# INTERPRETATION AND SIGNIFICANCE OF URBAN DEPOSITS

**R. I. MACPHAIL[1] and M.-A. COURTY[2]**

[1] Institute of Archaeology, University of London,
31—34 Gordon Square, London WC1Y OPY, UK.
[2] Institut National Agronomique Paris — Grignon,
78850 Thiverval — Grignon, France

## Abstract

In many United Kingdom cities, the late Roman to Medieval periods are an archaeological blank. The study of contemporary anthropogenic deposits is therefore crucial to any understanding of urban activity. Using pedological and micromorphological techniques, urban anthropogenic deposits of this age from London and Exeter were therefore investigated. It can be suggested from the results that previous interpretations of such deposits, once thought of as »flood loams» and often termed »Dark Earth», as

i progressively thickening within-urban area »market garden» soils, or
ii simple accumulations of urban dump material through time, are inadequate.

Analysis of undisturbed soil samples through optical microscopy, complemented by archaeological information from individual sites, allow us to be more specific. Our observations may indicate phases of dumping of mainly local soil material from, for example, military ditch digging at Exeter; whereas, at the London sites the deposits are tentatively interpreted as accumulations of partially or fully reworked materials derived from the destruction and collapse of insubstantial buildings. This finding may infer a gross under-estimation of urban activity at this time. Micromorphology has proven to be the best analytical technique. In contrast, analyses of bulk samples may only provide very general information in these often extremely heterogeneous deposits.

## Introduction

Poorly dated anthropogenic deposits of the Roman, Late Roman, Saxon and Early Medieval periods are ubiquitous in many United Kingdom cities. Varying in thickness from 0.5—2 metres these deposits — described at the macro-scale as including cultural material comprising pottery, charcoal, tile, mortar and other building materials, and foodstuffs such as bone, mussel and oyster shell (Roskams and Schofield; 1978; Macphail, 1981) — commonly bury Early (1st—2nd Century) Roman levels, but are disturbed by, and merge with, Medieval and post-Medieval activities and deposits. The archaeological difficulties of excavating and interpreting these horizons, termed »Dark Earth» (Norman and Raeder, 1912; Macphail, 1981) because of their colour, relate to them having few visible features and no stratified artefacts. Occasionally, however, lines of dumping, inhumations and very rarely Saxon huts, have been identified (Grimes, 1968; Roskams and Schofield, 1978; Macphail, 1981, 1983). One early interpretation considered the Dark Earth at Southwark — the Roman suburb on the south bank of the Thames — to be flood loams (Kenyon, 1959).

The major interpretative problems of these deposits relates to the Dark Earth spanning a period when normal urban activity apparently ceased, making it difficult

for archaeologists to understand the nature of Roman cities from the 2nd century AD to early Medieval periods (Biddle, et al. 1973). Recent archaeological explanations of the typical Dark Earth sites of Milk St, and GPO Newgate St suggest a changing land use for London, from an entrepreneurial City to one purposely developing possible within-wall market gardening (Roskams and Schofield, 1978; Roskams, 1981) by the dumping of soil (Macphail, 1981, 1983). In addition, statistical analyses of pottery assemblages from Southwark indicated the continuous accretion of the anthropogenic deposits through time (Orton, 1978), again supporting the conjecture that the Dark Earth represents thickening and expanding market garden soils (Sheldon, 1978), possibly indicating the slow decline of Roman cities from the 3rd century onwards (Reece, 1981).

Unfortunately, this interpretation has yet to be fully supported by field evidence of tillage and at some sites it is difficult to reconcile this theory with the actual archaeological context (Sheldon, pers comm.). In fact, very little is so far known concerning the origin, character and pedogenic history of the Dark Earth to encourage or dispute the garden-soil theory.

## Earlier Studies

Environmental studies utilising phytolith counts (Macphail, 1981) and what little pollen has survived oxidation and microbial attack (Scaife, in Macphail, 1981), indicate a general ruderal environment with probable non-local plant materials also being present in the deposits. Physical and chemical analyses (Macphail, 1981, 1983) have shown dark Earth to be an unsorted, base-rich deposit which although generally oxidised still remains moderately humic. Micromorphological investigations more clearly reveal the inherent variety of Dark Earth from site to site. For example, the Dark Earth appeared to be an homogeneous deposit at St Bartholowmews Hospital, London, whereas it was essentially heterogeneous at Tanners Hall, Gloucester (Macphail, 1983). Thus, in the light of current archaeological thinking, Dark Earth has been interpreted as the resultant of purposely introduced soils — which have been more or less homogenised by biological activity.

The excavation of a number of sites containing Dark Earth (see Materials and Methods) in 1982—84 provided further opportunities for the study of these anthropogenic deposits. As micromorphology had already proven so useful in investigating these oxidised and often heterogeneous deposits, this method was chosen as the main analytical technique in this study to characterise and interpret Dark Earth in its archaeological setting. Micromorphology would also allow the full testing of the garden soil hypothesis which has been suggested to account for Dark Earth accumulations.

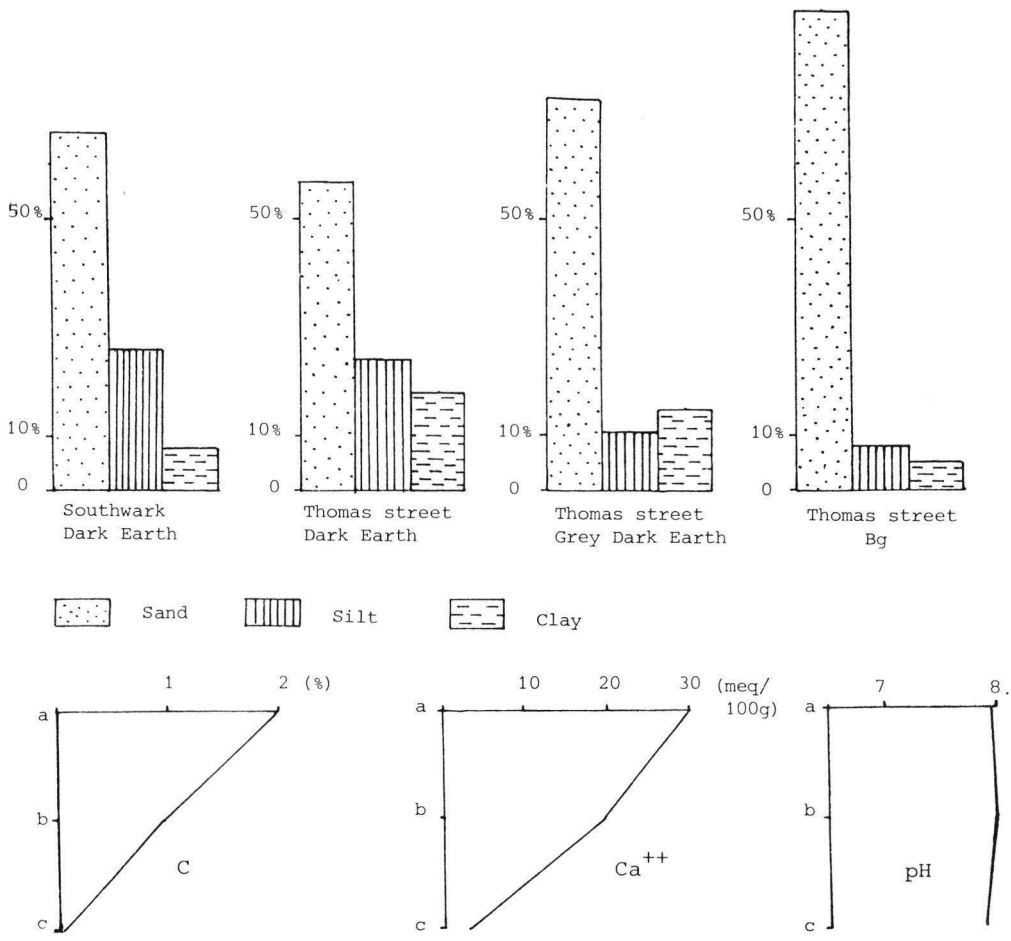
## Materials and Methods

The sites comprised Saint Thomas Street and Southwark Street, Southwark, London (Southwark Archaeological Unit), and Rangoon Street, City of London (Department of Urban Archaeology), on alluvial sands and gravels; and Paul Street, Exeter (Exeter Museums Archaeological Field Unit) on reddish Permian and Carboniferous deposits. Archaeological contexts are given individually for each site, although the Dark Earth deposits themselves, for example in London can only be broadly dated by the severely abraded pottery they contain. Large (5 cm × 5 (11) cm) thin sections, described according to Bullock, et al. (in press), were manufactured from the undisturbed sam-

ples. Physical and chemical analyses were by standard methods (Avery and Bascomb, 1974; Bonneau and Souchier, 1982).

## Sites and Results

*St Thomas St:* The archaeological context comprises local sands (B(g) horizon — sample 1) cut by early Roman (1st—2nd century) ditches, which are both truncated and sealed by a primary anthropogenic deposit termed »grey» Dark Earth (sample 2). The latter extending for 10's of metres may also be cut by these early Roman ditches — and possibly contemporary with early wooden building phases on the site. The »grey» Dark Earth is itself earlier than the major 2nd century clay-wall building phase, which cut through it. This period of building, and later phases including a substantial Late




a Thomas street Dark Earth

b Thomas street Grey Dark Earth

c Thomas street Bg

*Table 1.* Selected analytical data; Southwark (data from other sites available from the authors).

LEGEND OF THE PLATES

1. Thomas Street. Dark Earth; brickearth with plant temper embedded with a fine calcitic fabric. ×50, plain light.

2. Thomas Street. Dark Earth; piece of mortar including a sherd. ×50, plain light.

3. Thomas Street. Dark Earth; disaggregation of a piece of mortar; ×130, plain light.

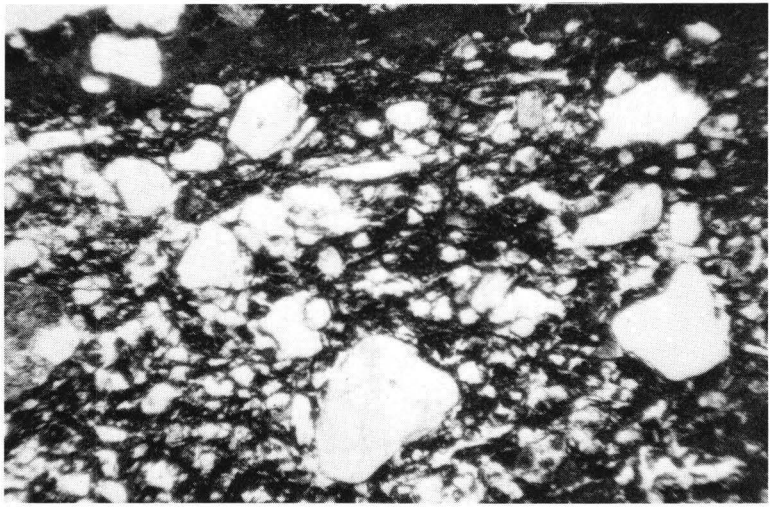
4. Thomas Street. Dark Earth; fine calcitic fabric; ×50, polarized light.

*Table 2.* Micromorphology (simplified)

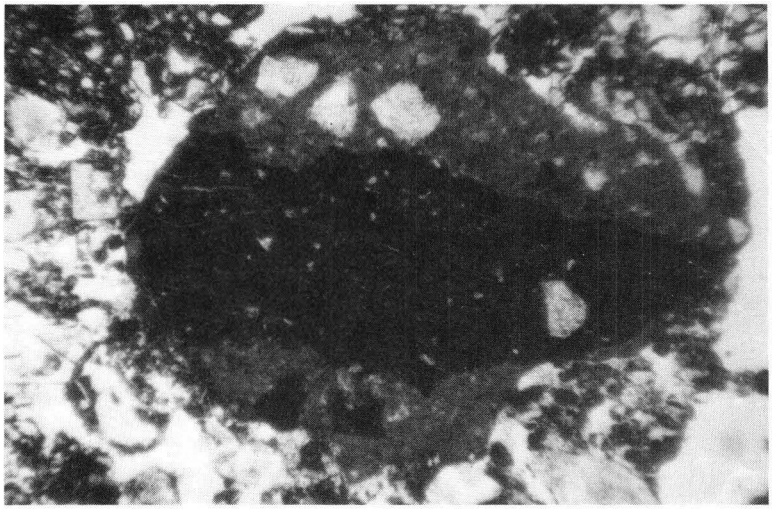
| Sample No. | Micro-Structure | Mineral: Coarse/Fine (20 um) ratio | Mineral: Coarse mineral (less quartz, flint) | Mineral: Fine Fabric | Bire-fringence | Total organic materials (including fine charcoal) | Selected pedofeatures |
|---|---|---|---|---|---|---|---|
| Paul St., Exeter | | | | | | | |
| 10. 13—15th Century D.E. | Vughy | 40/60 | Frequent igneous rock fragments, few artefacts. (i.e. mortar, pottery, 'hammer scale', bone, shell etc.) | Dominant dark yellow-brown. | Low | Medium | Homogeneous, Common intercala-tions and coatings |
| 9. » » » | » | 40/60 | » | » | » | » | » |
| 8. 11th Century D.E. | » | 30/70 | » | » | » | » | » |
| 7. "Late Roman" D.E. | » | 40/60 | » | » | » | » | » |
| Rangoon St. London | | | | | | | |
| 6. "Late Roman" D.E. | Micro-aggregate. | 65/35 | Few fragments limestone, soil, artefacts. | Mainly very dark brown (A) | Low/ medium | High | Mainly homogeneous, calcitic impregnations; nodules; (vivianite?) |
| 5. B(g) horizon | Channel | 75/25 | (Quartz, flint only) | Brown, yellow brown, and dark brown | mainly low | Low | Heterogeneous, nodules; (vivianite?) |
| Southwark St. Southwark | | | | | | | |
| 4. 'Late Roman' D.E. | Intergrain-micro-aggregate | 70/30 | Few limestone, Frequent soil fragments, artefacts | Mainly A, with brown (B) and few grey and yellow brown (C) | (A) As above (B) medium (C) high | (A) High (B) medium (C) low | Heterogeneous, calcitic impregnations; few biological fabrics. |
| St. Thomas St. Southwark | | | | | | | |
| 3. "Late Roman" D.E. | » | 65/35 | » | » | » | » | As above, heterogeneous |
| 2. 2nd/3rd Century Grey D.E. | » | 75/25 | » | Mainly A and B, few C. | » | » | As above, strongly heterogeneous |
| 1. B(g) horizon | Single grain | 90/10 | (Quartz, flint only) | Brown, dark brown. | Nil | Very low | Homogeneous, nodules. |

(D.E. = Dark Earth)

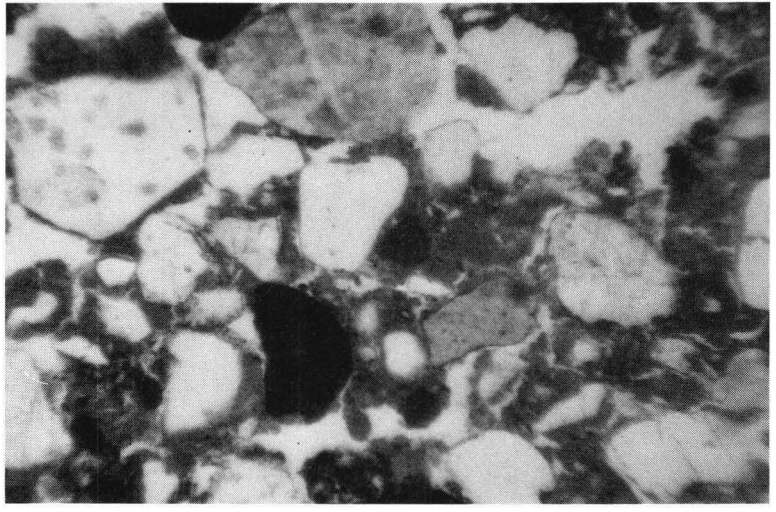
NB. Full micromorphological and analytical details available from authors.



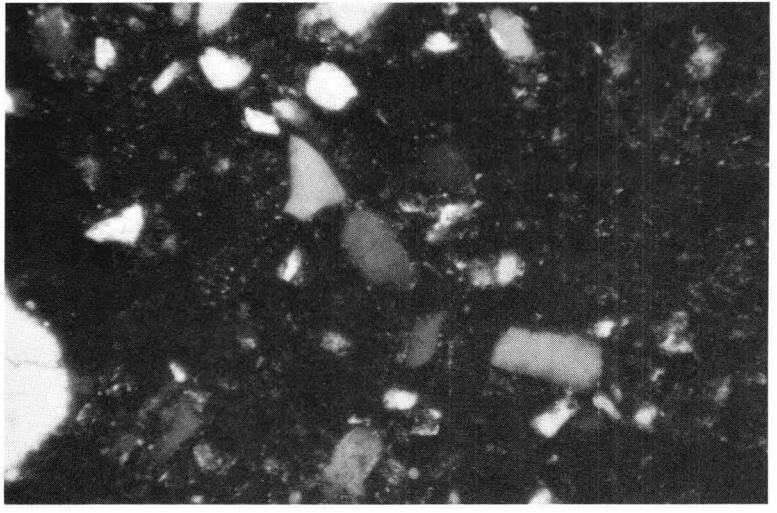
1



2



3



4

Roman (mid 3rd century AD) cellared building, of which no walls remain, are much disturbed by later activity and the whole is buried by a 2nd anthropogenic deposit, termed Dark Earth (sample 3). The sandy (Table 1) B(g) horizon composed of coarse quartz and flint, is loosely packed, contains little organic matter, and is characterised by minor hydromorphism and eluviation. In contrast, the »grey» Dark Earth is finer textured and heterogeneous (Table 2), containing a variety of fine fabrics is poorly sorted (Table 1). Frequent anthropogenic inclusions, such as coarse charcoal, pottery, mortar (Plates 1 and 2) which is calcitic in character, and fragments of a silty soil usually called Brickearth, were observed. The latter is not naturally present in Southwark.

The fine fabrics include, for example, common (type A) very thin, low birefringent (crystallitic b-fabic) brown material with intimately mixed dominant fine charcoal, charred organic material, and amorphous organic matter with a fine calcite, possibly ash content. The presence of phytoliths and the nature of the charred fine organic matter suggest it may be grass or straw in origin. The dominant (type B) pale brown to brown fabric is similar but contains more birefringent calcitic fine fabrics (eg type C) which are very low in organic matter. This type C material is very compacted and appears an artificial mixture of natural deposits, such as Brickearth, with calcium carbonate. Examination of its mineral content also suggest that biological activity will convert it into fabrics such as types A and B (Plates 3 and 4). The Dark Earth itself contains the same coarse inclusions as the »grey» Dark Earth, but is not so heterogeneous, having a fine fabric dominated by material similar to the very thin type A (described above), with very few areas of type B or type C.

Biological activity — as evidence by excrements and reworking — although not often plainly evident because of ageing and compaction through burial, apparently increases from negligible in the B(g) horizon to moderate in the Dark Earth, the humic type A fabric often being rather open in character.

The B(g) horizon is characterised by periodic hydromorphism and contains minor evidence of soil disturbance probably relating to the early Roman activity on site. The »grey» Dark Earth, so different from the local parent material, is apparently associated with anthropogenic activities — including the construction of wooden buildings — in the early Roman period, whereas the more fine textured and humic Dark Earth postdates the major building phases on the site.

*Southwark St:* The site experienced substantial building phases in the 1st and 2nd centuries. Dark Earth was present on the site occurring, for example, on an undisturbed probable 2nd century tessalated floor (sample 4), and over truncated foundations of other Roman buildings. The probable »clay walls» (Sheldon, pers comm) of the building containing the tessalated floor were absent, as were the remains of a possible later building — as evidenced by small areas of mosaic. In addition, the chalk foundations were all that remained of a 2nd—4th century bulding also occurring in the

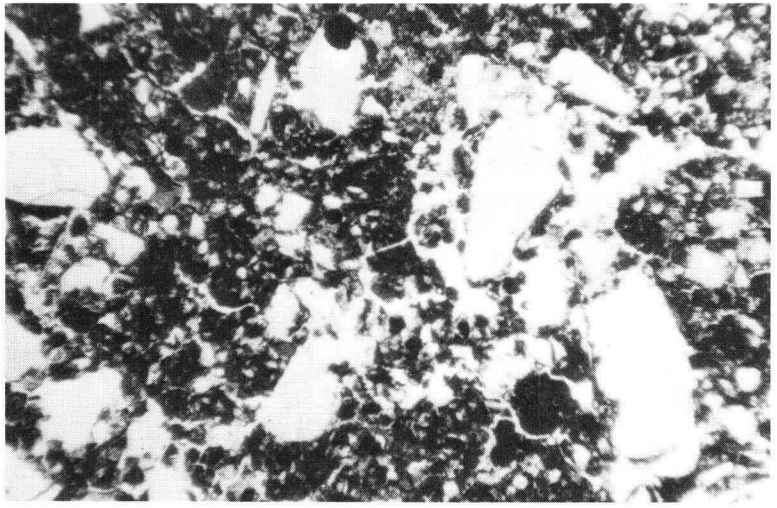
---

5. Rangoon Street. Dark Earth; typical dark fine fabric reworked by biological activity; ×50, plain light.

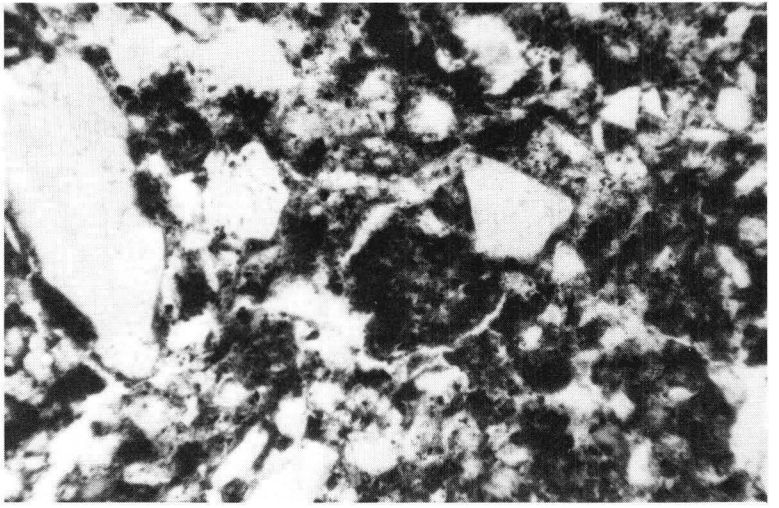
6. Rangoon Street. Dark Earth; detail of the dark fine fabric showing the abundance of fine micro-contrasted particles; ×130, plain light.

7. Rangoon Street. Bg.; vivianite; ×50, plain light.

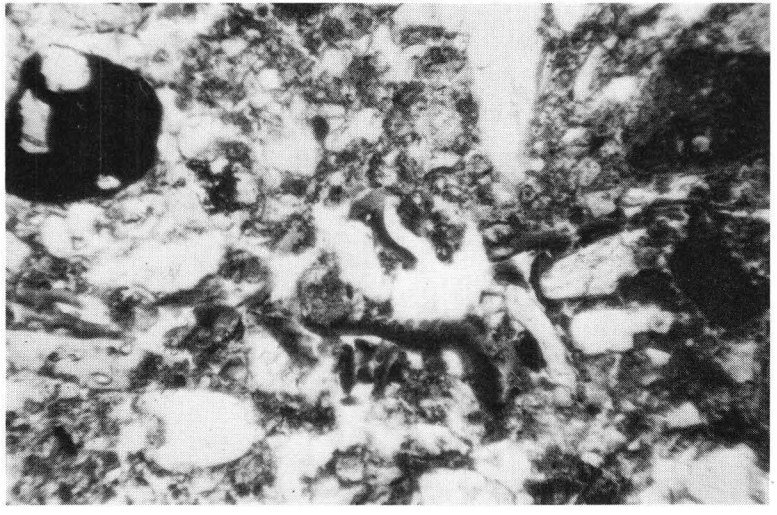
8. Thomas Street. Dark Earth; Piece of mortar with the same coarse fraction as the surrounding matrix; ×50, plain light.



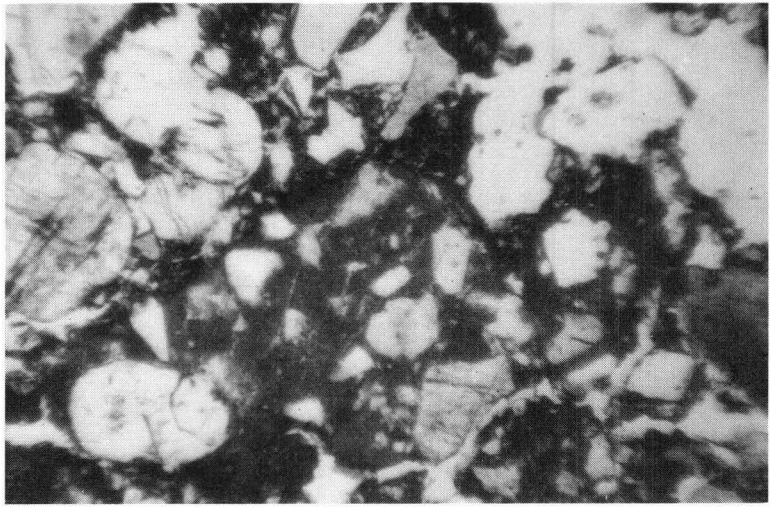
5



6



7



8

immediate vicinity — an area which also featured Late Roman (mid 4th century) inhumations.

The Dark Earth above the tessalated floor is heterogeneous and consists of many coarse fragments mixed with a brown calcitic fine fraction similar to type A (Table 2) described above. Of the coarse fragments, pieces of mortar (some mm. in size) are abundant alongside pieces of brick, pottery and rounded coarse sands. The mortar comprises a brownish yellow microcrystalline fine fraction cementing coarse sands, burned organic matter and other fragments, and shows traces of dissolution along the edges. In contrast, many other elements have calcitic coatings. The Dark Earth fine fraction is rich in calcium carbonate particles, which can be related to the disaggregation of mortar (Plates 3 and 4) — whereas loose coarse sands may be inherited from its dissolution (See Plate 8). Biological activity is responsible for microaggregate structures. Thus the Dark Earth appears related to the disruption of building materials of the many constructional phases identified on this site.

*Rangoon St:* Roman activity commenced in the mid 1st century AD, with the development of a ditch system — presumably for cultivation (Bowler, pers comm). Overlying the truncated alluvial soils (sample 5) substantial (c. 300 tonnes) quantities of apparently uniform Dark Earth (sample 6) occur in which periodic ditch digging, and the conversion of some areas to courtyards in the Late Roman period have been identified. The Dark Earth which is characterised by a number of included 4th century coins, was probably abandoned during the 5th—9th centuries, but contains a double Saxon (c. 1015-30 AD) inhumation which forms a kind of *terminus antiquem* to the deposit — although its upper levels are disturbed by Medieval intrusions (Bowler, pers comm).

The B(g) horizon has several soil fabrics namely: mainly moderately birefringent, fine sandy or silty, porphyric soils with striated fabrics that are unevely impregnated by ferro-manganiferous nodules; and a few dark brown low birefringent crystallic fabrics containing moderate quantities of fine charcoal, charred material and organic matter. Vivianite is present. The sample of the Dark Earth contains only few anthropogenic inclusions, compared with Southwark Dark Earth, and exhibits a dominant very dark brown very thin fine fabric in all ways comparable to type A (Plates 5 and 6) described earlier. Vivianite, as in the local B(g) horizon is present and is possibly associated with features reacting to organic matter and phosphate (Plate 7).

The heterogeneity of the B(g) horizon suggests some mixing, which could be a function of an early phase of cultivation on site. However, the Dark Earth sample, which is not from an identifiable archaeological context contains no positive evidence of being a cultivated horizon, and in addition the presence of vivianite suggests possible contamination by medieval »cess» (Keeley and Macphail, 1981; Macphail, 1983).

*Paul St:* The site is located in gently sloping ground between the legionary fortress and the rampart (c 200 AD) of the town wall (Fig. 1). Two trenches, 25 metres apart found that Roman levels and late Roman accumulations over the tail of the rampart,

---

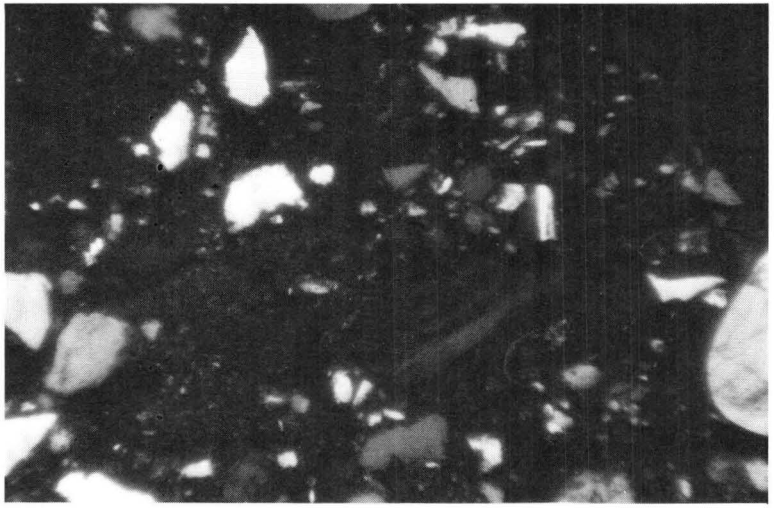
9. Thomas Street. Dark Earth; mixture of bones, flints and brickearth; ×50, plain light.

10. Thomas Street. Dark Earth; same than plate 9 in polarized light, ×50, showing the isotropism of the fine fraction.

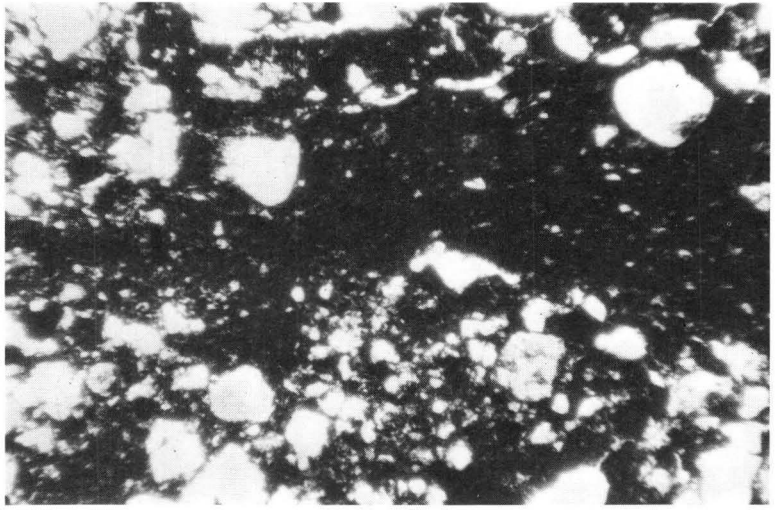
11. Paul Street. (1205) Dark Earth; intercalations, ×50, plain light.

12. Paul Street. (778) Dark Earth; vughy porosity, ×50, plain light.

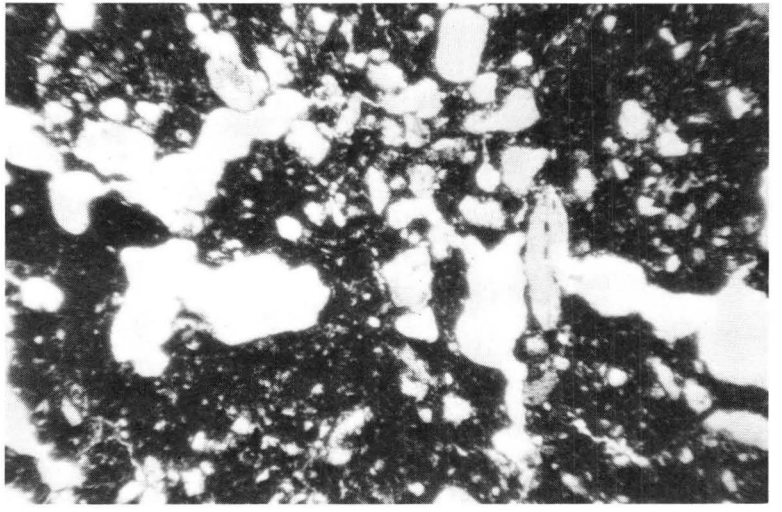
9



10



11



12

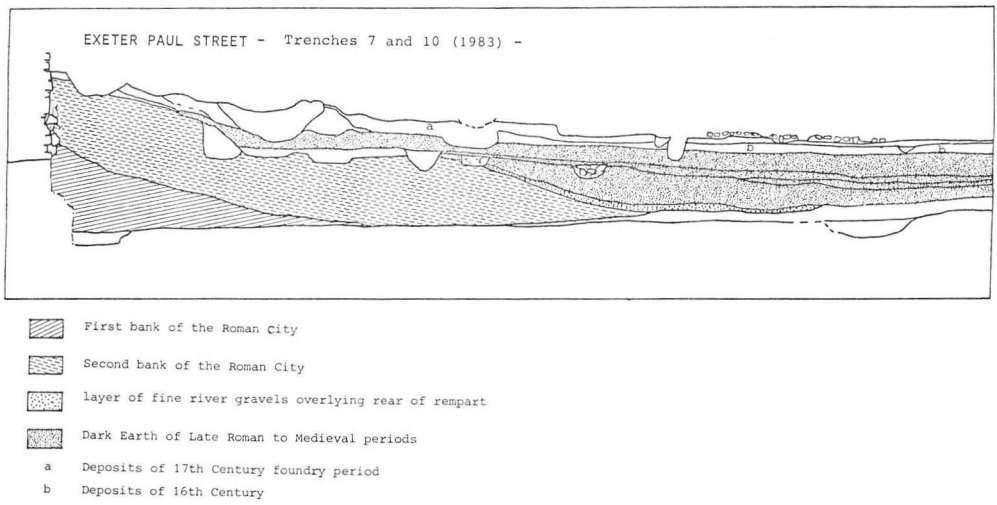



*Fig. 1.* Archaeological section at Paul Street, Exeter (simplified) after Henderson, Exeter Museums Archaeological Field Unit.

and a probable humic Late Saxon layer, underlie a deposit containing large quantities of volcanic inclusions. This can be interpreted as spoil from excavation into spillitic lavas (»Traps») located on Rougemont Hill during the digging of the Castle ditch in the 11th century. 12th century occupation levels are succeeded by late Medieval dumping and garden soils (Henderson, pers comm). The Dark Earth deposits sampled, which in this case are a reddish brown colour, relate to Late Roman (1205 — sample 7), 11th century (1204 — sample 8) and Late Medieval (778 — 1 — sample 9; 778 — 2 — sample 10) accumulations.

These comprise very uniform clay loam deposits which feature increasing organic content from the lowest level (7) to the most recent (10). The Dark Earth here, although similarly humic, contains only few anthropogenic inclusions compared with the Southwark material. It also features frequent volcanic rock fragments — as derived from the »Traps». Most striking is the uniform character throughout all the samples (Table 2), of the low to medium crystallic, birefringent, dark yellow brown fine fabric. This mineral component is intimately mixed with some fine charcoal and few charred organic material, but increasingly common amorphous and fine organic matter towards the surface. The deposits exhibit a vughy fabric, common textural pedofeatures of very dusty clay coatings and simple intercalations (see Plates 11 and 12).

These deposits therefore contrast with Dark Earth from London: by containing less fine charred organic matter, by featuring such well developed textural pedofeatures as described above, by being homogenous throughout and by including so much less anthropogenic material as compared with Southwark.

*Discussion:* The archaeological problems exposed by the micromorphological investigation of the four sites comprise;

*at Southwark* (St Thomas St and Southwark St) trying to understand the relationship of the natural sediments and various Dark Earth deposits to the archaeological context — which includes various constructional phases but poor preservation of the actual walls and floors of the later buildings;

*at Rangoon St,* there is no direct evidence of cultivation and therefore it is necessary to consider the Dark Earth in the light of the more explicit contextural evidence from Southwark and see how its microfabric compares;
*and at St Paul,* it would be useful to account for rather uniform deposits which span the Roman to early Medieval periods.

At the London sites the Dark Earth deposits are essentially anthropogenic (Plates 8, 9 and 10) sandy loams compared with the natural alluvial sands and gravels that they bury. It can be suggested that much of the finer anthropogenic deposits at Southwark at least derive from Brickearth, imported into Southwark and used extensively as a building materials (Sheldon, 1978) possibly from, for example, pits in the City of London (Roskams, 1981). The fine fabric (type A) is calcitic, a characteristic which may be derived from calcareous anthropogenic building materials such as daub, mud walls and plaster — which are also identifiable as partially reworked fine fabrics (type C and E). The calcite crystals of ashes (Courty, 1983) are also present in the fine fabric type A. Their origins may be domestic fires and destruction, or relate to the processing of lime for mortar. Large quantities of probable charred »grass» material in the fine fabrics A and B indicate the inclusion of »straw» from possible domestic and building material usage. The rather high C/N ratios (C20+) may reflect low biological activity, but also may relate to the charred organic matter present (Courty and Federoff, 1982). The organic and cation content suggest the deposit should be attractive to soil fauna, but evidence for biological activity is sparse, and many areas remain compacted and apparently unworked. If the deposit has been in a severely oxidised state from the outset, this may account for the rather low biological activity recorded in the deposit. This supports the case for the deposit being more closely linked to its having — to a major degree — a building materials origin, rather than just being the resultant of accumulation of cultivated soil containing anthropogenic inclusions.

The Dark Earth from Rangoon St cannot be placed in a firm archaeological context, but essentially appears to be closely comparable to the Southwark material. At St Thomas St and Southwark St the anthropogenic deposits may be seen as building material and occupation debris which through time includes larger quantities of fine organic matter and charred material — as illustrated by the differences between the earlier »grey» Dark Earth and the Dark Earth proper. At Southwark St, Dark Earth above the tessalated floor may represent deposits from the *in situ* collapse or destruction of insubstantial structures — minor biological reworking being sufficient to obscure any obvious layering. This signifies that the Dark Earth itself is actually composed to a high degree of building material — although not in the classic sense of dense layers of mortar, tile, brick, etc. — but that it is derived from »mud brick»/»mud wall» material where many of the abraded inclusions, as listed above, with brickearth fragments, were used as tempering. Fine organic matter and charred material of »straw» orign were added to mud walls and material from the floors and walls of the Late Roman buildings were »grubbed up» and re-used. This explains the time sequence of »grey» Dark Earth to Dark Earth proper, as more organic matter was added to local mineral material and earlier deposits were re-used for building purposes.

Archaeological arguments against this theory are the lack of post holes and hearths, for example, for these insubstantial buildings, but we are as yet ignorant of the mechanisms active during continual disturbance and continued use of these urban sediments. In addition, our ignorance of environmental conditions is aggravated by an archaeological blank of 600 years between the late Roman construction and cemeteries, and the medieval disturbances.

At Pauls St, Exeter, the problem is different, with the deposits which span the Late Roman to Late Medieval periods containing mainly natural materials — in part clearly suggesting one origin is spoil from the 11th century military ditch digging. The microfabric can be interpreted in two ways. One suggests that the deposits are purely dumps of soil with intimately mixed organic matter and few anthropogenic inclusions, that have undergone periodic slaking, producing the intercalations and the very dirty coatings in a compacted fabric (Plates 11 and 12). Alternatively the deposit may have undergone biological working, but the features have been obliterated by the phase of slaking and compaction. The physical location of the deposits in a form of hollow may account for the slaking as the result of minor ponding after heavy rain. If the soil did undergo some biological working this explains the lower (c15) C/N ratio at Exeter compared with London. The small quantity of inclusions and increasing organic matter content could relate to the possible use of the area for garden soils, but the slaking events may have also destroyed any direct evidence of this. Certainly, the last process affected all the deposits, giving them unusual uniformity.

## Conclusions

Well-drained anthropogenic deposits described as Dark Earth from Exeter and London as best characterised by micromorphological analyses, have been shown to be clearly different in origin, and to have had strongly contrasting histories of development. At Exeter, a large area was given over to the deposition of local soil probably originating from possible Roman ditch and rampart construction and Medieval ditch digging, and the resulting sediment may possibly have been used for cultivation at times. In London, it is now insufficient to explain Dark Earth as simply a dumped deposit utilised for within-wall gardening, in as much as the microfabric suggests Dark Earth to be an accreting deposit of partially to fully reworked materials probably derived from the collapse of insubstantial buildings. This interpretation is of the greatest significance, because if correct, the presence of these ubiquitous and substantial deposits in cities, infer a larger urban population and activity than is currently estimated in the Late Roman period.

## Acknowledgements

The authors wish to thank David Bowler, Peter Bullock, Nick Federoff, Chris Henderson and Harvey Sheldon for their cooperation and help with this study. We acknowledge the English Heritage Commission who funded the excavations.

REFERENCES

Avery, B. W. and Bascomb, C. L. (Ed) 1974. Soil Survey Laboratory Methods, Soil Survey Tech Monograph, 6, Harpenden.

Biddle, M., Hudson, D. and Heighway, C. 1973. The Future of London's Past. Rescue; a trust for British Archaeology. No 4.

Bonneau, M. and Souchier, B. (Ed) 1982. Constituents and Properties of Soil, Academic Press, London.

Bullock, P., Federoff, N., Jongerius, A., Stoops, G. and Tursina, T. In Press: Handbook for Soil Thin Section Description, Waine Research Publications, Wolverhampton.

Courty, M. A. 1983. Interprètation des aires de combustion par la micromorphologie. Bulletin de la Spocietè Prèhistorique Francaise, Tome 80, 6, 169—171.

Courty, M. A. and Federoff, N. 1982: Micromorphology of a Holocene Dwelling, Proceedings Nordic Archaeometry, (1981) PACT 7: II, 257—277.
Grimes, W. F. 1968. The Excavation of Roman and Medieval London. Routledge and Kegan Paul, London.
Keeley, H. C. M. and Macphail, R. I. 1981. A Soil Handbook for Archaeologists, Institute of Archaeology, Bulletin, 18, 225—244.
Kenyon, K. M. 1959. Excavations in Southwark (1945—57). Research Papers Surrey Archaeological Society 5, Guildford.
Macphail, R. I. 1981. Soil and botanical studies of the »Dark Earth». In M. Jones and G. Dimbleby (Ed) The Environment of Man: the Iron Age to the Anglo-Saxon Period. British Archaeological Reports, British Series, 87, 309—331.
Macphail, R. I. 1983. The mircomorphology of »Dark Earth» from Gloucester, London and Norwich. In P. Bullock and C. P. Murphy (Ed) Soil Micromorphology I, 245—252, A B Academic Publishers, Berkhampsted.
Norman, P. and Raeder, F. W. 1912. Further discoveries relating to Roman London, 1906—12, Archaeologia, 63, 257—344.
Orton, C. 1978. Sequence of Medieval and Post Medieval Pottery. In H. L. Sheldon (Ed) Southwark Excavations London and Middlesex Archaeological Society, Surrey. Archaeological Society, 140—6.
Reece, R. 1980. Town and Country: the end of Roman Britain. World Archaeology, 12, 1, 77—92.
Roskams, S. 1981. GPO Newgate St, 1975—9: the Roman levels. London Archaeologist, 3, 9, 227—234.
Sheldon, H. L. 1978. The 1972—74 Excavations: Their Contribution to Southwark's History. In H. L. Sheldon (Ed) The Southwark Excavations 1972—74 Joint publication No 1, London and Middlesex Archaeological Society, Surrey Archaeological Society.