

DIFFERENTIAL GRAIN USE ON THE TITELBERG, LUXEMBOURG

RALPH M. ROWLETT
and ANNE L. PRICE

*Department of Anthropology, University of Missouri-Columbia
Columbia, MO. 65211*

MARIA HOPF

*Emeritus Curator of Ethnobotany, Romisch-Germanische Zentral Museum Mainz
Federal Republic of Germany*

ABSTRACT.—The “Titelberg,” Luxembourg, is an Iron Age hillfort which was occupied from La Tene II (ca. 200 B.C.) until the end of the Roman Empire in northern Gaul (ca. A.D. 400). Prior to the Iron Age there was also a Neolithic use of the mountain top in the third millennium B.C. From the Iron Age until its abandonment, the Titelberg was mainly populated by Celtic folk, apparently of the Treveri tribal chiefdom. Carbonized cereal grains have been recovered from most levels. At the emplacement excavated by the University of Missouri, there were a stratified series of mint foundries. From the late Neolithic comes a small variety of wheat, while oats appear as early as the hearths of La Tene II. From the Dalles Floor phase, after the Roman conquest, barley is the most frequently encountered grain. Bread wheat does not make a strong appearance until the late fourth century, when either the last inhabitants of the Titelberg or immigrating Franks left the most recent feature to be excavated. Although the remains are found in the context of a continuing cultural tradition, the particular combinations of cereals recovered change with either major shifts in cultural trajectory or the appearance of intrusive cultures nearby. These changes seem not necessarily “caused” simply by either overt introductions or the prestige of the intrusive culture, but as a way to adjust to other factors, such as taxation, political status, and meat supply.

INTRODUCTION

The Titelberg lies at the extreme southwest corner of the Grand-Duchy of Luxembourg, near the juncture of the Belgian and French borders. It is one of a number of abrupt and fairly low buttes which extend east-west along the southern edge of Luxembourg toward Lorraine, France. The Titelberg rises to about 399 m, dominating the river (called *Chiers* in French, *Kor* in Letzeburgish, and *Korn* in German) and valley 100 m below. The Titelberg rests primarily on Oolitic Dogger limestone of Lower Jurassic age, and contains rich lodes of Lorraine iron ore. On top of the Titelberg are cultural strata which reveal a long history of human occupation from prehistoric through early historic times.

The buttes are the first important elevations east of the English Channel, causing humid westerly winds to drop more than a meter of rain per year on the Titelberg and its environs. This area is known as the “Gutland” and is considered some of the best agricultural land between the Ile-de-France and the Koblenz basin. The surface of the Titelberg extends well to the east, so that there has always been a considerable amount of easily accessible land to till.

Given this favorable environment, one might expect that the fundamental subsistence patterns of the people living on the Titelberg would exhibit little variation, despite immigration, political changes, such as the Roman conquest in the first century B.C., and the Frankish occupation (late fourth, early fifth centuries A.D.), for climatic change during these centuries was not pronounced. Palaeobotanical evidence from the Titelberg tends to confirm the persistence of a well-developed agricultural tradition. However, there appear to have been marked changes in the particular crops favored from one era to the next, which could reflect changing cultural and economic conditions on the Titelberg.

CULTURE HISTORY

In the late 1950's the Luxembourg State Museum began a long-range program of systematic excavation of the Titelberg (Thill 1965, 1966a and b, 1969, 1980; Thill et al. 1971; Metzler and Weiller 1977; Krier 1980a and b). During the summers of 1972-1974 and 1976-1978, excavations were made by a team of archaeologists from the University of Missouri.¹ This research team confirmed the depth of the stratigraphic sequence during excavation of a trench 13.35 m wide by 15 m long while attempting to establish the nature of the pre-Roman occupation of such hillforts.

The University of Missouri excavations on the Titelberg revealed two Neolithic levels, the later one dating to ca. 2000 B.C., (near the beginning of the Bronze Age) by thermoluminescence dating (Rowlett et al. 1980:38-40).

In the third century B.C., or slightly earlier, the Titelberg was settled by Celtic peoples. By the first century B.C. this group of settlers can be identified as members of the Treveri tribe. The Titelberg, by far the biggest hillfort in the Treveran tribal area, is commonly regarded as the main settlement of the tribe (Thill 1965). The central street system was arranged in a rectangular grid, and a coin-minting operation began in the later Iron Age horizons. Gaulish mints operated under the office of the chief, with coins usually bearing either his or the tribal name. This mint continued production through the early period of Roman rule on the Titelberg. Nothing was ever built over the mint except a metal smelter in the fourth century A.D., which appears to have been used in part to melt down debased Roman coinage.

During the period of Roman rule, from the late first century B.C. to the late fourth century A.D., the Treveri remained on the Titelberg, operating a profitable glass, ceramic and iron industry after the razing of the coin mint. At the end of this period, there was a settlement by Franks in the valley below (late fourth and early fifth century A.D.) The Titelberg has not been occupied since that time and was farmed after the Renaissance.

Under Roman rule, in the first century A.D., the capital of the Treveri was shifted east to where the modern city of Trier (Wightman 1970:38-42) stands in western Germany. Entirely new Roman or mixed Gallo-Roman towns were established at places like Mamer and Dalheim in Luxembourg, with the Titelberg relegated to the tribal hinterlands, away from the main highways, and seemingly no longer an officially significant place.

There is indication of considerable cultural continuity on the Titelberg. During the four centuries of Roman rule, the rectangular street grid originating in the Iron Age was retained, and the iron industry and coin minting operation continued. The basic subsistence pattern of cereal agriculture persisted. Manufacture of black marine shell-tempered pottery continued throughout the period, gradually diminishing from 44% to 5% of the ceramic inventory. Tools, such as knives and scalene cutters, and fibulae continued in traditional forms. In the Treveri area names continued as Celtic in formal arrangement although the names themselves were often Italic, Greek, or Hebraic adoptions (Wightman 1970:50-51). According to St. Jerome, Celtic was still the language of association for every day use until his day in the fourth century A.D.

SITE STRATIGRAPHY

Excavations on the Titelberg have produced nearly 50,000 each of potsherds and bone, numerous tools, objects of bronze, iron, lead, glass, and stone, as well as several thousand cereal grains. The main features in which remains have been found are (Figs. 1 and 2): 1) a smelter (North smelter) dating to the fourth century A.D., which contained, besides numerous potsherds, glass and tool fragments, over 200 heat damaged coins, 2) foundations (Fig. 1, e) of a two-room building, 4.4 m by 12 m, above the floor paved

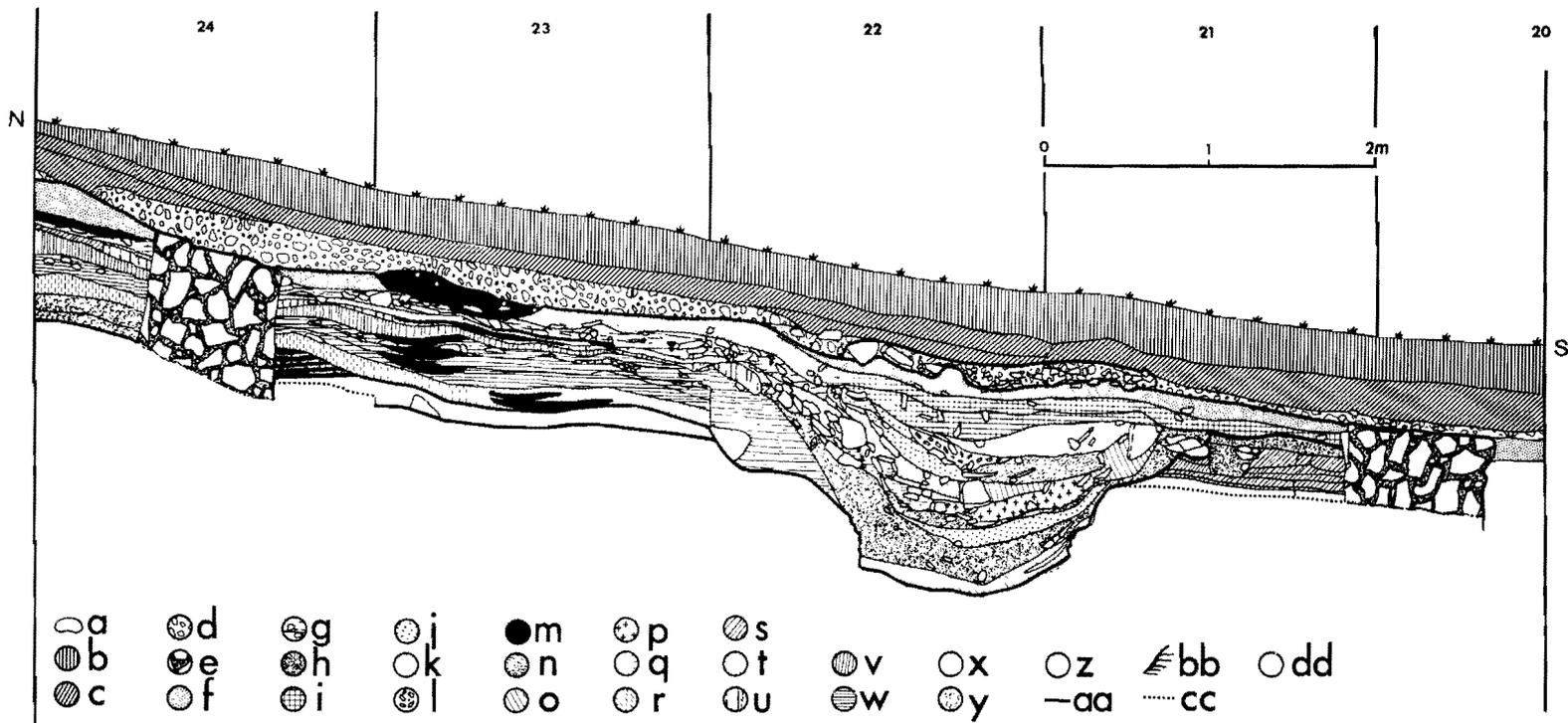


FIG. 1—Floor Profile (50 cm west of J/I line). (a) Stone, (b) Humus zone, (c) Dark brown, (d) Rubble, (e) Stone wall foundation, (f) Light Brown Interior Floor and Light Brown I Exterior, (g) Dalles Floor, (h) Dalles Illa level [green], (i) Dark Gray-Brown, (j) Cellar fill Brownish Orange, (k) Cellar fill Brownish, (l) Cellar fill Fossiliferous Deposit, (m) House hearths, projected three meters [Dalles floor] or one meter [all other floors] to the east to the profile, (n) Cellar Red-spotted, (o) Cellar Brown Dalles, (p) Cellar Green Clay spotted, (q) Cellar Tan, (r) Cellar Yellow-Orange layer VII, (s) Yellow-Brown Exterior, (t) Yellow-Green Clay Floor, (u) Orange-Clay Floor, (v) Bright Yellow level, (w) Pale brown Floors I-III, (x) Orange Brown Floors I-III, (y) Ash Floors I-IV, (z) Orange, (aa) Lower Neolithic level, (bb) Jurassic outcrop, (cc) Bottom of archaeological cut, (dd) Yellow. Floors are enclosed in heavy line. The Upper Neolithic, scraped away in this location, occurs just under the lowest Iron Age levels exterior to the Ash Floors.

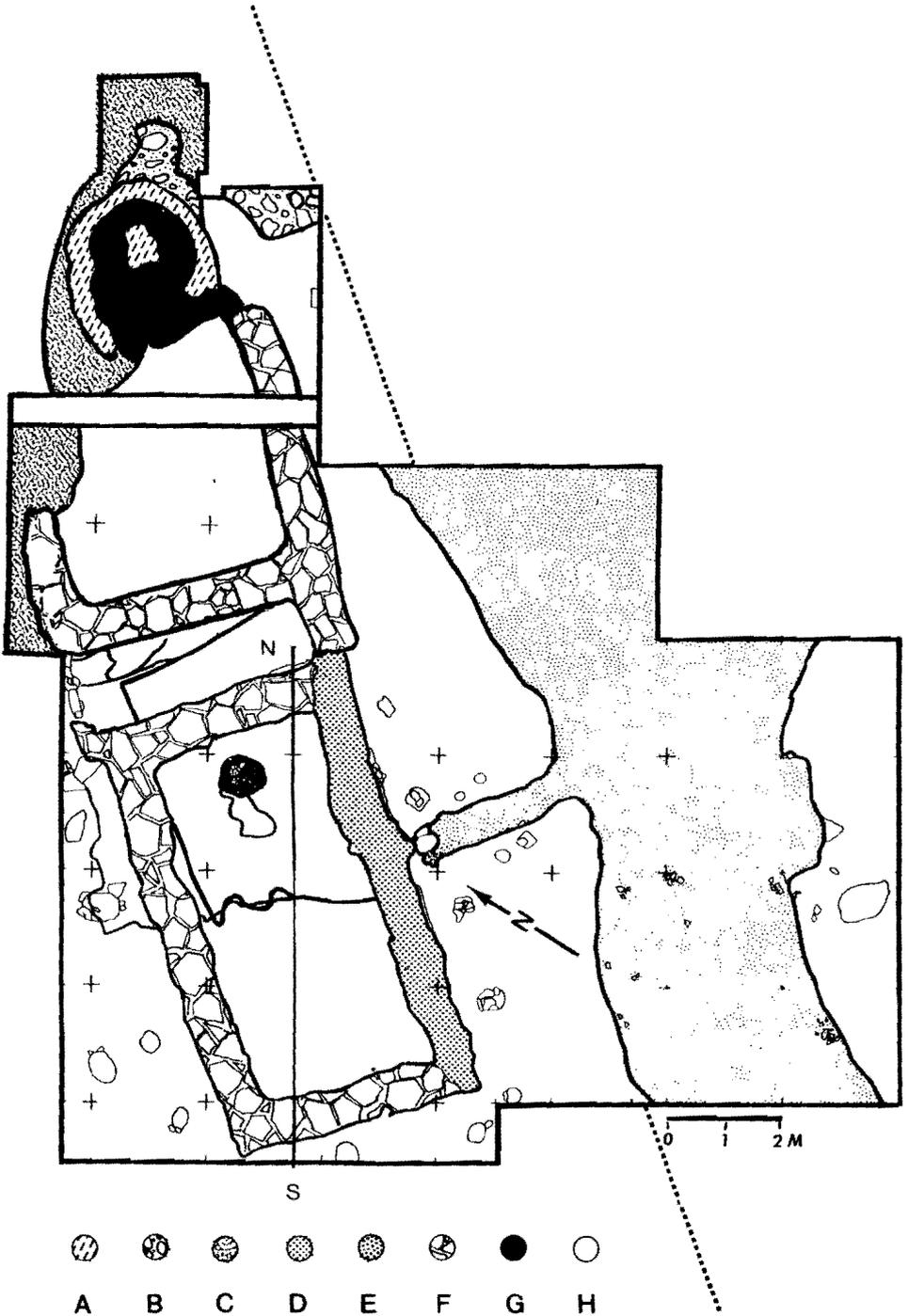


FIG. 2—Plan of Mint Foundries and Side Street. (A) Clay around 4th century smelter, (B) Stone rubble associated with 4th century smelter, (C) Compact rubble associated with 4th century smelter, (D) Gravel paved side street, (E) Plaster filled robber trench, (F) Foundations of Augustan mint foundry, (G) Fireplace of Augustan foundry, (H) Exterior levels. Heavy lines show limits of Dalles Floor (larger enclosed area) and Clay and Earth Floors (smaller enclosed area). Line N-S shows section profile in Figure 1.

with flagstones or dalles (Dalles floor) of Augustan age, built over a series of earlier Iron Age buildings, parallel to the Roman street, 4) a bronze smelter from early Augustan times (late first century B.C.), 5) a succession of at least 14 floors and 13 hearths (Fig. 1, f-h, t-y) beneath the Dalles floor, belonging to the Iron Age buildings. The floors, composed of various clays and ashy earth layers, are the veritable floors of the structures in which people lived and worked. All of the hearths except one are almost directly superimposed on each other. The earliest dated floor (y-Ashy earth II) has a C14 date of 306 ± 55 B.C. Lastly, 6) two Neolithic levels (Fig. 1, aa) one immediately below the Iron Age levels, dating to 2000 B.C., and another 20-25 cm below the later one.

Occupational levels overlying the Augustan levels in the westernmost 5 meters of the excavated area contained evidence, mainly coins, for the second through fourth centuries of Roman occupation.

PLANT REMAINS

Given a certain amount of cultural continuity and a favorable environment for cereal agriculture, one would expect a relatively stable complex of cereal grains utilized. However, the prehistoric plant remains from the Titelberg show fairly drastic shifts in the species and complexes of cereal grains used in different areas. Cereal grains and weed seeds have been recovered from seven levels (Table 1). Seeds were recovered by direct observation in the field and subsequent flotation of soil matrices in which seeds had been found. Some simple flotation was done in the field, but the majority of grains recovered from the Dalles Floor cellar hearth and the North Smelter were retrieved with the aid of chemical flotation described in Bodner and Rowlett 1980. Flotation of randomly selected soil samples has not produced a single seed so far.

TABLE 1.—Distribution of seeds by level.

Level	Date	Feature	Plant Remains
Dark Brown IA	Fourth century A.D.	North Smelter	1000 seeds 88.6% <i>T. aestivum</i> (breadwheat) 7.9% <i>T. monococcum</i> (einkorn) <i>T. dicoccum</i> (emmer) 2.8% <i>T. spelta</i> (spelt)
Dark Brown IB	Third century A.D.	includes concentration of finds in rubble heap	none
Dark Brown II	Second century A.D.		121 seeds 120 <i>Avena</i> sp (oats) 1 <i>T. aestivum</i> (breadwheat)
Dark Brown III	Second half of first century A.D.		none
Rubble Surface	A.D. 25-50	ruins of the Augustan stone foundation mint	none

TABLE 1. (Continued)

Level	Date	Feature	Plant Remains
Light Brown I	A.D. 10	flagstone floored Dalles Floor house	2800 seeds (found in hazel twig basket) 1850 <i>Hordeum vulgare</i> (barley) 535 Goosefoot (<i>Chenopodium</i>) 45 <i>T. Dicoccum</i> 5 breadwheat (bindweed) 10 misc. weeds
Clay Floors	50 B.C.- A.D. 1	building floors	none
Orange Brown II	La Tene III	building floors	46 seeds 31 goosefoot 8 oats 2 breadwheat
Ashy Earth II	La Tene II 306±55 B.C.	building floors	13 seeds 1 Einkorn 1 emmer 1 breadwheat 1 barley 1 oat 8 weeds
Late Neolithic	2000 B.C.		3 <i>Triticum</i> spp.

All seeds and grains have been identified by Dr. Maria Hopf of the Romisch-Germanisches Museum in Mainz. Wood and timber pieces were identified by Dr. Ernst Hollstein of the Rheinland - Pfalz Landesmuseum Trier, and Dr. Susan Vehik of Oklahoma University studied pollen from the Titelberg.

Given the fact that plant remains are subject to the vagaries of preservation, recognition, and recovery in the field to a greater extent than other artifacts and ecofacts, some observations can be made concerning the types of cereal grains used at various times. Some of the samples are quite large, and several come from tight associations where there is little likelihood of post-depositional movement biasing the samples.

Neolithic

Neolithic and late Neolithic wheat (*Triticum* spp.) provides a baseline against which to consider later Iron Age and Gallo-Roman grains. One of the three grains found in the later Neolithic level is intact, with some organic debris adhering to it, perhaps glume or carbonized chaff. The second grain is broken. The two grains were found close to each other, near a sherd, a scraper end, and a pendant. A grain impression of apparently the same genus was discerned on the potsherd nearby.

The size of these grains was compared with that of breadwheat, *Triticum aestivum* (cf. *T. sphaerococcum* and representative compactum identified by Maria Hopf) found on the Titelberg in the Missouri excavations on the North smelter (Table 2). It also compares the size of wheat from Chassemy, France (fifth century B.C.), from the Gallo-Roman site of St. Gengoux-de Scisse, Saone-et-Loire, France (third century A.D.), and a control sample of modern breadwheat from the University of Missouri.

TABLE 2.—Comparative wheat sizes in mm.

Sample	length	breadth	thickness
UMC Standard, carbonized (n=30)	5.48	2.86	3.86
Titelberg, 4th c. A.D. (n=10)	5.24	2.97	2.39
Roman, St. Gengoux, 3rd c.*	5.10	3.5	3.6
Chassemy, France, 5th c. B.C. (n=3)	5.0	3.5	3.5
Titelberg, Neolithic (n=3)	3.6	2.6	1.9

*Hopf et al. 1978:37-45

The fourth century wheat is clearly larger, but it is hypothetically possible that rodent or earthworm activity could have provided the means for later grain to be carried down to the Neolithic level. The probability of such an occurrence was tested using the Student's t-test as formulated by Blalock (1960:148). The test compared the normalized sizes of the grains from the fourth century A.D. smelter and the Neolithic level. The results of a one-tailed test with five degrees of freedom yields a probability of less than 0.025 that the smaller grains could be from the same cereal population as the grains from the North smelter.

The Neolithic grains are also considerably smaller than other grains of comparable or greater age, e.g. einkorn (*T. monococcum*) (5.2 mm long) and emmer (*T. dicoccum*) (5.35 mm long) from the Bandkeramik Tradition Neolithic levels at Entzheim (Bas-Rhin) (Hopf 1975:115-116),

Ash Floor II(y)

The earliest preserved Iron Age plant remains were recovered from the Ash Floor II hearth, early La Tene II, 200 B.C. or before. The seeds and grains found in the hearth are in close association. The remains included Einkorn, emmer, barley (*Horedum vulgare*) and one oat, (*Avena* sp.), and one weedy vetch seed (*Vicia* sp.).

Orange Brown II(x)

The 46 seeds from this level occur in the hearth. Of the 46, 31 are goosefoot (*Chenopodium* sp.). Goosefoot has long been considered seriously an Iron Age cultigen (Rowlett 1968:132), but these seeds may be wild. Barley outnumbers wheat 4:1. The five remaining seeds were weeds, one nipplewort (*Lapsana communis*), and four bindweeds (*Polygonum convovulus*).

Dalles Floor Cellar (g-o)

The number of grains here dating after the Roman conquest, but when mint operations were continuing, increases dramatically. Finds were from both the Dalles Floor cellar and outside the Dalles Floor cellar and outside the Dalles Floor house. The fire-place provided a sample of about 2,800 cereal grains and weed seeds which were burnt in a hazel twig basket or tray. One thousand eight hundred and fifty of the seeds are

barley, 45 are emmer, and only five are breadwheat. There were large numbers of goose-foot seeds (525), bindweed seeds (189), as well as nine other weed seeds, including hemp nettle (61), chess (9), purple cockle (1), nipplewort (12), corn spurry (2), graminac (10), *Astragalus* sp. (2), *Atriplex* sp. (1), and marsh bedstraw (2).

The number of weed seeds present is surprising. The Treveri were, along with the Remi, one of two tribes of Gaul reported by the Romans to have a mechanical reaper (Mertens 1958). The reaper could account for the number of weed seeds present in the sample, although the reaper could have been in operation as early as the Orange Brown II floor. Dr. Maria Hopf has cautiously suggested that the large collection of weed seeds and barley, less nutritious than wheat, was submitted by the conquered Treveri as part of their tax payments to the Romans. Thus, they would have little interest in clearing away the weeds, which would have swollen the total volume of the grain. Since the Romans, in the early days of the Empire, ruled through local leaders, the presence of tax payments in kind at the mint would not be unreasonable, as Celtic chiefs operated the mints producing coins.

The size of this barley may be compared to carbonized modern grain. It is smaller than the modern barley, and also barley from the Roman site at St. Gengoux-de-Scisses, France of the third Century A.D. (Hopf et al. 1978) (Table 3).

TABLE 3.—Comparative barley sizes in mm

Sample	length	breadth	thickness
Dalles Floor (n=50)	5.24 ± .50	2.97 ± .22	2.39 ± .24
St. Gengoux, 3rd c. A.D.*	6.2	3.4	2.6
Modern barley, carbonized (n=50)	7.2	3.94	3.11

*Hopf et al. 1978:37-45

Dark Brown IIB(c)

The early second century A.D. remains show a drastic change from the Dalles Floor level. One hundred and twenty of 121 grains are oats, and only one is breadwheat. These relatively clean finds were found scattered over the top of the last floor of the foundation house and in the exterior levels of Square 25/I. They were not found in close association, but the great preponderance of oats is clear. This makes sense when one looks at the curve of available animal protein through time. As the Roman occupation of the Titelberg continued, the Treveri had relatively less animal protein available to them. Oats, which have a relatively high protein content, may have been propagated to compensate in part for the diminishing availability of animal protein (Fig. 3). It is known that the Romans greatly preferred breadwheat, and encouraged its propagation. This seems to have had little effect on the native habitat Titelberg until the fourth century.

North Smelter (Fig. 2, b)

There are no grain samples dating to the third and early fourth centuries. However there are nearly 1,000 grains from the late fourth/early fifth century smelter where breadwheat is preponderant.

The North Smelter consists of black burnt levels alternating with stony levels. Finds from the smelter include potsherds of the fourth century, rouletted *terra siguillata*, the mouth of a Mayen lobate mouth pitcher and a tear-shaped belt tab. Iron tools were found, as well as fragments of glass and masses of molten bronze. The most frequent finds were coins, 218 total, 88% of which were burnt. The latest coins date to the reign of Constantine, A.D. 318-330. This feature constitutes virtually the only disturbance of the much older series of mint foundry floors.

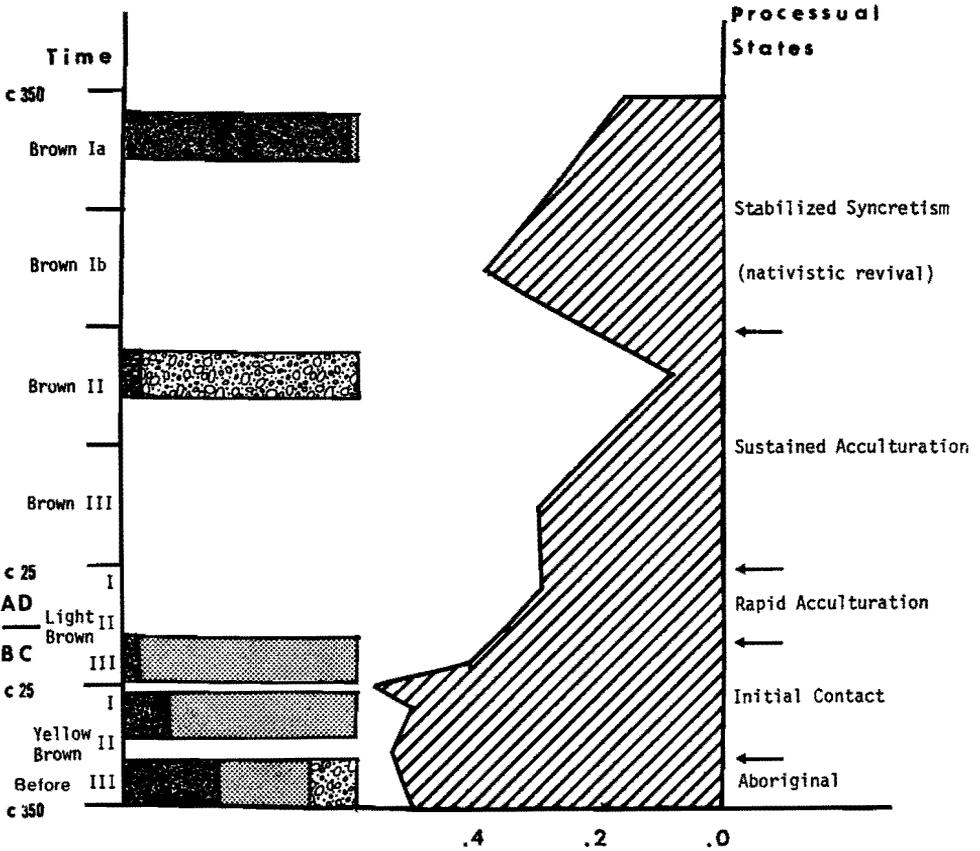


FIG. 3.—Proportions of cereal grain genera in relation to the amount of animal bone per stratum. Diagonal lines—animal bones; black—wheat (*Triticum*); stippled—barley (*Hordeum*); small circles—oats (*Avena*).

The grains from the burnt smelter layers were identified as 88.6% breadwheat. Einkorn and emmer composed 7.9% of the grain, and spelt (*Triticum spelta*) composed 2.8% of the sample. Only five barley grains were recovered from the lower levels as well as vetch, and one sloe-berry stone (*Prunus spinosa*). The breadwheat from the North smelter is smaller than a modern carbonized sample, but less so than any of the other cereal grains discussed above.

The plant remains from the North smelter were found in closer association than those of the second century which were scattered throughout the excavation area but less close than the hearth finds from the Dalles and Iron Age floors.

SUMMARY

The samples of plant remains found in excavations of the Titelberg cannot be considered random or totally representative samples of the total complex of cultigens on the Titelberg. However, there is a clear tendency for one or another of the cereal species to

be preponderant in particular horizons. Although the dates and samples must be viewed cautiously, it does not appear that there was as much continuity in the cereal crops grown and utilized as was manifested in other remains, including animal foodstuffs. The changing species of plants cultivated suggests that the emphasis on and preference for different crops changed according to the circumstances of each era. Except for spelt, most of the cereal crops were present by La Tene II, but production varied according to other demands; if one assumes that the grains recovered reflect the degree to which the grains were grown. The changes in crops can hardly be attributed strictly to acculturation in terms of the prestige or official preference of some particular crop, e.g. breadwheat, (favored by Romans) but varied in more subtle and complex ways. One might speculate that cheap, unnutritious grains were concentrated for payment of taxes due to the Roman conquerors, but protein rich oats were grown when animal protein was restricted. Breadwheat, preferred by the Romans, may not have been in wide use here until the fourth century A.D., when the Roman Empire was near collapse. Perhaps the breadwheat was no longer expropriated by the Romans, and thus was available for the natives for the first time. Thus the Treveran Celts of the Titelberg seem to have shifted their cereal production as part of an adjustment to a changing political and economic situation. This may have enabled them to let other aspects of their cultural tradition and everyday life continue relatively unchanged.

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LITERATURE CITED

- BLALOCK, HUBERT M. 1960. *Social Statistics*. McGraw Hill, New York. 465 pp.
- BODNER, CONNIE C. and RALPH M. ROWLETT. 1980. Separation of bone, charcoal and seeds by chemical flotation. *Amer. Antiquity*, 45:110-116.
- HOPF, MARIA. 1975. Fosses neolithiques d'Entzheim (Bas-Rhin) Etude des graines carbonizees. *Revue Archeologique de l'Est et Centre-Est*, 26:115-117.
- HOPF, MARIA, R. PERRAUD, and E. SAMUEL. 1978. Le Site Gallo-Romain des Chegnes a Saint-Gengoux de Scisse (S.-et-L.). *Revue de la Physiophile de Mines*, 89: 37-45.
- KRIER, JEAN. 1980a. Eine Zisternenerfüllung der Mittlern Kaiserzeit auf dem Titelberg. *Hemecht*, 32:104-111.
- _____. 1980b. Eine weitere Frühkaiserzeitliche Grabstele vom Titelberg. *Hemecht*, 32:104-111.
- MERTENS, J. 1958. Sculptures romaines de Buzenol. *Archeologica Belgica*, 42:1-44. Brussels.
- METZLER, JEANNOT and RAYMOND WEILLER. 1977. Beiträge zur Archäologie und Numismatik des Titelberges. *Publications de la Section Historique*, vol. 91.
- ROWLETT, ELSEBET S.-J., RALPH M. ROWLETT, and HOMER L. THOMAS. 1980. Neolithic Levels on the Titelberg. *Mus. Brief 18*, Revised ed., *Mus. Anthropol. Univ. Missouri, Columbia*.
- ROWLETT, RALPH M. 1968. The Iron Age north of the Alps. *Science*, 162:123-135.
- THILL, GERARD. 1965. Titelberg: site archeologique. *Musee d'Histoire et d'Art. Luxembourg*.
- _____. 1966a. Fouilles du Musee sur le Titelberg en 1959. *Hemecht*, 1:483-491.
- _____. 1966b. Une coupe a travers le rempart du Titelberg. *Hemecht*, 18: 176-177.
- _____. 1969. Fibeln vom Titelberg aus den Beständen de Luxembourger Museums. *Trier Zeitschrift*, 32:133-171.
- _____. 1980. Die Füllung eines Römerzeitlichen Brunnens (Nr. 8) auf dem Titelberg. *Hemecht*, 32:113-128.
- THILL, GERARD, JEANNOT METZLER, and RAYMOND WEILLER. 1971. Neue Grabensergebnisse vom Titelberg. *Hemecht*, 23:79-91.
- WIGHTMAN, EDITH MARY. 1970. *Roman Trier and the Treveri*. Rupert Hart-Davis, London.