Ancient Monuments Laboratory
Report 27/93

EXAMINATION OF SLAG AND OTHER METALWORKING DEBRIS FROM FOSSE LANE SHEPTON MALLET, SOMERSET, 1990

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Summary

Examination of the Romano-British settlement produced about 50kg of slag. A large proportion of this was tap slag from the smelting of iron, together with some debris diagnostic of iron smithing. Most of the material had been recovered during the cleaning of the site following top-soil stripping, rather than from the stratigraphically excavated areas. There would appear to be no connection between the metalworking debris and the hearths excavated on the site.

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EXAMINATION OF SLAG AND OTHER METALWORKING DEBRIS FROM FOSSE LANE, SHEPTON MALLET, SOMERSET, 1990

David Starley
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Introduction

The potential of the Fosse Lane site was revealed by an evaluation excavation carried out by the Birmingham University Field Archaeology Unit (B.U.F.A.U.) in advance of the construction of a warehouse on the site[1]. Subsequently, a much larger area was stripped of topsoil and cleaned back to reveal underlying archaeological features. Further excavation and sampling was undertaken by B.U.F.A.U. concentrating on areas likely to be most severely affected by the new building's foundations. The remains uncovered were predominantly of a Romano-British settlement alongside the Fosse Way. The town is thought to have coalesced during the early second century, been flourishing by the early fourth century, with occupation continuing to the late fourth/early fifth century. The site produced very little evidence of pre-Roman activity and none beyond the fifth century until the eighteenth[2].

Five boxes of slag and metalworking debris, totalling 50kg were recovered from the excavation. Only one of these, containing 3kg of material identified by Context Number, came from the areas of full excavation. A very small amount of material was classified as unstratified. The bulk of the material had been recovered from the large cleaned areas and was identified by Find Number only. The location of these finds had been recorded by electronic distance measurer (E.D.M.) to allow the distribution of classes of object to be plotted across the site. In addition to the slags and metalworking debris a small number of amorphous copper objects were examined.

Examination of slags and ferrous metalworking debris

Because of the need to provide a breakdown of the assemblage for computer plotting, all the material was examined visually, classified to type and weighed separately. The results of this examination were as follows:

Context/find No.	Weight(g)	Interpretation, comments
Context No.540	20	ceramic ?
Context No1000	30	cinder
Context No.1007/8	50	iron-rich cinder
Context No.1008	40	vitrified hearth/furnace lining
Context No.1008	120	iron-rich cinder
Context No.1022	20	vitrified hearth/furnace lining
Context No.1022	60	corroded pewter
Context No.1133	25	stone, poss. ore
Context No.1135	25	tap slag
Context No.1142	250	vitrified hearth/furnace lining
Context No.1142	400	cinder
Context No.1327	3	tap slag
Context No.1334	5	iron object
Context No.1350	5	burnt stone, poss. roasted ore
Context No.1352	10	fuel ash slag
Context No.1353	10	tap slag
Context No.1369	250	iron-rich cinder, poss. smithing hearth bottom
Context No.1371	50	dense ironworking slag
Context No.1371	50	tap slag
Context No.1377	10	cinder
Context No.1378	10	stone
Context No.1397	290	vitrified hearth/furnace lining
Context No.1397	50	iron-rich cinder
Context No.1397	10	cinder
Context No.1405	55	tap slag
Context No.1414	10	tap slag
Context No.1417	25	ironworking slag
Context No.1508	10	burnt clay
Context No.1510	210	vitrified hearth/furnace lining
Context No.1515	15	iron-rich cinder
Context No.1521	25	iron object
Context No.1521	5	ceramic
Context No.1521	70	vitrified hearth/furnace lining
Context No.1522	40	vitrified hearth/furnace lining
Context No.1522	5	fuel ash slag
Context No.1563	15	iron-rich cinder
Context No.1588	3	fuel ash slag
Context No.1697	15	stone
Context No.1891	10	stone

Context/find No.	Weight(g)	Interpretation, comments
Context No.4412	10	tap slag
Context No.4444	45	tap slag
Context No.4527	15	tap slag
Context No.4528	5	tap slag
Context No.6007	240	dense ironworking slag
Context No.6007	190	iron-rich cinder
Context No.6007	200	vitrified hearth/furnace lining
Context No.6007	5	vitrified hearth/furnace lining
Context No.60017	120	iron-rich cinder
Context No.60017	120	vitrified hearth/furnace lining
Feature No.21	5	tap slag
Feature No.37	75	tap slag
Feature No.128	40	cinder
Feature No.637	110	vitrified hearth/furnace lining
Feature No.637	50	tap slag
Unstratified	25	iron object
Unstratified	40	tap slag
Unstratified	10	vitrified hearth/furnace lining
Unstratified	30	stone, poss. ore
Unstratified	15	iron object
Unstratified	30	cinder
Find No.118	3	burnt clay
Find No.128	10	tap slag
Find No.137	5	iron-rich cinder
Find No.153	10	tap slag
Find No.165	10	tap slag
Find No.204	50	tap slag
Find No.205	15	tap slag
Find No.209	50	tap slag
Find No.210	25	dense ironworking slag
Find No.211	175	tap slag
Find No.216	30	vitrified hearth/furnace lining
Find No.222	15	vitrified hearth/furnace lining
Find No.229	10	tap slag
Find No.275	260	tap slag
Find No.332	5	ironworking slag
Find No.349	3	iron object
Find No.349	2	dense ironworking slag
Find No.355	80	ironworking slag
Find No.377	5	iron object
Find No.477	175	tap slag
Find No.477	125	stone, poss. ore
Find No.518	60	stone, poss. ore
Find No.520	50	ironworking slag

Context/find No.	Weight(g)	Interpretation, comments
Find No.524	15	burnt stone, poss. roasted ore
Find No.533	10	ironworking slag
Find No.538	100	dense ironworking slag
Find No.551	50	dense ironworking slag
Find No.539	5	tap slag
Find No.606	50	ironworking slag
Find No.627	5	burnt stone, poss. roasted ore
Find No.631	30	stone, poss. ore
Find No.642	10	tap slag
Find No.644	75	vitrified hearth/furnace lining
Find No.644	75	ironworking slag
Find No.645	3	tap slag
Find No.647	10	tap slag
Find No.653	50	tap slag
Find No.655	10	tap slag
Find No.663	50	tap slag
Find No.675	50	dense ironworking slag
Find No.677	40	tap slag
Find No.679	3	tap slag
Find No.701	625	vitrified hearth/furnace lining
Find No.701	625	iron-rich cinder
Find No.702	10	ironworking slag
Find No.738	100	stone, poss. ore
Find No.748	5	ironworking slag
Find No.751	20	dense ironworking slag
Find No.782	30	ironworking slag
Find No.812	50	tap slag
Find No.820	3	tap slag
Find No.894	10	tap slag
Find No.898	7	iron object
Find No.899	10	ironworking slag
Find No.904	100	vitrified hearth/furnace lining
Find No.908	5	tap slag
Find No.922	25	tap slag
Find No.962	125	dense ironworking slag, charcoal impressions
Find No.980	15	ironworking slag
Find No.980	10	vitrified hearth/furnace lining
Find No.1018	20	ironworking slag
Find No.1022	90	tap slag
Find No.1043	90	ironworking slag, poss. smithing hearth bottom
Find No.1043	25	hearth /furnace lining
Find No.1045	15	tap slag
Find No.1072	15	tap slag
Find No.1082	40	tap slag

Context/find No.	Weight(g)	Interpretation, comments
Find No.1091	15	tap slag
Find No.1150	50	dense ironworking slag
Find No.1169	90	ferruginous concretion
Find No.1171	100	vitrified hearth/furnace lining
Find No.1173	225	iron-rich cinder
Find No.1180	275	tap slag
Find No.1234	30	iron-rich cinder
Find No.1245	15	cinder
Find No.1246	10	ironworking slag
Find No.1263	25	fired clay
Find No.1288	10	tap slag
Find No.1291	15	tap slag
Find No.1292	30	stone
Find No.1292	30	ironworking slag
Find No.1292	90	tap slag
Find No.1293	60	tap slag
Find No.1302	25	tap slag
Find No.1303	170	dense ironworking slag
Find No.1303	80	tap slag
Find No.1304	200	tap slag
Find No.1305	125	tap slag
Find No.1306	20	dense ironworking slag
Find No.1311	50	tap slag
Find No.1311	40	ironworking slag
Find No.1313	40	tap slag
Find No.1314	25	pewter?
Find No.1321	15	burnt stone, poss. roasted ore
Find No.1327	5	iron object
Find No.1328	25	iron object
Find No.1329	50	ironworking slag
Find No.1340	30	cinder
Find No.1349	3	ferruginous concretion
Find No.1350	20	dense ironworking slag
Find No.1350	75	vitrified hearth/furnace lining
Find No.1350	30	cinder
Find No.1492	80	vitrified hearth/furnace lining
Find No.1508	10	iron object
Find No.1511	10	tap slag
Find No.1553	20	dense ironworking slag
Find No.1562	10	ferruginous concretion
Find No.1589	5	stone
Find No.1610	15	cinder
Find No.1620	15	dense ironworking slag
Find No.1627	50	tap slag

Context/find No.	Weight(g)	Interpretation, comments
Find No.1631	110	ironworking slag
Find No.1681	110	ironworking slag
Find No.1706	40	ironworking slag
Find No.1757	15	vitrified hearth/furnace lining
Find No.1765	5	vitrified hearth/furnace lining
Find No.1810	30	ironworking slag, charcoal impressions
Find No.1844	15	cinder
Find No.1846	10	tap slag
Find No.1859	25	tap slag
Find No.1871	60	ironworking slag
Find No.1922	500	dense ironworking slag
Find No.1940	125	tap slag
Find No.1951	725	tap slag
Find No.1951	255	ironworking slag
Find No.1960	50	vitrified hearth/furnace lining
Find No.1967	50	iron object
Find No.1967	60	tap slag
Find No.1967	15	stone
Find No.1967	400	ironworking slag
Find No.1968	20	iron-rich cinder
Find No.1974	30	ironworking slag
Find No.1978	40	ironworking slag
Find No.1986	30	ironworking slag
Find No.1994	30	fuel ash slag
Find No.1994	15	stone
Find No.1994	25	tap slag
Find No.1994	80	ironworking slag
Find No.2000	340	ironworking slag
Find No.2011	100	dense ironworking slag
Find No.2017	15	vitrified hearth/furnace lining
Find No.2030	60	iron-rich cinder
Find No.2032	90	dense ironworking slag
Find No.2036	50	tap slag
Find No.2036	150	ironworking slag
Find No.2038	110	vitrified hearth/furnace lining
Find No.2052	50	vitrified hearth/furnace lining
Find No.2052	100	ironworking slag
Find No.2057	40	ironworking slag
Find No.2064	100	cinder
Find No.2071	10	cinder
Find No.2073	5	cinder
Find No.2076	3	fuel ash slag
Find No.2076	140	iron-rich cinder
Find No.2084	200	vitrified hearth/furnace lining

Context/find No.	Weight(g)	Interpretation, comments
Find No.2084	600	ironworking slag
Find No.2091	190	ironworking slag
Find No.2092	300	iron-rich cinder
Find No.2094	80	vitrified hearth/furnace lining
Find No.2094	580	cinder
Find No.2095	50	fuel ash slag
Find No.2095	300	vitrified hearth/furnace lining
Find No.2097	490	vitrified hearth/furnace lining
Find No.2123	30	ironworking slag
Find No.2130	110	ironworking slag
Find No.2139	70	vitrified hearth/furnace lining
Find No.2167	30	cinder
Find No.2172	110	vitrified hearth/furnace lining
Find No.2176	20	vitrified hearth/furnace lining
Find No.2185	10	fuel ash slag
Find No.2185	20	ironworking slag
Find No.2192	160	vitrified hearth/furnace lining
Find No.2200	10	cinder
Find No.2202	130	ironworking slag
Find No.2203	30	cinder
Find No.2203	30	vitrified hearth/furnace lining
Find No.2203	80	ironworking slag
Find No.2206	660	vitrified hearth/furnace lining
Find No.2210	370	vitrified hearth/furnace lining
Find No.2233	10	vitrified hearth/furnace lining
Find No.2262	90	dense ironworking slag
Find No.2262	20	vitrified hearth/furnace lining
Find No.2268	25	fired clay
Find No.2286	30	vitrified hearth/furnace lining
Find No.2286	600	3 prob. smithing hearth bottoms
Find No.2303	70	stone
Find No.2303	420	ironworking slag
Find No.2307	110	vitrified hearth/furnace lining
Find No.2320	80	vitrified hearth/furnace lining
Find No.2323	100	ironworking slag
Find No.2332	15	ironworking slag
Find No.2332	5	cinder
Find No.2344	30	cinder
Find No.2358	80	tap slag
Find No.2359	10	vitrified hearth/furnace lining
Find No.2374	5	ironworking slag
Find No.2387	20	iron object
Find No.2392	90	tap slag
Find No.2396	20	tap slag

Context/find No.	Weight(g)	Interpretation, comments
Find No.2398	50	tap slag
Find No.2399	40	tap slag
Find No.2401	40	ironworking slag
Find No.2405	30	ferruginous concretion
Find No.2424	50	vitrified hearth/furnace lining
Find No.2424	75	cinder
Find No.2425	60	cinder
Find No.2425	60	vitrified hearth/furnace lining
Find No.2427	15	vitrified hearth/furnace lining
Find No.2427	85	cinder
Find No.2429	20	cinder
Find No.2429	70	ironworking slag
Find No.2431	150	iron-rich cinder
Find No.2432	25	tap slag
Find No.2432	150	cinder
Find No.2435	5	iron object
Find No.2439	10	iron-rich cinder
Find No.2443	50	tap slag
Find No.2447	20	cinder
Find No.2459	180	ironworking slag
Find No.2463	25	ironworking slag
Find No.2470	30	tap slag
Find No.2470	60	ironworking slag
Find No.2470	30	ferruginous concretion
Find No.2474	140	cinder
Find No.2479	20	tap slag
Find No.2479	100	dense ironworking slag
Find No.2486	80	dense ironworking slag
Find No.2498	20	tap slag
Find No.2550	10	stone
Find No.2612	20	ironworking slag
Find No.2627	20	cinder
Find No.2627	3	tap slag
Find No.2627	7	stone, poss. ore
Find No.2633	60	tap slag
Find No.2650	100	tap slag
Find No.2691	10	cinder
Find No.2691	50	dense ironworking slag
Find No.2696	60	dense ironworking slag
Find No.2698	10	fuel ash slag
Find No.2704	15	ironworking slag
Find No.2704	25	tap slag
Find No.2704	25	fuel ash slag
Find No.2704	30	vitrified hearth/furnace lining

Context/find No.	Weight(g)	Interpretation, comments
Find No.2705	470	cinder
Find No.2705	890	tap slag
Find No.2705	15	stone, poss. ore
Find No.2705	125	vitrified hearth/furnace lining
Find No.2709	50	burnt stone, poss. roasted ore
Find No.2709	225	dense ironworking slag
Find No.2709	50	ironworking slag
Find No.2711	260	tap slag
Find No.2711	20	cinder
Find No.2711	95	ironworking slag
Find No.2714	200	tap slag
Find No.2714	75	vitrified hearth/furnace lining
Find No.2714	15	cinder
Find No.2715	90	cinder
Find No.2717	5	charcoal
Find No.2717	10	tap slag
Find No.2717	10	vitrified hearth/furnace lining
Find No.2717	10	fuel ash slag
Find No.2717	85	ironworking slag
Find No.2722	25	tap slag
Find No.2725	40	dense ironworking slag
Find No.2743	15	tap slag
Find No.2751	220	tap slag
Find No.2766	30	dense ironworking slag
Find No.2766	20	cinder
Find No.2776	120	ironworking slag
Find No.2781	90	tap slag
Find No.2781	110	dense ironworking slag
Find No.2790	10	dense ironworking slag
Find No.2791	475	dense ironworking slag, charcoal impressions
Find No.2795	20	iron-rich cinder
Find No.2795	30	ironworking slag
Find No.2799	15	stone
Find No.2799	95	dense ironworking slag
Find No.2803	15	vitrified hearth/furnace lining
Find No.2803	45	iron-rich cinder
Find No.2810	70	cinder
Find No.2810	10	tap slag
Find No.2811	240	iron object
Find No.2820	75	tap slag
Find No.2823	45	ironworking slag
Find No.2823	15	ironworking slag
Find No.2824	90	tap slag
Find No.2824	30	vitrified hearth/furnace lining

Context/find No.	Weight(g)	Interpretation, comments
Find No.2824	25	cinder
Find No.2825	80	cinder
Find No.2832	15	tap slag
Find No.2872	10	tap slag
Find No.2878	15	cinder
Find No.2891	40	tap slag
Find No.2897	10	vitrified hearth/furnace lining
Find No.2898	20	tap slag
Find No.2898	40	cinder
Find No.2903	5	tap slag
Find No.2905	170	ironworking slag, poss. incipient smithing hearth bottom
Find No.2912	50	ferruginous concretion
Find No.2915	125	ferruginous concretion
Find No.2916	100	ferruginous concretion
Find No.2922	50	ferruginous concretion
Find No.2932	25	tap slag
Find No.2955	25	iron object
Find No.2959	20	dense ironworking slag
Find No.2962	100	tap slag
Find No.2976	75	tap slag
Find No.3010	125	tap slag
Find No.3016	60	vitrified hearth/furnace lining
Find No.3024	15	dense ironworking slag
Find No.3026	25	tap slag
Find No.3028	120	tap slag
Find No.3031	35	tap slag
Find No.3051	2	fuel ash slag
Find No.3062	10	tap slag
Find No.3069	180	ironworking slag, poss. incipient smithing hearth bottom
Find No.3081	10	ironworking slag, chalky inclusion
Find No.3096	30	iron object
Find No.3112	90	cinder
Find No.3112	50	dense ironworking slag
Find No.3114	110	iron-rich cinder
Find No.3136	10	iron object
Find No.3137	50	dense ironworking slag
Find No.3137	210	ironworking slag, poss. smithing hearth bottom
Find No.3139	30	tap slag
Find No.3146	15	cinder
Find No.3160	25	vitrified hearth/furnace lining
Find No.3188	15	iron-rich cinder
Find No.3195	15	iron object

Context/find No.	Weight(g)	Interpretation, comments
Find No.3206	5	fuel ash slag
Find No.3210	300	iron-rich cinder
Find No.3214	15	tap slag
Find No.3217	5	vitrified hearth/furnace lining
Find No.3215	25	tap slag
Find No.3259	50	vitrified hearth/furnace lining
Find No.3261	20	hearth /furnace lining
Find No.3272	75	vitrified hearth/furnace lining
Find No.3276	50	vitrified hearth/furnace lining
Find No.3276	50	tap slag
Find No.3278	10	iron-rich cinder
Find No.3278	90	vitrified hearth/furnace lining
Find No.3282	5	tap slag
Find No.3282	75	vitrified hearth/furnace lining
Find No.3284	40	cinder
Find No.3285	220	iron-rich cinder
Find No.3305	10	vitrified hearth/furnace lining
Find No.3313	5	fuel ash slag
Find No.3319	20	iron-rich cinder
Find No.3352	10	dense ironworking slag
Find No.3352	120	vitrified hearth/furnace lining
Find No.3374	30	cinder
Find No.3398	125	prob. smithing hearth bottom
Find No.3401	10	tap slag
Find No.3406	10	tap slag
Find No.3411	15	iron-rich cinder
Find No.3412	15	cinder
Find No.3435	200	tap slag
Find No.3435	45	vitrified hearth/furnace lining
Find No.3435	5	bone, tooth
Find No.3436	10	cinder
Find No.3437	2	tap slag
Find No.3442	35	vitrified hearth/furnace lining
Find No.3459	20	iron-rich cinder
Find No.3461	60	vitrified hearth/furnace lining
Find No.3463	10	vitrified hearth/furnace lining
Find No.3477	10	cinder
Find No.3477	15	iron-rich cinder
Find No.3510	75	iron object
Find No.3515	20	dense ironworking slag
Find No.3525	10	cinder
Find No.3528	30	tap slag
Find No.3528	5	cinder
Find No.3544	10	coal

Context/find No.	Weight(g)	Interpretation, comments
Find No.3544	30	iron-rich cinder
Find No.3549	50	tap slag
Find No.3569	50	tap slag
Find No.3573	50	dense ironworking slag
Find No.3575	50	tap slag
Find No.3578	70	tap slag
Find No.3584	20	vitrified hearth/furnace lining
Find No.3591	15	iron-rich cinder
Find No.3596	5	cinder
Find No.3615	50	tap slag
Find No.3624	10	ironworking slag
Find No.3658	10	tap slag
Find No.3671	25	tap slag
Find No.3671	30	fired clay
Find No.3703	220	vitrified hearth/furnace lining
Find No.3725	3330	tap slag
Find No.3725	2110	vitrified hearth/furnace lining
Find No.3727	35	tap slag
Find No.3727	25	vitrified hearth/furnace lining
Find No.3729	25	vitrified hearth/furnace lining
Find No.3729	295	tap slag
Find No.3732	60	tap slag
Find No.3732	15	vitrified hearth/furnace lining
Find No.3733	140	vitrified hearth/furnace lining
Find No.3733	80	fired clay
Find No.3733	120	tap slag
Find No.3733	35	ironworking slag
Find No.3736	325	tap slag
Find No.3737	100	tap slag
Find No.3737	60	vitrified hearth/furnace lining
Find No.3737	3	ceramic
Find No.3743	50	tap slag
Find No.3745	60	dense ironworking slag
Find No.3749	15	tap slag
Find No.3765	10	tap slag
Find No.3948	10	fired clay
Find No.4041	670	tap slag
Find No.4041	110	vitrified hearth/furnace lining
Find No.4041	40	iron object
Find No.4042	340	tap slag
Find No.4042	430	vitrified hearth/furnace lining
Find No.4043	540	tap slag
Find No.4043	235	vitrified hearth/furnace lining
Find No.4045	250	prob. smithing hearth bottom

Context/find No.	Weight(g)	Interpretation, comments
Find No.4076	80	tap slag
Find No.4096	25	iron object
Find No.4108	100	fired clay, charcoal inclusions
Find No.4195	5	iron object
Find No.4221	10	dense ironworking slag
Find No.4229	70	iron object
Find No.4236	50	iron object
Find No.4236	20	dense ironworking slag
Find No.4238	30	tap slag
Find No.4242	10	tap slag
Find No.4269	35	dense ironworking slag
Find No.4276	20	tap slag
Find No.4281	25	tap slag
Find No.4289	100	tap slag
Find No.4291	10	tap slag
Find No.4295	40	tap slag
Find No.4317	10	tap slag
Find No.4319	10	ironworking slag
Find No.4323	25	dense ironworking slag
Find No.4324	30	tap slag
Find No.4328	30	stone
Find No.4334	50	hearth /furnace lining
Find No.4334	10	dense ironworking slag
Find No.4335	25	tap slag
Find No.4338	150	tap slag
Find No.4338	60	iron-rich cinder
Find No.4338	120	dense ironworking slag
Find No.4351	120	iron-rich cinder
Find No.4354	80	tap slag
Find No.4356	100	dense ironworking slag
Find No.4357	90	tap slag
Find No.4360	25	ironworking slag
Find No.4363	15	tap slag
Find No.4364	175	stone, poss. ore
Find No.4366	60	tap slag
Find No.4367	15	tap slag
Find No.4369	350	tap slag
Find No.4372	15	stone
Find No.4374	15	tap slag
Find No.4379	160	tap slag
Find No.4379	30	ironworking slag
Find No.4382	20	tap slag
Find No.4386	180	tap slag
Find No.4388	50	tap slag

Context/find No.	Weight(g)	Interpretation, comments
Find No.4389	10	ironworking slag
Find No.4395	20	tap slag
Find No.4403	25	tap slag
Find No.4412	15	tap slag
Find No.4415	20	ironworking slag
Find No.4416	15	vitrified hearth/furnace lining
Find No.4419	70	dense ironworking slag
Find No.4422	80	iron object
Find No.4423	10	tap slag
Find No.4423	330	dense ironworking slag
Find No.4429	15	tap slag
Find No.4452	20	dense ironworking slag
Find No.4456	50	tap slag
Find No.4459	75	tap slag
Find No.4476	60	tap slag
Find No.4477	20	tap slag
Find No.4478	60	vitrified hearth/furnace lining
Find No.4480	30	dense ironworking slag
Find No.4481	30	iron object
Find No.4483	30	tap slag
Find No.4483	25	vitrified hearth/furnace lining
Find No.4488	75	tap slag
Find No.4498	250	dense ironworking slag
Find No.4498	90	vitrified hearth/furnace lining
Find No.4502	115	iron-rich cinder, charcoal impressions
Find No.4518	20	tap slag
Find No.4526	5	tap slag
Find No.4532	10	vitrified hearth/furnace lining
Find No.4533	20	tap slag
Find No.4539	5	ironworking slag
Find No.4540	75	ironworking slag
Find No.4624	15	tap slag
Find No.4624	5	vitrified hearth/furnace lining
Find No.4634	30	tap slag
Find No.4643	10	tap slag
Find No.4645	40	tap slag
Find No.4658	50	tap slag
Find No.4658	150	vitrified hearth/furnace lining
Find No.4686	60	tap slag
Find No.4686	180	dense ironworking slag
Find No.4813	40	stone, poss. ore
Find No.4822	35	tap slag

Context/find No.	Weight(g)	Interpretation, comments
Find No.4826	25	vitrified hearth/furnace lining
Find No.4886	260	iron-rich cinder
Find No.4887	45	iron-rich cinder
Find No.4887	5	tap slag
Find No.4941	25	iron object
Find No.4981	15	unknown
Find No.5069	10	fuel ash slag
Find No.5069	5	fired clay
Find No.5075	5	fuel ash slag
Find No.5149	10	cinder
Find No.5183	25	vitrified hearth/furnace lining
Find No.5197	3	fired clay
Find No.5222	25	vitrified hearth/furnace lining
Find No.5262	75	vitrified hearth/furnace lining
Find No.5268	30	tap slag
Find No.5406	50	iron-rich cinder
Find No.5411	40	iron-rich cinder
Find No.5419	50	iron-rich cinder
Find No.5432	25	iron-rich cinder
Find No.5442	25	ironworking slag
Find No.5445	20	vitrified hearth/furnace lining
Find No.5455	30	cinder
Find No.5460	50	iron-rich cinder
Find No.5461	75	ironworking slag
Find No.5466	10	vitrified hearth/furnace lining
Find No.5468	10	ironworking slag
Find No.5475	25	vitrified hearth/furnace lining
Find No.5476	5	fuel ash slag
Find No.5478	20	vitrified hearth/furnace lining
Find No.5496	3	tap slag
Find No.5508	40	vitrified hearth/furnace lining
Find No.5518	25	iron-rich cinder
Find No.5525	175	iron-rich cinder
Find No.5527	50	iron-rich cinder
Find No.5527	25	vitrified hearth/furnace lining
Find No.5532	175	vitrified hearth/furnace lining
Find No.5537	50	iron-rich cinder
Find No.5537	170	dense ironworking slag
Find No.5537	50	vitrified hearth/furnace lining
Find No.5537	440	slag cake
Find No.5411	40	iron-rich cinder
Find No.5419	50	iron-rich cinder
Find No.5432	25	iron-rich cinder
Find No.5442	25	ironworking slag

Context/find No.	Weight(g)	Interpretation, comments
Find No.5445	20	vitrified hearth/furnace lining
Find No.5455	30	cinder
Find No.5460	50	iron-rich cinder
Find No.5461	75	ironworking slag
Find No.5466	10	vitrified hearth/furnace lining
Find No.5468	10	ironworking slag
Find No.5475	25	vitrified hearth/furnace lining
Find No.5476	5	fuel ash slag
Find No.5478	20	vitrified hearth/furnace lining
Find No.5496	3	tap slag
Find No.5508	40	vitrified hearth/furnace lining
Find No.5518	25	iron-rich cinder
Find No.5525	175	iron-rich cinder
Find No.5527	50	iron-rich cinder
Find No.5527	25	vitrified hearth/furnace lining
Find No.5532	175	vitrified hearth/furnace lining
Find No.5537	50	iron-rich cinder
Find No.5537	170	dense ironworking slag
Find No.5537	50	vitrified hearth/furnace lining
Find No.5537	440	slag cake
Watching brief pit	95	cinder
Watching brief pit		hammerscale, flake and spheroidal
Watching brief pit	105	iron rich cinder
Watching brief pit	310	ironworking slag
Watching brief pit	320	smithing hearth bottom, 90x70x30mm
Watching brief pit	460	smithing hearth bottom, 80x75x50mm
Watching brief pit	135	smithing hearth bottom, 60x50x35mm
Watching brief pit	410	smithing hearth bottom, 110x80x50mm

Breakdown of results

Class	No. finds	Total Weight (kg)
Tap slag	77	15.620
Dense ironworking slag	51	4.657
Smithing hearth bottoms	4	1.325
Prob. smithing hearth bottom	3	0.975
Vitrified hearth/furnace lining	97	10.860
Non-diagnostic ironworking slag	84	6.180
Iron-rich cinder	45	4.430
Cinder	51	3.215
Iron objects	31	0.920
Stone, possibly ore	10	0.607
Ferruginous concretion	8	0.488
Slag cake	1	0.440
Fired clay	8	0.278
Stone	12	0.260
Fuel ash slag	14	0.188
Hearth/furnace lining	3	0.095
Burnt stone, possibly roasted ore	5	0.090
Tin/pewter	2	0.085
Unknown	1	0.015
Burnt clay	2	0.013
Coal	1	0.010
Ceramic	3	0.028
Charcoal	1	0.005
Bone	1	0.005

The largest, and most diagnostic component of the assemblage was that identified as **tap slag**. These dense, fayalitic slags show a ropey flowed structure on their upper surface and little porosity. They form when molten slag is run off from a smelting furnace and provide clear evidence of iron smelting ie, the primary production of metallic iron from the ore and are typical of Roman iron smelting. **Dense ironworking slags** lack the characteristic flowed surface but are of similar consistency to tap slags and also derive from iron smelting. Further evidence for smelting activity was found in the tentatively identified **slag cake** and the iron-rich **stone, possibly ore**, some of which appear to have been roasted, and may have provided a viable source of iron.

Slags diagnostic of smithing activity were less frequently observed. Some pieces were identified on morphological grounds as probable **smithing hearth bottoms**. However they did not conform well to the characteristic form, which has an irregular convex underside

and an upper surface which is flatter or slightly hollowed, from downwards pressure from the air blast of the tuyere, and has a smoother, vitrified appearance. The evidence of ironsmithing is generally much less certain than that for smelting. The one exception to this was a small quantity of material subsequently recovered from a small pit during a watching brief, and examined at a later date, together with some other material which had previously been misclassified. Debris from the pit included four well formed **smithing hearth bottoms** and some flake and spheroidal **hammer scale**, both of which provide good evidence of iron smithing although the size of the assemblage and of the hearth bottoms themselves is very small and therefore provides evidence of no more than very limited scale iron smithing.

Smithing hearth bottom dimensions

	range	mean	std dev
weight (g)	135-460	330	125
length (mm)	60-110	85	20
width (mm)	50-80	70	10
depth (mm)	30-50	40	10

Vitrified hearth/furnace lining fragments may derive from iron smelting or smithing structures or those used for other high temperature processes. The material forms as a result of a high temperature reaction between the clay lining of the hearth/furnace and the alkali fuel ashes or fayalitic slag. The fragments generally show a compositional gradient from unmodified baked clay on one surface to an irregular cindery material on the other. The slag attack of the Fosse Lane material was more than superficial and this would tend to suggest that the lining once formed part of a smelting furnace.

Material classed as **ironworking slag** is fayalitic (iron silicate) slag with a relatively dense structure. As very similar material can be produced both by iron smelting and smithing the slag is not diagnostic.

Cinder tends to be of a relatively light, highly porous but hard and brittle nature and forms as a result of high temperature reactions between the alkali fuel ashes and any available source of silica, such as sand used as a flux during smithing, or fragments of clay which have spalled away from the furnace lining. **Iron-rich cinder** has a similar appearance but has a significant iron content making it denser. Both materials are thought to be indicative of iron working but it is not possible to determine whether this is iron smithing or smelting.

Fuel ash slag is a very lightweight and normally light-coloured (grey-brown), highly porous material that results from the reaction between alkaline fuel ash and silicates from soil, sand or clay at elevated temperatures. The reaction is shared by many pyrotechnological processes and the slag is not diagnostic.

The ferruginous concretion is likely to have been formed as a result of iron panning. The redeposition of iron hydroxides is a natural phenomenon although the process may have been enhanced by the nature of the surrounding archaeological deposits. Although "bog ore" provided a source of iron for smelting in antiquity, the ferruginous concretions examined would appear on initial examination to be insufficiently rich in iron for successful smelting in the bloomery furnaces of the period.

Examination of selected non-ferrous metal objects

A further 10 samples which were thought to relate to non-ferrous metal working were visually examined. The classification of five of these was confirmed by non-qualitative X-ray fluorescence (XRF) analysis.

Context/find No.	Weight(g)	Interpretation, comments
Context No. 1379	4.0	Cu alloy* spill
Context No. 1514	2.0	Cu alloy* spill
Find No. 826	0.6	Cu alloy spill
Find No. 1314	46.4	Sn/Pb alloy*, poss. pewter
Find No. 1916	1.3	Cu alloy spill
Find No. 2768	3.1	Pb/Cu obj.*
Find No. 3133	20.8	Cu alloy spill
Find No. 3292	2.5	fuel ash slag* no metal traces
Find No. 4752	1.3	Cu alloy spill
Find No. 4844	0.8	Cu alloy spill
Find No. 6033	1.2	Cu alloy spill

* Confirmed by XRF analysis

The amorphous form of these corroded Copper alloy objects does resemble spills of metal associated with the casting of small artefacts. Similar results could, however, also be obtained when small objects were accidentally melted, for instance when a building caught fire. The fragment of fuel ash slag showed no traces of non-ferrous metals, and could derive from one of many high temperature processes. The absence of crucibles, mould fragments or other evidence of metal casting debris is also notable. On balance, there would seem to be insufficient evidence to support non-ferrous metal casting on the site.

Conclusions

The metalworking slag assemblage from Fosse Lane, Shepton Mallet contained a wide variety of ironworking debris. Of the diagnostic slags, those associated with smelting iron predominated. The smelting furnace employed is likely to have been the Roman shaft furnace which produced slag in a sufficiently liquid state to enable it to be tapped from the furnace. Even so, the quantities of tap slag recovered are not large, perhaps because most of the slag was tapped into pits below the level cleaned down to, or because the site was peripheral to the main area of smelting activity. Some smithing, ie hot working, of iron is also attested by slag. However, this is also very limited in extent and may represent only the primary smithing to consolidate the smelted bloom rather than any subsequent artefact manufacture. The very small quantities of ironworking debris associated with the excavated contexts is probably best explained as a background scatter from earlier activity and there appears to be no significant association between ironworking debris and the excavated hearths. There is insufficient evidence to support non-ferrous metal casting.

Potential for further work

Given the limited significance of the slag assemblage to the structures excavated at Fosse Lane, further examination and analysis of the metalworking debris would not appear to be justifiable. The planned plotting of artefact types is of considerable interest as it may clarify the relationship between the major groups of metal working debris, particularly the tap slag, vitrified lining, various grades of ironworking slag and cinder and possible roasted ores. Spatial relationships of slags to other artefact categories, especially the ferrous objects, should also be examined.

Storage of slag

Ironworking slag, being predominantly fayalitic, is not prone to deterioration and requires no special storage treatment. It is recommended that all the slag should be saved.

References

1. P. Leach, Shepton Mallet; *Romano-Britons and Early Christians in Somerset* (Birmingham, 1991).

2. P. Leach, J. Evans and S. Buteux, *Fosse Lane, Shepton Mallet: Archaeological Excavation Project 1990, Assessment and Post- Excavation Design.* Birmingham University Field Archaeology Unit, Report No. 156 (April 1991).