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Pottery Industry in the
Nene Valley

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By BRIAN R. HARTLEY
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These notes are intended to serve as a brief summary of our present state of knowledge of the Roman pottery industry in the Nene Valley, and also to help visitors to Peterborough Museum to appreciate the remarkable collections of Romano-British pottery on display. Recent excavations in the Nene Valley conducted by the Archaeological Field Section of the Museum Society and, more recently, by the Water Newton Excavation Committee are summarized. The writer wishes to thank the Museum Society for inviting him to contribute this account to its Papers and the Water Newton Excavation Committee for permission to describe work done under its auspices.

Introduction

During the Roman period, the Nene Valley in the Peterborough area was one of the most highly industrialized regions of Britain. Apart from the potteries that stretched along the valley west of Peterborough, there was extensive iron mining and smelting around Wansford, while the quarrying of stone for use in building or for the production of the stone coffins that are common in the east Midlands, seems to have been widespread. At Sibson a sculptor made statues of high quality from the local limestone (*Archæologia* XXXII, p. 13 ff.). But it is in the pottery industry that the greatest interest of the area lies. There are several reasons for this. Few other places in the province have produced evidence for such large-scale production. Furthermore, we know that the pottery was distributed widely in the Midlands and North, and it is quite clear that it was an important item in Britain's economy from the late second century A.D. to the end of the Roman period. At first sight this may seem surprising to the non-specialist, but it must be remembered that pottery served many purposes at a time when there were no plastics or cardboard boxes, and when metal and glass vessels must always have been relatively expensive. Then, too, Britain had imported most of its tableware from Gaul in the first and second centuries. It came mainly from large factories that exported the red-coated pottery

known as samian ware on an enormous scale. After the end of the second century very little samian reached Britain, and wares like some of those made in the Nene Valley must have taken its place on the table. Another important aspect of the industry arises directly from the wide distribution of its products, and particularly from their presence on northern military sites. At such sites the pottery may sometimes be dated from their known history, given by inscriptions or deduced from the accounts that have come down to us in the writings of Roman historians. If the same kinds of pottery are then found on civil sites in the Midlands or South, they may be used as dating evidence for those sites and for the layers within them. This is particularly important, because the kind of direct evidence afforded by inscriptions is almost completely wanting on civil sites. Finally, the Nene Valley pottery is considerably more sophisticated and technically better than normal provincial wares, while some of it, as visitors to the Museum will readily appreciate, has interest for the student of Romano-British art.

The background of the industry

There was already an appreciable population in the Nene Valley when the Roman army reached it, about A.D. 44-46, in the course of the conquest of Britain. We know, mainly from aerial photography, many small sites of Iron Age type, some of which survived into the Roman period without much change (p. 15). Changes did, however, come gradually. The planting of a Roman fort at Durobrivæ, Water Newton (Fig. 1), to guard the crossing of the Nene, would have provided the impetus for civilian development. Such a fort inevitably attracted camp-followers, including naturally the local tradesmen, who would not have neglected the opportunities offered by a new market for their wares. Soon, the main Roman road from London to the north-east (Ermine Street) reached Water Newton. At first it would carry mainly military traffic, but increasing numbers of merchants and other civilians would soon have begun to use it and would require accommodation overnight. It is also likely that a *mansio* or posting station would be provided, at which travelling officials could spend the night and get a re-mount. In other words, it is highly probable that a flourishing little community would have grown up alongside the fort within a few years of its establishment. We know very little about these early developments, but it seems clear that once the military garrison had been moved north, perhaps in the late 60's or early 70's of the first century, the civil use of the site continued. Certainly by the end of the second century the town of Durobrivæ, on the east side of the Billing Brook in the parish of Chesterton, covered an area of 44 acres and

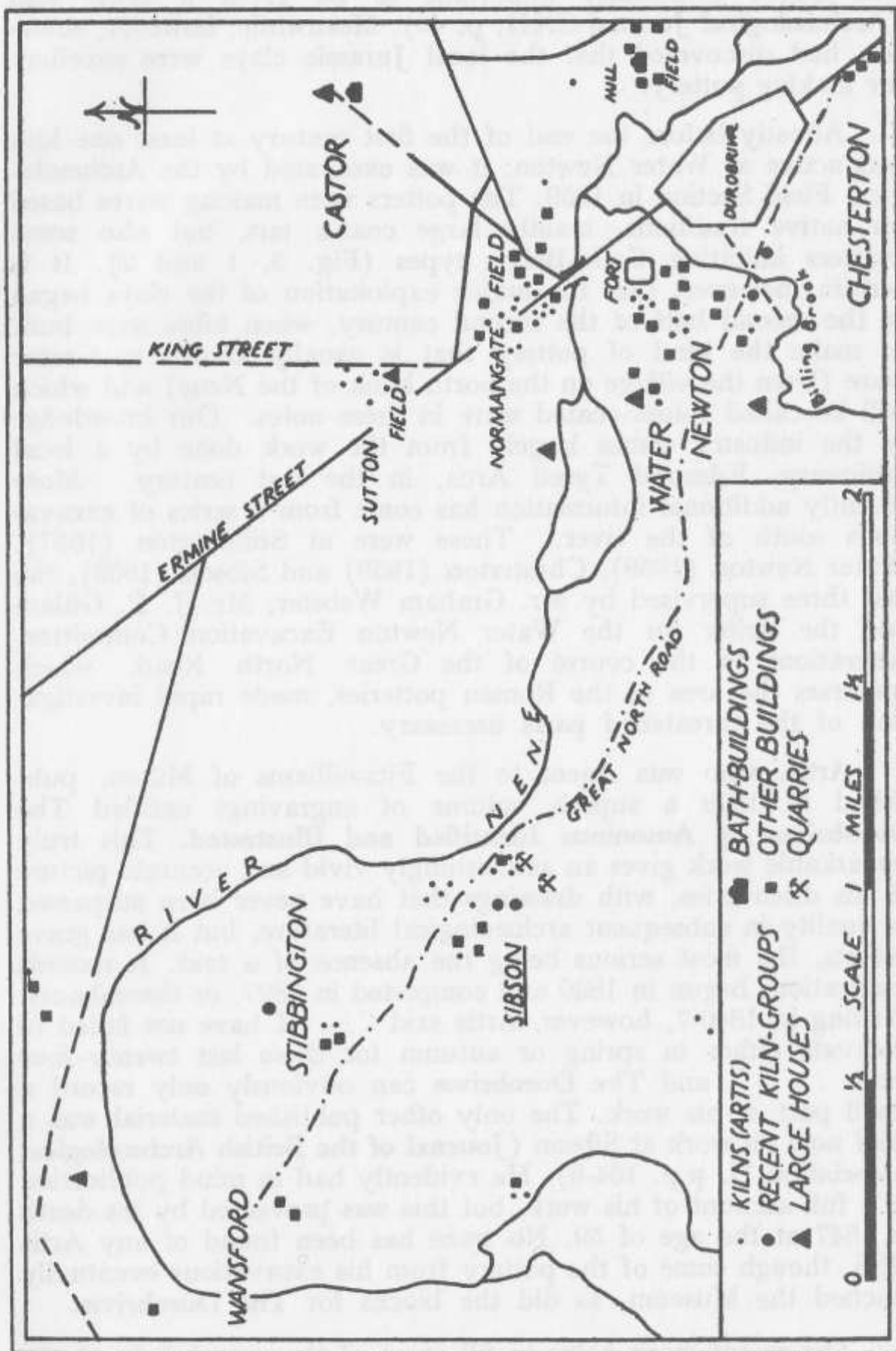


Fig. 1. Sketch-map of the potteries (after Artis)

was judged sufficiently important to be given a town wall (*Archæological Journal* CXII, p. 40). Meanwhile, however, someone had discovered that the local Jurassic clays were excellent for making pottery.

Already before the end of the first century at least one kiln was active at Water Newton: it was excavated by the Archæological Field Section in 1959. The potters were making wares based on native traditions, mainly large coarse jars, but also some platters imitating Gallo-Belgic types (Fig. 3, 1 and 2). It is certain, however, that the major exploitation of the clays began in the second half of the second century, when kilns were built to make the kind of pottery that is usually known as Castor ware (from the village on the north bank of the Nene) and which will be called colour-coated ware in these notes. Our knowledge of the industry comes largely from the work done by a local antiquary, Edmund Tyrell Artis, in the last century. More recently additional information has come from a series of excavations south of the river. These were at Stibbington (1957), Water Newton (1958), Chesterton (1958) and Sibson (1959), the last three supervised by Mr. Graham Webster, Mr. J. P. Gillam and the writer for the Water Newton Excavation Committee. Alterations to the course of the Great North Road, which traverses the area of the Roman potteries, made rapid investigation of the threatened parts necessary.

Artis, who was Agent to the Fitzwilliams of Milton, published in 1828 a superb volume of engravings entitled **The Durobrivæ of Antoninus Identified and Illustrated**. This truly remarkable work gives an astonishingly vivid and accurate picture of his discoveries, with drawings that have never been surpassed in quality in subsequent archæological literature, but it has grave defects, the most serious being the absence of a text. It records excavations begun in 1820 and completed in 1827, or thereabouts. Writing in 1846-7, however, Artis said ". . . I have not failed to excavate either in spring or autumn for these last twenty-four years . . . " and **The Durobrivæ** can obviously only record a small part of his work. The only other published material was a brief note on work at Sibson (*Journal of the British Archæological Association* II, p.p. 164-9). He evidently had in mind publication of a full account of his work, but this was prevented by his death in 1847 at the age of 59. No trace has been found of any Artis MSS, though some of the pottery from his excavations eventually reached the Museum, as did the blocks for **The Durobrivæ**.

The recent work helps to fill some of the gaps left by Artis, as far as the structure of the kilns and pottery-making techniques are concerned, though its main value will lie in the detailed study

of the pottery itself, which is not yet finished. For the general picture of the industry we are still largely dependant on Artis. He shows us a series of potteries stretching westward along both banks of the Nene, from Castor on the north and Chesterton on the south (Fig. 1). Interspersed with the kilns were substantial houses, some with mosaic floors as good as any in Roman Britain (*The Durobrivæ*, pls. XII, XIX, XXIV, etc.), and with such trappings of Roman civilisation as bath-suites. There were also some detached bath-houses which presumably served the needs of the less well-to-do (*The Durobrivæ* pl. XX). Outstanding among the major structures was a remarkable series of buildings in Castor village: these were formerly, and quite certainly wrongly, considered to be part of a Roman town. More recently it has been suggested that they all belonged to one villa (A. L. F. Rivet, *Town and Country in Roman Britain*, p. 114), but this is also debatable. Of the smaller houses we know less, for Artis was naturally more concerned to illustrate his best discoveries, but here and there are hints of less palatial establishments (*The Durobrivæ*, pl. XVI, for instance). Some perhaps belonged to the owners of small potteries, but most of the buildings marked on Artis' plan are of uncertain character, although many of them must have been potters' workshops. The one point that is abundantly clear is that with the big houses we are not dealing with typical Romano-British villas based on a farming economy, but rather with the residences of master potters. This is shown by the intimate juxtaposition of houses and kilns, the more so as elaborate villas of this kind could scarcely have been built before the date at which the industry began. The quality of these large houses speaks for itself; pottery-making was here an enterprise that more than paid its way. Nor must we forget the walled town of Durobrivæ and its suburbs. (*The Durobrivæ* pls. XXIII and XXXIV, *Journal of Roman Studies* XLVIII, p. 139). Many of those who worked in the potteries would have lived there and it is relevant to recall the cluster of kilns just outside the town in the parishes of Chesterton and Water Newton (Fig. 1). Indeed, the connection between the town, its suburbs, and the potteries is emphasized by one aspect of recent excavations carried out by Mr. E. Greenfield for the Ministry of Works. Over 95 per cent. of the samian from his excavations, mainly in the suburbs south-east of the town, belongs to the second half of the second century, when the pottery industry was beginning to flourish.

As for the kilns, Artis marks 49 on his plan. An unknown number, certainly more than half a dozen, and probably very many more, should be added from his later work, while the recent excavations add evidence for 17 more. We thus arrive at a total of at least 70, which will be only a small fraction of the number in

the valley. Their distribution (Fig. 1) suggests at once that the river was the main controlling factor. None marked on Fig. 1 is more than half a mile from the river, though there is one known group at Sutton Heath alongside Ermine Street some three-quarter mile away. The need to transport as much of the pottery as possible by water must have been foremost in the potters' minds. Nor is this surprising, for large-scale transport of fragile pottery by road must always have been hazardous in springless carts. The river gave obvious and easy access to the east coast, via the Wash. But there was also another possible means of distribution: the Car Dyke, the Roman canal that traversed the Cambridgeshire and Lincolnshire Fens, joined the Nene near Peterborough and offered easy transport by barge as far as Cambridge on the one hand and York on the other (*Archæological Journal* XC, pp. 117 ff; *Antiquaries Journal* XXIX, pp. 149—63). The importance of the river is further stressed by the nature of the geology of the kiln-sites themselves. All those recently excavated have been on river gravels or limestone, and this seems to have been true also of most of those examined by Artis (*Journal of the British Archæological Association* I, p. 4). In other words, the potters found it preferable to transport the raw clay to the kilns (by river from clay-pits west of Wansford?) rather than to make their pottery near the clay-pits.

Another factor that may have influenced the distribution was the availability of fuel, which would have been needed in immense quantities. Charcoal from the kilns suggests that brushwood and small branches were normally used, and it seems possible that supplies of them within easy reach of the early kilns would eventually have become exhausted. This may well have led to the establishment of new sites further away from the presumed original nucleus around Water Newton and Castor, though still near the river. As yet, we have too few dated kilns to be able to settle the question. It is, however, clear that the large potteries at Sibson and Stibbington were predominantly late third- and fourth-century.

Before ending this section, the scale of manpower involved in the industry should be considered. It is always exceedingly difficult to estimate ancient populations or the numbers engaged in specific tasks, but at least we can appreciate the many aspects involved in large-scale production. The digging of clay, its preparation and carriage, the cutting, bundling and transport of fuel, the throwing of pottery and preparation of decoration and slips had all to be done before firing. We then have to add the construction and maintenance of kilns, the tending of them during firing, and the transport and marketing of pottery. It is true that

not all the men involved would necessarily be employees of the potteries, as transport and marketing, for instance, might have been in the hands of middlemen. Nevertheless, a general impression of large numbers remains, particularly as it is certain that many kilns would be working at the same time.

We have no evidence of the status of the workmen, and it is conceivable that some slaves may have been used, though it is worth recalling that the samian industry in Gaul, as opposed to the Arretine one in Italy, has yielded very little evidence of their presence. The only Nene Valley potter known to us by name is SENNIANVS of Durobrivæ (see p. 18).

The recent excavations

Artis had no means of estimating the date of the kilns that he dug, but it has become apparent in recent years that the Nene Valley potteries started making colour-coated ware in the second half of the second century. The date that is usually accepted is about A.D. 170-180 (K. M. Kenyon, **Excavations at the Jewry Wall Site, Leicester**, p. 120). This is probably about right, though it does not follow that other centres making colour-coated ware, like Colchester, also started production at the same time. Indeed, it is certain that colour-coated ware with every appearance of British origin was reaching the Antonine Wall in Scotland before A.D. 160 or thereabouts. No second-century kilns have been located in the recent work, perhaps because they were mainly on the north bank of the river in the vicinity of the Normangate Field (Fig. 1). The earliest kilns found south of the river are those of the early third century at Water Newton. By the middle of the third century others were in use at Sibson, while late third- and fourth-century ones are known at Chesterton and Stibbington. Production at Sibson continued during the fourth century, and a structure at Stibbington appears to have been associated with kilns of the late fourth century or even the beginning of the fifth century. Nothing is known of the reasons for the final collapse of the industry, nor is it certain whether production continued into the fifth century. If it did, the types of pottery made cannot be distinguished from late fourth-century wares.

Stibbington

In 1957, when a field on a river terrace of gravel at Stibbington was deep-ploughed for the first time, masses of Roman pottery were turned up. The late Mr. Geoffrey Willson and other members of the Field Section, realising that a splendid opportunity offered, began investigation of the site. It is apparent from the surface

traces that the field contained a very large number of kilns, but it was only possible to excavate two (*Journal of Roman Studies* XLVIII, pl. XIX, 5). Like all the Nene Valley kilns excavated so far they were circular in plan and of updraught type (see pp. 15-16). The earliest, Kiln A, was entirely constructed of clay, except for a stone wall at the front at right-angles to the flue (Fig. 2A). A tongue-like pedestal projected from the back wall of the furnace and level with its top was a ledge around the kiln wall. The gap between the pedestal and wall would have been spanned by fire-bars of baked clay on which the pottery would

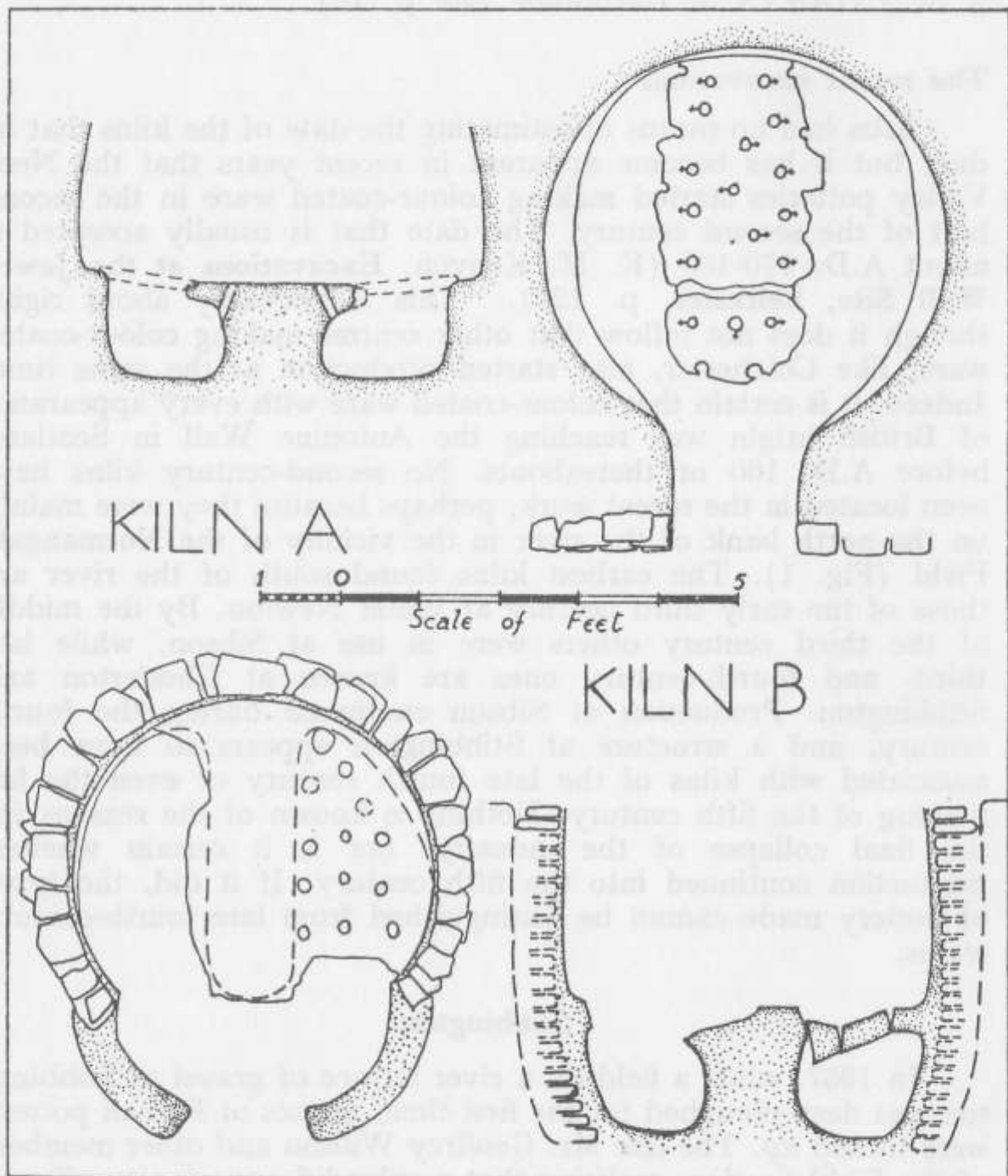


Fig. 2. Stibbington kilns

have been stacked. A temporary dome of clay and straw (or grass) would have been built over the loaded kiln and pierced by vents allowing a through draught. There were also diagonal vents through the pedestal which were clearly intended to aid uniform heating of the oven, they are an unusual feature not yet recorded elsewhere in the Nene Valley and without parallel in other Romano-British kilns. This kiln was 5ft. in diameter internally at the level of the pedestal and was cut over 3ft. into the subsoil. At the front, opening out from the flue, was a large stoke-hole, 10ft. long and 12ft. wide, at the opposite end of which another kiln had been inserted later. The second kiln (C) was not excavated beyond the stone wall fronting the flue.

After kilns A and C went out of use, they and their common stoke-hole were filled with soil and broken pottery. Subsequently, another kiln (B) was constructed, partly in the filling of the old stoke-hole. This was another large one, 4ft. 6in. in diameter and cut 4ft. into the subsoil, but built in a very different manner from Kiln A. It consisted of a stone-lined shaft, like a well, covered internally with a thin coat of clay. The solid tongue-pedestal supported a permanent clay floor pierced by vents. There was no stone wall at the front and no real flue but merely a semi-circular fire-box of clay projecting from the front of the stone structure (Fig. 2B).

Many years after the kilns had gone out of use, a rough floor of limestone rubble was laid over them. This contained late fourth-century pottery and coins, and on its surface were several potters' implements of iron. Their presence strongly suggests that the floor was associated with late fourth-century kilns somewhere in the vicinity. There was much late fourth-century pottery on the surface of the field, and it is clear that the Stibbington kilns were active for over a century, though the lives of individual kilns would be of the order of months rather than years. Kilns A and B illustrate very well the kind of thing that happened on these pottery sites. Although there was a distinct structural break between them, they were making the same kinds of pottery in almost exactly the same proportions, so we cannot doubt that the kilns belonged to the same firm and that they followed each other within a few years at the most. It is all the more interesting to find such a marked difference in structure between them.

Some of the pottery from the kilns is on exhibition in the Museum, and the visitor will see how great was the variety of pottery being made. About a third of it was colour-coated ware, almost all plain forms though a few bowls had painted cream coloured arches over the colour-coat (Fig. 3, 6). Imitations of samian forms were common, especially forms 38 and 31 and dishes

derived from samian form 36 (Fig. 3, 7 and 8). Of greater interest were some flagon necks with moulded faces having details picked out in paint (Fig. 4, 15). A mould for making the faces was found on the surface.

Mortaria (p. 17) accounted for about 20 per cent. of the output. Three distinct types were being made at the same kilns (Fig. 3, 9-11), a warning against over-application of typological argument in dating. It is estimated that if Kiln A were loaded entirely with mortaria it would have held about 230. In practice, however, a mixed batch of pottery would probably have been fired and, as most pots are smaller than mortaria, a load of 500 or more seems likely.

The rest of the pottery was ordinary coarse ware, mainly jars, bowls and dishes (Fig. 3, 3-5, are typical examples) of the kind used in every Romano-British kitchen.

One other surface find, now in the Museum, deserves mention. This was a small plaque with decoration in relief and brown paint, depicting the god Mercury clutching a purse and attended by a goat and a cock. Mercury was patron god of commerce, and his presence at a pottery is especially appropriate. The plaque is pierced by nailholes, so it was meant to be hung on a wall, though whether as a private devotional object, or as a votive offering in a temple dedicated to the god, must remain uncertain. (For a photograph see *Journal of Roman Studies* XLVIII, pl. XX, 3).

Water Newton

A truly remarkable complex of kilns was uncovered in 1958 on a gravel terrace immediately west of the Billing Brook at Water Newton (Fig. 1). In an area 15ft. square there were intersecting stoke-holes and structures of no fewer than five kilns of the early third century, one of which had been completely rebuilt. Mr. J. P. Gillam tells me that there seems to be very little difference between the pottery from the earliest and latest kilns in the group, so once more we have evidence of rapid replacement within a few years, or even months.

One of the kilns had never been fired, probably because its structure had begun to subside into an earlier stoke-hole. The two kilns that were fully excavated had both been fired; each had a clay lining and a stone retaining wall at the front, though their flues differed greatly in length. The diameters were 4ft. 6in. and 5ft. The larger one had some notable structural peculiarities, and it was fortunately well-preserved. Originally it had been fired from a stoke-hole to the north, but later the original flue was blocked

and the pedestal removed. A new flue was then cut on the east side of the kiln and a pedestal inserted on the same line. While this was still plastic, sticks were pushed into it and lodged at the other end in slots cut in the old wall of the kiln. Clay was then wrapped around the sticks, which thus formed a series of radiating fire-bars. At this stage the structure was fired to consolidate the bars and a permanent clay floor with vents was laid over them. A new stoke-hole had, of course, to be made on the east side. When excavated, the second floor of the kiln was found to be virtually intact, and on it was part of the last load of pottery (Pl. IB). It is clear that the last firing had gone wrong, perhaps because the flue had collapsed, and the pottery in the bottom of the kiln had cracked. The potter evidently decided to abandon the kiln and did not think it worth removing the cracked pots, all of which were colour-coated.

Despite the uniformity of fabric, there was much variation in the forms of the vessels, some of which were types that are only found in the vicinity of the Nene Valley and in the Fens, while others had a wide distribution. It is evident that the potter was either firing pottery intended for several different markets or else that he hoped to sell it all locally.

Chesterton

Two kilns excavated in 1958 by Mr. Graham Webster were notable for their structures. Like some recorded by Artis (*The Durobrivæ*, pl. XL, 3) they were built of pre-fired blocks, similar in general form and size to modern breeze-blocks. Otherwise, they were like the other kilns in the area in having solid tongue-pedestals and stone retaining walls at the front. They seem to have belonged to a fourth-century firm specializing in making bulbous beakers with white barbotine scrolls over a colour-coat (see p. 19 and cf. Fig. 4, 6 for the general type).

Sibson

Further progress with the alteration of the Great North Road in 1959 threatened a known kiln-site on the Jurassic limestone at Sibson, immediately south-west of Wansford station (Fig. 1). Artis is known to have excavated there when the railway was being built (*Journal of the British Archaeological Association* II, p. 164), and three of the kilns found in 1959 had been dug in the 19th century. Before the excavations, the line of the new road was thoroughly surveyed by Dr. M. J. Aitken, of the Oxford Research Laboratory for Archaeology (*Archæometry* II, pp. 34-5; *Antiquity* XXXIII, pp. 205-7). Using a proton magnetometer, Dr.

Aitken was able to locate several kilns and some other buried features, with the result that the Water Newton Committee was able to deal swiftly with the area and to excavate six kilns.

The kilns varied greatly in type and date. Kiln A, of the second half of the third century, was stone-built and, like Stibington B, had no flue in the normal sense but only a fire-hole at the front. Inside was a solid pedestal largely built of old fire-bars, while a ledge around the wall implies that the floor was a temporary one of fire-bars. It would again seem that the last firing was not completely successful, as about fifty more or less intact pots had been rejected and dumped in the furnace. All were coarse grey jars and dishes almost precisely the same in shape and size within each class (cf. Fig. 3, 4 and 5 for the basic types). We have direct evidence that the last firing was a reducing one, as the mouth of the kiln was plugged with clay and stone (see p. 18 for the significance of this).

About 40ft. to the east was Kiln B, of the mid-third century. This was built of pre-fabricated blocks, like the Chesterton kilns, but the blocks were curved to fit the circumference. The kiln was exceptionally large, over 7ft. in diameter, and so one of the largest civilian pottery kilns known in Roman Britain (Pl. IA). It had a solid pedestal similar to those already described for other kilns, but it was not joined to the rear wall. No doubt the explanation lies in the large size of the kiln: unimpeded circulation of heat and gasses would be especially necessary in such a large kiln. The floor was a permanent one of clay laid on massive fire-bars. At the front was a particularly well-built stone retaining wall, and a curiously small stoke-hole for such a large kiln. The last firing had been an oxidizing one (p. 18) and the products were red-brown colour-coated ware and buff coarse ware. Enough were left in the ash for us to be sure that the kiln was making the latest varieties of barbotined beakers, with crude scrolls and lattice pattern (Fig. 4, 2 and 3).

After the kiln had gone out of use, the floor and most of the prefabricated lining were removed and the kiln was used as a dump for wasters from another kiln making coarse grey ware.

One other prefabricated kiln was found. Its lining stood three courses high, but it had been excavated previously and the pedestal and pottery had been removed, so it cannot be dated. It is the smallest kiln yet recorded for the Nene Valley, just under 4ft. in diameter.

Close to the last were two others that had also been uncovered in the 19th century. They too had been partly demolished by Artis, who dug out the pedestals and removed most of the



A.—Sibson, Kiln B. Part of an earlier oven to right of far scale



B.—Water Newton, Kiln C, showing pots left when the kiln was abandoned

(Ph. G. Webster)

stone retaining walls. Enough pottery was left in the stoke-holes, however, to demonstrate that they made coarse ware in the mid or late fourth century. They were more crudely built than most kilns in the area, though the essential features were the same. Fire-bars seem to have been used, though only one kiln had a ledge around the wall. Both had been re-lined.

Another kiln a few feet away had been partly destroyed in the Roman period. It was cut into the rock and most of its clay lining had collapsed; enough was left to show that it had a tongue-pedestal built of fire-bars. It was oval in plan, with the long axis on the line of the flue and pedestal. The pottery includes much fourth-century colour-coated ware, as well as jars and bowls decorated by pressing the clay into small hand-stamps held against them (p. 20). Not far away was a dump of clay that was used for preparing colour-coats (p. 18).

Apart from the kilns, there were traces of early Roman occupation of the site, associated with irregular ditched enclosures known from aerial photographs. This occupation perhaps began before the Roman period, but it certainly continued as late as the second half of the second century. In addition, a large black-smith's hoard of scrap iron, including agricultural implements, was found by the magnetometer, and later excavated. This is now exhibited in the Museum.

The main characteristics of the kilns

As we have seen, at least 70 kilns have now been excavated in the Nene Valley and, though Artis published so few in detail, it is possible to pick out the main features of them.

The typical Romano-British updraught kiln was basically a roughly cylindrical hole in the ground lined with clay. A flue led into the lower part of the cylinder from a stoke-hole. Inside the kiln was a temporary or permanent pedestal that usually supported either a solid clay floor, or a temporary one (e.g. of fire-bars) which could be removed after each firing. The cylinder of the kiln was thus in effect divided into two parts, the furnace below the floor and the pottery oven above it. Occasionally, and notably in East Anglia, a central pedestal shaped like a mushroom was used in place of separate pedestal and floor. Whatever the type of kiln, a temporary dome of clay resting on the top of the load of pottery completed the structure. This was pierced by a vent, or vents, to allow the draught from the flue to draw heat up through the firing-chamber. This kind of kiln, when used by local potters, was rarely more than 4ft. in diameter. For a detailed study of updraught and other types of kilns, the reader

is referred to Dr. Philip Corder's recent paper in *Archæological Journal* CXIV, pp. 10-27.

It was normally only in the large centres of manufacture, like the Nene Valley or Colchester, and at military depots, that more solid and elaborate kilns were built. They also tended to be large in size: the average diameter of the kilns already described, for instance, is 5ft. The average load would be of the order of 500-600 pots, compared with a probable 200-300 for a typical local Romano-British kiln.

The kilns encountered so far in the Nene Valley fall into three main classes:

Class A had a clay lining and a stone retaining wall at the front at right-angles to the flue. Comparison with Class C, below, suggests that the stone wall was intended to prevent collapse of the clay lining of the kiln into the deep stoke-hole at the front. Either a temporary or permanent floor was used.

Class B had a lining of pre-fired clay blocks, a clay-lined flue, and a retaining wall like that used with Class A. Permanent clay floors, fire-bars, and floors of wedge-shaped pre-fired tiles have all been noted.

Class C had a stone lining with a thin covering of clay. Only two examples are known from the recent work (Sibson A and Stibbington B), but Artis no doubt found others. Neither of the recently excavated ones has a proper flue. There was no retaining wall at the front, presumably because the stone structure of the kiln was considered sufficiently stable. The flooring arrangements were no doubt as varied as those for the other classes.

In all three classes a single tongue-shaped pedestal projecting from the back wall of the furnace was the rule, though in the largest kiln (Sibson B) there was a slight gap between wall and pedestal. There is little to suggest that the choice of kiln type was determined by the class of pottery to be fired. It is, however, true that all the kilns in Class B that have been recently dug have been associated with colour-coated ware, though Sibson B was used for coarse ware as well. While most of the kilns had relatively short flues, there was a good deal of variation, even within a single group of potters. Orientation was obviously not regarded as important, and this seems to be generally true of kilns in Britain (cf. *Archæological Journal* CXIV, p. 24).

In standards of construction the Nene Valley kilns occupy an intermediate place between the typical provincial kiln and some of those used in the large Gaulish samian factories. At Lezoux, for instance, some of the samian kilns had insulating jackets of

pipes carrying hot gasses around the periphery of the oven (Chenet and Gaudron, *La terre sigillée d'Argonne*, p. 88). On the other hand, the kilns in use in the smaller East Gaulish samian factories were more like the Nene Valley ones.

The pottery

Until the detailed study of the recent material has been completed, only the main general points may be stated briefly. It is now known that there was a wider range of types than had been suspected: they may conveniently be divided into three major classes: (a) ordinary coarse ware, (b) mortaria and (c) colour-coated ware. Some kilns produced all three classes, others only one or two.

(a) **Ordinary coarse ware**, intended primarily for local markets, was made in grey and, less often, buff fabric. The commonest form was a wide-mouthed jar, which appears to have been the standard cooking-pot of the area (Fig. 3, 4); larger versions of the same basic type are known. They were probably used for storage. Next in order of frequency were straight-sided dishes and bowls, with or without a triangular rim (Fig. 3, 5). All were in use for a long time: though there are minor differences in form, they may be the result of individual potters' preferences rather than of general chronological trends. Other forms, such as flagons, were sometimes made in coarse ware, but they were always much less common than the types already mentioned.

(b) **Mortaria** were used primarily in preparing food in the kitchen. The Roman cuisine called for much pounding, grinding and mixing of food, as the recipes in Apicius' cookery book show (see B. Flower and E. Rosenbaum, *Apicius: The Roman Cookery Book* — Harrap, 1958, for a recent translation). Many of them have some such phrase as "... pound in a mortarium ..." To aid the process the inner surfaces of the bowls were studded with grit, invariably angular fragments of ironstone in the Nene Valley. Mortaria were traditionally made in light colours, and the Nene Valley ones were no exception; white or cream fabric with a buff slip was used.

As they were specialized vessels, mortaria were not made by every local potter and, especially in the third and fourth centuries, they tended to be mass-produced at relatively few potteries. Accordingly, they usually had a wide distribution, and those from the Nene Valley are found all over the eastern counties, and sometimes on military sites in the north. Three main varieties were made in the third and fourth centuries (earlier ones are not yet known for the Nene Valley). Commonest are those with a reeded flange (Fig. 3, 10), but more conservative types, gener-

ally similar to second-century ones, were still being made at the end of the third century or later (Fig. 3, 9), and there were also wall-sided forms (Fig. 3, 11). All three types were made contemporaneously at Stibbington.

In the first and second centuries, potters' stamps were frequently impressed on the rims of mortaria. For reasons that are not entirely clear this practice had died out by the end of the second century, but we have from Water Newton a large third-century mortarium with a unique painted inscription on the rim (in the Museum, published in *Journal of Roman Studies* XXX, p. 190). It reads SENNIANVS DVROBRIVIS VRI[T] i.e. Sennianus fired this at Durobrivæ. He is the only potter of the area known to us by name.

(c) **Colour-coated ware** is, of course, the product for which the Nene Valley is best known. There is a wide range of types and of decoration, but all have in common a surface colour contrasting strongly with that of the body of the vessel. The colour of a fired clay is controlled largely by the iron compounds in it and by their state of oxidation. There was little iron in the clay used for the body of the vessels, and they tended to fire to off-white or buff. On the other hand, the colour-coat was richer in iron compounds, as recent work by Drs. J. P. Roberts and D. White has shown, and so it tended to become highly coloured when fired. If oxygen (in the air) was allowed to circulate freely in the kiln during firing, a light colour-coat, usually red, tan or brown, was the result. If, towards the end of the firing, the kiln was sealed, a reducing atmosphere formed and the pottery tended to be dark in colour, usually, grey, blue grey or nearly black.

The methods used by the Nene Valley potters for producing their colour-coats are gradually becoming clearer, though there is still much detailed investigation needed. At Sibson a large dump of clay containing ironstone was found near the kilns (p. 15). Neither substance is native to the site. Judging by the fragments of heavily weathered pottery in it, the dump had been allowed to weather in the atmosphere and had been turned over from time to time. There is little doubt that the dump was the source of raw material for the colour-coats, and it is clear that the weathering of the ironstone, aided by turning, would enrich the clay in iron compounds. Pottery dipped in slip prepared from it might then be expected to assume a colour-coat on firing. A preliminary test confirms that this is so.

Many of the pots themselves show signs of dipping. They seem very often to have been held inverted by the base and plunged into the slip; potters' fingerprints may be seen in the colour-coat around the bases of many pots in the Museum. An

airlock sometimes formed in enclosed forms like jars during dipping. When this happened, parts of the inner surfaces never came into contact with the slip. Many examples of such partial internal coats are also in the Museum, some having trickles of slip that ran over the bare patches when the pot was turned the right way up after dipping. During firing the jars were often stacked so that the base of one sealed the mouth of the next one to it. Circulation of gases in the kiln was restricted by this, and the result was that the inner surfaces and the lower part of the outsides of the jars tended to be in a different state of oxidation from the rest, and so to have a different colour.

Much of the colour-coated ware was undecorated, including many of the imitations of plain samian forms (Fig. 3, 7 and 8) or the ubiquitous fourth-century flanged bowls (Fig. 4, 16). Although a wide variety of undecorated forms was made from the earliest days of the industry, they tended to have a more limited distribution than decorated wares before the late third century. The fabric became in general thicker and coarser as time went on. Decorated forms were important from the first: they are best considered under the types of decoration.

Barbotine decoration with relief in slip is typical of the earliest century of production. A thick slip, probably of the consistency of toothpaste, was trailed on the surface of the pot. The decoration is often a band of running animals, as on the so-called hunt-cups (Fig. 4, 1). Human figures are less common, though arena scenes and erotic groups were sometimes used. Deities appear occasionally, and some pots seem to have depicted the deeds of Hercules. Flowing scrolls were probably always used more than figured decoration, and on the latest types a simple lattice decoration appears (Fig. 4, 2 and 3). It should perhaps be remarked that barbotine decoration would necessarily tend to be flowing. There is no need to invoke possible Celtic influence to explain the widespread use of scrolls. As Mr. Graham Webster kindly reminds me, the first study of barbotine vessels (C. Roach Smith, *Collectanea Antiqua* IV, pp. 80-94) is still very useful.

Barbotine decoration is usually, but not invariably, on bag-shaped beakers and the barbotine was normally added before the colour-coat. There are a few examples of the use of contrasting white barbotine, presumably added after the colour-coat has been allowed to dry. But the technique of using white slip is more common on bulbous beakers, on which the relief is slighter and is restricted to one special kind of scroll (Fig. 4, 6). Barbotine leaves were used up to the second half of the third century on the rims of dishes imitating samian form 36, just as on the samian prototype.

The bag-shaped beakers belonged to the late second and the

early third centuries, and the true barbotine technique seems to have died with the latticed beakers of the mid third century. The bulbous beakers with white barbotine, already mentioned, appear to have been later, and probably all belonged to the second half of the third century and the early years of the fourth century.

Exceptionally, beakers with a light colour-coat over barbotine decoration have details added in slip without relief; this is sometimes called painted ware. A large beaker in the Museum with an arena scene portraying acrobats is an excellent example of this technique (see also *Antiquaries Journal* XXXIX, pl. XXIII).

In **painted wares** a thinner slip without relief was used to give decoration contrasting in colour with the body. As has been mentioned, this was sometimes used on barbotined jars, but it usually stands alone. Figures are uncommon (see, however *Antiquaries Journal* XXXIX, pp. 91-5), and simple geometric decoration is more usual (Fig. 3, 6, for instance). The technique appears to have been used throughout the third and fourth centuries, but it may well have been introduced earlier. It appears on a great variety of forms.

Moulded and stamped decoration is rarer than the types already mentioned, though at least one potter made moulded imitations of samian form 37 at Water Newton early in the third century. This is, however, exceptional and the products are only known from the kiln-site.

Moulded faces were sometimes used on the necks of flagons, and a mould for making them has been found at Stibbington. This was held against the neck of the flagon and the clay was pressed out into it. Details were then added in paint (Fig. 4, 15).

Several sherds with what looks like stamped decoration are now known from the kilns at Sibson and Stibbington. Strictly, it is not stamped, since the technique was to hold a die against the side of the pot and to press the clay out into it. The decoration was usually in the form of bosses or rosettes, some like those common in the New Forest and Oxfordshire kilns (Heywood Sumner, *New Forest Pottery*, pl. V; *Oxoniensia* VI, p. 19). Only one example of the use of figures has been noted in this technique, though a mould from Stibbington depicting an archer (*Journal of Roman Studies* XLVIII, pl. XX, 4) was probably used in this way rather than for making appliqué panels.

Rouletted decoration is found on many forms. It is usually very regular, and there seems little doubt that a rotating cylinder with regular teeth was held against the surface of the pot while it was spinning on the potter's wheel, thus giving a continuous

horizontal band of small indentations. Engraved cylinder stamps of the kind envisaged are known from Gaulish sites (e.g. Chenet and Gaudron, *Ceramique Sigillée d'Argonne*, p. 39). The Castor "box", a container like a butter dish with fitting lid, is the only form to have rouletting all over its surface (Fig. 4, 17), but it is used sometimes as subsidiary decoration on hunt-cups below the zone of barbotine decoration, and as the only decoration on some late beakers of the same general form, usually in three or four separate bands. Similar bands of rouletting are found often on the common indented beakers of the late third and fourth century (Fig. 4, 5). This simple type of decoration was used throughout the history of the industry on colour-coated ware. It is also found on some of the ordinary coarse forms and, exceptionally, on the outside of mortaria.

Problems outstanding

Among the many outstanding problems the most interesting is undoubtedly that of the origin of the industry in the Nene Valley. Some of the types of early colour-coated vessels are ones that were also made on the Continent and at Colchester (cf Gose, *Gefässtypen der Römischen Keramik im Rheinland*, Pls. 13 and 14; *Gallia* XVII, p. 132ff; Hull, *Roman Colchester*, pp. 248-9). Was the growth of the industry on the Nene spontaneous, perhaps under the stimulus of the decline in late second century samian? Or did potters migrate from the Continent or Colchester knowing that there were large potential markets in the Midlands and north of Britain? Precise dating evidence for the introduction of the technique and types in Britain and on the Continent is obviously needed; equally obviously it will not be easy to find, though the excavation of some of the earliest colour-coated ware kilns in the Nene Valley may help. It is possible that the types of the kilns themselves may throw light on the problem. A preliminary survey suggests that some kilns remarkably like the Nene Valley ones were used in the Rhineland (*Germania Romana*, pl. XXII-XXIII; Paret, *Die Römer in Württemberg*, pl. XIII and fig. 86), whereas the excavated Colchester ones appear to be quite different. An interesting point that may be significant is that the Nene Valley imitations of samian form 36 are based on late East Gaulish variants, and not on the normal Central Gaulish type, which was always much more common in Britain.

The composition of colour-coats is now better known, thanks to the work begun by Drs. J. P. Roberts and D. White, of Leeds University, but many problems remain. Why do some colour-coats have a metallic-like sheen, while others are matt? To what extent was there glass formation in different colour-coats? What was the range of firing temperatures in the kilns?

We know little yet of the preparation of the pottery for firing. What kind of wheels did the potters use? How was barbotine decoration applied? Was the pottery dried in the open air, or were heated drying floors used? Some of these problems could probably be solved by excavation of potters' workshops, if any can be located.

And what of the organization of the industry? There is probably little hope of detailed evidence, though the possibility of the existence of foremen's tally lists, like those from the Gaulish samian factories (Hermet, *La Graufesenque*, pp. 291-355) emphasizes the need to excavate workshops.

Finally, much remains to be done on the detailed dating of pottery types and on their distribution. The application of spectrographic analysis to this last problem is already beginning to appear helpful (*Archæometry* II, pp. 21-31; *Nature* 185, No. 4707, 1960, pp. 194-6).

It is these unanswered questions, and others like them, that provide the spur to further action by the Water Newton Committee and the Archæological Field Section. Now that the immediate threat to the kiln sites from the Great North Road alterations is over, a planned programme of research is possible and highly desirable.

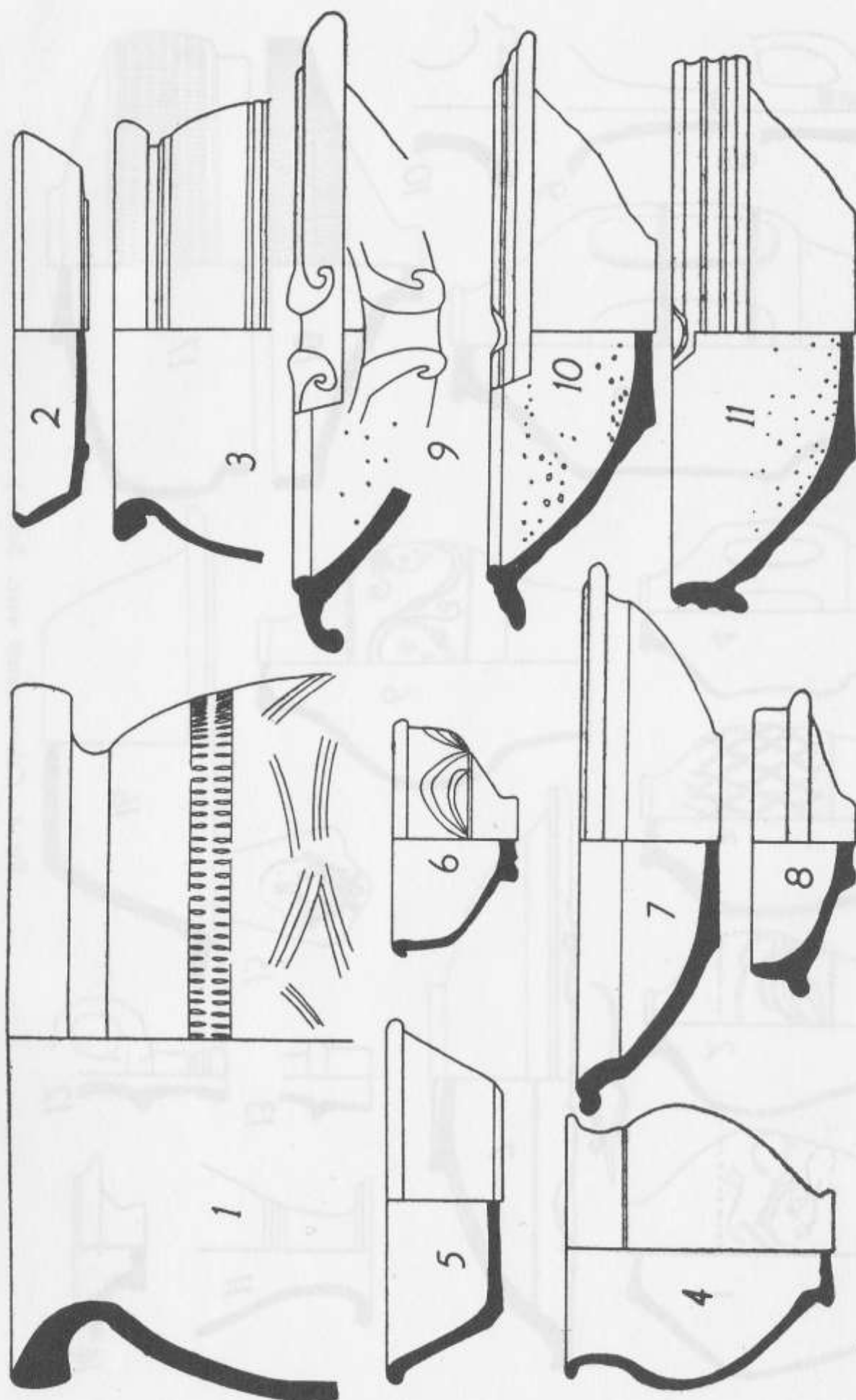


Fig. 3. Coarse ware, except 6-8 which are colour-coated. Scale 4

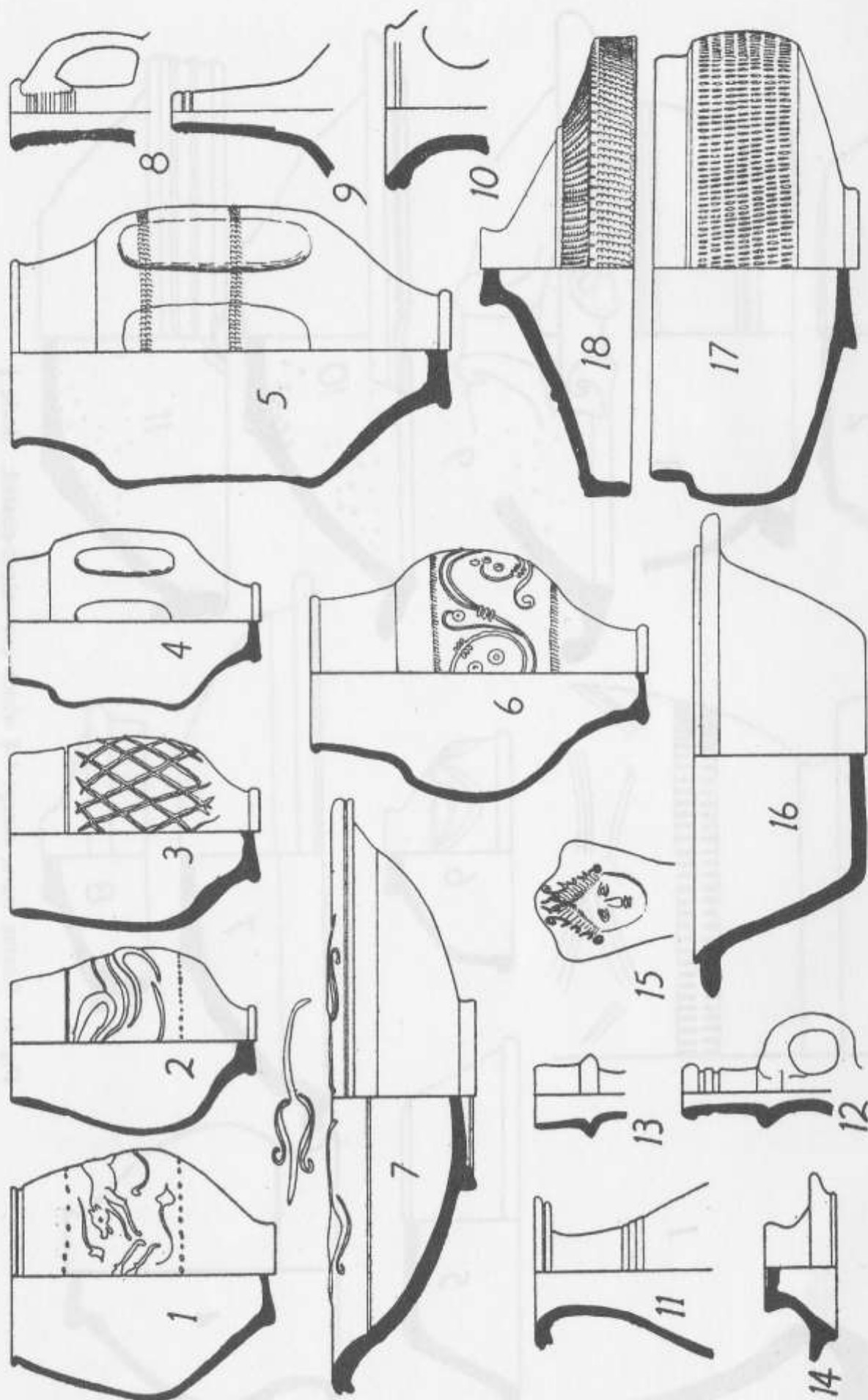


Fig. 4. Colour-coated ware. Scale $\frac{1}{4}$

DESCRIPTION OF FIGURED POTTERY (Figs. 3 & 4)

Fig. 3

1. Large jar in red-brown calcite-gritted ware. This is typical of the vessels produced in the first-century kiln at Water Newton (p. 6). Similar jars were found in Flavian-Trajanic contexts on one of the native sites.
2. Imitation Gallo-Belgic platter in sandy red-brown ware. This type was also made in the first-century kiln.
3. Late third- or early fourth-century grey jar from the Stibbington kilns, where the type seems to have been unusually popular.
4. Wide-mouthed grey jar. This example is from Stibbington, but the general form seems to have been made at all the kiln-sites and was the standard cooking-pot of the area.
5. Grey, burnished dish from the Stibbington kilns. The chamfer near the base is an invariable feature of the Stibbington products.
6. Small colour-coated bowl with cream-painted arches. The type was made at Sibson and Stibbington.
7. Colour-coated segmental dish derived ultimately from samian form 36 (cf. Fig. 4, 7). Variants were in use throughout the third and fourth centuries. This example was made at Stibbington at the end of the third or the beginning of the fourth century. It was occasionally made in coarse ware.
8. A small version of the hemispherical bowl derived from samian form 38. The type was invariably colour-coated, but there is much variation in precise form. Common in the fourth century, but perhaps introduced earlier.
- 9—11. Examples of typical Nene Valley mortaria. All are in cream fabric and have ironstone grit. The three forms were made contemporaneously at Stibbington, but No. 10 appears to have been the commonest form and variants of it were in use from the early third century to the middle of the fourth century.

Fig. 4

1. A typical hunt-cup of the late second or early third century. Only one kiln producing them (Water Newton C) was found in the recent excavations.
2. and 3. Examples of the late varieties of barbotined beakers made in Sibson Kiln B in the mid-third century. Both have brown colour-coats.
4. A plain indented beaker from the same kiln as the last.
5. A later variety of indented beaker with rouletted bands. From the Stibbington kilns.
6. Bulbous colour-coated beaker with thin white barbotine decoration over the colour-coat. The form was probably introduced in the mid-third century, but was still being made in the fourth century. Similar types were found in the Chesterton kilns.
7. Colour-coated imitation of samian form 36 with barbotine leaves on the rim (cf. Fig. 3, 7). From Sibson Kiln B. The use of barbotine leaves seems to have died out by the late third century, but they were not always present earlier.

8—12. Colour-coated flagon necks from Stibbington. These were not made in the excavated kilns, but were contemporary with them and must have been produced early in the fourth century at the latest. The wide range of types is interesting.

13. Colour-coated flagon neck from Sibson Kiln B. This was presumably the third-century type from which No. 12 was derived.

14. Colour-coated lid. Made at Stibbington in the early fourth century.

15. Flagon neck with moulded mask. These vessels were normally in cream ware with paint used to add detail. In the Nene Valley they have only been recorded at Stibbington so far, but they were also made elsewhere in Britain.

16. A typical example of the colour-coated flanged bowl made at Stibbington in the late third or early fourth century. All the known examples of this date are shallower in proportion to the diameter than the later fourth-century ones, which became one of the chief products of the Nene Valley.

17 & 18. A Castor box and lid. These seem to have been made at most of the Nene Valley kilns, probably from the late second century to the end of production. It is not clear whether variations in form have any chronological significance.

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