Vegetable Remains from the Site of the Roman Military Station at Newstead, Melrose.

BY

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The following constitutes a report based upon the examination of material submitted from time to time by Mr. James Curle, of Priorwood, Melrose, during the excavation of the site of the Roman Military Station at Newstead, Melrose.

Mr. Curle's investigation of the site,[1] as an antiquarian authority points out, forms "a great contribution to our knowledge of both Roman antiquities and Roman Scotland," and it was hoped that an examination of the vegetable remains from the various pits and trenches excavated, would contribute something to a knowledge of the flora of Roman Britain.

The nature of the material which was sent to the Royal Botanic Garden, Edinburgh, for investigation was of two kinds :—

(1) Samples of the deposits from the various pits and trenches opened during the work of excavation ;

(2) Definite articles of interest such as implement shafts.

The samples of earths from the pits gave numerous twigs of trees, pieces of bark, branches, chips of wood, and seeds, which had found their way into the pits at the time the latter were being filled with refuse from the station. From the pits and trenches, and mixed with the vegetable debris, came many of the important finds of Roman implements and other articles,

[1] Reports of excavations of the Roman Military Station, Newstead, Melrose, by James Curle. Proceedings of the Society of Antiquaries of Scotland, 1906, 1907.

and one is justified in assuming that the vegetable remains from the same levels represent species of plants which were contemporaneous with the occupation of the site. In the case of the woods associated with tools as handles, one has, of course, no direct evidence as to their origin.

The general character of the various samples of earths from the pits and trenches, with the vegetable remains identified in each sample, is given in Table I.

Table II gives the results of my identification of the separate objects, such as tool handles.

In Table III I give a summary of the plant remains, arranged systematically according to the various natural orders to which the identified species belong.

General Remarks upon the Material Investigated.

I. Examination of Samples of Deposits from the Pits and Trenches.

(For detailed descriptions of the deposits *see* Table I.)

The plant remains identified among the samples are of three kinds :—

(1) Specimens of woods and twigs identified by microscopic examination of their wood structure ;
(2) Leaves and bark fragments recognised by their external appearance ;
(3) Seeds and fruits.

1. The results obtained by the examination of the numerous twigs and branches are somewhat disappointing. As an analysis of Table I shows, these results tend more to indicate the general prevalence of certain well-known indigenous trees—some probably pre-glacial—than to afford evidence of the presence in Britain at the period of the Roman occupation of this station of species of exceptional interest. Thus, although a great number of twigs and branches have been examined, and the species of plant to which they belong ascertained, I am only able as a result to tabulate some seven separate species of trees, and these are kinds which have always been considered to be indigenous.

The number of specimens which turned out to be hazel was remarkable. The bulk of the twigs and branches among the material from the pits were of this tree, although twigs and branches of birch also were fairly common. Oak was less frequently found, and in most instances the specimens of this wood were in the form of chips of large timber. This is interesting, because while hazel fruits and birch catkins were found, no acorns or small twigs of oak were discovered among the material submitted. It may be noted that pieces of oak bark were recognised, and Mr. Curle, in a letter to me, says that "oak must have been fairly plentiful, I think, at Newstead. All along the west side the early rampart appeared to lie on a double layer of oak branches." As Table II shows, ash was employed as shafts and handles of implements, but there is no evidence that it was procured locally. In two cases only was ash wood found not associated with implements. A piece of wood from Pit VIII [1] proved to be ash, and a portion about two inches long of a branch about an inch in diameter, without bark, was found among the earliest material received. These may have been pieces of broken or discarded implement handles. A few specimens of branches of the rowan (Pyrus Aucuparia) and of the white beam (Pyrus Aria) were found, and there seems little doubt that these trees have been wild in Scotland from very early times. One or two specimens of the wood of alder were encountered, and similarly a few of poplar (or willow.)

Thus it will be seen that the trees, recognised by the wood anatomy of twigs and branches, with portions of bark, which one may regard as growing locally at Newstead at the time of the occupation of the Roman Camp, number seven only :—oak, birch, hazel, willow or poplar, alder, rowan, white beam.

2. Leaves and the soft parts of plants were not sufficiently well preserved in most cases to enable one to identify them. However, a few remains of this nature were in fairly satisfactory condition, and among them I was able to identify leaves of hazel, leaves of birch, the stem and leaf-base of an umbelliferous plant, leaves of various grasses and sedges, leaves and flower parts of the common ling, stems and flower parts of nettles, the stems and leaves

[1] See Table II, Spec. No. 9.

of a species of dock, a frond of the common bracken, the rhizome and leaf rhachis of a fern, probably the species just mentioned, and several mosses and liverworts. The stem and leaf-sheath of the umbelliferous plant, I have every reason to believe, is that of cow parsnip (Heracleum Sphondylium), but a search for remains of fruits of this plant, the discovery of which would have done much to confirm my diagnosis, proved unsuccessful.

The pieces of bark recognised belong to the following species:—oak, birch, hazel, rowan.

My attention has been directed by Professor Bayley Balfour to a report on the vegetable remains found at the Lochlee Crannog, Tarbolton, Ayrshire, investigated by Mr. Robert Munro.

Mr. Munro's account of the excavations of this Crannog is in the Proceedings of the Society of Antiquaries of Scotland, Vol. XIII., and the report upon the vegetable remains by Professor Bayley Balfour supplies what appears to me to be some interesting comparisons between the plant remains of that site and those of the Newstead Roman Station.

The brushwood from below the log-pavement of the Lochlee Crannog was, it appears, composed of woods belonging to one or other of the following trees:—birch, hazel, alder, willow. The twigs and branches of the nature of bushwood found in the material from the Newstead site are chiefly hazel and birch, while twigs of alder and willow, although not plentiful, were also found.

Alder and willow are trees preferring damp situations, so that their occurrence, perhaps in some quantity, in the vicinity of the Lochlee Crannog at the time of its occupation is easily understood. Hazel and birch, with alder and willow more plentiful perhaps in moist situations, I am inclined to believe, were somewhat dominant trees in the primeval woods of North Britain.

This opinion is supported not only by the results of the examination of the material from Newstead and the records from the Lochlee Crannog, but also by the results of similar investigations which at various times I have made of the plant remains of other sites of Roman and pre-Roman occupation. Thus, to quote

the result of one such investigation only[1] :—of a number of logs from a pre-historic pile-structure in Wigtownshire which I examined in 1903, seven were, I found, birch, five alder, three hazel, one poplar (or willow), and one oak.

Oak recorded from Newstead, from the Lochlee Crannog, from the Wigtownshire pre-historic dwelling, and from many other Roman stations, appears to have occurred plentifully in primeval woods of North Britain, in which were also scattered trees of rowan and white beam.

It is rather remarkable that no specimens of coniferous wood have been found in the brushwood deposits either at Newstead or at the Lochlee Crannog, and the absence of beech wood from material from both stations is worth noting.

Other plant remains mentioned in the summary of plant remains from Newstead, and recorded also from the Lochlee Crannog, are portions of bracken fern, stems of heather, rhizomes of ferns, bark of birch, and hazel-nuts.

3. The number of seeds and fruits obtained from the Newstead deposits is not, I think, inconsiderable, especially when it is remembered that their occurrence in the material examined was to a certain extent accidental, and that it was impossible to select for seeds any special seed bearing deposits.

Among the samples which contained grain, the associated weed-seeds belong to plants characteristic at the present time of cultivated fields. The occurrence of seeds of Lychnis Githago in considerable quantity among the wheat-chaff (Sample C, Table I) is interesting, in that it indicates that a troublesome weed of cornfields in certain districts at the present day was also a pest in the corn crops of the Romans. The plant is essentially a weed of cultivation, and as such is usually considered to be a weed introduced into Britain with the cultivation of grain crops. In the east of Scotland, even at the present time, it is more a casual in cultivated areas than anything else, so that the occurrence of the seeds among the wheat-chaff from the Newstead station fixes its introduction as far back at least as the Roman occupation of this site. Other weeds of the same natural order associated with the cultivation of crops at the

[1] Ludovic Maclellan Mann, Pre-historic Pile-Structures in Pits. Proceedings of the Society of Antiquaries of Scotland, 1903.

present day, and represented by seeds among the material examined containing grain or wheat-chaff, are those of Stellaria media, Lychnis vespertina, Arenaria serpyllifolia, and what I believe to be a species of Cerastium. These plants at the present day are not so completely limited to cultivated fields as is Lychnis Githago, and some of them are probably indigenous. It is interesting to note that Mr. Reid, in his recent paper before the Linnean Society of London on the Pre-glacial Flora of Britain, figures and describes seeds of Stellaria media and Arenaria serpyllifolia from the pre-glacial deposits on the Norfork and Suffolk coasts.[1]

From the material containing wheat grains, fruits of three species of Compositæ were also found. Two of these I have identified as Cnicus arvensis and Picris hieracioides. Both are species common at the present day, and the latter is recorded as pre-glacial.[2] Ranunculus repens and Ranunculus bulbosus are likewise common wayside and meadow plants occurring at the present day in cultivated areas, and both the species were represented by fruits in the samples containing grain. Fruits of a third species of Ranunculus were found, but I have not so far been able to identify it. Among the same grain-yielding samples were found fruits of Polygonum aviculare, seeds of Geranium sp., Medicago lupulina, Chenopodium album, and fruits of a species of Rumex, probably R. Acetosella.

The absence of seeds and fruits of common trees, with the exception of those of hazel, finds its explanation probably in the character of the deposits examined. These were, I feel sure, in most cases the debris collected in refuse pits, and although small twigs and wood-chips are present, such are but a small proportion of the total debris, and represent, doubtless, scraps from clearings.

The plants represented by seeds and fruits in certain of the deposits are essentially those weeds which would quickly cover embankments and ditches of fortifications. Thus in some of the deposits we have fruits and seeds of many grasses and sedges, and of common weeds of waste places, such as Stellaria media, Arenaria serpyllifolia, Polygonum sp., Chenopodium sp., Poten-

[1] Reid, in Jour. Linn. Soc., vol. xxxviii (1908), p. 206.
[2] Reid, l. c.

tilla Tormentilla, and the two species of Ranunculus already referred to. Other weeds of this nature are Sinapis arvensis Geranium sp., Mysotis sp., Urtica dioica, and various species of Rumex.

The seeds and fruits of other samples are of plants characteristic of thickets, and the presence of many twigs confirms the view that the deposits containing these are largely the scraps from forest clearings. Among such deposits I have recognised seeds of Solanum Dulcamara, Pedicularis palustris, fruits of Galeopsis Tetrahit, Urtica dioica, Rumex sp., and the fruits of many sedges. The fern remains also belong to these deposits.

Attention may be directed to the deposits containing brushwood in layers. In one instance a deposit of this character (Sample J, Table I) yielded seeds of characteristic moor-plants. Thus besides seeds of Calluna vulgaris, twigs of which formed the bulk of the brushwood in the deposit under review, I found the fruit parts of an Erica, berries and seeds of Empetrum nigrum, fruits of Rumex Acetosa, and those of several species of Scirpus and Carex. Besides the seeds mentioned, I found in this deposit leaves of a narrow-leaved grass, possibly Festuca ovina.

Where the brushwood laid on the clay was birch (Sample G, Table I) the seeds found were more varied in character, representing doubtless species that would form pioneers on freshly-made fortifications and embankments.

II. Woods of Implement Handles and other Articles.

(For detailed identifications, *see* Table II.)

Turning to the table giving the kinds of woods used for tool handles and other articles, one finds that those perhaps most commonly employed were ash and hazel. The latter wood figures as the shaft of a spear, as the shaft of a javelin, and as handles to tools. It doubtless recommended itself for these purposes on account of the clean and straight stems of moderate diameter and light weight obtainable. Hazel, though not durable, is fairly elastic. The value of ash for tool handles and the like is recognised at the present day.

Pyrus Aucuparia, used as a shaft for a hammer (No. 1, Table II), and also as a shaft for a gouge (No. 3, Table II),

was probably procured locally, for twigs of this species were found, in some cases with bark attached, among the material from the refuse pits. It is probable also that the birch used as a pick handle (No. 2, Table II) was similarly derived. Both birch and rowan are hard and tough woods which do not readily split.

One of the most interesting specimens submitted was a piece of basket-work made of the cleaned cores of stems of the hair-moss (Polytrichum commune). The stems of this moss are commonly a foot to eighteen inches long, and often attain a length considerably greater. The central stele, when cleaned, forms, as I have proved for myself, a tough pliable strand easily plaited, and quite suitable for the formation of such articles as baskets. When freshly cleaned, the core has a reddish colour and glossy surface, and basket work of the material would not only be quite strong, but would, at least at first, have an attractive appearance. I am indebted to Mr J. Masters Hillier, the curator of the Kew Museums, for particulars of articles made of this moss in the Kew Collections, and I give his list, as it supplies one with an idea of the use made of the moss in recent times.

LIST OF ARTICLES IN THE KEW MUSEUMS MADE OF HAIR MOSS, POLYTRICHUM COMMUNE, L.

1. Basket from near Wallington, Northumberland, received at Kew - - - - - - 1851.
2. Broom and brush, from Munich, received at Kew, 1858.
3. Hassock, from Yorkshire, „ „ „ 1852.
4. Broom, from Sussex, „ „ „ 1852.
5. Broom used by people at Hawkhead, near Windermere, received at Kew - - - 1855.

"A four-plied plaited object made of the long stems" of this hair-moss, and a "fringe-like structure made by plaiting together at one end" the long strands of the same moss, were found at the Lochlee Crannog.[1]

These records seem to indicate that a knowledge of the pliable and tough nature of the stems of this moss and of its usefulness

[1] Munro, in Proceedings of the Society of Antiquaries of Scotland, vol. xiii.

as a strand in the manufacture of plaited articles—a craft which the basket work from the Newstead Roman Station would indicate to have been appreciated, if not practised, by the Romans —must have been of greater antiquity than the period of the Roman occupation.

TABLE I.

Samples of Earth and Vegetable Remains from Pits and other Situations.

Sample A.—A dark vegetable earth containing a considerable number of pieces of chipped oak, evidently chippings of timber of some size. Mixed with other vegetable remains are twigs of hazel and birch in some quantity, the former being particularly numerous, while pieces of hazel bark are plentiful, some of the pieces being from trees of fair size. There is also a certain amount of charcoal and a piece of burnt bone. This sample yielded twigs of Pyrus Aucuparia with bark.

Sample B.—From this I obtained wood of Pyrus Aria, some of the branches being of fair size. The great bulk of the material consists of leaves of grasses matted and pressed together. The deposit is almost entirely of a vegetable nature, but the material is too much decomposed to determine its character. Many small wood chips, chiefly birch, are present, and pieces of birch bark.

Sample C.—This is a closely-caked mass of vegetable remains composed almost entirely of wheat-chaff. It appears to be the discarded refuse after winnowing and cleaning the grain, and indicates that the cleaning of the grain was carried on at Newstead. Among the chaff occur numerous seeds of Lychnis Githago, a troublesome weed of corn fields in some parts of Britain at the present time. Other weed-seeds from this sample are Stellaria media, Cerastium sp., Geranium sp., Medicago lupulina, fruits of Potentilla Tormentilla, Rumex Acetosella, Polygonum sp., and the fruits of several grasses.

Sample D.—A black deposit with numerous twigs and leaves. Leaves of hazel were identified, and several hazel nuts and pieces of hazel-nut shell were found, also catkins of hazel. The rhizome of a fern and the leaf rachis of a fern were identified. Grasses matted together form a large part of the deposit. The twigs and woods identified were hazel and birch.

Sample E.—This sample consists of a light-coloured clay with layers of a darker vegetable deposit running through it. Many grains of wheat and a little wheat-chaff were found. The sample proved one of the best for weed-seeds. It was carefully washed and the vegetable remains separated from the clay and sand. The fruits and seeds identified were those of Picris hieracioides, Cnicus

arvensis, Ranunculus repens, Ranunculus bulbosus, Polygonum sp., Polygonum aviculare, Rumex Acetosa, Urtica dioica, Chenopodium album, Potentilla Tormentilla, Lychnis Githago, Cerastium sp., Lychnis vespertina, Arenaria serpyllifolia, Stellaria media, several grasses, and a Carex. In addition there were present a number of small pieces of charcoal, some small chips of oak, and a few twigs of birch and hazel. An interesting feature was the presence of the remains of a large number of beetles.

Sample F.—A compost of vegetable matter much decomposed. It is made up almost entirely of a moss, probably a species of Hypnum. Birch-bark and hazel-bark, a branch of hazel, and hazel-nuts were identified. The material gave fruits of a Polygonum, fruits of a Carex, and fruits of one or two grasses. Seeds of Solanum Dulcamara, fruits of Urtica dioica, and fruits of Juncus effusus (?) were also identified.

Sample G.—A light-coloured clay with a definite layer of twigs all running one way, and for the most part all about $\frac{1}{4}$ of an inch in diameter. The twigs prove to be hazel and birch: one of the latter twigs with a catkin still attached. The clay on washing yielded the following:—Fruits of Ranunculus bulbosus, Ranunculus repens, Potentilla Tormentilla, seeds of Lychnis vespertina or allied species, Pedicularis palustris, fruits of Rumex obtusifolius, Rumex sanguineus, Polygonum Convolvulus, Urtica dioica, Scirpus setaceus, Scirpus sylvaticus, Carex sp., and several grasses, seeds of Atriplex sp., and Chenopodium sp.

Sample H.—A black earth with nothing sufficiently well preserved to permit of identification. (Pits in fore-ends.)

Sample I.—A black vegetable deposit. Chips of oak, twigs of birch, pieces of birch-bark, and a branch of rowan were identified. (Pits in fore-ends.)

Sample J.—This consists of masses of small twigs in a thick layer among light-coloured clay. The twigs are bundles of ling (heather), evidently brushwood cut and laid on the clay. Among the twigs were found flower-heads, leaves, and fruits of the heather. Other fruits or flower parts identified were those of Rumex Acetosa, Scirpus caespitosus, Scirpus sylvaticus, Carex sp., and Empetrum nigrum. Leaves of a grass, possibly Festuca ovina, were found.

Sample K.—A black vegetable deposit consisting almost entirely of moss. A few small pieces of birch-bark were noticed. From this sample came fruits of Urtica dioica, Rubus sp. (?), Galeopsis Tetrahit, Scirpus sylvaticus, Rumex sp., and leaves and fruits of several grasses. (Pits in fore-ends.)

Sample L.—A black deposit of vegetable origin. The remains were much decomposed, and nothing of interest sufficiently well preserved to be identified was discovered. (Pits in fore-ends.)

Sample M.—Clay soil, with a little dark earth, indicating vegetable remains. This was carefully washed and searched for seeds. Besides small bits of twigs and pieces of wood, fruits or seeds of the following were found:--Ranunculus bulbosus, Ranunculus

repens, Sinapis arvensis, Stellaria media, Stellaria Holostea, Potentilla Tormentilla, Polygonum sp., Rumex Acetosa, Rumex sanguineus, Scirpus sylvaticus, Urtica dioica, Chenopodium album, and another species of the last genus which was not identified. The sample yielded a few grains of wheat and one or two grains of what I believe to be barley.

Sample N.—A small cake of vegetable earth with a well-preserved frond of the common bracken. (Pits beneath east wall of buttressed end.)

Sample O.—A clay soil with a dark-coloured earth mixed with it. No vegetable remains of any size. The sample, after careful washing, gave fruits or seeds of the following:—Geranium sp., Myosotis sp., Polygonum Fagopyrum, Scirpus caespitosus, Scirpus setaceus, Rumex Acetosa, Rumex sp., Carex (several species), and fruits of several grasses.

Sample P.—A clay soil with a fair amount of vegetable earth. Seeds or fruits of the following were obtained after careful washing:—Ranunculus sp., Lychnis vespertina, Arenaria serpyllifolia, Pedicularis palustris, Potentilla Tormentilla, Rumex sanguineus, Rumex sp., Atriplex sp., Chenopodium sp., Urtica dioica, Urtica urens, Scirpus sylvaticus, and fruits of several species of Carex.

TABLE II.

Definite Objects received for Identification.

No. 1.	Shaft of hammer from Pit VIII.	Rowan (Pyrus Aucuparia).
2.	Shaft of pick.....	Birch (Betula alba).
3.	Shaft of gouge from Pit VIII...	Rowan (Pyrus Aucuparia).
4.	Fragment of a spear shaft from Pitt VIII.....	Hazel (Corylus Avellana).
5.	Shaft of an axe.....	Hazel (Corylus Avellana).
6.	Shaft of a large hammer.....	Hazel (Corylus Avellana).
7.	Handle of a chisel.....	Hazel (Corylus Avellana).
8.	Shaft of a large pick.....	Ash (Fraxinus excelsior).
9.	Wood from Pit VIII.....	Ash (Fraxinus excelsior).
10.	„ „ „ „	Oak (Quercus Robur).
11.	Lining of a helmet.....	Wool mixed with fine clay.
12.	End of a shaft taken from the socket of a javelin head of iron, from ditch in earlier part of fort	Hazel (Corylus Avellana)
13.	Basket work made of the stems of	Hair moss (Polytrichum commune).
14.	Bast twisted as rope.....	(Not identified).

TABLE III.

Summary of Plant Remains Identified

In the Samples of Deposits from the Newstead Roman Station.

Ranunculaceae
- Ranunculus repens—fruits
- „ bulbosus—fruits
- „ sp.—fruits

Cruciferae
- Sinapis arvensis—seeds

Resedaceæ
- Reseda lutea ?—seeds

Caryophylleæ
- Lychnis Githago—seeds
- „ vespertina—seeds
- Stellaria Holostea—seeds
- „ media—seeds
- Arenaria serpyllifolia—seeds

Geraniaceae
- Geranium molle ?—seeds
- „ dissectum ?—seeds

Leguminosae
- Medicago lupulina—seeds

Rosaceae
- Alchemilla vulgaris—fruits
- Potentilla Tormentilla—fruits
- „ argentea—fruits
- Fragaria vesca ?—fruits
- Rubus sp.—fruits
- Pyrus Aria—wood
- „ Aucuparia—wood

Umbelliferae
- Heracleum Sphondylium ?—stem and leaf base

Compositae
- Picris hieracioides—fruits
- Cnicus arvensis—fruits

Ericaceae
- Calluna vulgaris—stems, leaves, flowers, fruits
- Erica sp.—fruit parts

Oleaceae
- Fraxinus excelsior—wood

Boragineae
- Myostis sp. ?—fruits
- Lithospermum sp. ?—fruits

Solanaceae
- Solanum Dulcamara—seeds

Scrophularineae
- Pedicularis palustris—seeds

Labiatae
- Galeopsis Tetrahit—fruits

Chenopodiaceae
- Chenopodium album—seeds
- „ Sp.—seeds
- Atriplex sp.—seeds

Polygonaceae
- Rumex sanguineus — Perianth and fruit parts
- Rumex obtusifolius — Perianth parts and fruits
- Rumex Acetosella—fruits
- „ Acetosa—fruits
- Polygonum aviculare—fruits
- „ Convolvulus—Perianth parts and fruits
- Polygonum Fagopyrum ?—fruits
- „ sp.—fruits

Empetraceae
- Empetrum nigrum — seeds and fruit wall

Urticaceae
- Urtica dioica—fruits
- „ urens—fruits

Salicineae
- Willow or Poplar—wood

Cupuliferae
- Betula alba — catkins, bark, wood
- Corylus Avellana—nuts, catkin, bark, wood
- Quercus Robur—wood
- Alnus glutinosa—wood

Juncaceae
- Juncus effusus ?—fruits
- „ squarrosus ?—fruits

Cyperaceae
- Scirpus sylvaticus—fruits
- „ caespitosus—fruits
- „ setaceus—fruits
- Carex (3 species not identified)—fruits

Gramineae
- Several grasses, species not identified—fruits
- Festuca ovina ?—leaves

Filices
- Pteris aquilina — portion of frond
- Fern sp.—portion of rhizome

Musci and Hepaticeae
- Several kinds of Musci and Hepaticeæ were found but the species were not identified
- One moss was undoubtedly a Hypnum and Polytrichum commune was used in the making of basket-work