Parasite egg survival and identification from Hibernia Wharf, Southwark

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RESEARCH HAS ALREADY been carried out into parasite egg survival on various British archaeological excavations. This article deals with parasite egg retrieval and identification from Hibernia Wharf, Southwark.

Background

The situations from which parasite eggs have been recovered varies greatly, according to soil structure and climate. Sphagnum bogs, due to high acidity and anaerobic conditions, cause organic matter to decompose very slowly. Whole bodies, such as Tollund Man and Graubelle Man, from Danish peat deposits, revealed large numbers of intestinal parasites when examined by Helbaek[1]. More recently, Wilmslow Man from Cheshire was found to have considerable gut parasite infestation. Preservation of corpses in a state of intactness is however very rare indeed, so research is mainly confined to examination of faecal matter for eggs.

Under certain environmental conditions, faecal matter can become 'fossilised' – the mineral content of the faeces aiding the process. The conditions for fossilisation are not generally found in Britain, but occur, for example, in Mexico, Peru and the Middle East, where the climate is hot and dry. The individual stools, called coprolites, are easily recognisable, and can be reconstituted using chemical treatments. These coprolites, too, have been shown[2] to contain a variety of parasite eggs.

In Britain, the best conditions for preservation of eggs are in pits, cess-pits and wells. Parasite eggs can therefore be useful in deciding the use of a pit, according to their presence or absence. The work of retrieving and identifying parasite eggs is also valuable in assessing infestations of populations in various historical periods. It must be noted that the parasite eggs examined are no longer viable, and pose no threat of infection.

The method of retrieval of parasite eggs involves the use of 0.5% aqueous trisodium phosphate to reconstitute the coprolite or soil sample by soaking in the solution for several days. Smears or droplets can then be taken to determine whether or not there are parasite eggs present. The treatment of the soil samples does not distort the shape of the eggs, so identification under the microscope is not a major problem; the species appear not to have changed over the centuries and so can be compared with modern eggs.

The species expected to be found during investigation are the maw worm, *A. lumbricoides* (Fig. 1a) and the whip-worm, *Trichiuris trichiura* (Fig. 1b). Other parasite eggs which have been found in previous investigations are those of various species of tapeworm, *Taenia spp.* (Fig. 1c) and the fish tapeworm, *Diphyllobothrium latum*, (Fig. 1d) which affects both man and animals, and actual animal parasites such as the sheep liver fluke, *Fasciola hepatica*[3].

Investigation

The excavation of Hibernia Wharf (TQ 3256 8035), situated between Southwark Cathedral and the Thames, was begun in July 1979. Work revealed that the area was quarried in the 1st and 2nd centuries A.D.; the quarry was later filled in and the land used for building. A number of wells on the site indicate that several buildings may have been present. Post-Roman activity in the area consisted of a number of pits; three were timber-lined, and at least one appears to be Saxon in origin. Some early medieval pits were also found, but few later features survived due to the overlying cloisters of St. Mary Overy Priory[4].

Soil samples were taken from fifteen contexts, including a Roman well and a number of Saxon and medieval pits. The examination of the soil samples

1. A. K. G. Jones 'Human Parasite remains: prospects for a quantitative approach', *in* A. R. Hall and H. K. Kenward, (eds.) *Archaeology in the Urban Context*, C.B.A. Res. Rep. **43**, 1982.
2. E. O. Callen 'Diet as revealed by coprolites', *in* D. Brothwell and E. S. Higgs (eds.) *Science in Archaeology*, 2nd edition, 1969.
3. Jones, op. cit. fn. 1.
4. Britannia 11 (1980) 382.

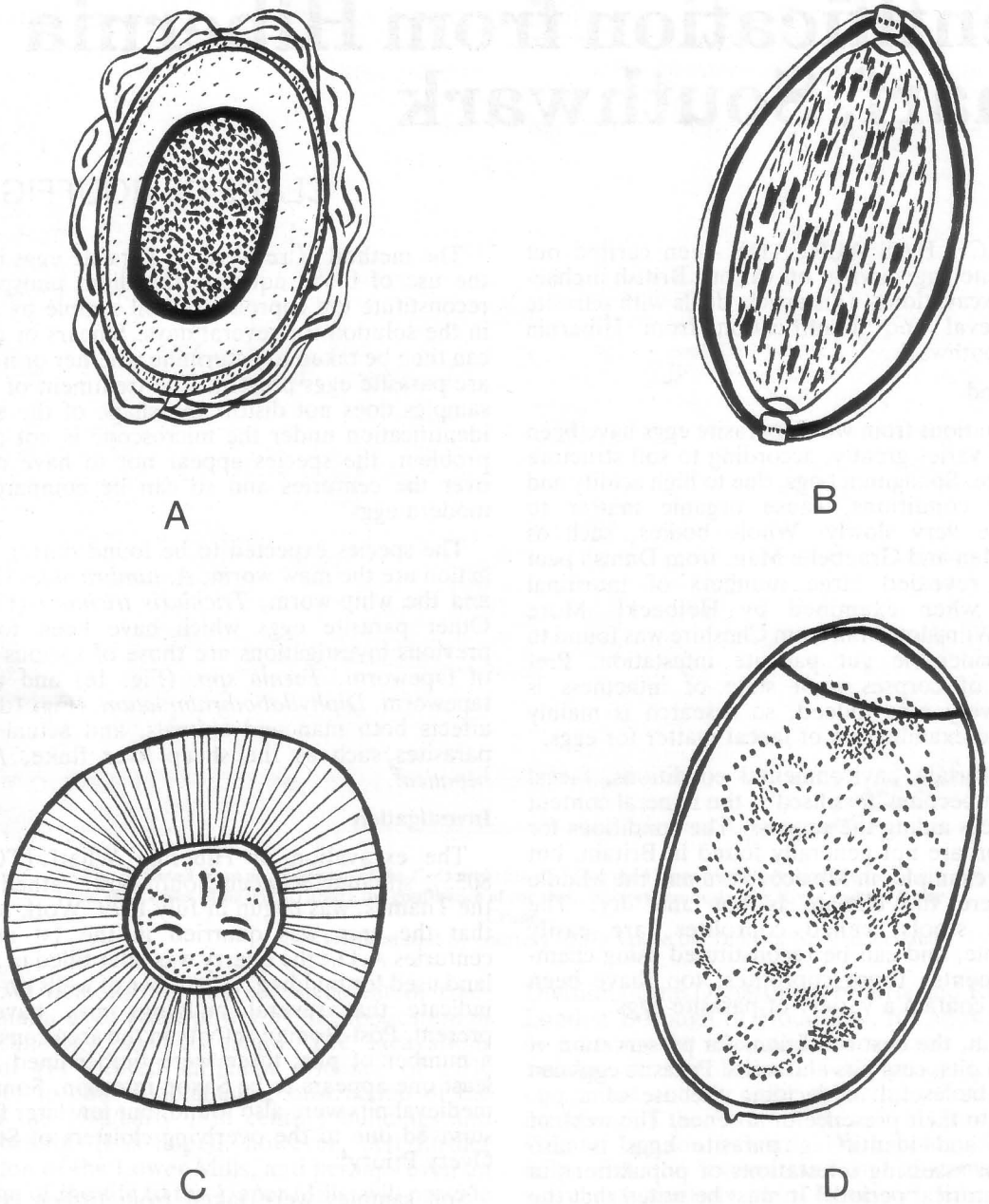

Fig. 1: (a) A. lumbricoides ×900.
(b) T. Trichiura ×1000.
(c) Taenia sp. ×1000.
(d) D. latum ×700.

for parasite eggs was to determine the species present, rather than the actual numbers of eggs, because of factors such as fluctuating egg production, dilution of sewage by soil and other refuse, and degradation of organic matter under certain environmental conditions. The samples were prepared using 0.5% trisodium phosphate solution, and droplets were pipetted onto slides for examination under the microscope.

Roman

Samples from a pit (103) did not contain any parasite eggs; however, material from a well (204) contained four species of parasite egg. These included *T. trichiura, A. lumbricoides* and *Taenia saginata*, showing that human faecal matter had been deposited there. There were also eggs of *D. latum*, which were possibly related to shellfish remains found in the well.

Saxon

A sample from an 11th century subsidiary channel was not of soil itself, but was a probable coprolite, 25mm (1 in) long and 15mm (0.6 in) in diameter. It was still fairly concreted even after prolonged soaking in trisodium phosphate solution, but when picked apart it was found to contain fragments of bone up to 5mm (0.2 in) in length. There were parasite eggs present of *Taenia sp*, the tapeworm genus. This confirmed the identification of the sample as a coprolite, its size and contents indicating canine origins. This rare instance of a coprolite in England can be attributed to mineralisation due to the large amount of bone present.

Samples from two pits were also examined for parasite eggs; one (112) was found not to contain any eggs, but the other (81) contained gut parasite eggs of three species: *Taenia saginata, T. trichiura* and *A. lumbricoides*; the latter two species occurred in numbers great enough to warrant a gram count. One gram of the soil sample was diluted in 20 cm^3 trisodium phosphate, over 30 droplets of 0.1 cm^3 were examined, and the numbers of eggs of *T. trichiura* and *A. lumbricoides* were counted. Calculations were carried out to obtain the number of eggs present in one gram of soil; for *T. trichiura* this was found to be 2240 eggs per gram, and for *A. lumbricoides* 1470 eggs per gram. A similar study carried out at the Olafskapel in Amsterdam yielded 780 *T. trichiura* per gram plus 20 *A. lumbricoides* per gram[5], figures which are considerably lower than those obtained above. This could be due to factors such as dilution of sewage in the environment, the varying level of egg production by worms, and sampling methods. Nevertheless, it can be seen that gut parasite infestations must have been considerable in Saxon Southwark.

Medieval

Samples from a number of pits were examined, and were found to contain a variety of parasite eggs. These include the common *A. lumbricoides* and *T. trichiura*, again showing the presence of faecal matter in the pits. Eggs of *D. latum* occurred in some pits, and were probably related to the remains of various species of fish which were present.

Some eggs of *Taenia spp.* were found, but in small numbers only, in five of the pits. The most unusual eggs from the Hibernia Wharf samples were found in one medieval pit, being eggs of the liver fluke *F. hepatica*. These indicate the presence of faecal matter from sheep.

Discussion

The results above show that parasite eggs can survive in considerable numbers from features on archaeological excavations and are identifiable as to the species present. Unfortunately, little information can be gleaned from the presence of parasite eggs with regard to the actual infestation levels in historical populations, but their commonness indicates that gut parasites must have been endemic in man as well as animals. The results also show that many pits were used for disposal of human refuse.

Despite the uncertainty of data concerned with actual egg numbers, it can be seen that parasitological discoveries can be useful as an indicator of faecal matter; further research will perhaps enable present quantitative techniques to be developed and refined.

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5. J. Jansen and J. H. Boersma 'Helminth eggs from the latrines of the Olafskapel Gatehouse, Amsterdam' (1972); referred to in P. Gooch Commonwealth Institute of Helminthology Annotated Bibliography 9 (1973).