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Inhoud

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Carbonized seeds from Northern France

The paper presents carbonized seeds found at thirteen sites in Northern France. Their date ranges from the Neolithic up till and including the Gallo-Roman period. The finds include both cultivated and wild plants. There are indications that, at least in the Suippes area, chalk grasslands were in existence during the La Tène period.

1 Introduction

In the past years I have identified carbonized material from several excavations in Northern France (*fig. 1*). The results have appeared in various different periodicals or have not been published as yet. It seemed worth-while to combine all data collected up till 1983 in one article.

The carbonized remains come from a great diversity of samples and objects. They range from one cereal grain out of a sherd to the fully sieved contents of a pit. Therefore the samples can not always be compared.

The thirteen sites to be described here yielded material dating from the Bandkeramik up till and including the Gallo-Roman period. In the following the carbonized remains will be treated by site. The sequence is a more or less chronological one. In succession will be mentioned:

1 Evendorff, Dept. Moselle, Bandkeramik
2 Montenach, Dept. Moselle, Bandkeramik
3 Cuiry-lès-Chaudardes, Dept. Aisne, Bandkeramik, Michelsberg, Seine-Oise-Marne
4 Menneville, Dept. Aisne, Bandkeramik, La Tène I
5 Villeneuve-St.-Germain, Dept. Aisne, Group of Villeneuve-St.-Germain, La Tène III
6 Le Fort-Harrouard, Dept. Eure et Loir, Early Bronze Age, Middle Bronze Age, Late Bronze Age
7 Compiègne, Dept. Oise, Early Bronze Age, Late Bronze Age, La Tène I
8 Vieux-Moulin, Dept. Oise, Late Bronze Age
9 Nanteuil-sur-Aisne, Dept. Ardennes, Late Bronze Age
10 Suippes, Dept. Marne, La Tène I
11 Champlieu, Dept. Oise, Gallo-Roman

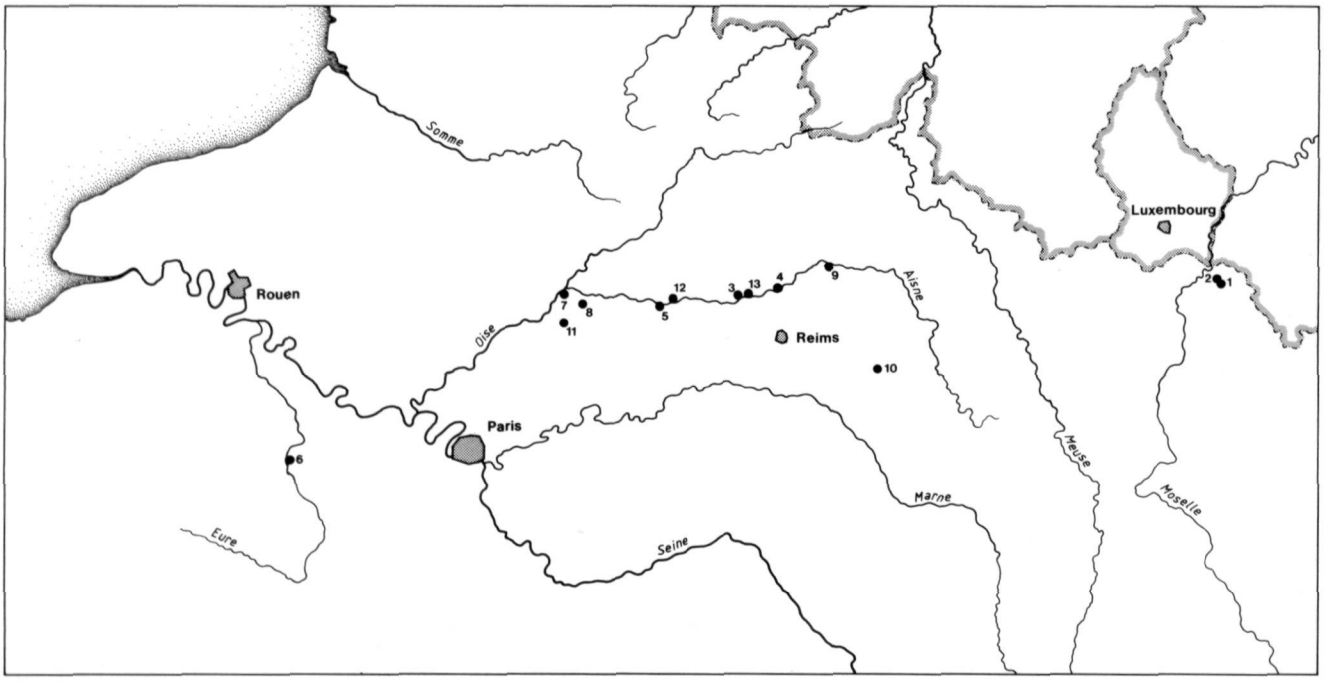

Fig. 1 The distribution of the thirteen investigated sites.

The samples from two other sites, Missy-sur-Aisne, Dept. Aisne, and Berry-au-Bac, Dept. Aisne, will not be described specifically. Structure 2 from the terrain 'Le Culot' at Missy yielded no carbonized remains. Four dm^3 of the filling of a post-hole belonging to a Neolithic house were sieved without success. The froth flotation of ten samples from Berry-au-Bac 'Le Croix Maigret' also remained without results. The samples in question are four samples from structure 126 and two from structure 131. Nr. 124 and 126 are pits which belong to one and the same Bandkeramik house. Nr. 131 is an isolated pit; it dates from a local post-Bandkeramik group. The relevant archaeological features have been published in the Rapport d'Activité 6.

2 Sites, finds and interpretation

2.1 EVENDORFF (MOSELLE)

The site Evendorff, Hameau de Kirschnaumen 'Dolem' has also been published under the name Evendorff-Kirschnaumen or Kirschnaumen-Evendorff. Therefore people sometimes get the impression that two different sites exist. The site has been published in Decker/Guillaume/Michels 1977.

The terrain 'Dolem' is situated on a hill of the Lotharingian plateau, not far from the rivulet the Montenach. This rivulet is a tributary of the Moselle. The local soil consists of a light loam: the result of the weathering of the limestone subsoil. On 'Dolem' a small part of a late Bandkeramik site was excavated. A C14-date sets it at 6050 ± 200 BP or 4100 BC (LY-1181). The two samples with charred seeds are from an ashy patch which the excavators interpreted as a kind of hearth. Sample 1 consists of seeds collected by hand during the excavation. Sample 2 was sieved from a soil sample. The mesh-width was 0.5 mm.

1

sample size	–
Triticum dicoccum	2
Pisum sativum	22

2

sample size	0.5 dm^3
Triticum dicoccum	1
Tr. monococcum/dicoccum, spikelet bases	2
Triticum sp.	2
Pisum sativum	2
Lens esculentum	1
Bromus sp.	2
Galium spurium	1
Polygonum convolvulus	1

The species found are not unknown in the case of Bandkeramik sites. The peas are rounded; their maximal diameter is 3.78 (3.2-4.4) mm, N = 15, a normal size for Bandkeramik peas (see Bakels 1978). The lentil is smallish with a diameter of 1.8 mm and a thickness of 0.9 mm. The density of the finds in sample 2 is a bit too high for a normal settlement noise (see Bakels 1979). On the other hand the sample is too small to allow opinions to be formed as to how and why the seeds got carbonized.

2.2 MONTENACH (MOSELLE)

The site Montenach lies at a distance of 500 m from Evendorff. Its situation and its date are comparable to those of the latter. The site is mentioned in Decker/Guillaume/Michels 1977. The sample consists of four hand-picked cereal grains.

Triticum monococcum	2
Triticum monococcum/dicoccum	2

The occurrence of einkorn is nothing unusual in Bandkeramik times. The importance of the find lies in the fact that now the list of Lotharingian Bandkeramik species has been extended with a cereal which was to be expected.

2.3 CUIRY-LÈS-CHAUDARDES 'LES FONTINETTES' (AISNE)

'Les Fontinettes' at Cuiry is one of the important excavations in the Aisne valley. From Neufchâtel in the east to the region beyond Soissons in the west, the valley is the subject of large-scale investigations by a team of archaeologists, mainly from the Université de Paris I and the Unité archéologique No 12 of the CNRS. The sediments in the valley are being almost totally dug away for their gravel. The aim is to document the prehistory of the area – before it is too late – by means of a large number of excavations. This has resulted in the discovery of settlements dating to several periods.

The terrain 'Les Fontinettes' is situated on a lower terrace of the Aisne, close to the river. The subsoil is a fine gravel overlain by a thin sheet of flood-loam. In this part of its course the Aisne has cut a relatively deep bed into a limestone plateau with a loess cover. At Cuiry the valley measures only 2500 m across and as a result the plateau with its loess is not too far away. However, the plateau is fairly dry and the question remains as to what extent the subsequent inhabitants made use of it. A map of the valley, its surroundings and its settlements can be found in Ilett 1982.

Cuiry-lès-Chaudardes 'Les Fontinettes' shows traces of more than one culture. From three of them samples were available.

2.3.1 Bandkeramik

The groundplans and pits mentioned here have been published in the Rapport d'Activité 2, 3 and 4. All samples have been watersieved through sieves with a 0.5 mm mesh,

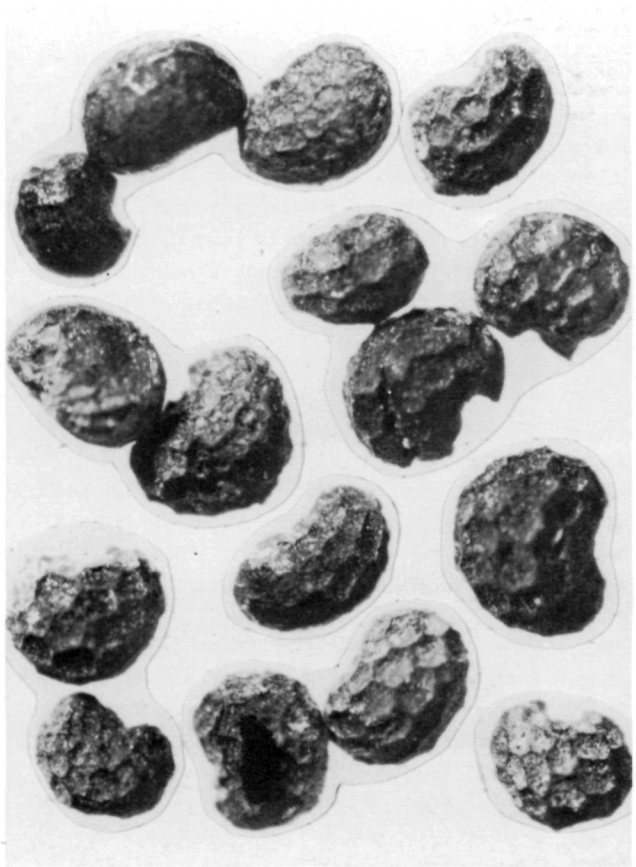

Fig. 2 Cuiry: poppy seeds. 30:1.

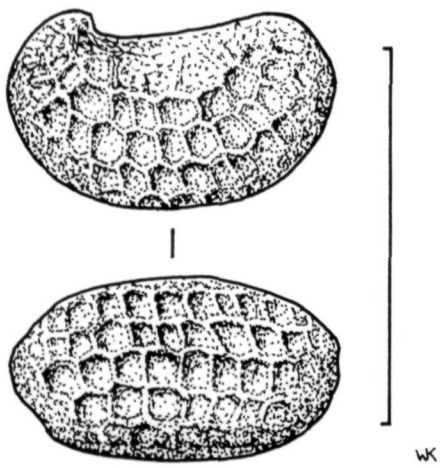

Fig. 3 Cuiry: Papaver argemone. Scale unit 1 mm.

except the sample from structure 7 which has been extracted with froth flotation. In the following all numbers are find-numbers allotted to so-called structures, all pits in this case. Their contents are loamy, dark-coloured and much finer than the sediment into which the pits were dug.

2, pit	
sample size	3 dm³
Polygonum convolvulus	1
7, pit belonging to house 126	
sample size	20 dm³
–	
25, pit belonging to house 90	
sample size	3 dm³
Corylus avellana	1
27, pit belonging to house 45	
sample size (from carré d2)	0.5 dm³
sample size (from carré b1)	0.5 dm³
–	
96, pit belonging to house 89	
sample size	4 dm³
Corylus avellana	1
230, pit belonging to house 225	
sample size	7 dm³
cereals indet.	1
241, pit belonging to house 225	
sample size	5 dm³
–	
247, pit belonging to house 245	
sample size	2.5 dm³
–	

It is clear that the pit-fillings of the Bandkeramik settlement are extraordinary poor in carbonized plant remains. Recently far more samples from this site have been sieved with the same meagre results. These analyses will be published later.

It has been suggested that the charred remains have been washed out of the gravelly sediment of the lower terrace. However, the pit-fillings themselves are fine-grained and do not raise any suspicion regarding a high porosity. There is no reason to consider an abnormal disintegration of carbonized matter. Moreover, on the same terrain the traces of the Michelsberg Culture do contain carbonized grains. The

conclusion is therefore that the Bandkeramik inhabitants of Cuiry produced little carbonized waste or deposited only few particles in the pits.

2.3.2 *Michelsberg*

The origin of the Michelsberg samples are the so-called silos. These cylindrical pits with their flat bottoms were filled with rubbish and loamy sediments. The silos have been published in the Rapport d'Activité 3. The sample from nr. 183 was sieved through 0.25 mm gauze. Nr. 187 was obtained by froth flotation.

183, silo

sample size	2.5 dm³
Corylus avellana	3

187, silo

sample size	10 dm³
Hordeum sp., hulled	3
Triticum dicoccum	1
cereals indet.	6
Papaver somniferum	267
Bromus sp.	1
Capsella bursa-pastoris	1
Myosotis sp.	1
Papaver argemone	1
Phleum sp.	1
indet.	1

The most conspicuous fact is the presence of poppy seeds (*fig. 2*). The seeds are small: 0.74 (0.6 - 0.8) x 0.54 (0.5 - 0.7) x 0.48 (0.4 - 0.6) mm, N = 10. Most specimens show the broad, somewhat irregular reticular pattern typical of Papaver somniferum. A minority has smaller meshes in rows. I have hesitated to attribute these to P. somniferum as well because they bear a resemblance to P. rhoeas. It is, however, impossible to draw the line. Nevertheless it is possible that some P. rhoeas or a comparable species lies behind the P. somniferum. In addition, one Papaver argemone is present.

The question remains as to what kind of material has been found. In silo 183 it is certainly the normal settlement waste and the same might be said of nr. 187. In the latter the density of the finds is relatively low. The amount of poppy seeds suggests an exception but if only one capsule hads been carbonized and thrown away, this would already imply a great quantity of seeds. One capsule can contain up to 7000 seeds.

2.3.3 *Seine-Oise-Marne*

'Les Fontinettes' 64 is an almost circular pit which had been published in the Rapport d'Activité 4. It only contains fragments of hazelnut shells.

64, pit

sample size	5 dm³
Corylus avellana	2

2.4 MENNEVILLE 'DERRIÈRE LE VILLAGE' (AISNE)

Like Cuiry, Menneville is a site from the Aisne valley series. With exception of the limestone plateau, its situation is comparable to that of the former. Here the river has cut its bed into a lightly rolling landscape of sandy and loamy deposits on chalk. The samples belong to two different settlement periods.

2.4.1 *Bandkeramik*

The samples have been collected from three pits, which have been published in the Rapport d'Activité 5. Structure 19 is one of the classical pits along a Bandkeramik house, in this case house 35. Nr. 40 is an oval pit which most probably also belonged to a house. The large, irregular pit with the find-numbers 38, 39 and 41, bears no relation to a house.

Analyses are present for one sample from pit 19, for twelve samples from pit 38/39/41 and for three samples from pit 40. The results have been published earlier in the Rapport d'Activité 6. Two samples from the large pit did not contain anything.

19, pit belonging to a house

sample size	0.25 dm³
cereals indet.	1
Corylus avellana, shell fragments	4

38-39-41, pit

sample size, sum of ten samples	2.5 dm³
Triticum dicoccum	4
Triticum sp.	1
Hordeum vulgare var. nudum	2
Hordeum sp.	1
Hordeum sp., rachis segment	1
cereals indet.	28
Corylus avellana, shell fragments	21
Veronica hederifolia	1
indet.	2

40, pit belonging to a house

sample size, sum of three samples	1.5 dm³
Hordeum vulgare var. nudum	10
Hordeum sp.	1
cereals indet.	7
Pisum/Vicia/Lathyrus	2
Veronica hederifolia	1

The presence of barley is remarkable. This cereal is usually missing in the Bandkeramik settlements from Central and Western Europe. Barley is however present in the very late

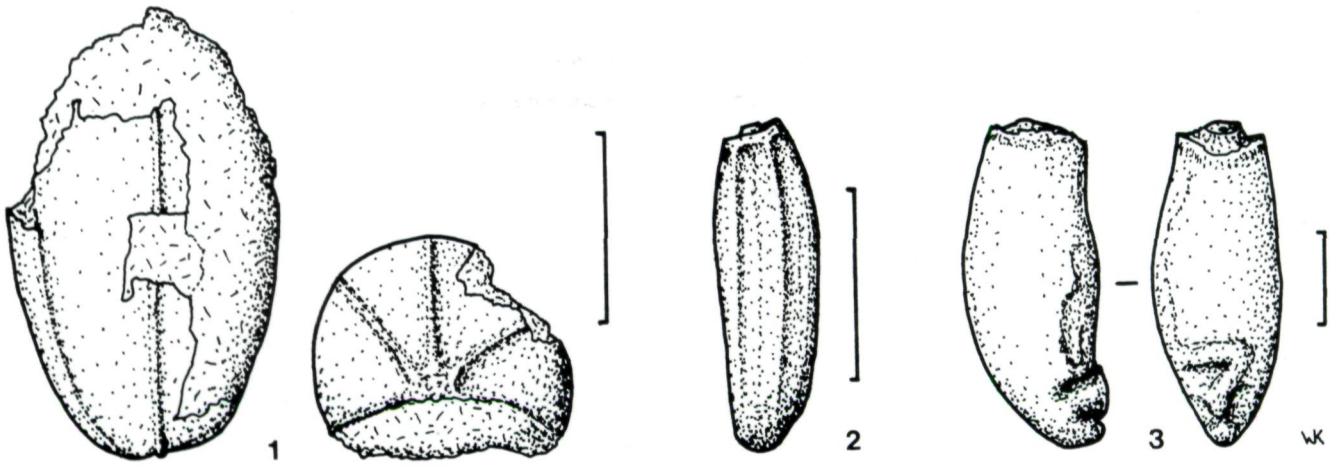

Fig. 4 Menneville: cf. Petroselinum segetum (1), Hieracium subgen. Pilosella (2) and Centaurea sp. (3). Scale unit 1 mm.

Bandkeramik site at Gonvillars (Villaret 1974). In France the cereal was perhaps more often cultivated than in the adjacent regions.
The two cotyledons of a pulse could be those of pea, but the mere occurrence of cotyledons cannot prove the presence of this plant.

2.4.2 La Tène I

Structure 89 in Menneville is a deep, cylindrical pit with a diameter of 2.6 m and a depth of 1.7 m. The pit was interpreted as a silo. The bottom layer contained a lot of carbonized grain. Structure 89 has been published in the Rapport d'Activité 6, p. 104 and 107. A sample of the bottom layer was froth flotated during the excavation.

89, silo

sample size	10 dm³
Triticum dicoccum and Tr. spelta	8000
Triticum dicoccum, spikelet bases	47
Triticum spelta, spikelet bases	17
Hordeum sp.	3
Avena sp.	20
Avena fatua, floret bases	4
Avena sp., awn fragments	1
Agrostemma githago	1
Alchemilla sp.	2
Anagallis arvensis	1
Artemisia vulgaris	17
Bromus arvensis	41
Bromus secalinus	51
Bromus div. species	17
Centaurea sp.	3
Chenopodium album	80
Chenopodium hybridum	1
Cirsium sp.	2
Compositae indet.	1
Daucus carota	1
Galium sp.	1
Hieracium subgen. Pilosella	1
Hypericum perforatum	1
Malva neglecta/sylvestris	1
Melandrium rubrum	1
cf. Petroselinum segetum	1
Phleum pratense	1
Picris hieracioides	13
Polygonum convolvulus	74
Rumex sp.	3
Solanum nigrum	2
Stachys arvensis/sylvatica	2
Thlaspi arvense	1
indet.	1

It is clear that the silo contains an amount of hulled wheat. At the time of contact with fire or intense heat the kernels were still surrounded by the glumes. Remnants of these adhere to the caryopses. The bulk is a mixture of emmer and spelt, but it is possible that a little Triticum aestivum is present as well. It proved to be difficult to make a distinction between the two hulled wheats. I got the impression that both occur in equal amounts. The identification of a small sample was tested by means of a scanning electron microscope. According to the criteria of Körber-Grohne (1980), emmer and spelt caryopses differ in the morphology of the second layer of epidermis cells. These characteristics proved to be quite useful and the first identification turned out to be correct.
The Avena must belong to the wild oat because the floret bases are those of A. fatua. The kernels measure 5.81 (4.9 - 6.7) x 2.06 (1.9 - 2.2) x 1.79 (1.7 - 2.1) mm, N = 10.

The Bromus species identified as Br. arvensis has smaller grains than the Br. secalinus. Its dimensions are 4.78 (4.4 - 5.0) x 1.16 (1.0 - 1.3) x 0.90 (0.8 - 1.1) mm, N = 10. Bromus secalinus measures 5.20 (4.9 - 5.7) x 1.88 (1.8 - 2.1) x 1.47 (1.1 - 1.8) mm, N = 10. The characteristics of the two species do not overlap in this sample. The apex of the former is also slightly obtuse, not well-rounded. The basis with the scutellum and the general shape are certainly not those of Bromus racemosus. Besides the two identified species, fragments of several other species are present.
The Hieracium from the subgenus Pilosella measures 1.7 x 0.5 x 0.5 mm. All species belonging to the subgenus Hieracium are bigger. The achene bears the closest resemblance to H. pilosella, H. auricula or H. caespitosa.
A drawing of the seed resembling Petroselinum segetum is given in *fig. 4:1*. It is damaged, but its dimensions can still be estimated: 2.3 x 1.4 x 1.2 mm. Apium is smaller. The specimen has also been compared with Selinum, Sium and Pimpinella, but these differ either in the morphology of the ribs or in the sculpture of the surface between the ribs. Petroselinum crispus is more oblong.
The Picris achenes are very characteristic (*fig. 5*).
With the exception of Alchemilla, Daucus, Hieracium and Hypericum, all seeds can be interpreted as weeds, even field weeds. The four exceptions may have grown in adjacent grassy patches. Therefore all remains of wild plants can be seen as true contaminants of the original wheat crop. The fact that the cereals predominate and that the weeds and spikelet bases are relatively few in number indicates that silo 89 contained the carbonized remains of a bulk-store that had already been cleaned, perhaps even hand-sorted. Such an assemblage might represent the remains of the original content of the silo, charred during cleaning with fire for second use. Another possibility is that the amount was taken from the silo, was cleaned and got carbonized in a household accident, during the preparation for dehusking for instance. If this happens to be the case, the charred remains are just domestic waste cast into an empty, abandoned silo.

2.5 VILLENEUVE-ST.-GERMAIN 'LES GRANDE GRÈVES' (AISNE)

Villeneuve-St.-Germain is the third site in the Aisne valley which has yielded carbonized seeds. The samples originate from the post-Bandkeramik 'Groupe de Villeneuve-St.-Germain', named after this site, and from the La Tène III period.

2.5.1 Villeneuve-St.-Germain Group

Structures 70 and 162 belong to this group. They have been published in the Rapport d'Activité 4 (p. 69-85) and 5 (p. 75-77). Nr. 70 is definitely a pit next to a house and nr. 162 could be one. The samples have been sieved through a 0.5 mesh.

70, pit belonging to a house

sample size	?
Corylus avellana, shell fragments	2

162,pit

sample size	2.5 dm^3
Triticum dicoccum	2
Triticum cf. dicoccum	81
Triticum monococcum	2
Triticum monococcum/dicoccum, spikelet bases	21
Chenopodium album	5
Corylus avellana, shell fragments	3
Bromus tectorum	72
Galium spurium	1
Phleum pratense	54
Poa sp. non annua	1
Polygonum convolvulus	25
Vicia/Lathyrus	2

In the assemblage from 162 grass seeds predominate. The caryopses of Bromus are broken but the fragments are those of long specimens with lengths between 7 and 10 mm. Their bases are pointed and the shape of their apices is something between blunt and pointed. Their thickness is about 1.3 mm. Seeds of Bromus sterilis and Br. madritensis are longer and have more pointed apices.
The Phleum seeds measure 0.98 (8.8 - 1.1) x 0.58 (0.5 - 0.7) x 0.62 (0.5 - 0.8) mm, N = 25.
The wheat kernels are distorted owing to carbonization. Most of them, however, closely resemble emmer. The kernels cannot be measured anymore, but they give the impression that they vary considerably in size. Small sizes less than 4.5 mm predominate.
The assemblage looks like the material that falls through the grain sieve when part of a store is sieved for daily use. These 'fine sievings' contain undersized kernels, spikelet bases and small weed seeds. The fine sievings could have been burnt on purpose. An essential feature of this interpretation is that Bromus and Phleum are considered weeds from wheat fields. Nowadays these grasses are not reputed as field weeds, but in the Neolithic Phleum at least is often found associated with cereals, Bromus is not unknown in such contexts either.
An alternative hypothesis is that the grasses were collected for their own sake. They could be the remains of hay or bedding. In that case the grain could be the remainder of some straw. It is not necessary for stems to be found, because they easily burn to ash; the same applies for the culm nodes. The whole lot might even represent a piece of burnt dung.
The fourth species which characterizes the assemblage is Polygonum convolvulus, a climber of cereal stems. What-

Fig. 5 Menneville: Picris hieracioides. 15:1.

ever the interpretation may be, the plant has come with the wheat.

2.5.2 *La Tène III*

Structure 81 dates from the La Tène III period. The pit has an oval shape, 1.8 x 1.4 m, and is only 0.5 m deep. It has been published in the Rapport d'Activité 3 (p. 85). The seeds have already been published in the Rapport d'Activité 6 (p. 263).

81, pit

sample size	5 dm^3
Hordeum vulgare, hulled	1
cereals indet., fragments	20
Bromus sp.	1

2.6 LE FORT-HARROUARD (EURE-ET-LOIR)

The hillfort Le Fort-Harrouard belongs to the municipality of Sorel-Moussel near the town of Dreux. It is situated on a promontory between a steep sided dry valley and the river Eure. The subsoil consists of chalk covered by loam with flints. Already during the Chasséen the promontory bore a fortified settlement. Its occupation continued, with or without breaks, well into the Gallo-Roman period. The fort is best known for its thick deposits from the Bronze Age and the important finds therein. The fort must have had a dominating regional function. Part of the site was excavated at the beginning of this century by Abbé J. Philippe (Philippe 1936, 1937). The results of his excavations are at present being restudied and reconsidered under the supervision of the Musée des Antiquités Nationales at St.-Germain-en-Laye. The analysis of the carbonized material forms part of this re-editing. The results will be published in the Bulletin of the Musée (Bakels in press). Only a summary is given here.

During the excavations of Philippe, seeds were collected whenever seen by the excavators. The assemblages are therefore not to be considered as true associations. Because of this, no actual numbers are given here for the seeds, only an indication whether a certain species occurs often or less often in the samples.

The most striking aspect of the Le Fort-Harrouard finds is the predominance of millet. This cereal occurs in the form of lumps of kernels sticking together. The grains are still encased by their palea and lemma. The lumps were evidently broken during excavation and look like pieces of cokes. Except in two cases, all lumps of millet are free from other cereals or weed seeds. The exceptions are lumps enclosing a few emmer grains. The millet was obviously grown or stored separately from other products.

There are two more lumps of grain. One is a mixture of emmer, barley and wheat; the other consists solely of emmer.

The remaining collections only contain loose seeds. Owing

	BA-BM	BM	BM-BFI	BFI	BFI-BFII	BFII	BFII-BFIII	BFIII	BF
Number of samples	2	4	2	13	2	3	2	11	10
Triticum dicoccum	+	–	+	+ + +	+ +	+ +	+ + +	+ + +	+ + +
Triticum aestivum s.l.	–	–	–	+	+	+	+	+	–
Hordeum vulgare	+	–	–	+ +	+	+	+ + +	+ + +	+
Panicum miliaceum	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
Vicia faba	–	+	–	–	–	–	+ + +	+ + +	+ +
Pisum sativum	–	–	–	+	+	–	+ + +	+ +	+
Malus sylvestris	–	–	–	+	–	–	–	–	+
Rosa sp.	–	–	–	–	–	–	+	–	–
Prunus spinosa	–	–	–	–	–	–	–	+	–
Quercus, cotyledons	–	+	+	+	+	+ +	–	+ + +	+ +
Corylus avellana	–	–	–	+	–	–	+	–	–
Bromus sp.	–	–	–	+	–	–	+	–	–
Avena sp.	–	–	–	+	–	–	–	–	–

+ + > 20 specimens, + + + > 100 specimens, BA: Early Bronze Age, BM: Middle Bronze Age, BF: Late Bronze Age.

to the sampling method, it is difficult to see true assemblages in them. They do not reveal anything about associations between species.
Seeds occurred everywhere in the excavated area. Several places show large concentrations. Cereals, pulses and acorns were lying next to each other because most finds contain a mixture of species. This, and the ubiquitous presence of millet-lumps, suggests that the carbonized matter is no ordinary refuse, nor the witness of small accidents. The carbonized seeds are rather the result of a real fire. One fire at least must have raged in the Late Bronze Age I settlement and another in the Late Bronze Age III. These periods show the largests concentrations and have the most finds. I should like to suggest that the fortified settlement at Le Fort-Harrouard burned down at least twice.

2.7 COMPIÈGNE 'LE FOND PERNANT' (OISE)

The situation of 'Le Fond Pernant' can be compared with that of the settlements along the Aisne. The site was built on a low river-terrace and its subsoil consists of gravel with loamy lenses. The excavation of 'Le Fond Pernant' is of recent date and has therefore not been published yet. The soil traces consist mainly of pits of the Early Bronze Age, Late Bronze Age and La Tène I. All samples were sieved, mesh-width 0.5 mm, except nr. 12 where sieving was not necessary.

2.7.1 Early Bronze Age

20, small pit

sample size	10 dm³
Panicum miliaceum	1
cereals indet.	1

2.7.2 Late Bronze Age

19, pit

sample size	0.25 dm³
Triticum dicoccum/spelta, spikelet basis	1
Phleum sp.	1

60, pit

sample size	1.0 dm³
Triticum dicoccum, spikelet basis	1
Hordeum vulgare, hulled	4
Daucus carota	1
Polygonum aviculare/convolvulus	1
Polygonum lapathifolium	5

2.7.3 La Tène I

Already during excavation the filling of pit nr. 12 showed a dark patch consisting of a concentration of pure grain. Such little mineral matter was mixed with the kernels that sieving or flotation was superfluous. The samples from the remaining pits unfortunately had a rather small volume.

3, pit, bottom layer

sample size	0.1 dm³
Triticum dicoccum/spelta, spikelet basis	1
cereals indet.	1

8, pit

sample size	0.6 dm³
–	

12, pit

sample size	2.0 dm³
Hordeum vulgare	65000
Triticum spelta	9200
Triticum spelta, spikelet bases	30
Triticum dicoccum	*260*
Avena sp.	1000
Avena sp., awn fragments	39
Avena fatua, floret bases	5
Agrostemma githago	3
Aphanes microcarpa	1
Arenaria serpyllifolia	1
Artemisia vulgaris	1
Brassica sp./Sinapis arvensis	10
Bromus arvensis	3
Bromus sp.	1
Cerastium sp./Stellaria sp.	1
Chenopodium album	86
Chrysanthemum leucanthemum	13
Eleocharis palustris	1
Galium aparine	1
Galium spurium	1
Galeopsis tetrahit	1
Knautia arvensis	1
Myosotis sp.	1
Papaver argemone	12
Phleum pratense	11
Polygonum convolvulus	1
Rumex sp.	2
Tanacetum vulgare	1
Thlaspi arvense	1
Valerianella dentata	1

58, pit

sample size	0.75 dm³
Polygonum convolvulus	1

66, pit

sample size	1 dm³
Triticum cf. spelta	1

74, pit

sample size	0.75 dm³
Triticum dicoccum/spelta, spikelet basis	1

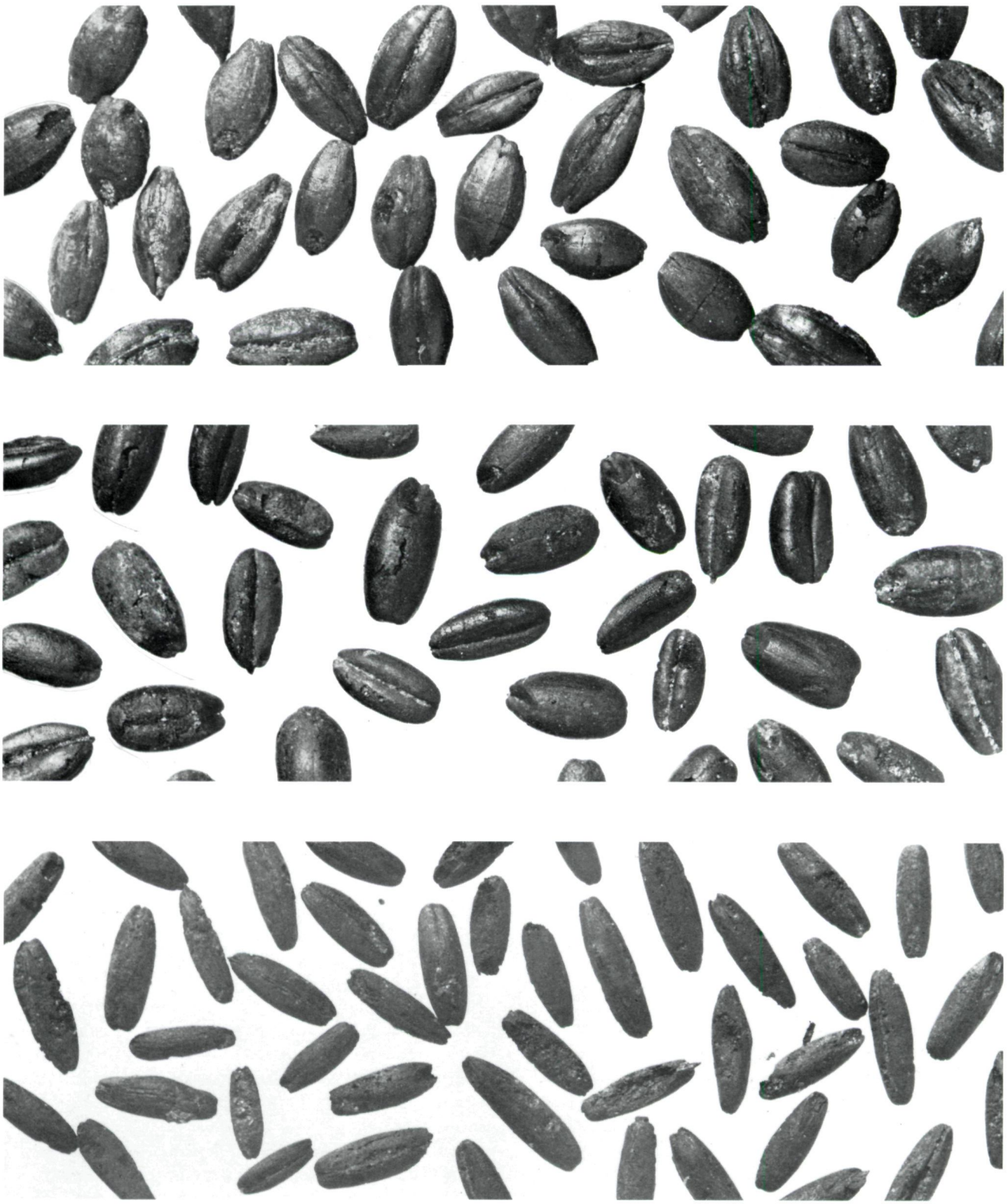

Fig. 6 Compiègne: barley (top), spelt (centre) and oats (below). 4:1.

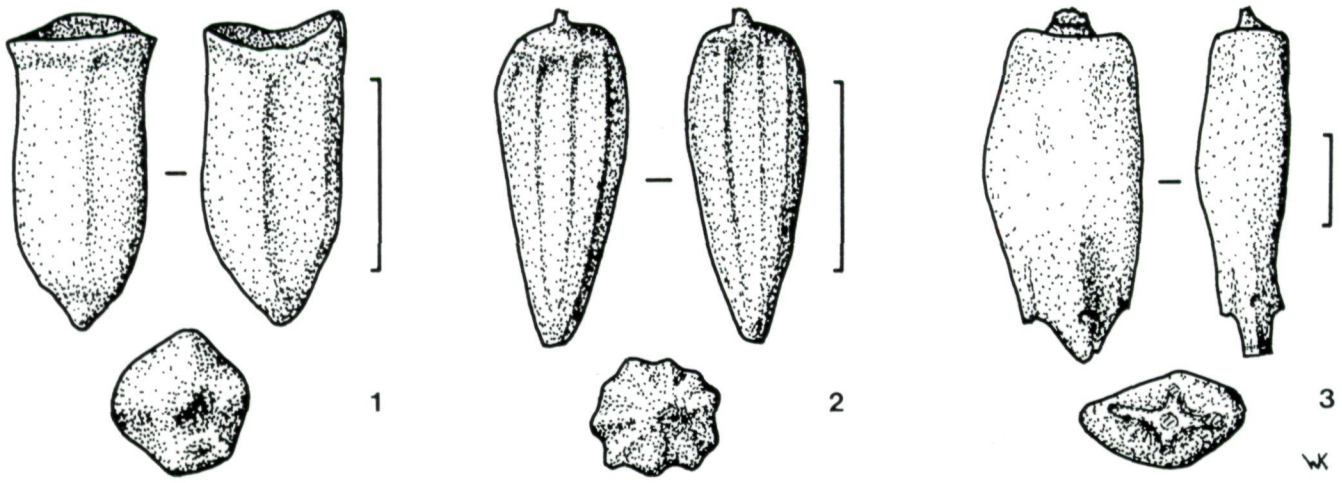

Fig. 7 Compiègne: Tanacetum vulgare (1), Chrysanthemum leucanthemum (2) and Knautia arvensis (3). Scale unit 1 mm.

76, pit

sample size	1 dm³
Avena sp., awn fragment	1
Panicum miliaceum	1

118, pit, -35 cm

sample size	1 dm³
Hordeum vulgare	250
Avena sp.	2
Avena sp. awn fragments	14
Avena fatua, floret bases	3
Chenopodium album	5
Chenopodium hybridum	1
Galium spurium	7
Polygonum convolvulus	4
Polygonum minus	1
Potentilla sp.	2
Rumex acetosella	2
Silena conica/nutans	1

118, pit, bottom

sample size	0.1 dm³
Panicum miliaceum	1
cereals indet.	4

The most interesting sample is the sample from pit 12. 86% of the small heap of carbonized cereals found in this pit consists of hulled barley, 12% of spelt, 1.5% of oats and 0.5% of emmer-like grain. In this mixture the barley is not yet de-husked; on the remainder remnants of chaff were not to be seen. The number of glume fragments and spikelet bases of wheats and oats is so small that it is unlikely that these cereals were originally carbonized in the husk, but came undone from their chaff. The barley has the following dimensions: 5.45 (4.6 - 6.8) x 2.91 (2.2 - 3.8) x 2.31 (1.6 - 3.0) mm, N = 100 (*fig. 6:top*); measured are kernels with glumes burnt off. For spelt has been found: 5.37 (4.0 - 6.7) x 2.79 (2.1 - 3.5) x 2.13 (1.4 - 2.7) mm, L/B 193.8 (155 - 233), T/B 76.8 (58 - 96), N = 100. The emmer measures 4.55 (3.9 - 5.2) x 2.05 (1.7 - 2.6) x 1.70 (1.5 - 1.9) mm, L/B 223.3 (192 - 260), T/B 83.9 (70 - 95), N = 10. The oats have dimensions of 5.37 (3.9 - 7.0) x 1.78 (1.4 - 2.3) x 1.50 (1.0 - 2.0) mm, N = 50.

The four Avena floret bases are those from Avena fatua, so that one may ask whether these bases belonged to a few kernels of wild oat which cannot be distinguished from the cultivated species, or whether one should identify all oats as the wild species.

The total amount of wild plants is small, but the list of species is rather long. The assemblage is very heterogenous. It contains typical field weeds such as Agrostemma githago, Bromus arvensis, Galium spurium, Papaver argemone, Thlaspi arvense and Valerianella dentata. But typical meadow components are present too, Chrysanthemum leucanthemum and Knautia arvensis for instance, just a the ruderals Artemisia vulgaris, Chenopodium album and Tanacetum vulgare (*fig. 7*).

The Galium spurium has a pattern of isodiametric cells, whilst the Galium aparine, likewise present, is quite different with its rows of elongated cells. The bristles have, of course, vanished. The former measures 1.0 x 0.8 x 0.8 mm and the latter 2.0 x 1.7 x 1.5 mm. Their overall shape is identical.

The achenes of Chrysanthemum leucanthemum measure 1.7 x 0.6 mm, 1.5 x 0.5 mm, 1.5 x 0.5 mm, 1.5 x 0.7 mm, 1.7 x 0.6 mm and 1.7 x 0.7 mm. They are rather small. The specimens are thought to belong to Chrysanthemum leucanthemum because this is the only species with ten ribs and

the greatest width above the middle of the achene.
The Cerastium or Stellaria is so badly preserved that an identification is impossible.
At first sight the assemblage looks like a lot of cereals in a well advanced state of cleaning. Loose spikelet bases, weed seeds as large as cereal kernels and small seeds have vanished. Such assemblages are usually intended for direct consumption. Hulled cereals are de-husked in the last stage of preparation (see Hillman 1981, for instance). It is strange, however, that the barley remains to be de-husked, but that both the wheats and the oats are already devoid of husks. Moreover, a portion of cereals is expected to contain mostly field weeds with an accidental species from the surrounding vegetation. But the field weeds do not predominate and the wild plants originate from a great diversity of habitat. The mixture is not natural. Although the heap of grain in pit 12 looks like one assemblage, the truth may be that in reality it consists of two or even three assemblages,

Fig. 8 Vieux-Moulin: barley. 4:1.

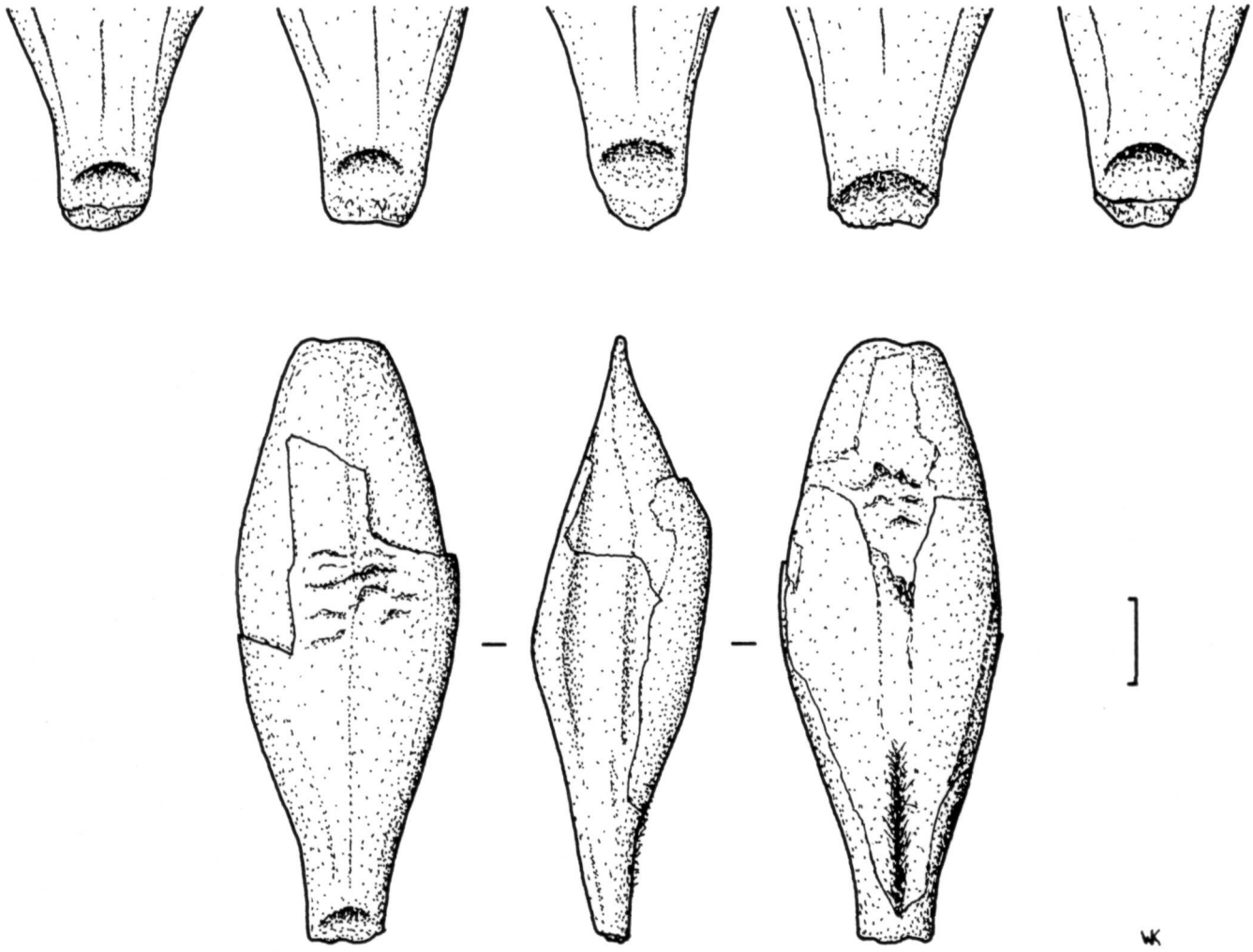

Fig. 9 Vieux-Moulin: barley; five lemma bases are shown in detail. Scale unit 1 mm.

which got mixed and deceive us into believing there is only one.

I should like to think in terms of one or two quantities of cereals, charred during household accidents, and one assemblage of a quite different origin. The question is which origin. If the third also came from the house, one could think of fuel for the oven or the kitchen fire, perhaps even dung as fuel. In this way the mixture as a whole originated in the same place, which might explain the fact that they were thrown away together. The carbonized matter must have been disposed of at the same time, because the mixture does not contain any mineral matter.

The content of pit 118 resembles that of nr. 12, except that in this case there is no question of mixtures of different kinds of cereal.

2.8 VIEUX-MOULIN, ST.-PIERRE-EN-CHASTRE (OISE)

St.-Pierre-en-Chastre is a hill-fort, just like Le Fort-Harrouard. The second similarity is the fact that the excavation was carried out a long time ago. The hillfort was excavated in the middle of the nineteenth century by Viollet-le-Duc. The work was executed at the command of emperor Napoleon III. During the investigations a small vessel containing carbonized grain was found. As can be deducted from the excellent condition of the cereals, the find was handled with the utmost care. It found its way into the national collections and now belongs to the inventory of the Musée des Antiquités Nationales at St.-Germain-en-Laye.

The piece of earthenware was made in the Late Bronze Age IIb or early III and provides a date for its contents.

contents of vessel

sample size	10 cc
Hordeum vulgare	400
Hordeum vulgare, internodia	4
Triticum dicoccum	16
Triticum dicoccum, spikelet bases	4
Hordeum/Triticum, fragments	1.5 cc
Panicum miliaceum	1
Brassica/Sinapis arvensis	4
Bromus arvensis	1
Polygonum lapathifolium	1
indet.	2

The cereals have been preserved perfectly. The barley was carbonized in a hulled condition and even the rachilla is in some cases still in place and intact. 26% of the sample consists of asymmetrical kernels. The lemma bases show a horseshoe-shaped depression (*fig. 8, 9*). The four rachis segments are of the slender type. Two of them are connected; they look like the first two internodia of the spike. The lower one is broken, the second is 1.3 m long. The loose segments measure 2.1 and 2.3 mm. Especially the lemma bases point to a type of barley with lax ears. The dimensions of the kernels which lost their chaff are 5.25 (4.1 - 6.5) x 2.50 (1.8 - 3.2) x 1.93 (1.3 - 2.5) mm, N = 100.

The emmer kernels still posses their apical hairs. They measure 5.26 (4.7 - 5.7) x 1.95 (1.4 - 2.2) x 1.88 (1.5 - 2.3) mm, T/B 96.6 (84 - 117), L/B 270.9 (234 - 322), N = 14. Their ventral side is flat. The kernels have a normal length, but are rather slender. Perhaps they are not fully developed.

The sample includes few weed seeds. It is in fact a find of pure barley. The perfect condition can only be accounted for if the kernels got carbonized in the vessel itself. The vessel must have been exposed to indirect heat. Direct contact with fire and flames has to be excluded. It is easiest to think in terms of intense heat during the burning down of a house. The question remains how to explain the presence of hulled barley in a small vessel. Even if the vessel was completely filled, the quantity of grain is far too small to represent a future meal or a store of sowing seed. Are we dealing with an offering?

2.9 NANTEUIL-SUR-AISNE (ARDENNES)

The site Nanteuil-sur-Aisne is situated on the slope between the valley of the Aisne and the plateau to the south of this river. The Aisne flows at a distance of 500 m from the site and has its bed some 40 m deeper. Plateau and slope are covered with loess.

A strong erosion exposed dark discolorations, which proved to be pits from the Late Bronze Age. The first results of the excavation can be found in a publication by Lambot (Lambot 1977). The site has a C14-date of 2820 ± 90 BP (Gif-3577), that is 870 BC (uncalibrated). One of the pits contained a sherd with a carbonized cereal grain enclosed in it.

sherd

Hordeum vulgare	1

According to the publication another sherd showed the imprint of a hazelnut (Lambot 1977, 29).

2.10 SUIPPES (MARNE)

The terrain at Suippes forms part of a chalk district with an undulating relief. On the chalk a shallow soil has developed. The grounds form part of a military terrain.

The site was detected during construction works. More than a hundred pits appeared which all belonged to La Tène I or a slightly earlier period. Many of the pits are so-called silos. They were cut into the chalk and were refilled with material varying from coarse blocks of chalk to fine black soil, mixed with domestic waste. Two of these silos have been published in the meantime (Jonot/Villes 1976). In some cases the filling of the silos shows carbonized matter. As an experiment samples from nrs. 130 and 139 were processed by froth flotation. For this the machine used for the Aisne-valley project was borrowed. The flot was sent to me. The result was such that I asked for more to be sent. Thus a sample from silo 129 and another from 139 were obtained and water-sieved (mesh 0.25 mm). The results can be found in the table. In the case of the largest samples, the category 'seeds smaller than 1 mm' was only partly analysed. The quantities found were multiplied in order to arrive at the total amount, a procedure which has left its marks in the table.

The three pits belong to the La Tène I period. In the near future dozens more silos will be investigated.

The carbonized remains comprise a remarkably rich mixture of cultivated and wild plants. The crop plants are represented by five or six kinds of cereals and one oilseed: gold of pleasure (Camelina sativa). According to me this is the first time gold of pleasure is mentioned for France. A specimen is shown in *fig. 10:2*.

The barley belongs to a hulled variety. The dimensions of kernels from 139 are: 5.65 (4.3 - 7.0) x 3.13 (2.1 - 4.7) x 2.51 (1.5 - 3.5) mm, N = 100. Asymmetrical kernels are present, but their share amounts to a mere 41% instead of the theoretical 67%. Most specimens are damaged owing to carbonization and therefore it is possible that many asymmetrical kernels were not recognized as such.

The silos contain three kinds of wheat. The kernels of the einkorn-type belonging to the sieved samples 129 and 139 may be those from the uppermost spikelets of emmer, but the flot from 139 shows so many examples that true einkorn must be present here. The bases of the spikelets are

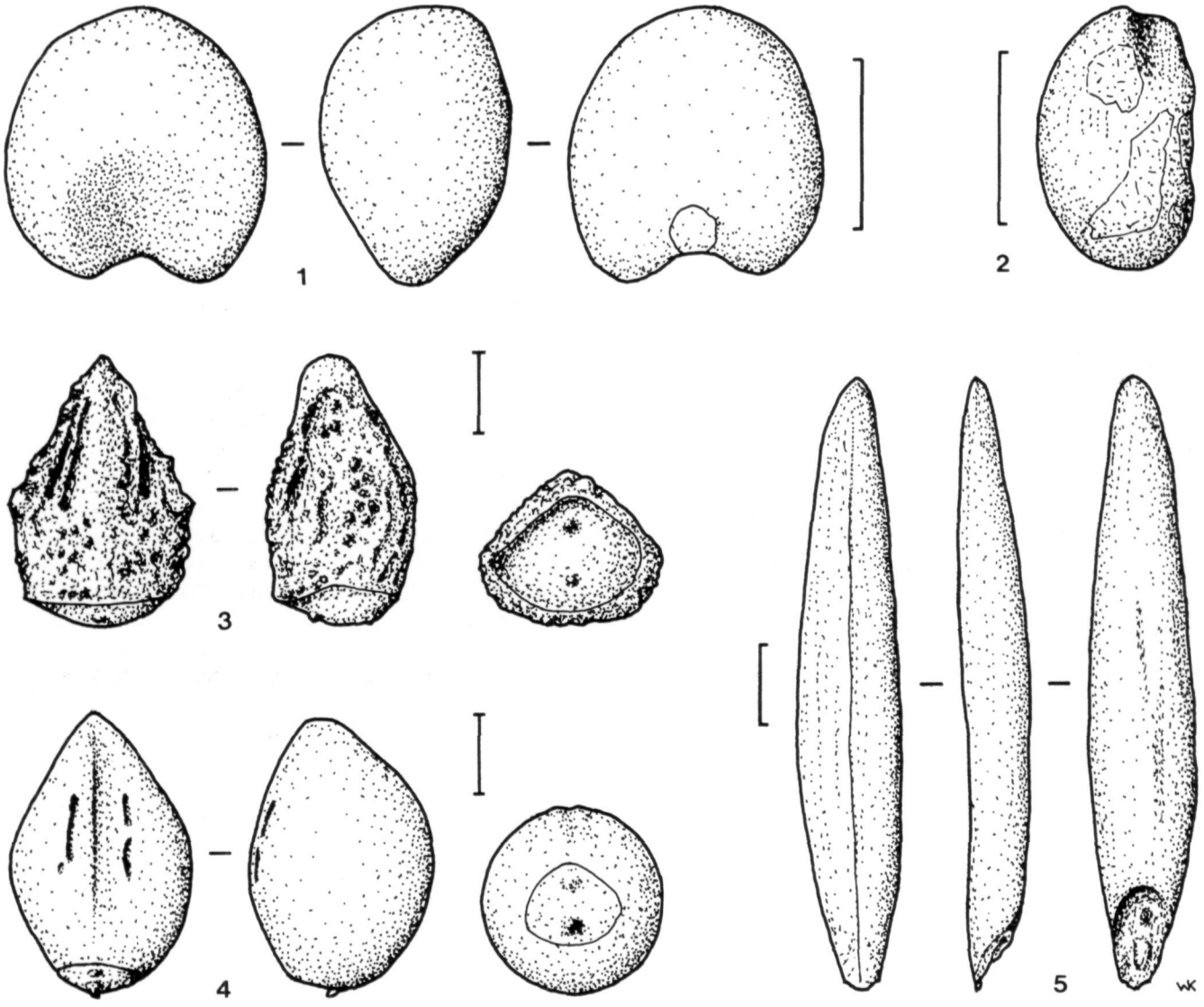

Fig. 10 Suippes: millet (1), gold of pleasure (2), Buglossoides arvensis (3), Lithospermum officinale (4) and Bromus erectus/tectorum (5). Scale unit 1 mm.

not very helpful in distinguishing einkorn fom emmer. Both are present, but their characteristics overlap. The spikelet remains of spelt, however, are very distinct. Even the broken-off lemma-bases are easy to identify because they are much coarser than those of the other wheats. Also their cross-section is more angular. The kernels belonging to them have also been found. Unfortunately the wheat grains are too badly damaged by fire to allow measuring.
Millet is only present in small amounts. Three specimens from 129 measure 1.8 x 1.5 x 1.6 mm, 1.4 x 1.4 x 1.2 mm and 1.6 x 1.5 x 1.1 mm.

A sixth kind of cereal might be oats, but as only awn fragments have been found the oats could belong to a wild species.
The long list of wild plants includes both species which are often found in charred assemblages and seeds which are quite rare. Because it is impossible to describe all of them here, only species from seven families will be commented on.
Arenaria serpyllifolia has very small kidney-shaped seeds covered with shiny, oblong warts. Starting from the hilum the warts fan out radially, forming ever wider circles. The

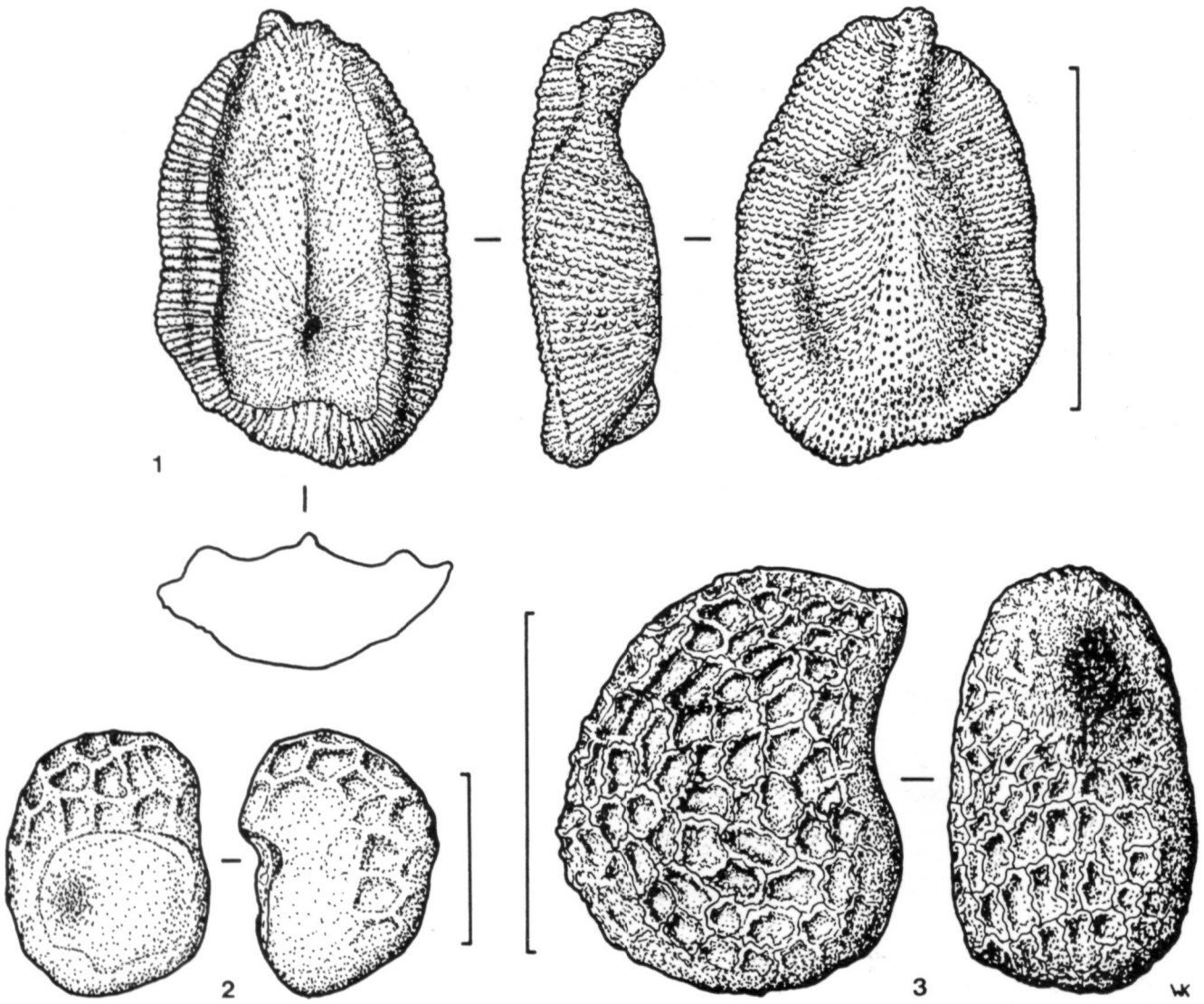

Fig. 11 Suippes: Petrorhagia prolifera (1), Teucrium botrys (2) and Hyoscyamus niger (3). Scale unit 1 mm.

length of three seeds from 139 is 0.46, 0.48 and 0.45 mm. Besides seeds, fruits have been found. These could be recognized because some of them still hold seeds. They have six triangular calyx-teeth (*fig. 12:5*).

As so many members of the Caryophyllaceae Melandrium rubrum seeds are kidney-shaped and have warts. Two specimens measure 1.4 x 1.1 x 0.8 mm and 1.1 x 0.8 x 0.8 mm. The warts are conical and pointed. The seeds of Melandrium album are very similar, but their warts are usually shorter and thicker.

The seeds of Petrorhagia prolifera are easy to distinguish on account of their form, their dimensions and their sculpture (*fig. 11:1*).

If we look at Hypericum perforatum seeds, we see 6-7 rows of cells at the same time. Many Hypericum-species have a smaller reticulum. Others are smaller in their general length. One of the Suippes Hypericums measures 0.8 x 0.4 x 0.4 mm and a second one 1.0 x 0.4 x 0.4 mm (*fig. 12:6*).

Galeopsis ladanum can be seen in *fig. 13:2*. G. ladanum also includes G. angustifolium. The seeds can only be confused with those of G. segetum. The latter is, however, slightly bigger. The dimensions of one of the Suippes seeds are 2.5 x 1.4 x 1.2 mm.

The very small seeds of Origanum vulgare (*fig. 13:4*) are

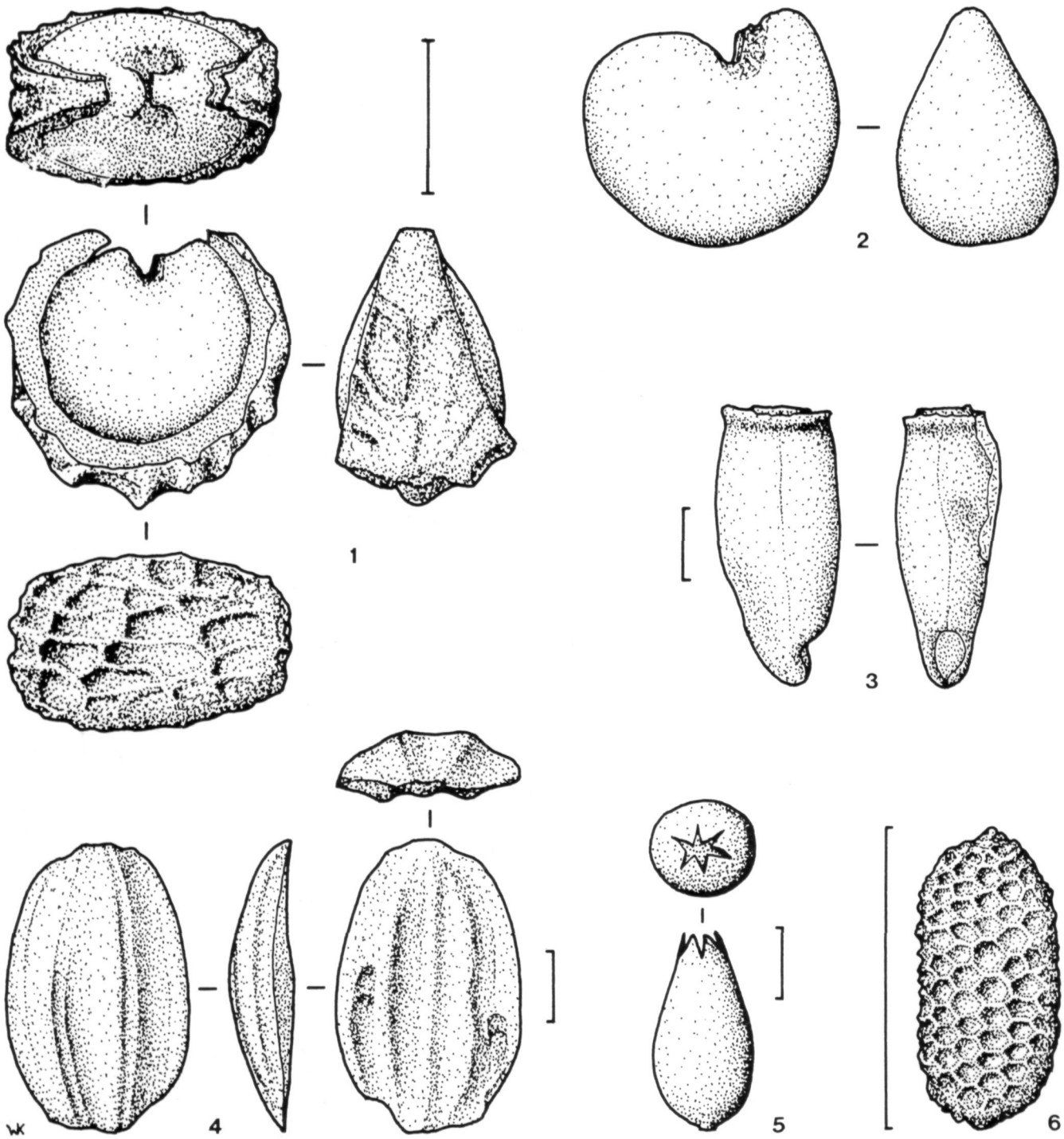

Fig. 12 Suippes: Malva sylvestris fruit (1), Malva sylvestris seed (2), Centaurea scabiosa (3), Heracleum sphondylium (4), Arenaria serpyllifolia fruit (5) and Hypericum perforatum (6). Scale unit 1 mm.

more oblong than those of that other very small member of the Labiatae: Thymus.
Satureja acinos (*fig. 13:1*) is bigger than Origanum. The species is much more slender than the other Satureja species.
Part of the surface of Stachys annua still shows the characteristic, relatively coarse, reticular pattern which distinguishes this species from other similar Stachys-seeds. Dimensions: 1.52 (1.3 - 1.8) x 1.31 (1.1 - 1.5) x 0.98 (0.9 - 1.2) mm, N = 12 from 139 (*fig. 13:3*).
Teucrium botrys bears a remote resemblance to Ajuga reptans, but the seed is more globular and its hilum is clearly rounded. Moreover, the ridges of the reticulum are broader, in an absolute sense, but also in relation to the diameter of the meshes (*fig. 11:2*).
The seeds of Malva are partly surrounded by the fruit-wall. The reticulum of this is characteristic for M. sylvestris (*fig. 12:1,2*). In M. pulsilla it is coarser and in M. neglecta it is less outspoken. M. alcea and M. moschata are bigger.
The Papilionaceae have seeds which are difficult to identify. By means of the dimensions, the general morphology and the morphology of the radicle, groups of species or even species can be recognized, but carbonization often causes characteristics to disappear. Moreover, Papilionaceae seeds are rather variable. Five species are shown in *fig. 14*.
Astragalus glycyphyllos can be distinguished from A. cicer, because the latter is more triangular in outline.
Coronilla varia has a centrally placed hilum (*fig. 14:4*). In C. coronata the hilum lies slightly off centre. C. emerus is larger, C. minima is smaller.
It is impossible to draw a distinction between Lotus corniculatus and Trifolium repens in the material from the silos. Both have a diverging radicle which is half the length of the seed.
Small Trifolium seeds with radicles running parallel to the seed and reaching two-thirds of its length are specified as Trifolium aureum-type. This type comprises T. aureum, T. campestre and T. dubium. Their size is about 1.0 x 0.7 x 0.4 mm.
Slightly bigger and with a diverging radicle which is half the length of the seed are the seeds of Trifolium medium and T. pratense. They measure a 1.2 x 0.9 x 0.8 mm.
Medicago lupulina has a parallel radicle which bends outwards just before it reaches the hilum at two-thirds of the total length of the seed. Seeds measure 1.55 (1.5 – 1.7) x 0.90 (0.8 - 1.0) x 0.78 (0.7 - 0.9) mm, N = 6 from 139. Other Medicago species are slightly bigger. M. falcata has a longer radicle.
Many seeds were badly deformed by carbonization. They cannot be identified anymore and are lumped together as 'Papilionaceae, small seeds'.
As regards the Rubiaceae only Asperula odorata calls for some comment. The seeds are of the same size as those of Galium aparine, also present, but their surface shows equidimensional cells. The seeds also have a longitudinal ridge inside which eliminates the possibility: Galium spurium. The wall is very thick, a characteristic which is absent in the similar Asperula arvensis.
The last seeds to be mentioned are those of Veronica. (*fig. 14:6,7*). The Veronica arvense-type measures 0.7 x 0.5 x 0.3 mm. The hilum is small, and oblong, and is situated in the middle of the seed. Those dimensions and those characteristics of the hilum are found in Veronica arvense, and in a part of the seeds of V. verna and V. prostrata. The Veronica chamaedrys-type is bigger and measures 1.1 x 1.0 x 0.4 mm. The hilum is relatively large (diameter 0.5 mm) and is placed centrally. These characteristics belong to Veronica chamaedrys and to the smallest specimens of V. teucrium.

Although the table suggests the possibility of a comparison between the results of water-sieving and froth flotation, the analyses are not suitable for a true quantitative test. The samples are not exactly the same. Even the samples from silo 139 are not identical. They do come from the same layer, but they do not represent one sample divided into two parts. Still it is clear that neither after sieving nor after froth flotation a category of seeds is missing. There is no sense in remarking, for instance, that Origanum vulgare appears only when flotated, while the similar seeds of Satureja acinos are found on the sieve (the mesh was fine enough for both). I should like to conclude that the absence of Origanum in the residues is mere chance. In the future the samples from Suippes will be used for real experiments with water-sieving and flotation. There are already indications that dense and heavy seeds do not appear easily in a flot.
The cereals were obviously carbonized in the chaff, because all samples show almost as much chaff-remains as kernels. The ratio cultivated plants:wild herbs is 1:2.4, 1:42, 1:1.3 and 1:1.5. Among the wild plants species of different habitats are represented. They grew in fields, but also in ruderal areas, chalk downs, other dry grasslands, forest edges and even in forests. It is impossible to interpret all plants as field weeds. The quantity of perennial plants growing in grasslands, for instance, is much too large. Nevertheless, the carbonized remains give the impression of being one assemblage. If all seeds were indeed carbonized at the same time and thrown away together, the charred matter in the silos cannot be interpreted as the remains of a grain stock. The assemblage looks more like animal fodder. Perhaps the whole represents a mixture of waste from crop cleaning and hay. Another possibility is that the plants were eaten by animals grazing in the surroundings of Suippes. In this case they roamed over stubble fields, grasslands and around forest-edges. The seeds may have got into the dung

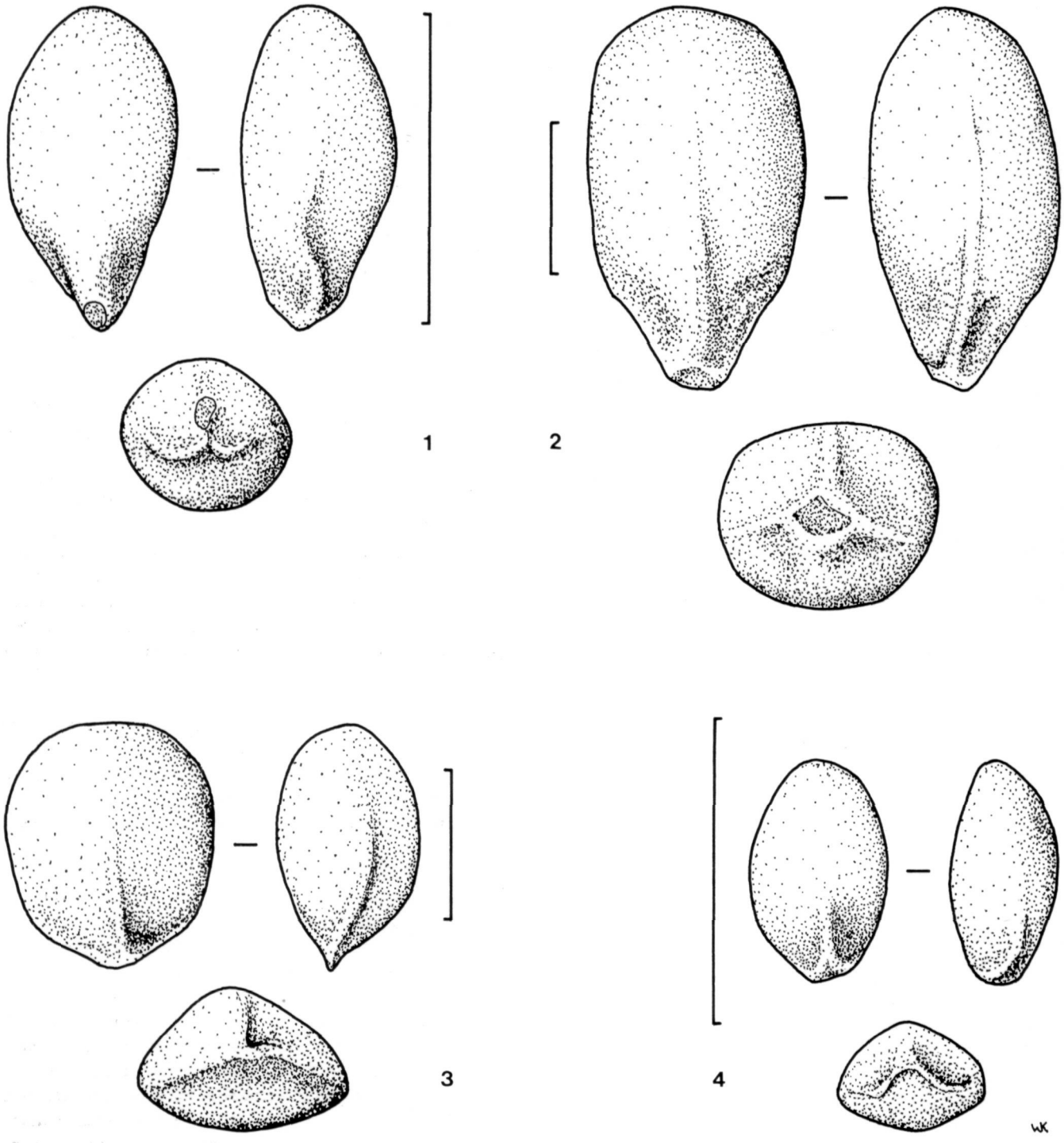

Fig. 13 Suippes: Satureja acinos (1), Galeopsis ladanum (2), Stachys annua (3) and Origanum vulgare (4). Scale unit 1 mm.

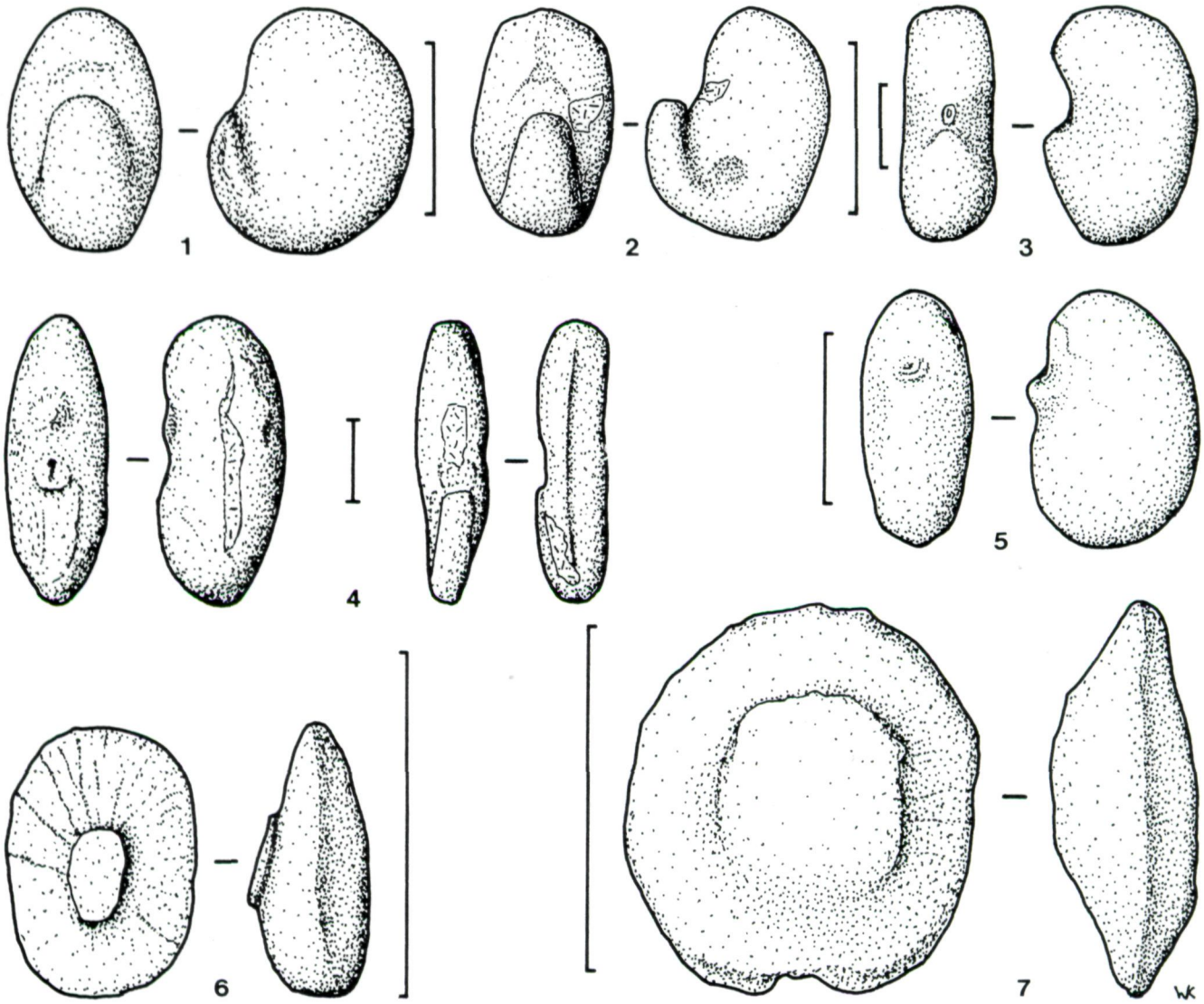

Fig. 14 Suippes: Lotus corniculatus (1), Trifolium medium/pratense (2), Astragalus glycyphyllos (3), Coronilla varia, two specimens (4), Medicago lupulina (5), Veronica arvensis (6) and Veronica chamaedrys (7). Scale unit 1 mm.

and the dung may have got burnt.

Naturally it is not surprising that many of the plants found are characteristic of calcareous soils. Fields rich in lime are represented by Stachys annua, Sherardia arvensis and Valerianella dentata. Typical representants of calcareous ruderal areas are Centaurea scabiosa, Lithospermum officinale, Verbascum and Reseda lutea. Lime in forest-edges is indicated by Origanum vulgare and Astragalus glycyphyllos, for instance, and the true chalk grasslands are represented by Satureja acinos, Coronilla varia, Knautia arvensis and Petrorhagia prolifera. The last-mentioned plants verify the existence of open country: land which was deforested by man and his cattle. It is possible that these represent the equivalent of the Northwest European heathlands, which precisely in the Iron Age became a considerable component of the landscape in dryer areas.

	sieved	flot	sieved	flot
silo	129	130	139	139
sample size	5 dm³	10 dm³	10 dm³	90 dm³
Hordeum vulgare	68	30	84	2512
Hordeum vulgare, internodia	29	20	3	16
Triticum monococcum	5	–	4	64
Triticum dicoccum	180	–	49	144
Tr. monococcum/dicoccum, spikelet bases	70	125	73	319
Triticum spelta	4	–	–	176
Triticum spelta, spikelet bases	166	30	105	250
Triticum sp.	–	–	–	384
Triticum, awn fragments	+	–	+	–
Triticum + Hordeum	450	–	200	–
Cereals indet.	–	10	–	240
Avena sp., awn fragments	350	–	–	–
Panicum miliaceum	8	–	11	–
Camelina sativa	18	–	30	–
Betulaceae				
Corylus avellana, shell fragments	–	–	1	–
Boraginaceae				
Buglossoides arvensis	649	–	141	736
Lithospermum officinale	–	–	–	16
Caprifoliaceae				
Sambucus ebulus	–	–	–	+
Caryophyllaceae				
Agrostemma githago	8	–	–	48
Arenaria serpyllifolia	700	30	–	16
Arenaria serpyllifolia, fruits	–	–	–	32
Cerastium sp.	–	–	–	5
Cerastium/Stellaria	–	–	–	5
Melandrium rubrum	4	10	–	32
Petrorhagia prolifera	2	10	–	5
Chenopodiaceae				
Atriplex hastata	2	–	–	14
Atriplex hastata/patula	–	–	–	16
Chenopodium album	27	390	60	442
Chenopodium cf. glaucum	–	10	–	–
Chenopodium hybridum	2	–	–	21
Compositae				
Artemisia vulgaris	–	10	–	5
Centaurea scabiosa	5	–	–	+
Chrysanthemum leucanthemum	–	–	–	+
Lapsana communis	5	–	–	5
Leontodon autummalis	–	–	–	16
Cruciferae				
Capsella bursa-pastoris	–	10	–	5
Sinapis arvensis	45	10	–	18
Thlaspi arvense	–	–	–	+
Cyperaceae				
Carex sp.	–	–	–	+
Dipsacaceae				
Knautia arvensis	–	–	–	+

	sieved	flot	sieved	flot
silo	129	130	139	139
Geraniaceae				
Erodium cicutarium	1	–	–	–
Geranium columbinum/dissectum	–	–	1	+
Gramineae				
Bromus arvensis	–	–	–	5
Bromus erectus/tectorum	1	–	2	188
Bromus secalinus/mollis	61	–	75	309
Bromus sp.	–	–	–	94
Lolium perenne/Festuca sp.	8	–	–	74
Phleum phleoides	–	270	–	–
Phleum phleoides/bertolonii/pratense	2	–	10	382
Poa sp. non annua	104	130	–	185
Gramineae sp. div.	14	140	30	394
Guttiferae				
Hypericum perforatum	–	10	–	52
Labiatae				
Galeopsis ladanum s.l.	1	–	–	5
Origanum vulgare	–	10	–	11
Satureja acinos	–	40	10	9
Stachys annua	4	–	20	30
Teucrium botrys	–	–	–	+
Malvaceae				
Malva sylvestris	3	–	–	112
Papaveraceae				
Fumaria officinalis	–	–	–	+
Papaver dubium/rhoeas	–	20		22
Papilionaceae				
Astragalus glycyphyllos	–	–	–	38
Coronilla varia	–	–	2	+
Lotus corniculatus/Trifolium repens	–	50	–	37
Medicago lupulina	5	180	–	60
Melilotus/Medicago (non lupulina)	–	–	10	–
Trifolium aureum - type	–	–	–	5
Trifolium medium/pratense	–	–	–	9
Vicia/Lathyrus	–	–	2	–
Papilionaceae, small seeds, indet.	15	–	–	186
Plantaginaceae				
Plantago lanceolata	4	180	–	356
Plantago major	–	–	10	+
Polygonaceae				
Polygonum aviculare	–	–	–	78
Polygonum convolvulus	9	–	28	197
Rumex sanguineus	–	–	–	14
Rumex sp.	–	–	–	16
Primulaceae				
Anagallis arvensis	10	–	–	23
Ranunculaceae				
Ranunculus repens	–	–	–	+
Resedaceae				
Reseda lutea	–	–	–	+

	sieved	flot	sieved	flot
silo	129	130	139	139
Rosaceae				
Potentilla species 1	–	–	–	37
Potentilla species 2	–	–	–	18
Rubiaceae				
Asperula odorata	–	–	–	32
Galium aparine	1	–	3	96
Galium verum-type	–	–	–	+
Galium sp. div.	56	30	–	144
Sherardia arvensis	–	–	–	+
Scrophulariaceae				
Euphrasia/Odontites	–	–	–	+
Verbascum sp.	–	–	–	+
Veronica arvensis/(verna)/(prostrata)	–	–	–	5
Veronica chamaedrys/(teucrium)	–	10	–	–
Solanaceae				
Hyoscyamus niger	3	40	11	275
Solanum nigrum	–	–	–	5
Umbelliferae				
Daucus carota	–	–	10	16
Heracleum sphondylium	–	–	9	+
Pimpinella major/saxifraga	4	–	–	53
Valerianaceae				
Valerianella dentata	–	10	–	+
Verbenaceae				
Verbena officinalis	–	–	–	9
Violaceae				
Viola arvensis/tricolor	–	10	–	–
Indeterminatae	20	85	60	363

2.11 CHAMPLIEU, ORROUY (OISE)

In 1977 archaeological investigations were carried out in the priory of Champlieu. In trench nr. 5, next to the northern wall of the nave of the chapel, the excavators came upon a small quantity of carbonized seeds. They belong to a level datable to the Gallo-Roman age. The seeds were sent to me for identification. The sample contained very little mineral matter. Sieving was not necessary.

trench 5	
sample size	–
Triticum aestivo-compactum	60
Hordeum sp.	9
Secale cereale	39
Avena sp.	27
Pisum sativum	1
Lens esculenta	1

The dimensions of the cultivated plants found are as follows:

Triticum aestivo-compactum measures 4.62 (3.9 - 5.0) x 3.36 (2.6 - 4.0) x 2.64 (2.2 - 3.2) mm, L/B 138.9 (120 - 174), T/B 78.8 (69 - 85), N = 10 (*fig. 15*). One kernel shows a dorsal ridge but has a scutellum with a normal Tr. aestivo-compactum shape. This specimen, 5.4 x 2.6 x 2.7 mm, must represent a kernel from a spikelet in which only one seed developed.

The barley measures 5.50 (4.9 - 6.3) x 3.13 (2.7 - 3.7) x 2.43 (2.2 - 3.0) mm, N = 6. One specimen looks vaguely asymmetrical but this is not sufficient to say which species is present here.

The dimensions of the rye are 5.55 (4.9 - 6.3) x 2.28 (2.0 - 2.7) x 2.00 (1.8 - 2.3) mm, N = 10 (*fig. 16*).

To which species of oats the Avena belongs, is not clear because the diagnostic floret bases are absent. I think,

Fig. 15 Champlieu:
Triticum aestivo-compactum
(club wheat). 4:1.

however, that in view of the context, the species is most likely a cultivated one. The kernels measure 5.19 (4.2 - 5.9) x 2.20 (1.9 - 2.5) x 1.92 (1.6 - 2.3) mm, N = 10.
The pea has preserved its hilum; its diameter is 4.8 mm.
The only lentil has a diameter of 3.2 mm and a thickness of 2.1 mm. It is slightly puffed owing to carbonization.
The odd mixture of six cultivated plants in one assemblage, without any trace of wild plants, may represent the remnant of burnt stocks swept together.

3 Summary and conclusions

The data mentioned above clearly show that the analysed samples provide different kinds of information. They share only one aspect and that is information about the presence of specified plants in specified periods. Naturally, when plants are absent no information is provided.
If I concentrate on cultivated plants and only use the data presented here, I can give the following compilation for plants in Northern France:

	einkorn	emmer	spelt	wheat	naked barley	hulled barley	millet	oats	rye	pea	horsebean	lentil	gold of pleasure	poppy
Bandkeramik	x	x			x					x		x		
Villeneuve-St.-Germain Group	x	x												
Michelsberg		x				x								x
Early Bronze Age							x							
Middle Bronze Age							x				x			
Late Bronze Age		x		x		x	x			x	x			
La Tène I	x	x	x			x	x						x	
La Tène III						x								
Gallo-Roman				x				x	x	x		x		

Fig. 16 Champlieu: rye. 4:1.

The table can be supplemented with data from three other sites published previously, that is Béthisy-St.-Martin (Oise), Chassémy (Aisne) and Châlons-sur-Marne (Marne). Here were found respectively Triticum aestivum s.l., Triticum aestivum s.l. + Tr. dicoccum + Tr. cf. monococcum + Hordeum vulgare var. nudum, and Triticum dicoccum (Jouve 1973, Hopf 1969). The first site dates back to La Tène III and the other two to La Tène I. These data supplement the table with wheat and naked barley for the period La Tène I and with wheat for La Tène III, which immediately shows that many more investigations have to be carried out before a more or less complete picture of which plants were cultivated when, can be given. And after that there are still the regional differences to be investigated. Such differences certainly existed.

The analyses show that cereals are much easier to detect than other plants. At this stage only one wild plant can be commented on and that is the hazelnut. Fragments of hazelnut shells seem to occur frequently in Neolithic contexts, they are much rarer in later deposits. This must have something to do with the environment, local economy or both. More data must be available before we can come to a safe explanation.

Hulled barley is present often enough and in such amounts that it is possible to note a little more than its mere presence or absence. Its dimensions call for attention. As appears from the table below, La Tène I kernels seem to be bigger than those of the Late Bronze Age.

It is, of course, quite possible, that the sizes have nothing to do with time and possible seed selection, whether intentional or not. They might be the result of difference in soil, for instance. This cause is however less likely here, because all soils in question seem to be similar. Future research must confirm whether I am right in suggesting crop improvement. For emmer and millet such a trend cannot be shown because not enough kernels were measurable.

In accordance with their nature, the samples can be classified into three main categories. The first is the category: 'stray finds' and 'samples which are too small'. To this category belong Evendorff, Montenach, part of the Compiègne material, and the sherd from Nanteuil. They can only give quantitative information on the presence of plants. The second category comprises the samples with 'settlement noise'. This is the most common kind of carbonized material and can be found at all sites where sieving or flotation is carried out. It includes all kinds of scattered waste and is mostly expressed in remains per dm^3 of pit-filling. The noise gives an impression of the amount and nature of carbonized filth in a particular settlement. Because the density is not only dependent on the absolute amount of carbon present but also on the time it took the pit to fill, it is advisable to compare the density of carbonized matter with the density of other kinds of waste such as sherds. A first and very preliminary comparison made with material from the Bandkeramik settlement Cuiry-lès-Chaudardes 'Les Fontinettes' shows that the paucity of carbonized remains from this settlement is an actual fact and not the result of the pits filling too rapidly. Low densities of charred remains may be caused by three factors: 1. plant remains were few, 2. plant material was not burnt, at least not often, and 3. charred remains did

	L(mm)	B(mm)	T(mm)	soil	N	period
Le Fort-Harrouard	5.16	2.82	2.16	calcareous loam	100	Late Bronze Age
Vieux-Moulin	5.25	2.50	1.93	calcareous ? loam	100	Late Bronze Age
Compiègne 12	5.45	2.91	2.31	calcareous loam	100	La Tène I
Suippes 139	5.65	3.13	2.51	calcareous loam	100	La Tène I

not fall into pits. The low densities of carbonized remains of cultivated plants at Brześć Kujawski in Poland were one of the arguments for P. Bogucki to conclude that the site was not one of the usual Bandkeramik settlements with the accompanying agricultural activities (Bogucki 1982, 95-96). The samples from the Bandkeramik settlement at Cuiry and those from the post-Bandkeramik sites of Missy and Berry-au-Bac are as poor in agricultural waste as Bogucki's site. In the future we may come to the conclusion that agriculture played a minor role in the daily lives of the inhabitants. However, there are still many samples to analyse and it is wiser to await results before making any statements.

The third category of samples comprises all actual concentrations of seeds. Contrary to those of the second category, the seeds more or less belong together. Needless to say, it is not necessary for these assemblages to share a common origin.

Some assemblages were carbonized in situ, others were not. Among the assemblages published here, only one consists of seeds charred in situ. It is the cereal from Vieux-Moulin. It is less clear whether the samples found in silos were charred in situ. The carbonized seeds excavated from silos do not have to have been charred in them. They might have been thrown in. The theory that every grain sample from a silo is the result of cleaning by fire, is wrong. The same applies for the theory that every cleaning leaves a layer of charred grain behind. Silos with undeniable layers of grain burnt in situ at the bottom are rare in comparison to the relatively frequent occurrence of this kind of structure. All the grain may have got burnt by accident. Moreover, it is quite unpractical to remove a whole layer of grain from a deep pit by using fire. Fire is more useful for drying the silo after cleaning and for destroying mould.

The best candidate for a silo with original contents is the La Tène I silo 89 from Menneville. Nevertheless, here too, the possibility cannot be ruled out that the grain got charred elsewhere and was tipped into an empty, unused silo. Found in silos, but with certainty not carbonized there, are the seeds from Suippes. The contents of these La Tène I silos resemble the assemblage from the Neolithic pit 162 from Villeneuve-St.-Germain. All look like burnt fodder or even dung. The content of the La Tène I pit 12 at Compiègne is a hybrid of the remains of a stock meant for human consumption and the remains of fodder. It is therefore difficult to interpret.

Then there are the finds from Le Fort-Harrouard and Champlieu. The seeds from both sites were certainly part of storages of food intended for human consumption. Those found in Le Fort-Harrouard must have got carbonized during big fires. They do not lie in their original position. The assemblage from Champlieu cannot have been in situ either, but what it represents and how it got to its final place, is unclear.

To conclude, it must be stressed that assemblages belonging to category three always have their own history; they must be interpreted individually.

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