

AMR Rpt 3688  
Copy sent sheet.

Metallurgical examination of iron from Sewerby  
(East Yorks.) Pagan Saxon Cemetery.

Only three pieces out of the 32 submitted had enough iron in them to be worth examination. These were sectioned, polished, and etched in the usual way.

590100 - A blade. This was sectioned right across the width (Fig. 1) The thickness was uniform and there was no edge to the blade. It consisted of three layers of clean ferrite with two welds. The hardness of 159 HV suggests some phosphorus.

590102 - A piece of a weapon which has cut into bone and been left in it. Clean metal with some carbide particles. On etching this showed a nicely piled structure with carbon content varying from zero to quite high values on the other side. The structure of the higher carbon regions was entirely that of tempered martensite and this was confirmed by the hardness which was 340 HV. The tip, which had been welded to the rest of the blade, was fully rusted and the residual metal nearest it was one of the low carbon laminations with a hardness of 186 HV1. The slag inclusions were multi-phase.

This is a piece of steel made by the piling of unevenly carburized laminations which has been finally heat treated by heating to 800°C and quenching in water. The tempering was probably accidental.

590167 - A long blade or spearhead with a thick midrib.

Rather slaggy metal. Another piled structure with the carbon content varying from zero to about 0.2-0.3%. The tip is pure ferrite. The pearlite of the rest is spheroidised and has therefore been held at around 700°C for some time. The hardness is 159 HV1 at the tip and 138 in the thicker region.

Conclusions.

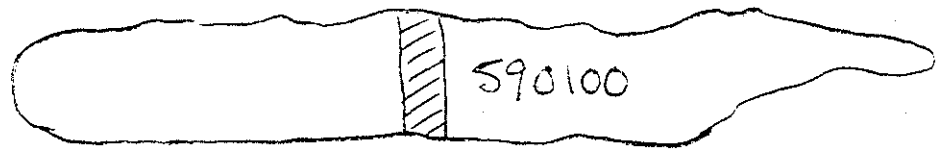
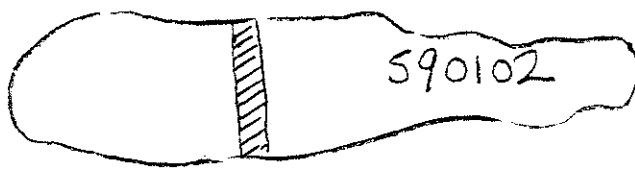
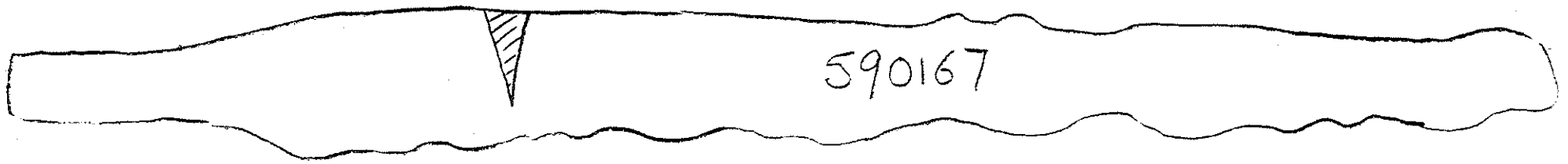
Two out of three of these pieces have been carburized. But to have one out of three heat-treated is a definite improvement on the preceding Roman ironwork. The first one was clearly not intended as a tool or cutting implement. The other two are little

different from what went before but certainly show promise of the better techniques that were to be used in the later Migration period.

May 22nd 1982.

Mounts 454 and 456.

R.F. Tylecote.

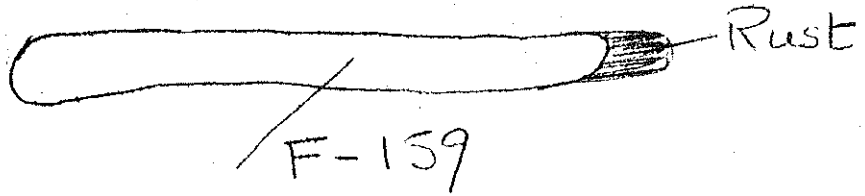


Sewerby

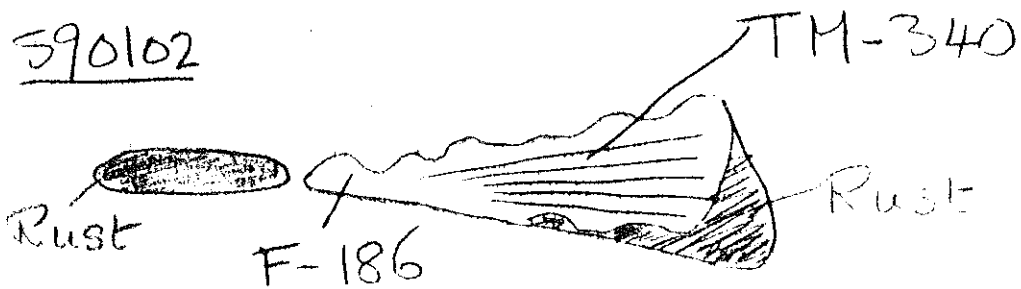
Full size.

Fig. 1

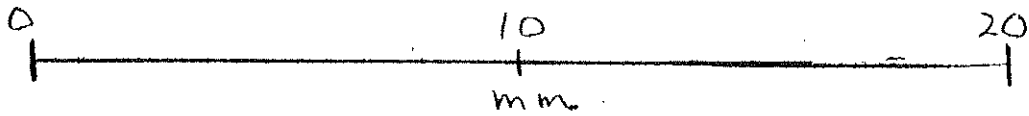
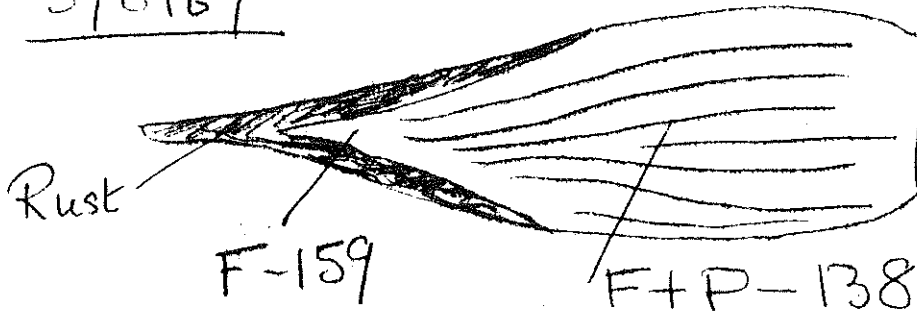
590100



590102



590167



Sewerby

Fig. 2.