

S. 324

JOURNAL OF THE PERTHSHIRE SOCIETY OF NATURAL SCIENCE



**JOURNAL OF THE
PERTHSHIRE SOCIETY
OF NATURAL SCIENCE**



VOLUME XV

© 1987

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The Bridge of Perth; engraving by Robert Scott after R. Littlejohn.
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Photo: Alan Borthwick.

James R. Aitken

Few members of the P.S.N.S. have done so much for the Society as has Mr. Aitken who has just stepped down from a spell of sixteen years as President. His P.S.N.S. membership is nearly life long: he joined the Society as a boy and now as an Honorary member he remains boyishly active in body and young in spirit. Mr. Aitken has always had a deep interest in and affection for Nature in its various forms—who knows more about Scottish wild flowers and their cultivated relations? His work in garden planning and construction has brought beauty and interest to almost all parts of the country and his great artistic skill as a photographer has enabled him to bring colour and joy to many a gathering throughout the land.

His kilted presence has added distinction to our winter lectures and how much he has done in our summer excursions to introduce to members so many places of interest and beauty.

A Bridge over the Tay

Iain A. Robertson

As with many other towns, the development of a settlement at Perth derives principally from the topography of the river basin within which it is located. The River Tay and its tributaries radiate from Perth forming natural arterial routes which have been used since the earliest times. Thus a means of crossing the Tay at Perth has always been of both local and national significance. There have been successive bridges built over the Tay at Perth since at least the thirteenth century but as the result of a flood in 1621 that swept away the then existing structure, there was a period of 150 years during which the river remained unbridged. The bridge which was planned and constructed during the decade of the 1760s remains in use to the present day. It is variously called the *Old Bridge*, or the *Perth Bridge*, or sometimes *Smeaton's Bridge*. The question that comes to mind is, why 150 years? The want of a bridge must have been always obvious, indeed the volume of traffic crossing the Tay at Perth by the 1750s required no less than thirty vessels.

That John Smeaton's name is still associated with the Perth Bridge is entirely appropriate. His design is manifestly sound and the high arches of his structure have a grace that succeeding civil engineers have failed to surpass. But the passage of time has erased from public memory the name of the other man whose efforts to have a bridge constructed were at least equal to Smeaton's. He was Thomas Hay, ninth Earl of Kinnoull, a local landowner with properties on both sides of the river, but a man who had also been at the heart of national (i.e. Westminster) politics.

The first written reference proposing a new bridge is in the Perthshire Quarter Session Minutes of 3rd May, 1763, but there is circumstantial evidence to suggest that this was a formal culmination of previous informal activity. As a preliminary to their resolution to have a bridge built, the Justices had noted that John Smeaton was to visit Perth during the coming summer, and it was their proposal that he be asked to investigate the site for a bridge and draw up a plan. The Justices did not claim to have invited Smeaton to Perth, but noted he was coming and resolved to take advantage of his visit. This raises the question of why Smeaton

was coming to Perth. Smeaton's papers were published in 1812 as *The Reports of the Late John Smeaton, F.R.S.*, and in them there is a note, "concerning the works for the defence of lands of the Rt. Hon. the Earl of Kinnoull, laying upon the rivers Ammon (*sic*) and Tay, North Britain". These works required Smeaton to visit Perth during 1763. It would thus appear that he came to Perth at the request of Kinnoull. Was this purely to investigate flood defences on the Dupplin Estate, or did Kinnoull also have it in mind to involve Smeaton in the bridge? Kinnoull's subsequent role in the initiative would certainly suggest that he was the instigator of Smeaton's visit. Smeaton's report and plan arrived in Perth in time to be presented to the Quarter Sessions held on 23rd May, 1764. The total cost of construction, including £1000 to cover contingencies, was estimated at £9,723 11s 1d. On the basis of this estimate, the Justices were confirmed in their resolve to have a bridge constructed.

Before carrying the narrative further, a few biographical details concerning some of the principals in the bridge initiative are in order. John Smeaton (1724-1792) was the pre-eminent civil engineer of his day; indeed he is credited with founding the profession of Civil Engineering. He initially came to public notice when he designed and superintended the construction of the first stone-built lighthouse on the Eddystone Rock, completed in 1759. The majority of Smeaton's works are to be found in England, and they comprise: mills and other machinery, steam engines, canals and river navigation, fen drainage, harbours and bridges. In Scotland his major works were the Forth and Clyde Canal between 1767 and 1777, the harbours at Aberdeen and Peterhead, and the bridges at Coldstream (1766), Perth (1771), North Esk (1775) and Banff (1779). The Banff Bridge is the only one of Smeaton's Scottish bridges not extant¹.

Thomas Hay, ninth Earl of Kinnoull (1710-1787) was the eldest son of George Hay, the eighth Earl. His mother was Lady Abigail, daughter of Robert Harley, first Earl of Oxford, and one of Queen Anne's principal Secretaries of State. Of his two brothers, Robert (called Hay Drummond) was Archbishop of York (1761-1776). In 1741 Thomas Hay, as Lord Dupplin, was elected M.P. for Cambridge. His parliamentary career lasted until 1759 when he inherited the earldom; during this time he served in the ministries of Walpole, Henry Pelham and the Duke of Newcastle. His ultimate post was Chancellor of the Duchy of Lancaster (1758), although he had declined the Chancellorship of the Exchequer in 1757. While living in England, Thomas Hay retained links with Scotland through his father's extensive estates in Strathearn. It is significant also for what follows, that he took an interest in the setting up of the Commission for the Annexed

Forfeited Estates, which may be seen as an eighteenth century prototype of the twentieth century Highlands and Islands Development Board². Accession to the earldom in 1759 need not have excluded Kinnoull from active politics, but the concurrence of bad health and his party's fall from power apparently persuaded him to withdraw³. Other persons particularly associated with the bridge initiative were: Sheriff John Swinton, Robert Oliphant of Rossie, Charles Craigie of Glendoick, Lawrence Craigie of Dunbarney, John Craigie of Kilgraston, John Mackenzie of Delvine, David Moncrieffe of Moredun and George Dempster of Dunnichen, M.P. for the Perth Burghs. Mention should also be made of Patrick Miller, who was both clerk and treasurer to the Perth Bridge Commissioners. He was a member of the family that provided a number of town clerks and burgh chamberlains to the town of Perth.

Being in possession of both a plan and a price, the next step was to formalise an organisation to oversee the building of the bridge, and more important, to raise the finance. The first matter may be described briefly; Parliament was petitioned by Dempster and the other local M.P. Colonel Graeme, and as a result *An Act for the Building a Bridge over the River Tay, at or near the Town of Perth*, was passed in 1765. This allowed for the appointment of Bridge Commissioners with the responsibility for seeing the project through.

Finance was a more complex matter. On the basis of Smeaton's £10,000 estimate, Perth Town Council offered to lend the Bridge Commissioners £6000 recoverable from tolls, provided that the remaining £4000 could be raised by public subscription. However, the Bridge Commissioners aspired to a toll-free bridge and they were successful in persuading the Treasury to approve a contribution of £4000 from the Commissioners for the Annexed Forfeited Estates. In these altered circumstances Perth Town Council were prepared to donate £2000, and the Convention of Royal Burghs £500. These offers were all made during 1765, so that it became apparent to the Bridge Commissioners that if they could raise in the region of £3500 by public subscription, a toll-free bridge was possible.

Work at the river was begun during the 1766 season. It was decided that initially an experimental pier would be constructed one span out from the east (Bridgend) shore where the river was deepest. Smeaton did not remain in Perth to personally superintend the work, but arranged for his own clerk of works, John Gwynn, to be in charge of a locally hired labour force. The Bridge Commissioners apparently felt that the local labour force required augmentation, for they arranged for two companies of soldiers to

be allocated to the work by Colonel Skene, who had just succeeded Major Caulfield as the Inspector of Military Roads. Smeaton had investigated the local quarries and had chosen the Quarrymill (NO 121253), presumably for reasons of location as much as the quality of the stone. A road was constructed over the short distance to the river bank. From there the blocks were conveyed to the site by boat. The mason work at the quarry was under the charge of John Adam, who was probably (direct evidence is lacking) the brother of the more famous Robert Adam. The method of construction was to build a coffer dam around the spot on the river bed where the pier was to be erected. The area within the coffer dam required constant pumping, and as this was done by hand, it required shifts of men twenty-four hours a day¹. The first pier was completed during the 1766 season, and although the structure was a success, other problems became apparent. The first of these was the employment of the troops; they would neither take orders from civilians such as Gwynn, nor work shifts over the twenty-four hours. They were not re-engaged in subsequent seasons. The second problem was more pressing; this was a considerable cost overrun, which if projected for all the piers, would represent a figure $2\frac{1}{2}$ times Smeaton's estimate—a prophetic figure. It took all Smeaton's powers of persuasion to convince the Bridge Commissioners that a second experimental pier should be erected during the following season. In fact 1767 was a more successful year; not one, but three more piers were constructed, in spite of a land flood in August that swept away the coffer dam surrounding the third pier. This was certainly the year in which the point of no return was passed; the bridge was to be built—cost overruns or no. All the river piers were completed during the 1768 season, and a temporary wooden service bridge was laid across these, open to pedestrians at a toll of one farthing. This “temporary bridge” is referred to by Thomas Pennant in his, *A Tour in Scotland*, 1769.

Completion of the piers meant that the work was no longer confined to the summer season when the river was lower. In February 1770 work was begun erecting the centres and stages for the arches of the bridge. The centres were the wooden framework upon which the stones rested until the arch was completed by the insertion of the keystone, whereupon the centres were removed leaving the arch free-standing. As this was work requiring different skills, John Gwynn was replaced as clerk of works by Joseph Jagger. John Adam remained in charge at the quarry. An indication of the progress of the bridge is given by the decision of the Bridge Commissioners in October 1770 to have a toll-house erected at the east end of the bridge. It was during 1771 that toll-gatherers were appointed, and the bridge was in constant use from that time on, although it was not entirely completed until 1772.

While the process of construction was relatively trouble-free, the same could not be said of the bridge's finances. The pattern of escalating costs established in 1766 continued, and by 1768 it became obvious to the Bridge Commissioners that the monies subscribed or promised to them, including a credit of £4000 from the recently formed (1766) Perth United Banking Company, were not going to be adequate. Their solution to this problem was to abandon the idea of a toll-free bridge, and borrow money on the security of a toll income. The initial intention was to borrow £3000, but this was to prove inadequate. The sum ultimately borrowed was £12,500 in amounts varying from £500 to £2000, and this between January 1769 and September 1773. The most eminent lender was the philosopher, David Hume, who lent £1000 in February 1769.

This was not the last financial crisis, however. During 1770 it became obvious to the Bridge Commissioners that the interest payable on the sums of money borrowed (and yet to be borrowed) would equal or exceed the estimated annual income from tolls, leaving no income from which to repay the capital sums. A crisis indeed, especially for those Bridge Commissioners who had given personal sureties against the sums borrowed. The evidence is conclusive that it was Kinnoull who extricated the Commissioners from this predicament by lobbying Lord North's Administration in London, and securing a further payment of £700 per annum from the Commissioners for the Annexed Forfeited Estates. This was initially fixed at ten years, but was later extended to fourteen years. The total cost of the bridge at its completion in 1772 was £26,446, which bears roughly the same proportion to Smeaton's original estimate as did the actual cost of the piers, i.e. $2\frac{1}{2}$ times greater. The capital debt was not repaid until 1788, by which time, largely because of interest payments, the cost had risen to £34,763. It was in 1788 that the tolls were removed. Setting aside those sums of money borrowed and subsequently repaid from tolls, donations to the bridge were as follows:

Commissioners for the Annexed Forfeited Estates (£4000 + £9800)	£13,800
Burgh of Perth	£2,000
Convention of Royal Burghs	£500
Free-Gift Subscriptions	£4,799
	£21,099

Given that central government through the agency of the Commissioners for the Annexed Forfeited Estates was the principal source of funds for the bridge, it is perhaps surprising that this was not acknowledged. And it is interesting to note that in the Scottish

Record Office, among the Annexed Estates' papers⁵, there is a drawing of a plaque that was to have been displayed on the Perth Bridge. It reads:

This Building Erected A.D. MDCCLXX.
HIS MAJESTY
Gave in Aid to it out of the Annexed Estates
L13,800 Sterling
Viator
Tuto transeas
sis memor
Regii Beneficii

Why this was never erected is not explained.

In 1772 the Bridge Commissioners ceased to collect the tolls on their own behalf, and thereafter the tack of the tolls was put to public roup. For the first year the upset price was £700, rising gradually to £863 in the last full year of tolls, 1787-88. During the years 1773-74 and 1779-80, the tacksman of the tolls was allowed a partial remittal of the tack because these were both severe winters during which the Tay froze, allowing travellers to cross the ice and avoid paying the toll. It was during the first of these severe winters that the bridge underwent a test of the soundness of its design and construction. When the ice broke up in February 1774, the floes became jammed under the arches, effectively damming the river and diverting it through the lower parts of Perth. However, the bridge stood fast, sustaining no damage apart from a small part of the parapet on the west shore.

To come finally to some kind of answer to the question posed initially—why the 1760s? It must surely be the concurrence of the talents of Smeaton and Kinnoull. Smeaton designed an elegant and most durable structure, though to be fair to others of his craft, there are bridges in daily use that were built long before the Perth Bridge—the “Wade” Bridge at Aberfeldy, built in 1733, being a case in point (actually designed by William Adam)⁶. This makes even more significant the role of Kinnoull. Given that the principal source of funds was central government, the missing element from all the previous decades had been someone with access to and influence with the London Administration.

Postscript. The Minute Books and Papers of the Bridge Commissioners are held in the Perth and Kinross District Archive, located at the Sandeman Library, Perth. For fuller accounts of the building of the Perth Bridge see, I. A. Robertson: “A Bridge Over Tay”, unpublished M.Litt. dissertation, University of Stirling, 1983; and I. A. Robertson: “The Earl of Kinnoull’s Bridge: the Construction of the Bridge of Tay at Perth, 1763-1772”, in *Scottish Economic & Social History*, Volume 6, 1986.

Notes

1. For further details of John Smeaton's life and works see, Smeaton: *Works, op. cit.*; and A. W. Skempton (ed.): *John Smeaton FRS*, London, 1981.
2. See A. M. Smith: *Jacobite Estates of the Forty-Five*, Edinburgh, 1982.
3. For further details of Kinnoull, see *Dictionary of National Biography*, and L. B. Namier & J. Brooke: *The History of Parliament: the House of Commons 1754-1790*, Vol. II, HMSO, 1954.
4. For details of Smeaton's constructional methods see *Works, op. cit.*, and T. Ruddock: "Bridges", in Skempton, *op. cit.*
5. S.R.O., E727/36/13/2.
6. See further, W. Taylor: *The Military Roads in Scotland*, Newton Abbot 1976.

A Long Cist Burial at Blair Atholl

Alison Reid and Dr. S. M. MacLaughlin

Introduction

In early October 1986 Pitlochry Police contacted Perth Museum and Art Gallery about an unusual burial which had come to light in Blair Atholl. The burial had been partly uncovered by the foundation trench of an extension to be added to the back of

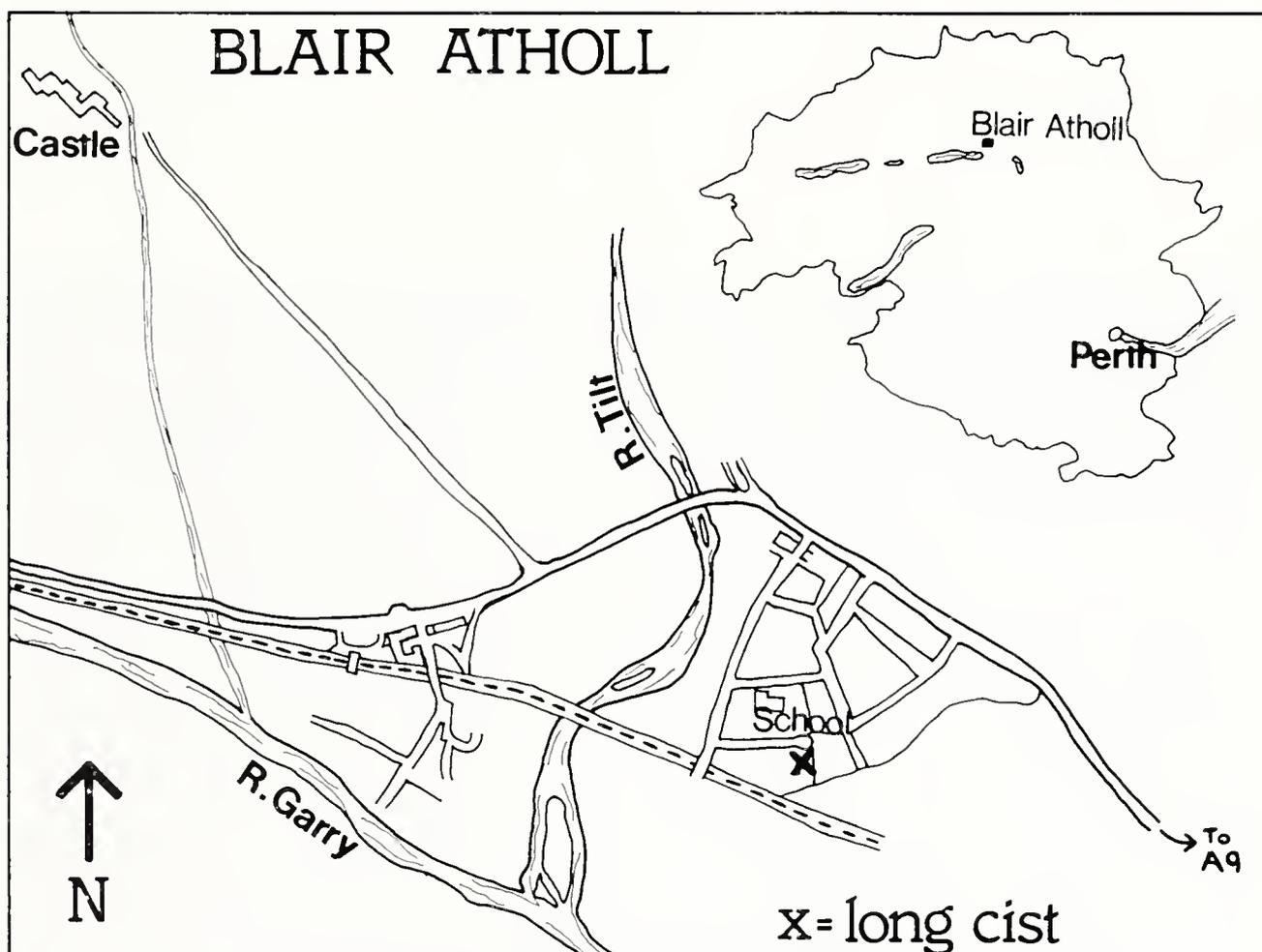


Fig. 1—Location plan for the site.

number 7, Golf Course Road (Fig. 1). This is on the south side of Blair Atholl close to the edge of a terrace overlooking the River Garry just east of its junction with the River Tilt.

A quick survey of the exposed section of the burial confirmed that it was of archaeological rather than forensic significance. Courtesy of the owners of the house, and with the co-operation of the builder, the site was excavated.

It was clear from the exposed section of the burial that the coffin was built of stone slabs with at least two layers of cover slabs. One of these cover slabs had been removed during the digging of the trench, allowing a preview of what was inside. It was possible to

see that the coffin contained a fully extended inhumation—that is a body laid out flat on its back. This meant that it was a long cist burial, and not the more commonly found short cist burial. Short cists, where the body is laid in a crouched position in a slab built coffin only about 1 metre in length, date to the Bronze Age era about 2,000-500 BC. Long cist burials in general come from the following eras, the Iron Age and Early Historic, about 500 BC-900 AD.

The Excavation

The top layer of cover slabs was just over 0.5 metres below the present ground surface. The surrounding soil and that above the cist was heavily mixed with river gravel, stone and pebble, and consistently unpleasant to work. It was not possible to detect any sign of a cut or pit edge where the area had originally been dug to put the burial in.



Photo 1—The cist fully excavated looking east.

As the house foundation trench had cut across one end of the cist, the trench was extended along the apparent line of the burial and cleared down to the top layer of cover stones. The cist was then seen to be oriented east/west (with the head to the west). The cover slabs were laid over the cist in layers. Over the western end there were some four layers, the upper two extending just over half way along the cist. There was a separate second layer on the eastern end, over the feet. The bottom layer of four slabs which rested on the side slabs of the cist were considerably bigger than the upper layers. In all some twenty slabs covered the cist. All were irregular, unworked and of mica-schist, available locally.

When the cover slabs were removed the cist was found to be built of ten side slabs (Photo 1). As with the cover, nine of the ten were unworked, probably naturally fractured sections of mica-schist, of varying size and thickness. The tenth, the eastern or feet end slab, was worked into a rough circle, and the inner face was smooth. It was also of a mica-schist stone, but was almost certainly re-used. Although its first use is uncertain, it may have been the base stone for a rotary quern for grinding grain. The muscular build of the skeleton (see skeleton section below) would fit well with agricultural work.

While the side slabs were irregular, they had clearly been chosen and positioned with care. Those at the west end at the head and shoulders, were thinner than those further down the body and set more squarely. The slabs of the eastern half around the legs were more irregular, set closer, and angled inwards. The side slabs had been paired in length opposite one another, and the overall appearance was of a shaped coffin with a wide, squared head end, tapering from the waist to a narrower end at the feet.

When measured, the cist proved to be internally about 1.8 metres, although the end slab at the feet was not parallel to the head end slab. The width varied from 0.45 metres at the head to about 0.16m at the feet. When fully excavated the cist slabs were 0.39m deep at the head and 0.31m deep at the feet end.

Inside the cist lay an almost complete skeleton, head to the west end (Photo 2). The head lay facing to the left, either as it was buried or slumped shortly afterwards. The burial had not been disturbed, and the skeleton lay in a shallow deposit of soil which had filtered in over the centuries. Much of this probably came in through gaps between the side slabs, in particular around the third slab on the north side which was sharply angled inwards and may have been pushed from its original position. It was only at this level, around the waist of the skeleton, that there was any damage. At this point some of the bone was damp, and damaged. The delicate hand bones were also missing and had probably disintegrated.



Photo 2—The skeleton as it first appeared looking west.

The skeleton was carefully removed, packed, labelled and taken away for analysis. After this the intrusive soil in the cist was removed. While it was clear that no substantial objects, such as a pot, had been buried with the skeleton it was possible that smaller items or broken fragments were mixed in the soil.

When the soil was removed section by section, it was put through a fine sieve. Unfortunately, nothing was found either in it, or on the floor of the cist. This was mostly the same river gravel of the surrounding soil, but there were two small slabs at the eastern end, underneath the feet.

As the soil outside the cist was cleared away, a number of larger waterworn stones emerged. These were packed in close to the side slabs along both the long sides of the cist, and at the western head end. These were however absent at the south western corner, and at the eastern feet end (Photo 1). They were deliberately placed to pack or strengthen the cist when it was constructed, as stones of that

size (0.2m) were not common in the soils around. When the cist was fully excavated its total depth below the present ground level was just over 1 metre. It was found alone, and no indication of other burials was seen in the rest of the foundation trench. The cist lay only 7 metres from the edge of the terrace.

The Skeleton

The human skeleton is the most durable reminder of our mortal existence, and indeed a great deal of information relating to the individual during life is permanently recorded on the skeletal elements. One of the first steps in the analysis and description of skeletal remains is the identification of 'BIOLOGICAL' identity. This refers to the sex, age at death, stature and racial or ethnic origin of the individual. Once these factors have been firmly established then other factors can be examined. Features such as occupation related stress, pregnancy scars and even cause of death may be discernible from the skeleton.

The amount of information that can be gleaned from the skeleton relies heavily on the state of preservation of the bone. From an intact skeleton a great deal of information can be recorded but as the state of the skeleton deteriorates then the level of information decreases.

Fortunately in the case of the Blair Atholl skeleton the remains were particularly well preserved, mainly due to the good drainage of the sandy soil on the banks of the old River Garry. Only the bones of the hand and wrist were absent and this is possibly due to the fact that they were resting in direct contact with the soil.

The first step in the determination of biological identity is to establish the sex of the individual. The most important skeletal element for sex estimation is the innominate bone or pelvis. This is particularly important as in the female it has to cope with the different functional demands of walking and childbirth, whereas in the male the pelvis is solely related to the functions of efficient walking. The pubic bone is generally considered to be the most sexually diagnostic skeletal element in the adult human skeleton, yet because they are covered by only a thin covering of compact bone they often do not survive inhumation well. In the Blair Atholl cist however, the pubic bones were preserved. The characteristic triangular shape of the male pubic bone was evident. This diagnosis was confirmed by the hooked shape of the greater sciatic notch and also the presence of pronounced nuchal markings and supra-orbital ridging on the skull. A series of measurements recorded from the long bones fell within the accepted male range for modern Scottish males and this therefore further confirmed the diagnosis of male sex.

The second step in the analysis of biological identity is the determination of age at death. This parameter is particularly difficult in adult skeletons as after the mid 20's the changes in the skeleton tend to be degenerative in nature, and, as can be verified from every day experience, all people do not necessarily age at the same rate. The method in most common use for age determination is the assessment of the stage of development or degeneration of the pubic symphyses, which is the joint that separates the two halves of the pelvis. In addition information may be available from degenerating joint surfaces, skull suture closure and dental attrition. Taking all of these factors into consideration, the Blair Atholl male was aged in the region of 45 years at death. This age was confirmed by the ossification of the thyroid cartilage which most frequently occurs after the age of 40 years. Evidence from other Iron age and Bronze age material suggested an average life expectancy of some 30-35 years, and therefore in relation to this the Blair Atholl male was quite 'old' at death.

By comparison with standard tables for stature estimation the Blair Atholl male was calculated to be approximately 5 ft 10 ins in height. Again compared to other Iron age burials this was tall, as the average stature was recorded to be 5 ft 6 ins for males.

Racial or ethnic origin is difficult to assign on archaeological material, but the skull was 'long headed' and showed some evidence of wide set eye sockets and a narrow nasal bridge.

Therefore, in biological terms, the Blair Atholl skeleton was a male, aged around 45 years at death and approximately 5 ft 10 ins in height.

What now could be inferred about 'PERSONAL' identity? Most areas of the skeleton showed some evidence of pronounced muscle markings. These markings were well defined on the skeleton and therefore it is suggested that intense physical activity was maintained virtually until death as there was no sign of bone wastage due to inactivity. There was no evidence of bone disturbance during childhood, as evidenced from radiographs, and the compact bone of the long bones was thick and dense. It can therefore be suggested that he both enjoyed a relatively healthy childhood, and certainly given the degree of mineralisation of bone, that he appeared to enjoy a fairly healthy diet in adulthood.

In terms of occupation, he showed a marked asymmetry in bone lengths and diameters in the upper limb suggesting a dominant right hand both in a passive and active sense. Also some vertebrae showed evidence of cortical disturbance indicating perhaps greater physical activity one side of the body or perhaps excessive strain to one side of the body. Such markers on the skeleton may well be related to agricultural work such as pulling a plough share in farming or perhaps even net fishing on the river Garry.

There was no evidence of a traumatic cause of death, however a molar apical abcess was found and it is possible that the cause of death may have been septicaemia, that is by poison from the decaying tooth entering into the blood stream.

The Date of the Burial

As mentioned above (see introduction)..., long cist burials are usually ascribed to the Iron Age/Early Historic eras (c 500 BC-900 AD). Long cist burials oriented east/west and without grave goods have tended to be seen as Early Christian (c 600-900 AD). In recent years, cemeteries of these have been found and excavated¹, although isolated examples are less certainly placed in the chronology.

Fortunately the good survival of the skeleton at Blair Atholl allowed for a Radiocarbon date to be taken. Radiocarbon dating depends on the known decay rate of a radioactive isotope Carbon 14 which exists in all organic living material, and decays after death. It is therefore possible to measure the amount surviving in the organic material tested, and convert that into time since death.

Unfortunately there are several problems with this technique which affect its accuracy. Firstly, the date provided always has a statistical error factor, which means the result is a date range from lower to upper limits, not a specific year or even century. Secondly the assumption that C14 has been produced at a consistent level through time has been shown to be wrong, and all dates have to be calibrated by dendrochronology, or tree ring sequences. In addition to this the rate of radioactive decay of C14 is being re-assessed, and it is also accepted that samples from different materials from the same site can produce widely different dates. In recognising these problems however, Radiocarbon dating is still the best scientific technique available to give approximate dates for archaeological material. The date from Blair Atholl was in radiocarbon years a.d. 370 +/- 50 (GU—2153). When calibrated this gives a 95% chance that the burial took place between 340-615 AD, and a 66 $\frac{1}{3}$ % chance that it took place between 410-590 AD. This places the burial in a definitely Pre-Christian period, in the late Iron Age.

Discussion

Prior to the result of the radiocarbon date, the orientation of the long cist burial and lack of grave goods, in combination with other existing evidence from Blair Atholl had caused the author to place this burial in the Early Christian category.

Blair Atholl certainly has several associations which suggest early Celtic missionary activity. The parish church is dedicated to St. Bride or Bridget, an Irish saint who lived about 452-524 AD. There are several church dedications to her in Scotland, and in this area they probably stem from the Christian communities at Abernethy and Dunkeld in the 700's and after². The Episcopal church of Kilmaveonaig reflects the tradition that Adamnan, the biographer of Columba was active in the area, although Watson³ suggests that this is a mistranslation for another Irish saint, Beoghna who was active in the late 500's and early 600's AD.

The position is further complicated by a record of a burial ground behind the present Bridge of Tilt hotel called 'Clagh-ghil-Andreas'⁴ or the cemetery of Andrew's disciple. While the current long cist has been given a Pre-Christian date, it is interesting to note that the early descriptions of the burials at Clagh-ghil-Andreas are of short cists. These are usually of Bronze Age date and therefore considerably earlier than the Christian period. It is possible that the current excavation is of a burial which forms part of a long established religious and burial centre stretching from the Bronze Age through to the Medieval period and including several different burial traditions whose associations have become confused. Half way between ghil-Andreas and this present excavation is a standing stone also of uncertain date and association.

It is clear from recent surveys of late prehistoric burials⁵ that there is still a lot of work to be done before chronology of these different traditions can be sorted out. Long cists have been discovered in cemeteries, on their own, and associated with short cists. They are found beneath cairns and barrows, and unmarked by any monument as at Blair Atholl.

The present ground surface is not as it would have been in previous centuries though, as the terrace was heavily wooded in the past, and traces of any cairn or marker could have been destroyed. A cairn east of ghil-Andreas recorded in 1792 has been lost, but there are several surviving burial cairns including two substantial ones (Tulchan and Sithean) to the north east of Blair Atholl beyond Lude House. While other stray comments hint at other possible long cist burials in the area, there is as yet no physical or archaeological evidence to support this view. The close proximity of so many other religious and burial monuments however does suggest a reasonable likelihood that there are others to be found.

Very few definite long cist burials have been identified in Perth and Kinross, and fewer are adequately described. Of these some have been found beneath individual cairns⁶, and others in apparent cemeteries⁷. The best described are an apparent 'double decker' cist at the 'Women's Knowe' Inchtuthil⁸, and four possible Early

Christian burials at Kingoodie by Longforan⁹. At Kingoodie the cists were fully paved and one had some packing at the east end. The burials had their heads to the west, and were about a mile from an early church by which two cross slabs have been found. There were no grave goods.

At the moment though the closest parallel to the Blair Atholl example in construction and geographical position was found in Peeblesshire¹⁰, one of three known from that area and undated. Another isolated find in a similar setting overlooking this time the River Tweed, but also without a clear date was found at Ringley-hall in Roxburgh¹¹.

In construction the long cists vary as well. Four categories were listed by Hutcheson¹² in 1903: cists of roughly parallel unworked slabs and capstones whose floor is not always paved; cists with no cover stones or proper floor; cists wider at the shoulder and tapering towards the feet, with capstones and generally paved; coffins carved of one piece dated to the Medieval period. Since then another category 'double decker' cists¹³ has been added, but few dates have been confirmed, and differences in construction will certainly reflect local custom as well as chronological sequence.

At Lennelhill in Berwickshire¹⁴ two long cists, one of which contained the remains of three bodies have produced an uncalibrated date of AD 320 +/- 85. In Orkney a long cist burial under a square kerbed cairn has given a date of AD 445 +/- 75¹⁵ while at Sandside there is a much later date of 865 +/- 55¹⁶. On the earlier side, the excavations at Broxmouth in East Lothian have shown a change in burial tradition from short cists in about 200-100 BC to extended inhumations from about 100 AD onwards. The long cist at Blair Atholl therefore lies at the earlier to middle stretch of the known date range for such burials.

In summary, the burial is that of a well built man in his forties dating to the late Pre-Christian Iron Age, who probably died between about 410 and 590 AD. Although Blair Atholl has many Early Christian associations this burial predates them, and forms part of a long established but varied tradition of religious practice and burial in the area.

Acknowledgements

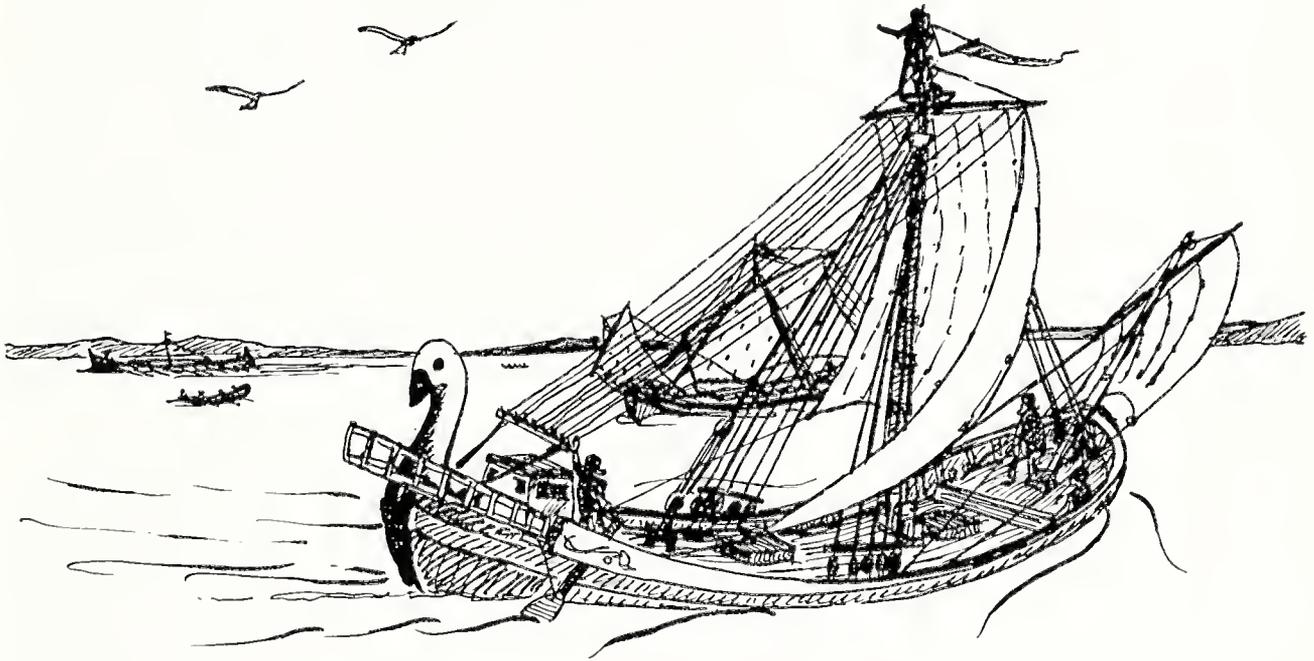
I would like to express my thanks and appreciation to the following individuals and institutions for their help with the excavation and report—Mr. and Mrs. Kistenmacher, Mr. Watson, Miss Irene Haggart, Dr. Margaret Bruce, Historic Buildings and Monuments Directorate, Mr. P. Ashmore, Dr. N. Dixon, and Mr. G. Watson.

NOTES

1. e.g. Catstane, Edinburgh. PSAS vol 109, 1977-78. Cowie, T.
2. Mackinley, J. M. Ancient Church Dedications in Scotland 1914.
3. Watson, W. J. Celtic Place Names of Scotland 1926.
4. Old Statistical Account 1792.
5. Ashmore, P. PSAS 110, 1978-80. Low Cairns, long cists and symbol stones.
6. Cairn Wochel NN 8301 1276 O/S NN 81 SW4.
7. O/S NN 81 SE4 near Blackford.
8. Abercromby, J. PSAS 36 1901-02. Inchtuthil Report.
9. Taylor, D. B. PSAS xcii. Kingoodie.
10. Maclaren, A. PSAS ci 1968-69. A long cist at Logan Cottage, Peebles.
11. Ritchie, J. N. G. PSAS 106 1974-75. Ringleyhall.
12. Hutcheson, A. PSAS XXXVII 1903, p. 233.
13. Ritchie, J. N. G. & A. PSAS 106 Cnoc Aingil 1974-75. Abercromby, J. PSAS 36 1901-02. Inchtuthil.
14. Ritchie, J. N. G. & A. D & E 1982 p. 1, 1983 p. 1.
15. Bigelow G. D & E 1980 p. 27.
16. Hedges, J. W. PSAS 109 Sandside, Orkney 1977-78.

Roman Activity in the Firth of Tay

William W. Gauld



FIRTH OF TAY - 209 AD
- APPROACHING INVERGOWRIE

WG
OCT 86

To support his campaigns in Scotland at the beginning of the third century AD, the Emperor Septimius Severus established a main base at South Shields, where he had twenty large granaries constructed, enough, it has been calculated, to hold three months' rations for 40,000 men (1). He had Cramond recommissioned as an intermediate port to serve troops in central Scotland and in transit to the main field of operations in Strathmore. In the war zone itself Carpow, the "fort on the pool" (NO 208179), was selected as a permanent legionary base. In the course of excavations there, the fragments of many amphorae were discovered, and at least some of them had contained oil from Spain. Surely such large and fragile containers had come all the way by sea in the same bottom, and the shipmaster is not likely to have been familiar with the approaches to his port of destination (2). Clearly the whole operation was designed to be supplied by sea, even if the army itself came and went overland.

Carpow is an interesting choice. It lies on the south side of the Tay, although, judging from the marching camps attributed to this campaign, all the activity took place in Strathmore and Angus, or further north. It is just east of Abernethy, later a chief place of the southern Picts, south of the River Earn, and about 11 km

downstream from Perth. It is thought that the Romans built a pontoon bridge at Carpow to give access to the north bank of the Tay (3). Both Tay and Earn are tidal for some kilometers beyond this point, and this would have complicated the mooring of the pontoons.

In the Old Statistical Account (1792), the Rev. Thomas Stuart, Minister of Newburgh, 3 km east of Carpow, wrote as follows:—
“The Tay . . . begins at Newburgh to assume the appearance of an arm of the sea; and by the inhabitants of that town and neighbourhood, is denominated the Broad Water. When the tide in it, however, has ebbed, it leaves a considerable part of its channel dry; and collecting itself into two currents, passes along the opposite sides of its bed, in what are termed the North and South Deeps. The South Deep contains by far the greatest quantity of water, and furnishes the course, which vessels of burden usually hold, in passing up and down the river. As far up as Newburgh, the Tay admits vessels of 500 tons burden; but, above the confluence of the Earn, beyond which Perth is situated, vessels of 200 tons burden, when deeply laden, proceed with difficulty. Vessels of about 90 or 100 tons burden (in which the trade with Perth is usually carried on) easily make the shore of Perth; and when larger vessels are employed in that trade, part of their cargoes is distributed among lighters, on their arrival at the shore of Newburgh.” (4).

In 1845 David Stevenson, an uncle of R.L.S. and a partner in the family civil engineering firm, described dredging works his firm had, some ten years previously, recommended should be carried out on the Tay between Newburgh and Perth, to enable shipping to come more easily right up to the Fair City, as follows:—

“Before the commencement certain ridges called ‘fords’ stretched across the bed of the river at different points between Perth and Newburgh, and obstructed the passage to such a degree, that vessels drawing from 10 to 11 feet could not, during the highest tides, make their way up to Perth without great difficulty. The depth of water on these fords, the most objectionable were six in number, varied from 1 foot 9 inches to 2 feet 6 inches at low, and 11 feet 9 inches to 14 feet at high water of spring tides; and in addition to the shoalness of the water many detached boulder stones lay scattered over the bottom.” (5). Presumably these features were moraines and erratic blocks left by the retreating glaciers of the last Ice Age.

The relevance of all this to what happened during the Roman incursions into Tayside may be judged from the fact that the typical small merchantman they would have used to bring supplies to Carpow would have had a capacity of between 100 and 200 tons, a draught of about 10 feet, and be capable of about 5 knots. They

would have been reasonably manoeuvrable, though somewhat less so than the sailing craft of the end of the eighteenth century, to which they were comparable in size. (6). So in selecting Carpow the Romans were doing much as everyone else did until the upper channel was cleared and vessels could easily get up to Perth. Either their hydrographers were very efficient at sizing up an unknown estuary on brief acquaintance, or their local informants were familiar with the capabilities of the Roman vessels, in spite of the fact that their own sea craft were likely to have been skin-covered cibles, much like the currachs of their Irish cousins, the Scots (7). The Romans must have given equal thought to the problem of how to get their ships up-river to Carpow. As a guide to the conditions they faced, let us turn first to the British Admiralty "North Sea Pilot" (8). With the permission which I gratefully acknowledge of the Controller of Her Majesty's Stationery Office, the following passages, which are Crown Copyright, are reproduced from Vol. II:—

"The River Tay flows into the sea, after a winding course of about 180 miles, between Buddon Ness and Tentsmuir Point. In 1953, the least depth on the leading marks, as far as Dundee, was 14 feet, but with 17 feet available, this least depth being over Lady shoal. At high water springs, vessels drawing 12 feet can proceed as far as Perth tidal harbour, 29 miles from the entrance."

"The entrance to this river is encumbered with extensive sandbanks, which are liable to change, especially during heavy easterly weather; these sandbanks narrow and define the main navigable channel. The bar is dangerous in heavy weather."

"Inside the bar . . . the in-going stream, spring rate about one knot, . . . the out-going stream, spring rate about $2\frac{3}{4}$ knots, . . . Both the duration and the rate of the out-going stream may be increased, and the in-going stream correspondingly reduced, when the snow is melting and during and after periods of heavy rain."

"Tentsmuir Point is low and sandy. Between this point and Tayport, about 2 miles westward, the southern bank of the river forms a bight encumbered by Green Scalp, Lucky Scalp, and Larick Scalp, banks of sand and gravel, which dry from one to 11 feet, extending as far as 6 cables offshore."

"The Horse Shoe is a ridge of foul ground with large stones extending south-eastward from the western part of Monifieth sands, and lying on the north side of the fairway."

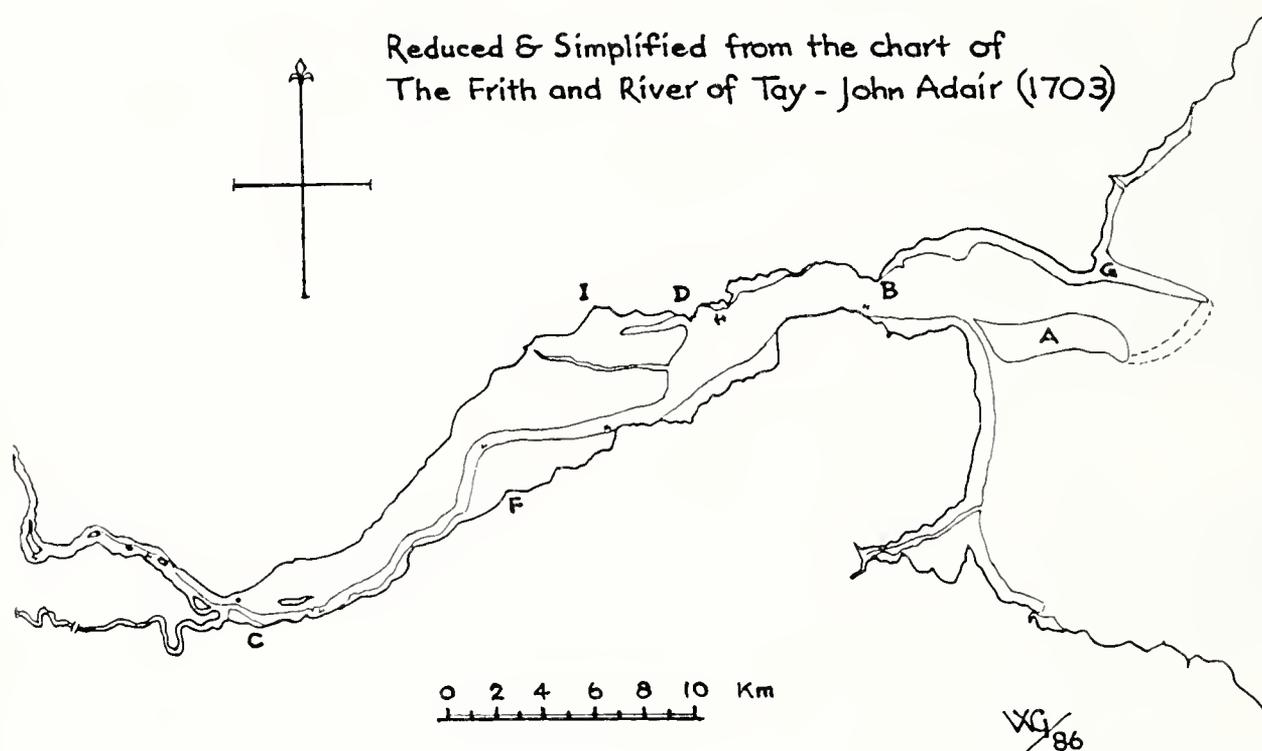
"From Tayport the southern bank of the river is rocky"

"Newcome, a shallow bank, lies on the southern side of the fairway abreast Tayport leading light-tower; it is subject to frequent changes."

Invergowrie bay is encumbered by My Lord bank, which dries from 2 to 7 feet. . . . The continuation of the channel, **which cannot be attempted without local knowledge** (my emphasis), is marked by”

The whole section runs to some twenty pages

Nearly 300 years earlier the Scottish cartographer John Adair surveyed “The Frith and River of Tay”. His chart, published in 1703, forms the basis of the sketch attached to this paper (9). Comparison with the current chart (10) gives some idea of changes over this period. Allowing for uncertainty about Adair’s chart datum, the eastward extension of the Abertay sands (marked A



on sketch) and the Gaa sands (G) is much the same, but the shapes of the spits have altered. There have been major extensions of the sands to the south of Invergowrie (I) and Dundee Law (D), where Adair shows the principal anchorage to have been in his day. A new Middle Bank has formed south of this anchorage. The triangular spit north of Flisk Point (F) has disappeared, and the channel now runs along the south side of the river all the way to Newburgh. But the basic pattern remains of a broader channel from the bar to about Dundee, and a much narrower and winding channel beyond that.

Going further back, it appears that Invergowrie bay was a place of royal embarkation in the time of King Alexander I (1106/07-24) (11). Is it cynical to suggest that as the build up of My Lord bank was making embarkation less easy, he handed over the site at first intended for a royal palace at Invergowrie to the monks of Scone?

Even in 1703, Adair shows a channel of sorts stretching towards Invergowrie, and going back in time it is not impossible that in Roman times Invergowrie was even more attractive as a landing place, with a sandy bottom well suited for use by Roman galleys, which were normally beached—stern first in Mediterranean fashion—to keep their bottoms from fouling and thus making them harder to row.

Severus had assembled a large fleet from all over western Europe for his invasion of Scotland, so he had plenty of warships on hand (12). He could have stationed a squadron, of ten ships under a nauarch (13), in the Firth. This could have been able to provide a guard-boat (stationed perhaps between Broughty Castle and Abertay sands according to conditions), regular patrols up and down the river to Carpow, supervision of a corps of pilots (supplemented perhaps by locally enlisted mariners whose families could be taken into “protection” as hostages for their good behaviour), as well as patrols along the coast to make contact with the Forth squadron and with the squadron or squadrons operating in close support of the army north of the Tay.

Invergowrie would also be an ideal assembly point for the transports. It is about as far up-river as they could reasonably be expected to proceed independently, on the basis of orders received at South Shields, or when they made their number to the guard-boat. Once there, they would be safely tucked away behind the spit of land upon which Dundee now stands, to await favourable wind and tide for the second leg along the narrow channel to Carpow (14). It is about equidistant from both Abertay and Carpow, and breaks the whole passage into two sections, each comfortably manageable in one tide. I accordingly put forward as highly probable that Invergowrie, or somewhere near it, was occupied by the Romans as a naval base, especially during the invasion of Severus.

This hypothesis brings us straight to the alleged Roman fort of Catermillie. If, as claimed by Mehan (15), this was on Bullions farm, and partly under the round-about which marks the start of the Dundee Kingsway, it is, at about 700 m from the present shoreline, rather farther from the beach than might be expected. One would surely expect annexes to enclose the slips for the galleys, and no doubt also a transit camp for the crews of the transports. Possibly the mouth of the Invergowrie burn was then much farther in, and has subsequently been choked by the sands which proceeded eventually to fill the whole bay. The matter is probably not now resolvable, in the absence of a lucky find, since the entire area is now built over by the modern village.

NOTES

- (1) S. Frere, "Britannia", 2nd edition (1978), p. 200.
- (2) An amphora reconstructed from these fragments is on display in the Regional Museum, Dundee. Information from the accompanying ticket.
- (3) D. J. Breeze, "The Northern Frontiers of Roman Britain" (1982), p. 132.
- (4) Old Statistical Account, Vol. X, Fife, Parish of Newburgh, p. 665.
- (5) "Remarks on the Improvement of Tidal Rivers", in the Transactions of the Royal Society of Edinburgh, 1845.
- (6) See K. D. White, "Greek and Roman Technology" (1984), chap. 11, and B. Lindstrom, "The Ship" (1961), pp. 49-51.
- (7) Gildas (6th or 7th century), quoted by T. C. Lethbridge, in "The Painted Men" (1954), p. 48, has Picts and Scots landing from their currachs ("de Curucis", the standard Latin for a hide-covered boat) to overwhelm northern Britain. The etymology given in the Oxford English Dictionary for "coble" is from the Brythonic, of which Pictish was probably a member, the Welsh word being "ceubol", so for Pictish craft "coble" seems preferable. Hide-covered boats would fit a nomadic, pastoral economy, and modern Scottish cobbles, though now of course constructed of wood, have a look of the currach about them.
- (8) "North Sea Pilot, Vol. II" (1959 edition), pp. 179-191.
- (9) John Adair, Chart of "The Frith and River of Tay" (1703), in the Map Room of the National Library of Edinburgh. I have omitted all the numerous soundings and most of the land marks.
- (10) Hydrographer of the Navy, Chart No. 1481, "River Tay" (1985).
- (11) See F. H. Groome, "Ordnance Gazetteer of Scotland", Vol. II (1882), under "Invergowrie" and "Kingoodie".
- (12) S. Frere, *op. cit.*, p. 200.
- (13) P. A. Holder, "The Roman Army in Britain" (1982), p. 40.
- (14) From the climatic table in the North Sea Pilot (see note (8)), p. 28, it appears that between 1901 and 1950 at Dundee, winds were from the easterly quadrant during the summer months for some 30% of the time (43% in May).
- (15) G. W. H. Mechan, "Catermilly: A lost Roman fort near Invergowrie?", in "Aspects of Antiquity" (1966), Abertay Historical Society Publication No. 11, pp. 33-40.

Native and Roman in Glenalmond

William W. Gauld

Introductory Note

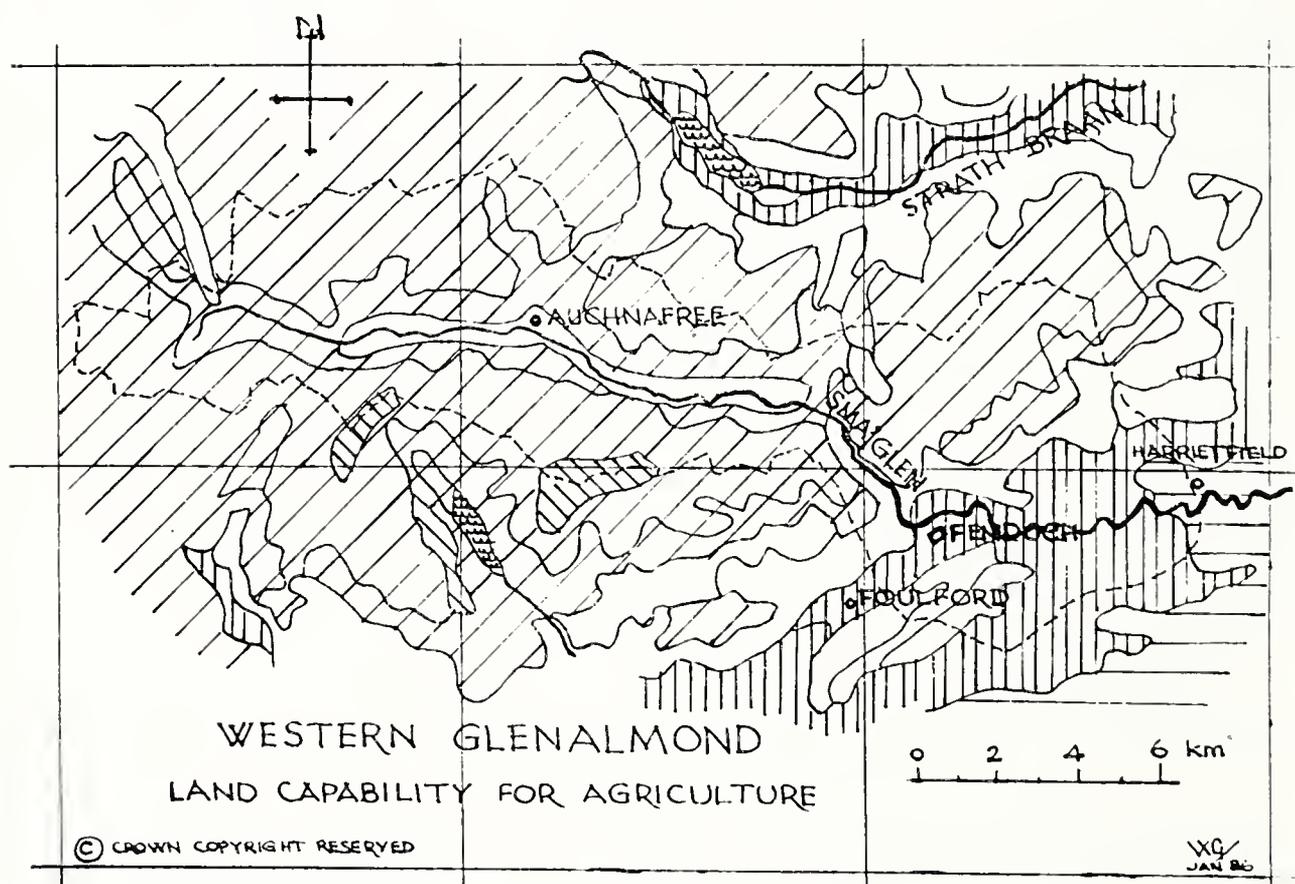
I should like to stress that the assumptions upon which this paper is based represent a **limiting value**, viz. the population capacity of upper Glenalmond if, as the Roman historians say, there was a pastoral economy with no arable cropping. This was clearly not the case in the main Tay Valley and Strathmore, and cereal growing is attested from much earlier, e.g. at Moncrieffe in the 3rd millennium BC. But pockets of conservative, non-cultivating, transhumant population “up the glens” are not impossible, even if their relations with more settled people is likely to have been somewhat uneasy. I am now collecting data from which it may be possible to derive a figure for a settled population, with crop growing, in both the upper Glen and in my postulated wintering area round Buchanty, which, in the **limiting** case, would be effectively deforested.

The catalyst that brought together the various strands in this paper was reading “Farming Practice in British Prehistory”, ed. R. Mercer (1981). I thank Mr. Mercer and his fellow contributors for this, as well as for the material I have drawn from their book. I should also like to thank Mr. Neil McCall Smith, Connachan Farm, Crieff, an eminent hill farmer with long and intimate knowledge of upper Glenalmond, who was my consultant on the carrying capacity of the ground and other livestock matters, and Mrs. Maisie Steven, author of “The Guid Scots Diet” (1985), who helped me on nutritional aspects. Finally, I thank the Director, the Macaulay Institute for Soil Research, for permission to derive the sketch map from the Soil survey of Scotland’s map of Land Capability for Agriculture, Sheet 5.

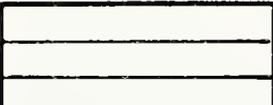
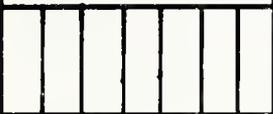
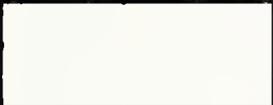
I wish to make it clear that I am not claiming that the native population of western Glenalmond, when the Romans briefly occupied it, was of any particular size. That would be a question for field archaeologists. I am examining the constraints on their numbers imposed by their environment and way of life, with a view to establishing the limits to their growth. The actual population may well have been smaller; but it could not safely have been much larger, unless they became cultivators.

The Roman fort at Fendoch (NN 919284), at the southern end of the Sma’ Glen, was built in the 80s AD, during Agricola’s invasion

of Scotland. It was designed to hold a military cohort, i.e. an auxiliary regiment of ten centuries, each of eighty men (1). For every eight men there was a mule to carry their leather tent and the two stones of a rotary hand quern, to grind their daily corn ration of about 1 kg. a man (2). According to Tacitus all the forts established by Agricola were supplied with a year's rations (3). Grain in such quantity was not available locally and would have had to be brought from the south. Fendoch alone would have required some 300 tonnes, and had two large granaries in which to store it (4). Strageath (NN 898180), the nearest point on the main Roman axis of communication, is about 13 km. away and 200 m. downhill. In later days the route between them was part of the Highland drove road through the Sma' Glen, via Gilmerton, and over Dalpatrick ford, and there was doubtless even in Roman times an old established trail. But the Romans would not have had time to build a bottomed road along it, and there is enough soft ground, especially on the higher part by Foulford, to make any attempt to bring trains of wagons along it very laborious if not impossible. They would surely have used pack animals. The double journey, each mule bringing back four 28 kg., or two 50 kg. sacks of grain, is an easy day for a mule (5), but the total "lift" would have occupied half the regimental complement of mules for two months solid, supposing so high a proportion could have been spared from the immediate tasks of bringing in fodder, fuel-wood, and such items of food etc. as could be procured locally, as well as carrying camp-kit for patrols sent out by the garrison. From a local pastoral people the Romans would have looked especially for fresh meat and for hides, for the repair and replacement of boots, equipment straps, animal harness and tents.



LAND CAPABILITY FOR AGRICULTURE — CLASSES

	3 Capable of producing a Moderate Range of Crops (two subdivisions)
	4 Capable of producing a Narrow Range of Crops (two subdivisions)
	5 Capable of use as Improved Grassland (three subdivisions)
	6 Capable of use only as Rough Grazings (three subdivisions)
	7 Of very Limited Agricultural Value

Exactly 1 km. from the fort, on a knove at the entrance to the Sma' Glen (NN 909285), the Romans built a watch tower. Here—about the line of the Wade road, and presumably also the ancient trail, lies in dead ground from the fort. The tower was clearly sited to remedy this, and to provide a view into the throat of the glen. It would have been ineffective to stop war parties, which would simply have nipped over the hill, but it would have warned the garrison in time to enable them to intercept transhumant groups encumbered with livestock and baggage.

What of the natives? Julius Caesar says that most of the inland Britons did not sow corn, but lived on milk and meat, and clothed themselves in skins (6). Tacitus is strong on noble sentiments but short on facts, save that the Caledonians had large limbs and red hair (7). Dio Cassius, in his account of the campaigns of Septimius Severus at the beginning of the third century, says that the Caledonians and the Maeatae had neither towns nor tilled fields, but went naked and lived in huts, subsisting on their flocks and herds, on wild game, and on various fruits, and—hard to believe—that they did not eat fish, although the rivers were full of them (8). These statements are over simple; cereal growing is attested from Moncrieffe Hill, possibly as early as the third millennium BC (9), and maybe a thousand years earlier from Balbridie on Deeside, where cereal grains and hazelnut shells were found in association with the remains of a timber hall, 22 m. by 11m. (10). One of the reasons for the interest the Romans continued to take in Strathmore could well have been that they identified it as potentially good corn growing land, only needing a bit of drainage, which they were well able to carry out. Else why did Severus insist on the Caledonians surrendering land? (11). Some corn growing by the

locals would have given them a hint. Nevertheless their general impression of Caledonian country was a land of forests and marshes (12).

The Highland foothills and glens are likely to have been occupied by pure pastoralists. If so, and supposing they had been there long enough to be in balance with their environment, it is possible to make some fairly plausible deductions about their way of life, and apply these to the situation which may have obtained in western Glenalmond.

The upper Glen, above Newton Bridge, is except round Auchnafree narrow and shadowed by steep hills to the south. The total catchment area is about 8,200 hectares, of which less than 1% has even today been improved. The bottom lands are mostly of humus-iron podzol type, peat, or alluvial gravel and sand, with only a few patches of brown forest soil, and it is all very acid; at best improvable grassland, capable of no more than occasional cropping (13). There is much scree and rock outcrop on the slopes above. Such territory can produce a reasonable summer flush, but thin pickings in the winter, and grazing would have prevented the regeneration of any scrub or woodland there may originally have been, reducing such shelter as that might have provided. For people who did not grow cereals, and had no scythes to cut grass for hay (14), it was not a place in which to winter. It would have made much more sense for them to use the upper glen for summering only, between the traditional dates of Beltane (May Day) and Samhain (Halloween) (15).

If the upper glen was summer pasture, there is only one way the people could have gone for wintering, that is through the Sma' Glen to the western end of lower Glenalmond. North-east, towards Amulree, would have been the territory of the Strathbraan folk some of whom would have summered up Glen Quaich; south-east, towards Foulford, would belong to the people who wintered between Monzie and Monzievaird, and summered on the slopes above them, from Fendoch Farm round to Glen Turret. The wintering grounds would have been restricted to the south, where lay the summer grazings of the people of Fowlis Wester, while eastwards from about Harrietfield or Glenalmond School it would be natural to summer one's stock on the braes of Logiealmond and up Little Glen Shee. So it seems reasonable to postulate a distinct group which used the upper glen for summering and the western part of lower Glenalmond for wintering.

By making a few simplifying assumptions one can estimate the numbers of their stock, and even of themselves. The Caledonians had sheep as well as cattle (16), but seven sheep can be counted as equivalent to one cattle beast, as is done in calculating the

soumings of crofters. We do not know how big their cattle were but larger obviously means fewer and vice versa, and the output of the herd in terms of milk or meat would be much the same either way. We know neither milk yield, length of lactation, nor what milk products they made, and these uncertainties are much greater than arise if the whole output is taken to be meat. For we can take a representative, smallish, modern breed, and use it as the basis of calculations. Mercer uses the Dexter (17), and late nineteenth century weights, and this seems very suitable. On this basis a reasonable maximum summer carry for the upper glen is thought to be about 500 cows, and their followers. If they were outwintered, and had to find their own keep, except perhaps a few cows kept for fresh milk, the cows are not likely to come into breeding condition oftener than every second year, and would do well to achieve an 80% conception rate. So on average the Caledonians might expect some 200 calves a year. The yeld cows would be prime candidates for culling, and 10% a year would seem a reasonable proportion. The bulls would no doubt run with the cows all the time, so calving would be spread, but probably mainly in midsummer or after. Thus the calves would still be small and unweaned when the time came to move back to the winter grounds, so it would make sense to keep them over their first winter, though they would probably make little growth over it, give them a second summer to put on flesh, and then, after selecting the fifty or so best heifers as herd replacements, bring them back for slaughter in the early winter. By this time there would have been further losses, so at best there might have been about 130 young beasts available for meat, in addition to the culls (18).

The total wintering stock would then have been the basic breeding herd of up to 500 cows, some 20-25 bulls, 200 under one year, and a proportion of the second year animals, say 750-800 in all. If the people lived in huts, and did not lay in any great store of winter keep, it is most unlikely that the beasts would have been housed (19). Provided there was reasonable natural shelter, in open woodland and among scrub, such as the hazel thickets that must have abounded (20), and the nuts from which would have provided a significant part of the human diet, and along the riverside haughs, the animals would have fared best dispersed in small groups throughout the area. Bearing in mind that the Roman authors described the whole area as the Caledonian "Silva", i.e. wood (21), it is reasonable to suppose there was a considerable amount of cover, and that the people and their livestock were spread over it in small family groups. The boundaries of the area available are not so clearly defined as the summer grazing in the upper glen, but there might be about 1,700 hectares in all, of which one quarter is intrinsically no better than the ground in the upper glen, but it improves as one goes east (22). So long as there was a fair amount

of cover, and the ground was rested during the summer, the area should be adequate. Browsing in forest is said to support 20-30 cattle per km.², for summering or wintering, and it is here suggested that mixed forest, scrub and grassland might support about twice that. The wintering and summering capacities seem then to be about matched. (See sketch map for boundaries and land classes).

More speculatively, and making the further simplifying assumption that the contribution to the diet of the Caledonians from domestic stock, wild game, and plant material was about equal, one can make a shot at estimating the human population which could have been living there, on the basis that the cattle available for slaughter would represent about one third of their food. Taking the Dexter, with cows of c.450 kg., killing out about 50%, and young beasts at, say, 350 kg., at 55% (23) one would have some 36,000 kg. of meat, with an energy value of 10 megajoules per kg., that is nearly 800-900 MJ a day, allowing for waste in preparation, with the other two components of the ration each contributing the same. Allowing for the different energy requirements of children, women and working men, and the few that reached old age, an average daily intake of about 10 MJ would be adequate (24). So, neglecting the problem of "food-flow", the total native population could have been as high as 250 persons (25). Dispersed in households of 10-15, there would have been some 20 family groups, each with a bull, 25 cows and followers. In the wintering grounds each family would occupy from half to one square kilometer (26).

One can well imagine the consternation with which these people watched the arrival on their territory of a Roman army unit about four times as numerous as themselves, and the inroads which it would have made, not only by requisition of their own supplies, but also by its mules grazing on their carefully reserved winter pastures, and the thankfulness with which they must have watched the Romans depart a year or two later. The site of the fort might indeed have been the people's assembly ground, before and after their moves to and from the summer grazings, where they held their ceremonies and feasts. It is very suitable for this purpose, and in the right place, and for the Romans to have built their fort on a site held sacred by the natives seems entirely in character, in the aftermath of Mons Graupius, when they wanted to rub in their superiority, but that is sheer speculation (27).

The Caledonians may, as suggested here, have moved their meat to their winter quarters on the hoof, or they may have taken some or all of the output of their herds in milk, and turned it into butter and cheese, which would have had to be transported. But the part of their diet contributed by wild game would have had to be eaten when killed, or preserved and carried. Here an intriguing remark

by Dio Cassius may provide a clue. "For emergencies the Caledonians prepare a special food, eating a bean-sized portion of which they neither hunger nor thirst." (28). Could this highly concentrated ration have been some kind of pemmican, made from venison? (29). About 500 g. of pemmican would provide about 15 MJ, a day's ration for a man doing hard manual work. A meal-sized portion might well be described as "bean-sized" by soldiers accustomed to getting their energy from vast quantities of wheat-meal porridge! A similar sentiment was voiced by the American Arctic explorer, Admiral Peary: "When the pemmican ration was dealt out and I saw my little half-pound lump, about as large as the bottom third of an ordinary drinking glass, I have often felt a sullen rage that life should contain such situations." (30).

EMERGENCY RATIONS - CALEDONIAN STYLE



ISSUED EXPERIMENTALLY TO A ROMAN ARMY UNIT:-

"CIBARIA ILLA? LUDISNE, CENTO? FABA MEHERCLE POTIUS!"

(That me ration? You got to be joking, Sarge. That's more like a flaming bean!)

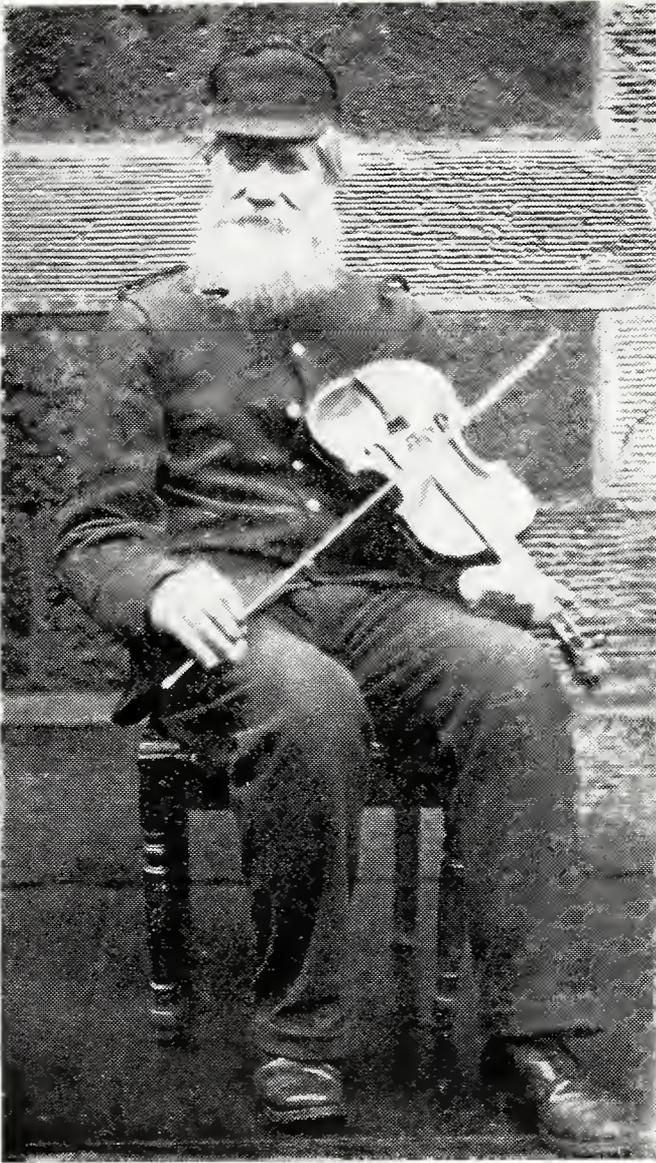
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NOTES

- (1) I. A. Richmond & J. McIntyre, Proceedings of the Society of Antiquaries of Scotland, Vol. 73 (1938-39), pp. 110-154. Of course no army unit in the field is likely to be up to establishment.
- (2) Graham Webster, "The Roman Army" (Rev. 1973), p. 28, and Anne Johnson, "Roman Forts" (1983), p. 195. It is assumed that auxiliaries had the same provision as legionaries. For querns see Johnson, p. 199.
- (3) Tacitus, "Agricola", c.22.
- (4) Richmond & McIntyre, op. cit.
- (5) K. D. White, "Greek and Roman Technology" (1984), pp. 128-129, and Johnson, op. cit., p. 198.

- (6) Caesar, "De Bello Gallico", V. c.14.
- (7) Tacitus, *op. cit.*, c.11.
- (8) Dio Cassius, "Epitome of Book LXXVII", c.12. The Loeb edition wrongly translates "skenais" as "in tents". Dio surely refers to the summer shielings and winter huts of the Caledonians, which would equally be "skenai".
- (9) C. Caseldine, *PSAS*, Vol. 112 (1982), p. 46.
- (10) I. B. M. Ralston, *Aberdeen University Review*, No. 168 (Autumn 1982), pp. 240-241.
- (11) Dio, *op. cit.*, c.13.
- (12) In fact the earliest reference to the phrase "woods and marshes" is in the speech attributed by Tacitus to Calgacus (*op. cit.*, c.31). "Our goods and fortunes are ground down for tribute, our fields and harvests for corn levy, our very bodies and hands under whips and insults for making roads through woods and marshes." But the phrase became established as the stock description of Caledonia.
- (13) Macaulay Institute for Soil Research, Soil Survey of Scotland, Land Capability for Agriculture Map, 1:250,000, Sheet 5, Eastern Scotland. The whole valley bottom is in class 5².
- (14) R. Bradley, "The Prehistoric Settlement of Britain" (1978), p. 40, and Mercer et al., *op. cit.*, p. 80. The locals would have had bill-hooks which they could have used to lop branches for fodder.
- (15) I. F. Grant, "Highland Folk Ways" (1961), p. 66.
- (16) Dio, *op. cit.*, c.13 relates how the Caledonians used the unusual tactic of putting sheep and cattle into the front line to lure the Romans on.
- (17) Mercer, *op. cit.*, Appendix, pp. 234-235, but see note (23).
- (18) With a dairying regime, the distribution of stock would be quite different. The only young stock would be herd replacements, so there could be more cows.
- (19) Bradley, *op. cit.*, pp. 48-49, and Mercer, *op. cit.*, pp. 234-235.
- (20) Ralston, *op. cit.*, p. 244, Richmond & McIntyre, *op. cit.*, p. 154. Dr. J. H. Dickson, Glasgow University (personal communication) reports a lot of coryloid (most likely hazel) pollen from a core taken on Methven Moss, at about the right level.
- (21) See note (12).
- (22) Soil Survey of Scotland, *op. cit.* The bulk of the area is Class 4², i.e. primarily grassland but with some limited potential for cropping. Just past the eastern boundary the land shades into class 3², i.e. cropping land.
- (23) Figures rounded from Mercer, *op. cit.*, pp. 234-235. In Grant, *op. cit.*, p. 78, 24-30 stone (150-190 kg.) is said to have been "a good weight" for a bullock from Skye, Kintail or Argyll. If that sort of figure applied in Glenalmond one would be talking of a thousand Sheltie sized cows, and followers to match!
- (24) Figures rounded from Mercer, with further help from the "Manual of Nutrition" (MAFF) (1978).

- (25) The population that could be supported by a dairying regime would depend on milk yield and period of lactation. Mercer suggests a yearly average of two gallons a cow, which would square with Dr. Grant's figure for winter housed cows in Speyside in 1924. Calculating on this basis would give figures which would compare with the beef output calculations in this paper. For earlier times Dr. Grant quotes a yield of one Scots pint (= 2 Imperial pints) over a "comparatively short" lactation. This seems very low, but would be explicable in the light of Osgood Mackenzie's uncle's hilarious account of a Highland milking in the early 19th century, at which the dairymaids competed with the calves for the milk ("A Hundred Years in the Highlands" (1921), pp. 12-14).
- (26) See Andrew Fleming, in "World Archaeology", Vol. 4, pp. 182 and 185.
- (27) Unless the name "Fendoch", i.e. the fair davoch, preserves a far memory of this. No oak pollen was reported by Richmond & McIntyre (see note 20), so we can thankfully rule out a Druids' grove.
- (28) Dio, op. cit., c.12.
- (29) Roderick Mackenzie, in "A General History of the Fur Trade, etc." published as a preface to the journals of Alexander Mackenzie (1801) (ed. M. G. Hurtig (1971)), gives a recipe for pemmican of 50/50 lean meat, dried and pounded into powder, and boiling fat. From this it can be calculated that one kg. would provide some 30 MJ, a day's ration for two men doing heavy work in a temperate climate.
- (30) Robert E. Peary, in "Secrets of Polar Travel" (1917), pp. 78-79.



John Sim (1812-1893)

Michael Taylor

Photo:

Perth Museum and Art Gallery.

We know very little about John Sim. Previously the only account of him is in Vol. 4 of this Society's Proceedings which was drawn on again by J. Ritchie in a section of the 1929 centenary edition of the 'Perthshire Advertiser'.

He was born in Aberdeenshire in 1812 and worked as a herd-boy and farm labourer. His education though cannot have been neglected—as shown by the handwriting, grammar and generally high standard of his later botanical publications which include Latin and French quotations.

In 1832 he joined the 92nd Regiment (Gordon Highlanders) and was stationed successively in Ireland, Gibraltar, Malta, St. Lucia and Ireland once more. He is said to have suffered at the siege of Sebastopol but this may not be correct for he writes that he was still in Ireland in January 1855 and in any case the 92nd did not form part of the army in the Crimea (although it is possible that he volunteered for active service with another regiment).

It was apparently in Limerick in 1848 that he first "set about the study of plants in earnest"; and while in Belfast he made contact with Prof. Dickie (an Aberdeen man) and used the botanic garden there to further his knowledge.

He seems to have come to Perth in about 1856 and took up residence at 9 Commercial Street, Bridgend. Although one source gives his occupation as 'gardener' this again may be an error and his only income seems to have been from his appointment as Hospital Sergeant to the part-time Royal Perthshire Rifles, which he held until 1865.

At this time there were few active botanists in Perth (The PSNS was not founded until 1867) but in 1858 he found an outlet for his interest in the 'Phytologist' one of the few botanical journals published at this time. Its Editor Alexander Irvine was also an Aberdeenshire man—which may account for his high opinion of Sim. Irvine wrote that he did "not know a more single minded, trustworthy, truth-loving, upright man alive . . . the new stations for rare plants recorded by Mr. Sim are as usual very numerous and more than usually important". Between 1858 and 1863 he contributed 34 papers to the Phytologist the majority about the local flora though a few dealt with the flora of the sites of his army postings. In a description of the flora of St. Lucia he included the banana and plantain "the former is extremely delicious," he wrote "and tastes of honey and butter mixed." His local papers were primarily concerned with the localities of rare plants around Perth and his attitude to collecting these was certainly ambivalent. In 1858 he wrote "the *Moneses grandiflora* in the wood of Scone is almost extirpated and no wonder, the Edinburgh students devour every green thing." Later he appealed to botanists "to be content with the stem and its appendages and leave the root to perpetuate the species" and yet in the same article he offers plants for exchange with other collectors and says "I have no doubt but applicants for *Moneses* will be legion, therefore botanical friends apply in time". He also records taking 300 plants of *Scheuchzeria palustris* from Methven Bog. Undoubtedly his prize find, discovered while searching for *Moneses* at Scone was *Linnaea borealis* which Irvine noted as "one of the most interesting facts which have ever been published in the 'Phytologist'." By the time the 'Flora of Perthshire' was published (1894) the *Moneses* was almost, and *Scheuchzeria* and *Linnaea* entirely, extinct in the sites where Sim had seen them. Sim's quest for rarities led him to publish details of species which may have been introduced. One such record of *Arenaria balearica* found on a wall at Moncrieffe brought the wrath of Hewitt Cottrell Watson down on poor John Sim! Watson accused him of being "imperfect in his reports, and unsound in his conclusions from alleged facts." Irvine sprang to his defence and Sim found himself in the middle of one of the most acrimonious relationships in the 19th C. botanical world. Nothing daunted he continued to send in his records for publication even venturing a little dig at Watson himself. "You will please announce this in the 'Phytologist'," he wrote, "for the delectation of some of our friends

who like to hear the truth, even though it upsets some of their pet theories.”

He used the still novel railways for his local excursions though it seems that even then they could be a little unpredictable. In June 1859 he left Perth on an excursion train for Birnam at 2.30, arriving at Birnam at 4.15! The return journey took only an hour. In 1860-61 he gave a series of botanical lectures to patients at the Murray Royal Hospital illustrated by his own herbarium consisting of upward of 1,000 plants. Unfortunately ill health seems to have dogged him, he refers constantly to “being weakly”, “greatly fatigued” “unable to go far” etc. and eventually he lost his sergeancy with the Militia. He was forced to sell some of his books and his collections to pay doctors’ fees. He did not however stop collecting, after 1861 he took up lichenology and many of these specimens are still in existence, along with others donated to the Museum in 1895 and 1903 after Sim’s death.

In 1858 he had become an Associate member of the Botanical Society of Edinburgh, in June 1867 he became the 28th member of the PSNS and in 1869 read a paper to the Society ‘On exotic plants naturalised in Perthshire’ but his publishing days were now over as younger more energetic enthusiasts came along. He moved from Perth to his married daughter’s house at Dunfermline in 1884, dying there in 1893. He described himself as “a plain man” (but) “facts are facts, and they are worth reporting, even though observed by a plain observer.”

Of his favourite subject he said “if you want to be a botanist, buy a book, read it, and go to the fields, and you will, beyond doubt, succeed.”

The Bruar Gorge

James R. Aitken

The waters of Bruar rise in the heights of Ben Dearg in the Forest of Atholl, flow south for about ten miles and before joining the Garry near Calvine, pass through a spectacular Gorge. The old Schistose rocks of the area are bisected by many sills of volcanic rock and this gives rise to many fine waterfalls and rock formations.



Bruar Gorge.

Photo: J. R. Aitken.

The Gorge is spanned by two stone bridges which give good vantage points to view the falls. These are much visited by the public, especially in summer, but to witness the falls in full winter spate is something to remember.

When Queen Victoria and Prince Albert were staying at Blair Castle in the Autumn of 1844, the Queen was drawn up to the lower bridge in her garden chair, and expressed great admiration of the scenery.

On the rocky and precipitous banks of the stream grow many interesting plants, from the woodland at the foot of the Gorge to the alpine flora in the upper reaches.

In Spring the conifer woods are bespangled with the white flowers of Chickweed Wintergreen (*Trientalis europea*) and in the damper areas the Marsh Violet (*Viola palustris*) abounds. Rocky places by the stream are draped with Bearberry (*Arctostaphylos uva-ursi*) and the track through the trees is bordered with Cowberry



Herb Paris.

Photo: J. R. Aitken.

(*Vaccinium vitis-idaea*). In some of the heavily shaded cliffs the Drooping Wintergreen (*Othilia secunda*) can be found sprouting from cracks in the rocks and often in association with Yellow Pimpernel (*Lysimachia nemorum*).

When the head of the Gorge is reached and you emerge from the conifer woods, a dry-stane dyke has to be crossed, and then the open heather moor stretches away to the distant mountains. In boggy areas the usual colonies of Heath Orchis and Bog Asphodel add to the colours in summer and the air is strong with the mingled scents of the Cross-leaved Heath (*Erica tetralix*) and Bog Myrtle (*Myrtica gale*).

Here also is found Cranberry (*Vaccinium oxycoccus*), its tiny pink flowers in Spring looking like miniature cyclamen. In drier areas occasional spikes of the Medium Wintergreen (*Pyrola media*) push up among the heather-like flowers of Lily of the Valley and the Petty Whin (*Genista anglica*) twining its spiny shoots through the lower vegetation bears yellow flowers all through the summer.

Back at the stream-side, which now flows in a much more tranquil manner with many deep clear pools, a more alpine flora is now appearing.

Early Purple Saxifrage (*Saxifraga oppositifolia*) hangs from damp rocks and is the first to flower in early Spring.

The Golden Saxifrage (*Saxifraga azoides*) and Starry Saxifrage (*Saxifraga stellaris*) grows in places where water oozes from the rocky banks and both flower throughout the summer.

Mountain Sorrel (*Oxyria digima*) grows in damp shady rock crevices and the small green Spleanavort Fern (*Asplenium viride*) likes a similar situation.

Mention must be made of a fine colony of Herb Paris (*Paris quadrifolia*) which grows on the banks of the River Garry near Killiecrankie. Although not a showy plant to look at when in flower, it is always a delight to see it in such a strong healthy mass. This will be sufficient to show that a walk up the Gorge is well worth while and, on the return trip through the Moor, the lovely views of Farragon and Schiehallion are an added bonus.

Margaret E. C. Stewart,

MBE, PhD, DLitt, FSA (Scot)



An appreciation by

Rose M. Smith,
FSA (Scot)

Photo: Dr. W. H. Findlay
from a transparency by
Mrs. R. M. Smith.

When Margaret Stewart died in June 1986, Perth lost one of its most distinguished citizens. She will be missed from the many spheres with which she was associated.

After a childhood in the Borders, where her father was a director of the Eskdalemuir Observatory, Margaret was educated at Mary Erskine School in Edinburgh and subsequently gained an M.A. in archaeology at Edinburgh University. Later, she earned a Ph.D. with a thesis on Bronze Age pottery, a subject on which she was to become a recognised authority. Happily, she also met her future husband in Edinburgh.

On her marriage to John Stewart, Margaret settled in Perth and proceeded to acquaint herself with the archaeology of the county she grew to love. She worked to encourage local people to take an interest in their rich heritage and, at her instigation, the Archaeological Section of the Perthshire Society for Natural Science was formed. The Section, which is still very active and has a healthy membership, will celebrate its 40th anniversary in 1988. She encouraged the formation of other archaeological groups throughout Perthshire. Through study groups and field training classes, she formed a competent pool of volunteer archaeologists, who worked with her, and other visiting directors, in the county. She set a high standard for herself, being meticulous in everything she did, and expected no less of those who worked with her. But

she also had a keen sense of humour and would frequently relate amusing anecdotes, often against herself. She continued to direct excavations until a series of accidents impaired her ability to sustain the physical effort of digging on a site.

Margaret was keenly interested in Perth's historical heritage and, eventually, after much effort on her part, the archaeological potential of the town was recognised and a trial trench at St. Ann's Lane was investigated. This yielded a rich assortment of mediaeval artefacts and, as a result, the large area now occupied by Marks and Spencer's store in High Street was excavated. It gave her much satisfaction to see the formation of the Scottish Urban Archaeological Trust Limited, which is based in Perth and spends much of its time and resources investigating sites of archaeological importance in the town.

Always keenly interested in local archaeological societies and a firm believer in 'grass roots' observation, Margaret helped in the setting up of the Tayside and Fife Archaeological Committee, which provided a liaison between professional archaeologists and the amateur local societies.

Much in demand as a lecturer, she addressed groups of all kinds and was a familiar figure in the classrooms of the area, where her talks on archaeology were popular. Her extra-mural classes were always fully subscribed.

With the flourishing of redevelopment in the town and the fear that many of the early buildings would disappear if something were not done to protect them, she helped to set up the Perth Civic Trust, serving as an early chairman and continuing as an honorary chairman to work tirelessly on its behalf for the rest of her life.

Locally, her work and public spiritedness were acknowledged when she became, in December 1980, an early recipient of the D. K. Thomson Award.

Margaret's work was recognised and respected far beyond Perth. St. Andrews University honoured her with a D.Litt. A Fellow of the Society of Antiquaries of Scotland, she served on its Council and was proud to be the first woman to be elected an honorary member. A past chairman of the Council for British Archaeology, Scotland (then the Scottish Group, C.B.A.), she served for many years as editor of its annual publication *Discovery and Excavation, Scotland*. The crowning accolade came when, in the Honours List of 1983, she was awarded an M.B.E.

We have much to be thankful for that in those far off days in Edinburgh Margaret met her future husband and came to make her home in Perth. Those of us who had the privilege of working with her are certainly the better for the experience.

