witness (Weiller 1993) surely gives evidence of the volume that were less fortunate; the paw sawn off the sculpture of a lion also gives credence to the hunger for metal that motivated such a recycling business.

While much of the discussion has involved the failure of centralization and the cash economy that thrived under Roman occupation, and Hobbs underscores

the balkanization that he perceives happening in the third and fourth century, there are singular evidences within this humble set of refuse that demonstrate a broader network of trade.

Terra sigillata was manufactured in a number of locations, but traded widely; there was a well known production in the Argonne that traded its somewhat identifiable wares throughout northern Gaul and beyond. Plate 10 A and B are Argonne sigillata recovered from the Münsterberg in Breisach, south of Strasbourg along the Rhine (Petrikovits 1976:269-270). The sherds come from components that are contemporary with the North Smelter at Titelberg and are samples of a wide range of such wares; compare the sherds in Plate 10, A, with the terra sigillata sherd in Plate 2, A, and the Breisach sherds in Plate 10, B, with those in Plate 6, B and C. The motifs are similar and the ware is very comparable; while they may not all be Argonne ware, (that in 6A almost certainly is), they represent a commonality of market options and tastes if not necessarily direct sources. In fact, Fulford and Bird state immediately that Argonne ware is so well known in fourth century British contexts that it eclipses discussion of most others (1975:171). Even if not Argonne ware, an early fifth century Frankish burial at Vireux-Molhain, France, excavated by Patrick Perin in 1987 exhibits similar sherds but from a Mediterranean source; the interment also has a strike-a-light much like those at the North Smelter and a tall glass beaker similar to the claw-foot beakers popular in the north (Todd 1994:449).

Additionally, Mayen Ware, a subgroup of *Eifelkeramik*, were produced through the fourth century at a Frankish center north of Trier along the Rhine. A very hard ceramic with a pebbly surface, Mayen Ware is well documented in Britain and seems to have enjoyed a wide export market (Fulford and Bird 1975). Fulford and Bird cite Wightman and von Petrikovits as wondering if there was state involvement in the production and trade of Mayen Ware, as they see it as a phenomenon whose axis is the Rhine and its concentrations where there were armies (1975:179-181). This is all rather organized for a time of localization and the dwindling of princely centers. Nevertheless, compare the Mayen Ware sherd from Plate 5, E, with the examples from Britain in Plate 10, C; Fulford and Bird are convinced by their mineralogical studies that the wares in Britain were indeed traded from the German Rhineland. Titelberg was connected into the trade network and the marketplace that chose to acquire this ware, even when it is less aesthetically pleasing than alternatives like terra sigillata.

The ceramic sherds in Plate 6, A, and 5, E, also exhibit a chronological marker, with the cloverleaf mouth on a jug or pitcher. Milikowski shows excellent examples of this from a Merovingian cemetery that also seems to date from the fourth or fifth century. Though one sherd from the North Smelter is Mayen Ware and the other likely not, the style is characteristic, and the burial remains at Smalmen show it as another trope of a growing northern European style.

These sherds do suggest a more northern market identity than southern, with trade goods from the northern Rhine and the Argonne well established. The

fragments of claw foot beakers retrieved from the North Smelter are also a telling detail. James repeats Böhner's sequence of the development of Merovingian goods, and claw foot glass beakers were much in favor among the Frankish elite in the early and mid-fifth century James 1988:26). The presence of fragments in the turn of the fifth century Titelberg smelter betrays another clue as to the cultural affiliation as well of the inhabitants. The Mayen Ware, Argonne sigillata and claw foot beaker fragments are small, but certainly act as horizon markers for the late fourth and early fifth centuries, and either espousal of or accommodation to German identity for the descendants of the Treveri.

5.

RECYCLING CONCLUSIONS

Arnold discusses the fourth and fifth centuries as paying the price, as it were, for the decline of Roman administration in the provinces, especially since the Roman settlers and barbarian immigrants had overpopulated and taxed the system to the point where migration was inevitable (1984:280). He perceives the role of Frankish rulers of the fourth through sixth centuries, in particular, to establish “projects’ to encourage growth of infrastructure and reinvigorate urban areas. Though he seems to get sidetracked by issues of religious responsibility, he does recover and clearly state that what was needed was industry and markets (1984: 281).

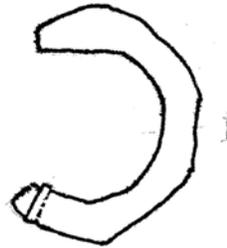
While couched in a strange tone of civic duty, Arnold was not far from the heart of the matter. A common trope about the chiefdoms of the Hallstatt (Early, Pre-La Tène) Iron Age is that they held their positions through the ability to dispense luxury items. Focus on prestige goods as movers of social dynamics, such as that of Frankenstein and Rowlands (1978), concentrates on the administration veneer of a society, and a small percentage of the population with access to such materials. Gosden, in good Marxist fashion, suggests that control of the means of production is at the heart of Iron Age chiefdoms (1985). While Titelberg in the late fourth century is a world away from the fortified strongholds of warchiefs in 600 BC Austria, but there were some valid similarities.

If Hobbs localization was the dominant paradigm, then exploiting resources with great frugality is prudent, and local production means less indebtedness or strife with rivals; if, however, the wide ranging market we postulate based upon the trade of Mayen Ware from Trier to East Anglia is in effect, then putting things up for sale is sound practice. the reality was no doubt more convoluted, and indeed must have been both at times. But recycling a precious metal, for bronze is expensive to produce when you must import the copper or tin, makes sense for a growing market. A central point of Hamilton's paper on the PIXE study of copper alloys (1994), is that, while availability of a variety of ores with which to work dwindled, production did not in any way. It seems parsimonious then to regard the Titelberg North Smelter as a profitable operation for a time, and the continuity of population and metallurgy in place.

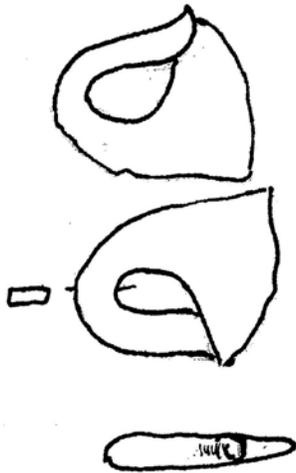
PLATES



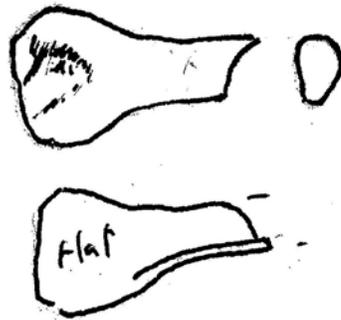
A.



B.



C



D

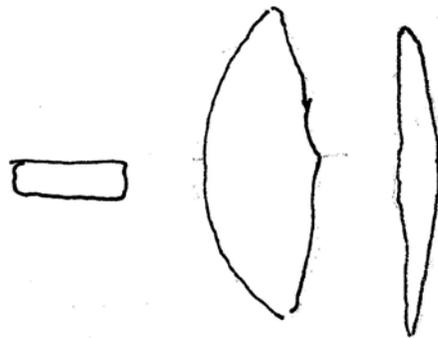
Plate 1.



A.



B



C

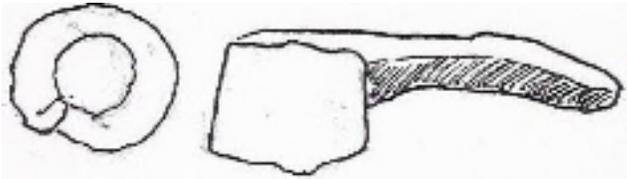
Plate 2.



A.



B



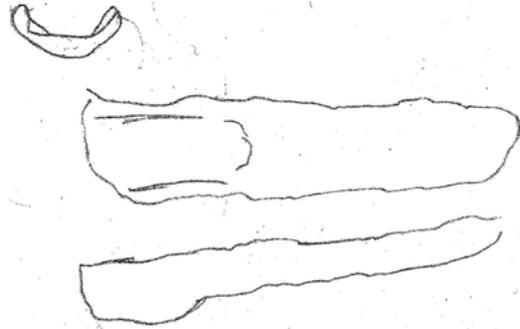
C.



D.



E.



F.



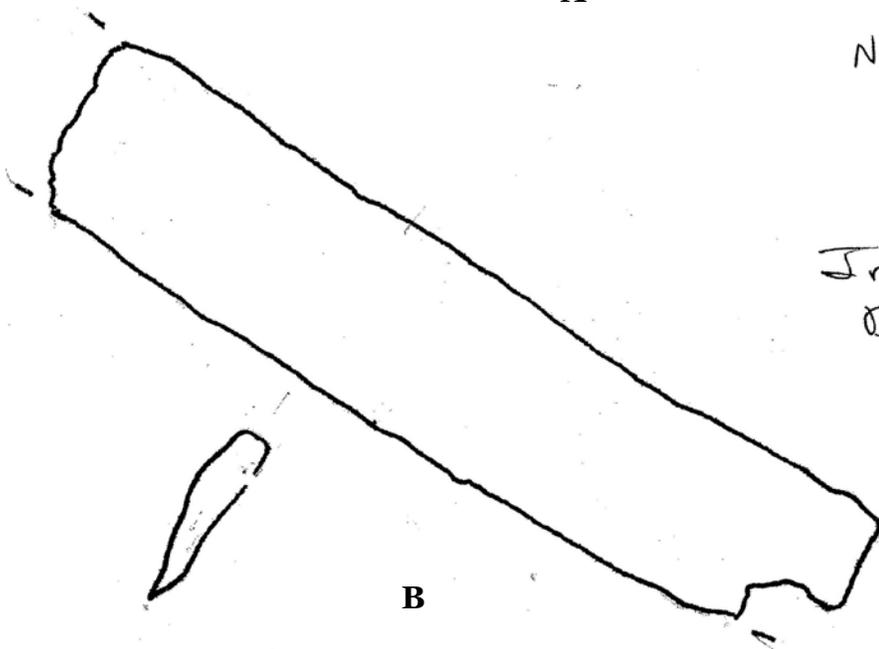
G.

Plate 3

QuickTime™ and a
TIF (LZW) decompressor
are needed to see this picture.



A



B



C



D

Plate 4.

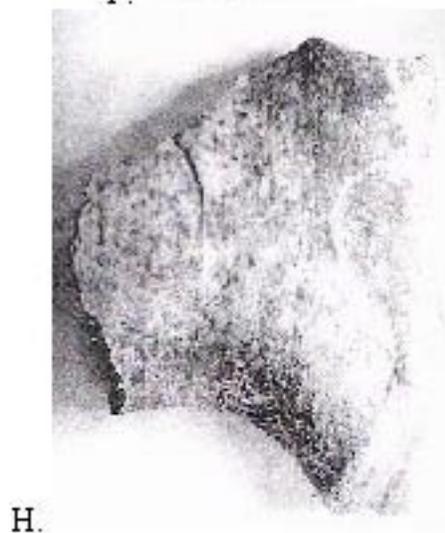
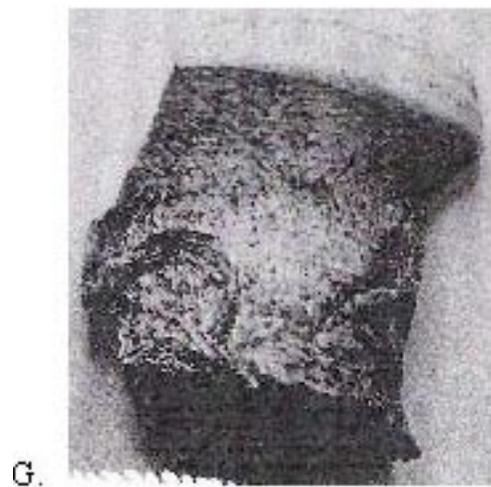
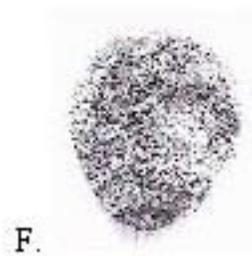
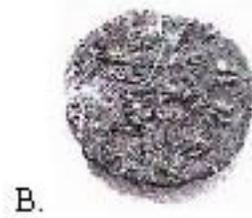
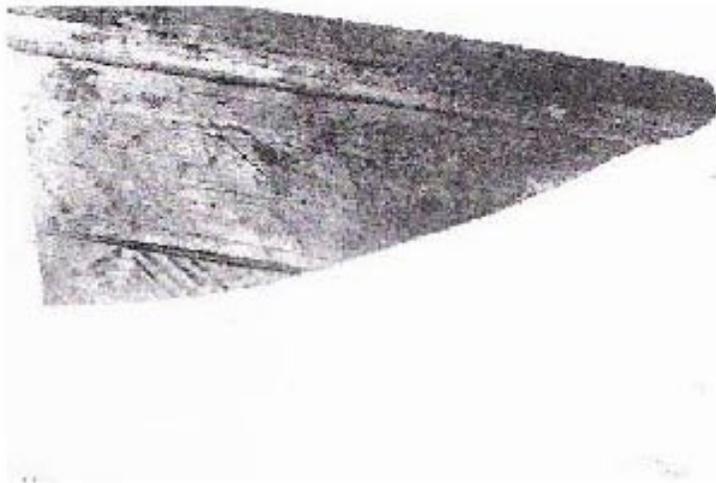


Plate 5.



A.



B.

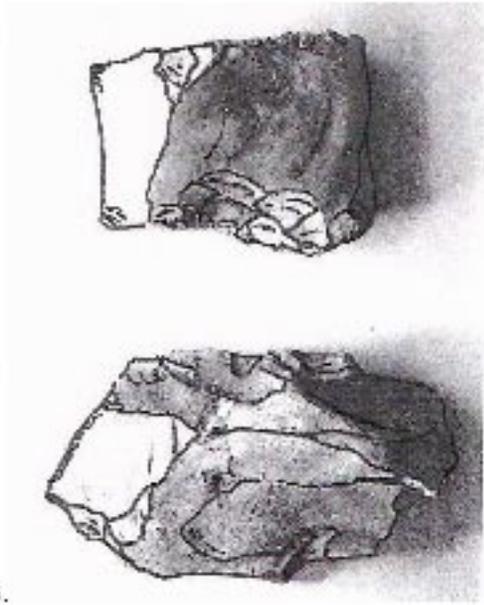


C.

Plate 6.



A.



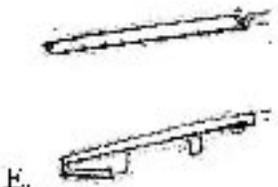
B.



C.



D.

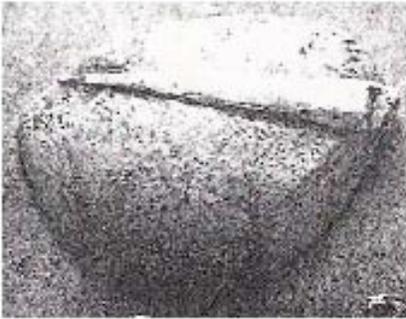


E.



F.

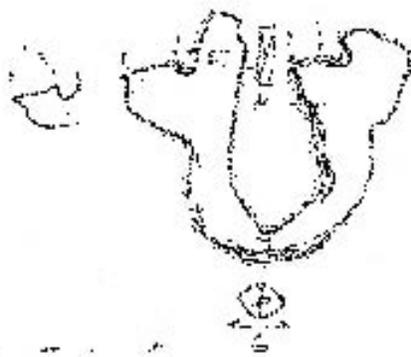
Plate 7



A.



B.



C.



D.

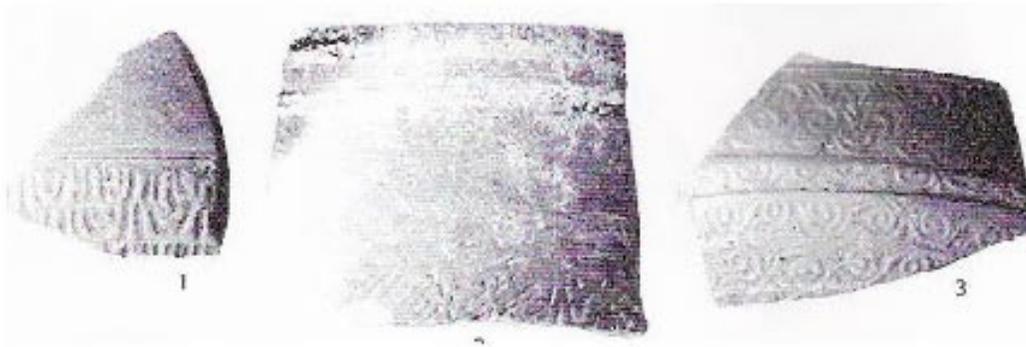
E.

F.

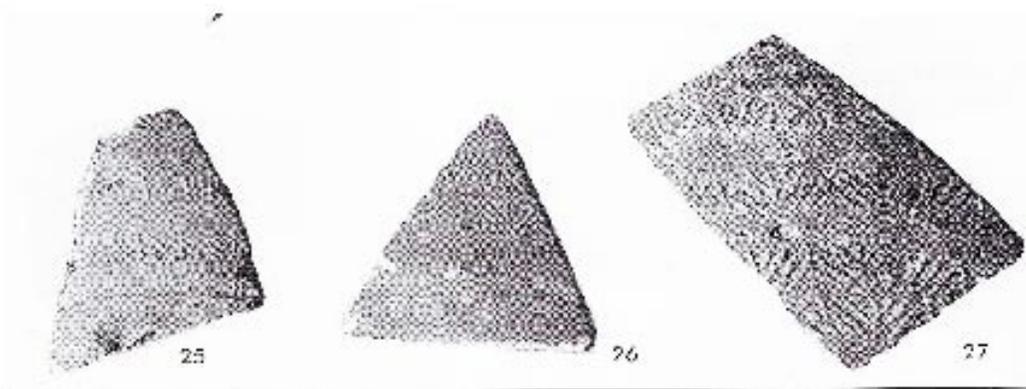
Plate 8



A.

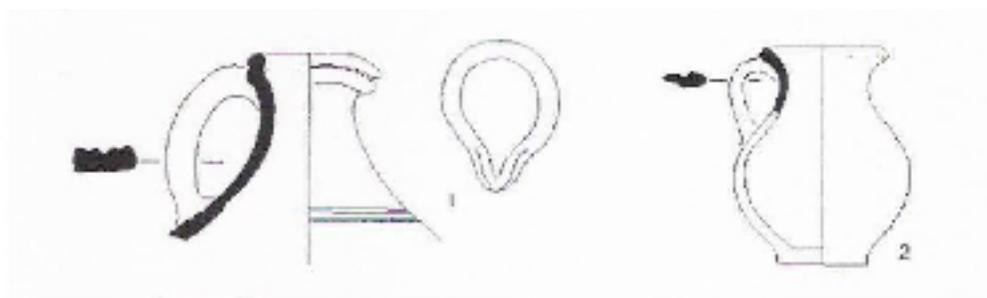


B. From Bender and Pohl 2005

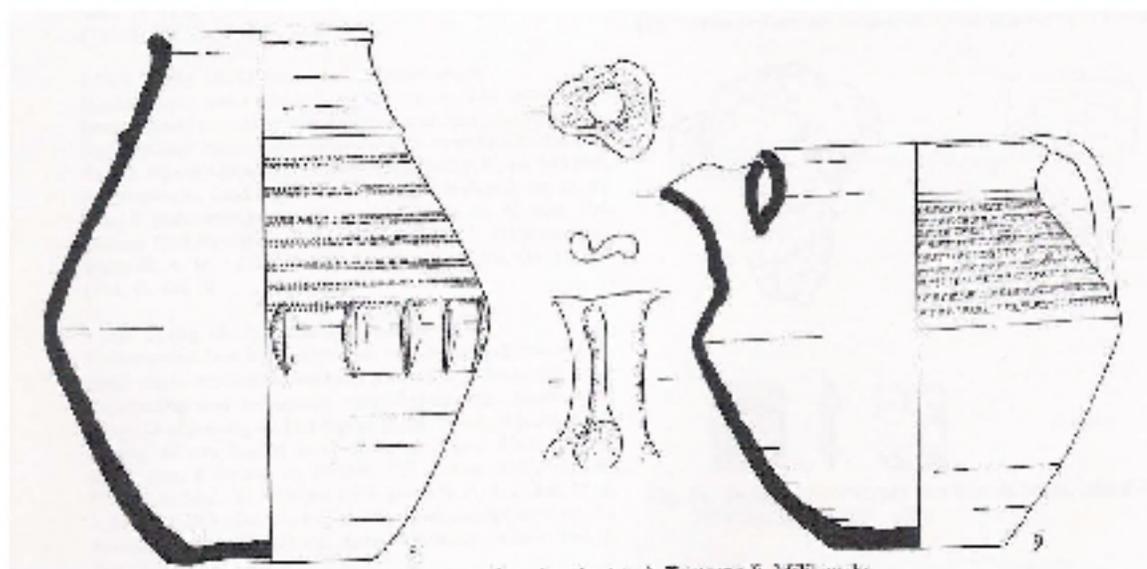


C. From Bender and Pohl 2005

Plate 9.



A. From Fulford and Bird 1975



B. From Milikowski 1986

Items in Plate 10 not to scale.

Plate 10.

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