The Spatial Dispersion of Coins within the Plough Zone Horizon

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This note builds on some observations first published in 2008 (Cuddeford 2008, 84 - 86) in which a control sample of coins was buried and subjected to agricultural processes, in order to facilitate a better understanding of how coin hoards and other numismatic deposits may become dispersed and are subsequently interpreted. Whilst it has long been obvious that deposits disturbed by ploughing become scattered, this experiment sought to examine the processes at work and the possible range over which dispersal might occur. Such studies had been conducted before and it was found that different categories of archaeological object seemed to disperse at different rates and distances depending on shape and density (Clark & Scofield 1991, 93 - 105), but as this work was based on visual fieldwalking rather than metal detecting, it seemed appropriate to carry out an experiment to see if metal-detected coins might behave in any sort of predictable way and thus perhaps provide some statistical probability in assessing the original size of dispersed assemblages, something that is seldom possible using conventional fieldwalking techniques (e.g. Haselgrove 1985, 7 - 31).

The Experiment

The experiment sought to simulate the dispersal of a control hoard comprising coins of a size and weight roughly comparable to some types of Roman and later medieval coins and for this purpose 100 copper-alloy decimal pennies of the 1971 issue were selected, each countermarked to prevent confusion with any naturally-occurring loss, even though this was not a high probability in an arable field. The field selected was not one with any known history and preliminary checks with a metal detector indicated a low 'background noise' of natural finds. The surface was flat and well-drained, the soil type chalky boulder clay. The coins were buried loose in a hole at a depth of twenty-five centimetres. This depth was chosen to be below that of most pre-mechanised agricultural processes and thus would simulate a hoard brought into the cultivation zone in fairly modern times, something which probably applies to many metal -detected groups.

Over a number of subsequent years the field was subjected to annual cultivation, rotating through cereals, oil seed rape and beans. Ploughing was by means of six or eight furrow reversible mouldboard ploughs to a maximum depth of 20-25cm, followed by secondary cultivation using power harrows and rollers. The power harrows operated at around 15cm. Sub-soiling to a depth of around 45cm was also carried out on several occasions using a two-tine chisel plough and on one occasion a mole plough was used to a depth of around 60cm. Cultivation was in alternate directions each year.

The hoard was left for five years and then checked with a metal detector. Coins found were plotted but re-buried at the exact location and depth at which they were located. A group of eighty-three coins remained at the point of deposition, three more lay in a line at around 1m intervals and three more further away in a fairly direct line, the furthest being located at 20m from the main deposit. This demonstrated that the main body of the hoard was still intact, but six coins had been displaced and eleven coins were now unaccounted for.

After sixteen years it was decided to attempt the complete recovery of the hoard. The metal detectors used were both top-end units and tests had demonstrated that a coin of the control sample type could be located at a maximum depth of 22cm. However, this was not consistent and it was found that on average coins were not detected much beyond 15cm, a figure that was reduced by 30% or more if target coins were buried on edge or at an angle. As this probably accounts for a significant proportion of ploughsoil-buried coins it was clear that total recovery in a single cultivation cycle would be very unlikely.

The search commenced on a flat rolled seedbed at the point of original deposition. No response was received, but twenty-one coins were recovered within a 5m radius, all single finds save for two which were lying together. Over a period of months a further twenty-four coins were located within a 10m radius but nothing further out. A return to the location was made two years later and a further fifteen coins were recovered within a 10m radius of the place of deposition. A wider search along the direction of cultivation by up to 80m produced no further coins. Following another cultivation cycle a further search was undertaken out to a radius of 20m from the point of deposition and three further coins were recovered. This gave a total of sixty-three coins recovered with thirty-seven still unaccounted for.

This experiment demonstrated that modern agricultural processes can cause significant displacement of buried artefacts such as coins but spatial movement is not initially dramatic and a significant percentage of a deposit may remain within a fairly discrete area of 20m or less. No further work has been done on this site since and so it is probable that more coins would be recovered within the general area of the original place of deposition. It might be expected however that over the course of time a few coins might travel much greater distances and this has been observed with a number of dispersed hoards that continue to produce occasional finds. The mechanisms for spatial dispersal are varied and although ploughing itself does not move material to any great degree other than inverting it, secondary cultivation such as harrowing, can move small objects quite considerably (*ibid.* 100), although such items will only be those in the upper levels of the ploughzone. Other more drastic methods of movement noted can be objects adhering to tractor tyres – several Roman coins were discovered on a concrete hardstanding in a farmyard after mud was pressure-hosed from a tractor's wheels, the location of their original deposit being several hundred metres away along a metalled road! On another occasion a deposit of paste jewellery was discovered at the edge of a field, presumably disposed of by a burglar on realising it was of little value. However, part of one necklace was found at the opposite end of the field some 450m distant; presumably the item had been carried up the field in soil adhering to a reversed ploughshare and re-deposited at the other headland when the plough was again rotated and the share reinserted.

Case studies

The following examples are of two hoards detected over a five year period in north Norfolk and plotted to a ten-metre grid using hand-held GPS. The total search time invested is estimated at around 350 hours. The first group (Fig. 1) comprised a number of Iron Age silver units, of which four adhering were found in one location (square containing six coins) and two adhering in an adjacent grid square (containing five coins). All the rest were single finds and the plot demonstrates that with two exceptions nothing had moved more than forty metres. The exceptions were located some eighty to a hundred metres away and although the assumption was made that these coins were part of the group, they

could also have been single unrelated losses as other coins (Roman) were also found over the whole area and a clearly unrelated Bury 'A' silver unit was found about 100m to the east, so the two outliers here cannot be ascribed to the main group with certainty.

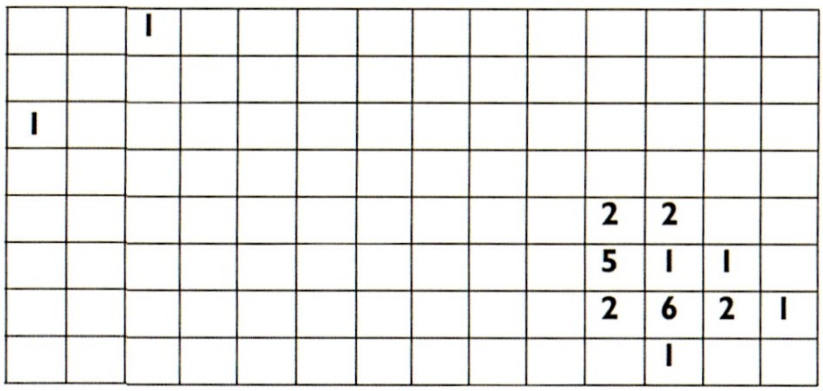

Figure 1

The second group (Fig. 2) comprises late Roman silver 'siliquae' with a date range from Constantius II through to Honorius. This composition is fairly typical of 'siliquae' hoards of the late 4th century. What is interesting about this group is the clear lateral scattering together with numerical clustering within a fairly tight area. It transpired that although the field had been cultivated in a North-South direction for a number of recent years, previously it was always cultivated West to East. In addition, the field was sub-soiled around twenty years ago, which is probably the event that brought the group into the plough horizon. These facts are perfectly reflected in the coin plot.

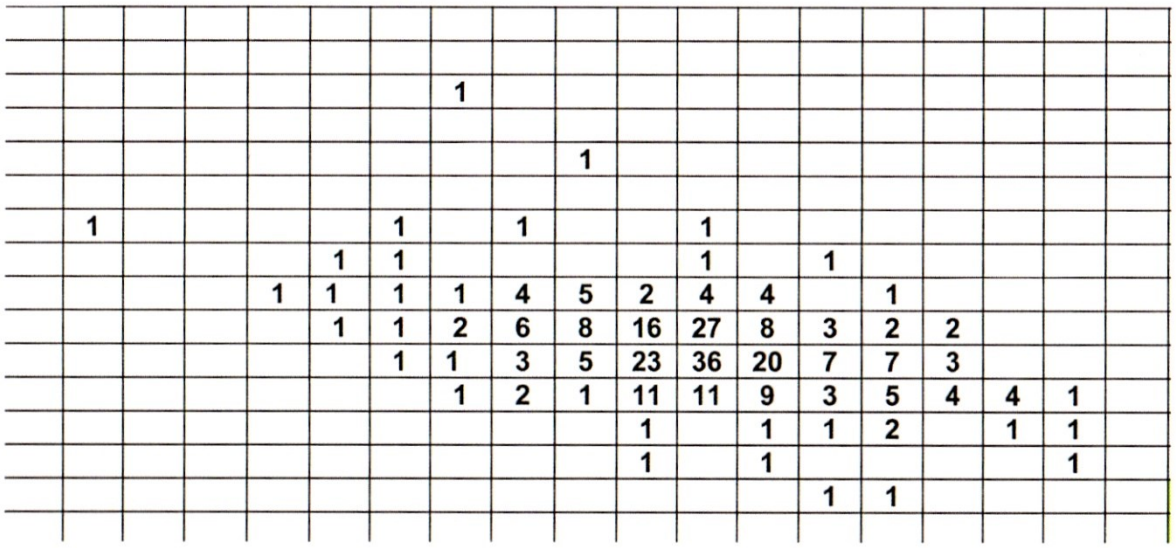

Figure 2

So far the location has been searched over three consecutive cultivation cycles and each time coins continue to be found in significant numbers. The metal detector used was operated with two different size coils running on variable frequencies and the area was searched in two direction at right angles to each other, along measured strips of 1.5 metres. Even then, random searching after the main searches had been carried out still found odd coins, sometimes even within the area of the main nucleus.

Conclusions

The preceding observations confirm that agricultural activity disperses buried coin groups, but that a significant percentage of coins will remain within a fairly discrete area. Some may travel distances well beyond a hundred metres but these will be statistically few in number compared to the main body. No search conducted after just one cultivation cycle will probably recover even half of the statistical potential and repeated searches over a period of years would be required to take this forward, with finds gradually reducing but with the probability that total recovery will never be likely. In conclusion, these data serve to offer some guidelines for assessing the probable approximate size of an original assemblage, provided sufficient time and sound methodology is invested in the recovery programme.

Some coins from Coin Group 1

Some coins from Coin Group 2—Valentinian II, Magnus Maximus and Eugenius

References

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