Fish-traps in Scotland: construction, supply, demand and destruction

Fischreusen in Schottland

Les pièges à poisson en Écosse

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Introduction

In 1943 Thomas Bathgate published a short paper entitled 'Ancient fish-traps or yairs in Scotland' in the Proceedings of the Society of Antiquaries of Scotland (*Bathgate 1948-9*). He began by stating that, '*little attention has been paid in antiquarian literature to the old fish-traps around the coasts of the British Isles*'. Sixty years later this statement will be re-addressed with regard to the Scottish remains. This paper combines archaeological field survey results, evidence from documentary research and examples from ethnographic archive material to investigate the Scottish fish-traps. I shall illustrate some of the different types of fish-trap design, outline their form and function, and discuss ownership issues and the maintenance of these structures, as an example of a particular mode of water management in the rural economy.

Scottish fish-traps may appear ubiquitous and a brief scan of some early maps shows a plethora of sites on many different types of coastline and in rivers around the country. Within the widespread distribution there are regional variations. As a result of field survey we can identify variations of design, location and construction, patterns of survival and destruction, and combine those results with documentary sources to understand the role of fish-traps in the wider economy. In addition, there are a number of fish-traps that were still in use until very recently, which can be used as *comparanda* to both documentary sources and field remains. Evidence of ownership and also construction and upkeep can be gleaned from documentary sources and be used to corroborate the field evidence. These details enable the researcher to understand the use of

Fig. 1. *Oblique aerial photograph of two stone yairs in the Beauly Firth, near Inverness (Crown Copyright: RCAHMS SC700317).*

Fig. 2. *Salmon yair on the River Dee (Copyright: School of Scottish Studies, B1118 c3 1114).*

Fig. 3. *Salmon yair on the River Dee (Copyright: School of Scottish Studies, B1118 c3 1115).*

fish-traps, define when they were erected and used, and how the structures were owned and maintained, under the auspices of royal, ecclesiastical or civil authorities.

Fish-traps in estuaries

Scottish estuaries (commonly known as 'firths') comprise extensive sand and mud-flats that dry out during low-tides. Given the characteristics of the intertidal zone, fish-traps have tended to be extensive structures that extend below the high-water-mark, towards low water channels. The results of field survey show that estuarine fish-traps were built in a variety of forms, utilising different construction materials, situated in particular places in firths and were often referred to using colloquial terminology. They are set at right angles to the coastline or at least at an angle that provides a barrier against which the fish cannot swim and are subsequently forced into traps by the receding tidal waters. In some case the structures can be situated across ebb and flow channels and in this way they are specifically positioned to trap migrating fish, during the ebb and flow of the tide. There are a number of different types of design, which will be described, along with examples derived from documentary sources and ethnographic illustrative material.

Yairs comprise stone, timber or mixed materials built to form straight or curvilinear arms, that encompass an area in which the fish become trapped usually during the ebb of the tide. The stone examples tend to be aligned at right angles to the shoreline with a curving arm that leads upstream (*fig. 1*). As can be seen in this photograph, there are two yairs on this site, perhaps representing different phases of use. The more elaborate timber structures comprise fences or net walls that act as funnels that drive the fish into increasingly confined spaces. There is a broad range of design variations, the simplest form being that where the fish swim into the enclosed space and are unable to retreat as a result of the falling tidal waters. More complex designs comprise traps set at particular points within the main structure, into which the fish retreat and find themselves confined by both the receding water and the traps (*fig. 2*). The individual traps can be baskets, known as 'putts', made of wicker-work, or the restricted spaces formed by an arrangement of nets.

Ethnographic examples that were recorded in the middle part of the last century enable us to see how modern yairs were operated and to understand how the archaeological remains functioned. One such example is well illustrated by the photographs taken by Werner Kissling and deposited in the photographic archives at the Celtic and Scottish Studies Department, University of Edinburgh (*fig. 3*). The yair was leased to a retired offshore fisherman,

'A salmon yair is still in operation (1955) *during the summer in the estuary of the Dee at Kirkcudbright. It consists of two 'leaders', wattled with twigs, forming a V-shaped enclosure into which the fish enter with the flow of the tide. It must therefore be placed as close as possible to the tide-way. The fisher operates the net from what are called the 'yaires', a sort of scaffold with projecting platform (18ft from base) erected at a point where the two leading stakes come close together, pulling up each salmon on to the platform as he feels it entering his net' (School of Scottish Studies B1118 c3 1115 photograph caption).*

This example describes a type of yair that requires the fisherman to be present to capture the fish, which raises the question as to whether the simple fish-traps required fishermen to be present or whether they could turn up during the ebb tide and net those fish that became trapped? This example also makes the point that the word 'yair' is a catch-all term that, dependent on the different parts of the country, can be applied to the whole or a specific feature within the fish-trap structure.

Dingwall yair

One particular yair that was identified during recent archaeological field survey is in the Cromarty Firth, near Dingwall. The site lies close to the confluence of the Cromarty Firth and the river Conon, on a gently-sloping shoreline just to the south of the town. Field survey shows that the site comprises at least two fish-traps, which have been built on the same location, partially overlying one another (*fig. 4*). The traps comprise

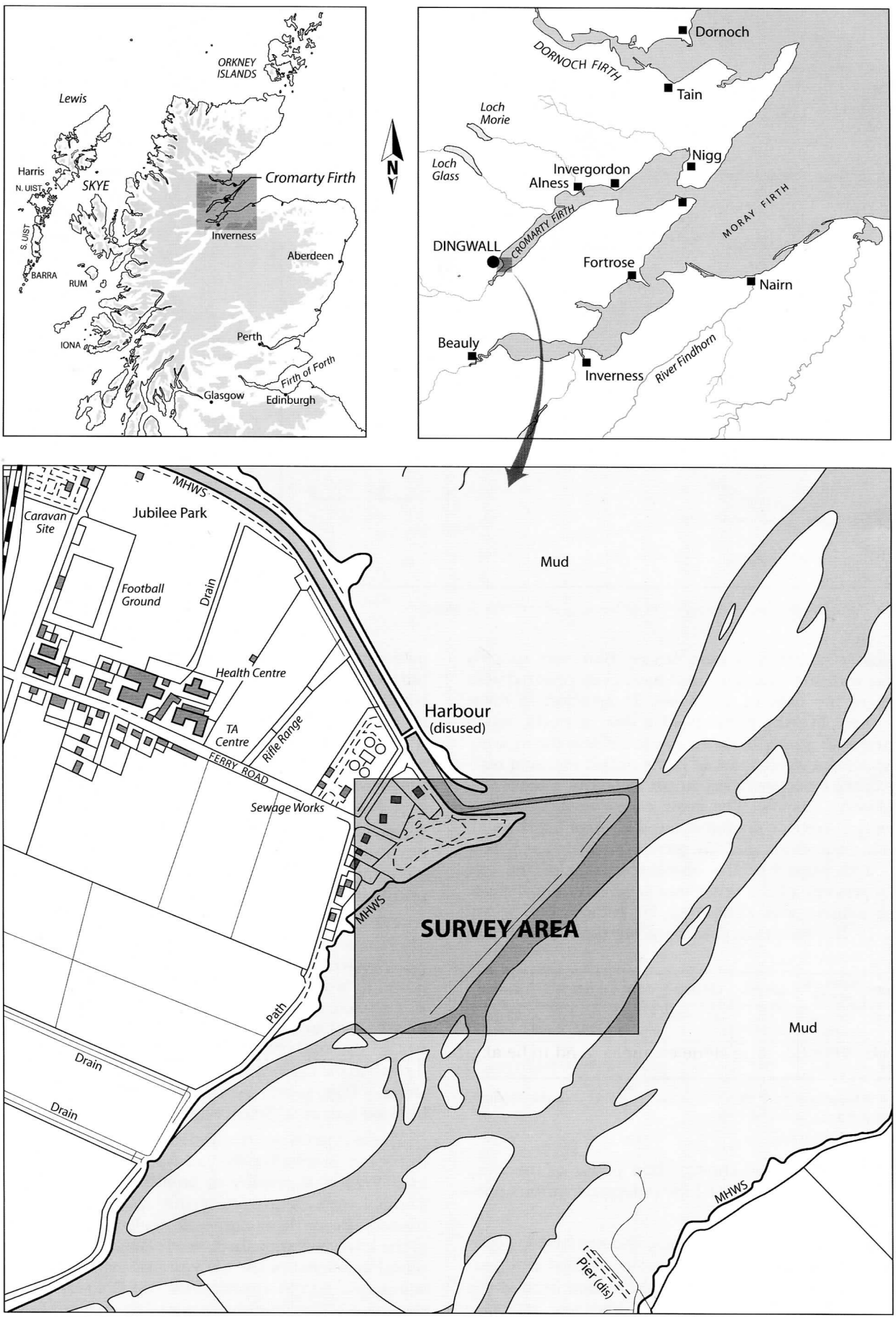

Fig. 4 a. *Site location map of Dingwall yair (Copyright: CFA Archaeology Ltd / Historic Scotland).*

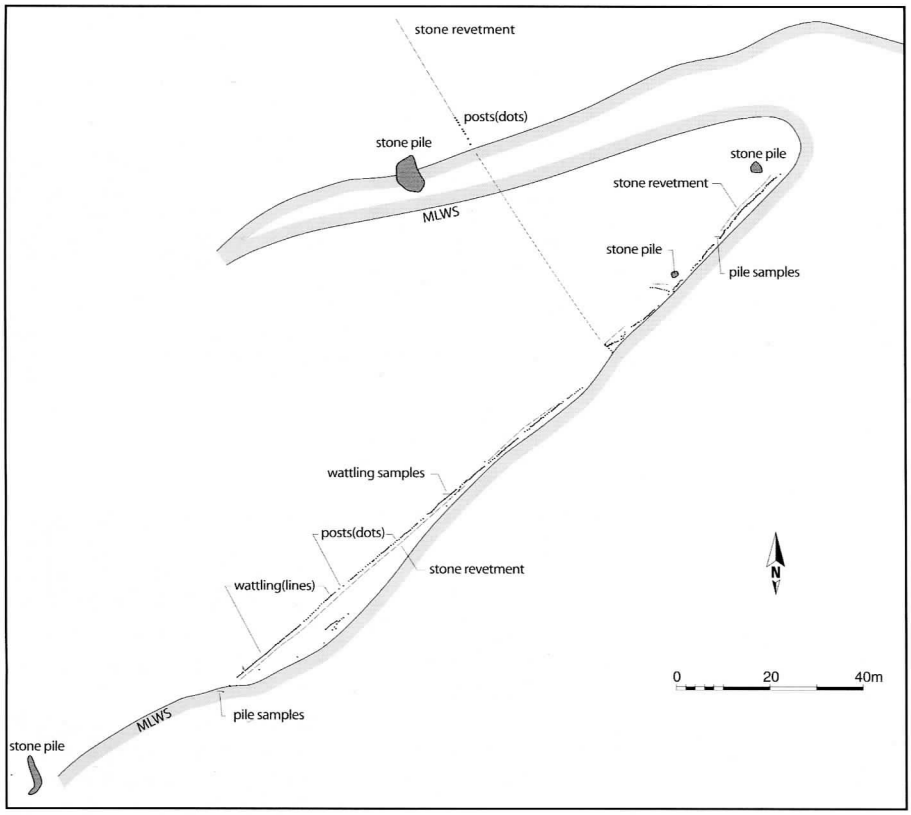

Fig. 4 b. *Plan of Dingwall yair (Copyright: CFA Archaeology Ltd / Historic Scotland).*

curvilinear wattle and post fences that run roughly parallel with the shoreline, and have been revetted with stones at the base of the posts. In addition to these arms there are the remains of a line of posts, again revetted with stone, between the fence and the shoreline. Additional short lines of posts occur, running obliquely to the fence and there are at least four piles of stones close to the site. The posts comprise alder stakes that only survive as eroded stumps, protruding through the estuarine muds and the pieces of wattle are willow rods. With regard to the absolute dating of the two structures, one of the posts was removed from the site and a sample was submitted for radiocarbon assay (*table 1*). The resultant date suggests that these remains represent the last construction phase of the trap, which as will be seen below has undergone various phases of re-building.

Site name	NMRS site number	Lab ref.	C14 date	sigma 1	sigma 2	sample
Dingwall yair	NH55NE 152	GU 11557	145 +/-45	AD 1667-1881	AD 1660-1960	Alder post
Corgrain Point	NH54NE 51	GU 4544	260 +/-50	AD 1530-1790	AD 1489-1947	Alder post

Table 1. *Radiocarbon dates from two Scottish Highland estuarine fish-traps (calibration after Stuiver et al. 1998).*

Further information regarding the ownership, construction and use of this yair are contained in documentary sources. The documentary source used is the Dingwall Town Council Session Minutes (*MacRae 1923*). The minutes of the Town Council were established in 1708 and the first reference to a fish-trap dates to 1732,

'*1732, Nov. 21. Wm. Fraser, Dean of Guild, proposed to the Council that since the Yair belonging to the town, near the Ness of Dingwall, had been ruinous for several years and consequently of no use to the Burgh, he made an offer to the Council of putting and erecting a Yair in that place and upholding the same in good condition and leaving it so at the expiration of such a number of years as the Council would please allow him in consideration of his expenses in putting up and erecting the same. Offer accepted: Tack ten years from 1st March next*' (*MacRae 1923*, 215).

Here we see the Dean of the Guild proposing to the Town Council that he build and maintain a yair, which he is granted to rent for 10 years. The situation is of interest, because it is on the same spot as an earlier yair, although that had clearly been abandoned and allowed to fall into disrepair. In terms of ownership, we come to understand that by the early part of the 18th century the town owned the right to command a rental, which in this case was for no sum and for the period of 10 years. William Fraser obviously saw an opportunity to catch fish, in a static fish-trap, which would need re-building, and maintaining but one that would afford him no rental outlay.

Subsequently, there are references in the Minutes to various changes to the rent and duration of the lease of the Town yair, throughout the 18th century. One particular minute is worth recalling because it describes the refurbishment of the yair,

'*1764, March 23. The application made by Alexander MacKenzie...to furnish to the Council the sneddings of his aller wood of the Bogg for wattleings to the yair proposed to be built by the Council on the shore of Dingwall this season, as also to furnish as much of the largest and best of said woods as will be found proper to make stakes for the said yair and after the yair is so made up, to furnish to the Council as much of the sneddings of the said wood of Bogg yearly therafter as will be sufficient to keep the said yair in sufficient repair*' (*MacRae 1923*, 223).

These entries in the Council's Minutes show that thirty-two years after the yair was reconstructed by William Fraser, it needed re-building and obviously the Council were right in asserting that they get the best timbers. From these entries it is clear that the survival of the town yair was short-lived. There are no records of rental payments in the early to mid-eighteenth century, whereas it would appear that the Council recognised the value of the yair and realised that they could charge increasingly larger amounts of rent, into the ninete-

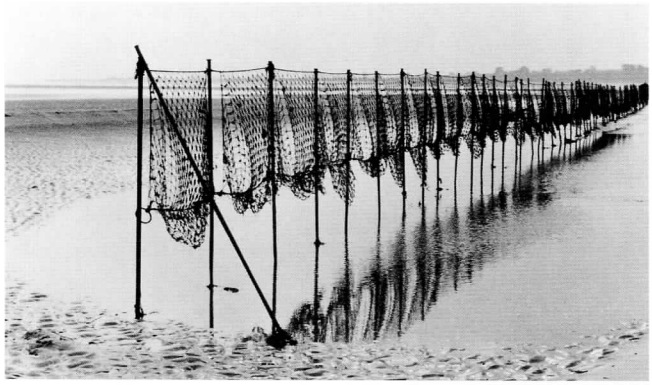

Fig. 5. *Stake net trap, with five pockets, Portling, Kirkcudbright (Copyright: School of Scottish Studies, B1118 c3 3172).*

Fig. 6. *Poke net trap, Annan, Dumfries and Galloway (Copyright: School of Scottish Studies, B1118 c2 2575).*

enth century. For example, in 1791 the yearly rent to build, erect and fish at the yair was set at £1, 11 shillings and sixpence. In 1813, the yearly rent had risen to £20 and there were additional conditions such that the Magistrates, members of the Council and a list of particular town inhabitants were supplied with salmon at the rate of nine shillings per pound in the Spring months and six shillings per pound, during the rest of the season. By 1827, the yearly rent had reached £120 and similar conditions still applied. Clearly by this time the rights to fishing were providing the Town Council with a reasonable income and there are references to various disputes between Council and landowners regarding fishing rights and extents. It is around this time that landowners upstream, on the River Conon, began a series of litigation cases, regarding the Town fishing, that ended in the Court of Session and the House of Lords. The Town lost its fishing rights, partly due to the fact that the landowners claimed that yairs situated at the mouth of the river were preventing salmon from migrating upstream into their spawning grounds, which they owned the rights to fish. It was shortly after this time that static fishing, which included yairs, were outlawed in the Cromarty Firth.

Stake nets, poke nets and bag nets

Another design variation of estuarine fish-traps were known as 'stake nets'. They comprise lines of stone mounds into which wooden stakes were driven and between which nets were strung. This type of trap would be positioned at right angles to the shoreline and could indeed trap fish on both the ebb and flow of the tides (*fig. 5*). More recently, until at least the 1950s, stake net traps were operated on the north side of the Solway Firth. They were constructed of timber or iron posts, running across the tidal flats and designed to trap flounders and salmon. Apparently the traps were situated to catch flounders migrating towards their feeding grounds. Local variations of stake nets in the Solway Firth sometimes used 'poke' nets strung between iron posts. The nets have a wide opening and are designed to catch fish on both the ebb and flood of the tide (*fig. 6*).

Similarly 'bag nets', comprise single lines of nets with attendant nets either side that form 'rooms' in which the fish become trapped. In terms of fixings they comprise stakes at either end of the main nets and additional stakes, which form the attendant 'rooms'. Archaeologically this kind of site presents very little field remains because the majority of the trap comprises netting, which would be removed either by the owner or through the natural agencies of erosion. However, one such site was identified at Corgrain Point, in the Beauly Firth, in the 1990s and comprised the eroded remains of 13 wooden piles laid out in a roughly diamond shape on plan (NMRS site number NH54NE 51). One pile was found lying horizontally in the intertidal muds and had been well preserved. It showed signs of cutting at both ends, probably with an axe and a sample was submitted for radiocarbon dating (*table 1*).

Fish-traps on exposed coasts

In this case we can use archaeological field survey data of coastal fish-traps to establish their presence or absence and gauge the survival and destruction of these sites. One example where archaeological fieldwork can identify the surviving remains of fish-traps, is coastal-edge survey. Following the identification of the structures, which is dependent on favourable tidal conditions, individual site investigation can be undertaken. Between 1996 and 1999 Historic Scotland, the government agency charged with managing the cultural heritage of Scotland, commissioned 16 coastal erosion assessment surveys, with the aim of quantifying the coastal archaeology and assessing the condition of the remains (*Ashmore 1996*). In 1998, as part of Historic Scotland's programme, the author undertook a coastal assessment survey of the Inner Moray Firth, managed by the Centre for Field Archaeology, University of Edinburgh. As a result 62 fish-traps were identified scattered along the 200km stretch of coastline that was surveyed (*Cressey – Hale 1998*).

The fish-traps survive in the sheltered, relatively calm environments of the Beauly and Cromarty Firths, whereas analysis of cartographic sources, such as an 1838 chart of the Cromarty Firth, depicts the locations of various types of fish-traps and shows that they were situated on both the firth shorelines and the exposed, rocky coastal shores. However, during the coastal survey the

fish-traps were found to survive only in the firths and none survived on the coastal exposures (*fig. 7*). This distribution is a good indicator of survival and destruction in exposed coastal conditions compared with those in the firth environments. The reasons for this distinct demarcation of surviving sites may, of course, be as a result of the type of structures that were used to fish off rocky, coastal shorelines, compared with the extensive remains that survive in firths.

The structural remains of yairs as opposed to those coastal fishing stations have survived as a result of the relatively passive conditions of the tides in the sheltered firths, whereas on the rocky, exposed shores the erosive power of the tides have destroyed any fish-trap remains. In addition, the fish-traps built on exposed coastal shores comprised scant structural remains, which were easily portable and could have been taken away by the fishermen. Static coastal fishing techniques have involved little more than a hand-winch or electric powered winch from which a net could be hauled, having been strung out from a small boat or cobble. This form of 'seine-netting' or 'cobble fishing' is well known in the Moray Firth, since at least the 1690s (*Slezer 1693*, plate 43) and would leave no archaeological 'footprint'.

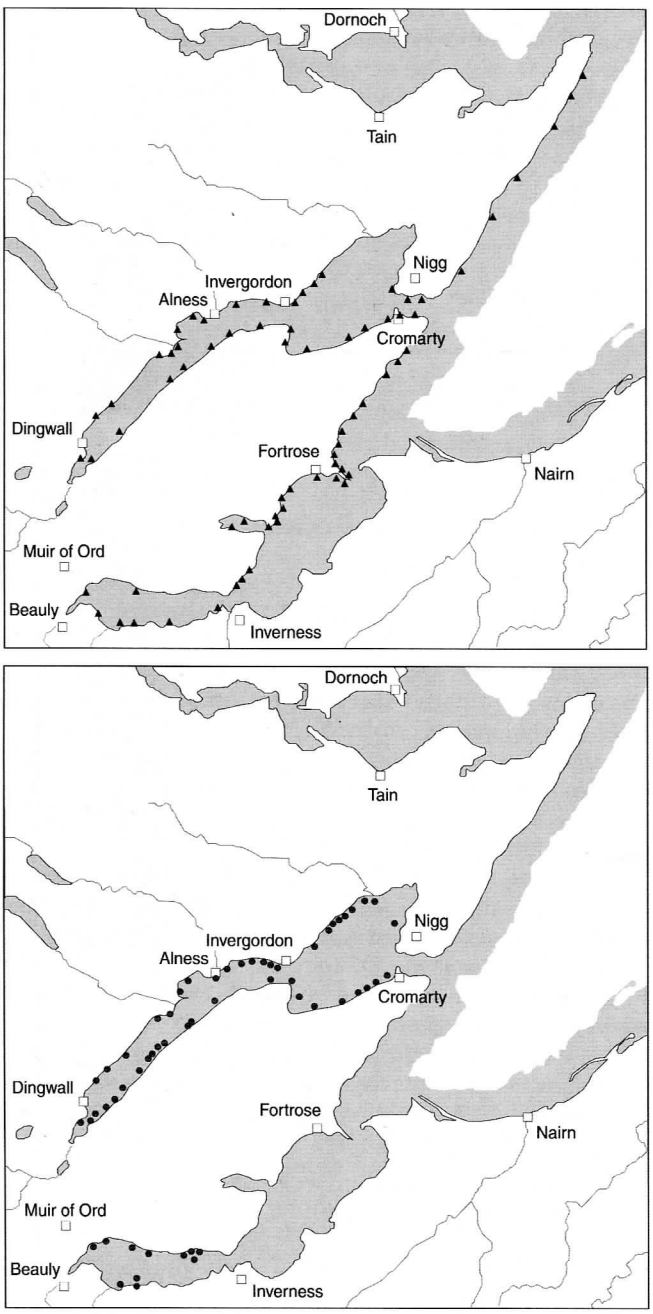

Fig. 7. *Comparative maps showing locations of fish-traps between Inverness and Tarbat Ness (Copyright: CFA Archaeology Ltd / Historic Scotland).*

Riverine fish-traps

The remains of riverine fish-traps, often known as 'weirs' or 'cruives', can be found in the lower and tidal reaches of Scottish rivers. They are designed to trap migrating fish on their way upstream to spawning grounds, especially salmon. Given the nature of river channels, cruives tended to be smaller structures than those found in estuaries and they comprise traps and funnelling devices that are tailored to the topography of the river bed. For example, a riverine fish-trap could comprise a number of staggered weirs designed to drive the fish into a particular channel of the river, where they can then be trapped at a final closed weir. The design and construction of riverine fish-traps would have had to withstand the erosive nature of Highland rivers, especially in times of spate and hence today we see the remains of more recently built cruives that can comprise modern bonding materials such as concrete.

Cruives have a trap, sometimes known as a 'box', at a point in the barrier that is used to catch the fish. Because cruives limit the routes by which the fish can travel upstream, the traps are located in those apertures. A working cruive, in the early part of the 20th century, in the river Beauly, near Inverness, possessed at least three boxes (*Country Life Magazine 1904*). The boxes provided the barrier against which the fish could not pass, hence they turn away from the barrier and are forced by the flow of water onto horizontally placed spars and drown. The secondary advantage of building cruives would have been the creation of pools both above and below the barrier, within which fish could be fished by both rod and net.

Inverness cruives

Documentary evidence of cruives on Highland rivers include an article regarding the Black Friars of Inverness, and discusses the Friars' fishing rights (*Boyd 1915*). The Friars were granted fishing rights on the river Ness in 1240, by King Alexander II. The grant enabled the Friars to fish the river Ness and therefore to maintain their supply of fish. This grant specifically detailed the limits of the fishing, between Friar's Lane and the Cherry Shot. Later, in 1544, the fishing rights on the same river that had belonged to the bishop of Moray were granted to Lord Lovat. There is also a record that some time during the 1570's the Earls of Huntly owned the fishing known as the Castle Shot, immediately below Inverness Castle. These grants from various charters describe the changing ownership of the fishing

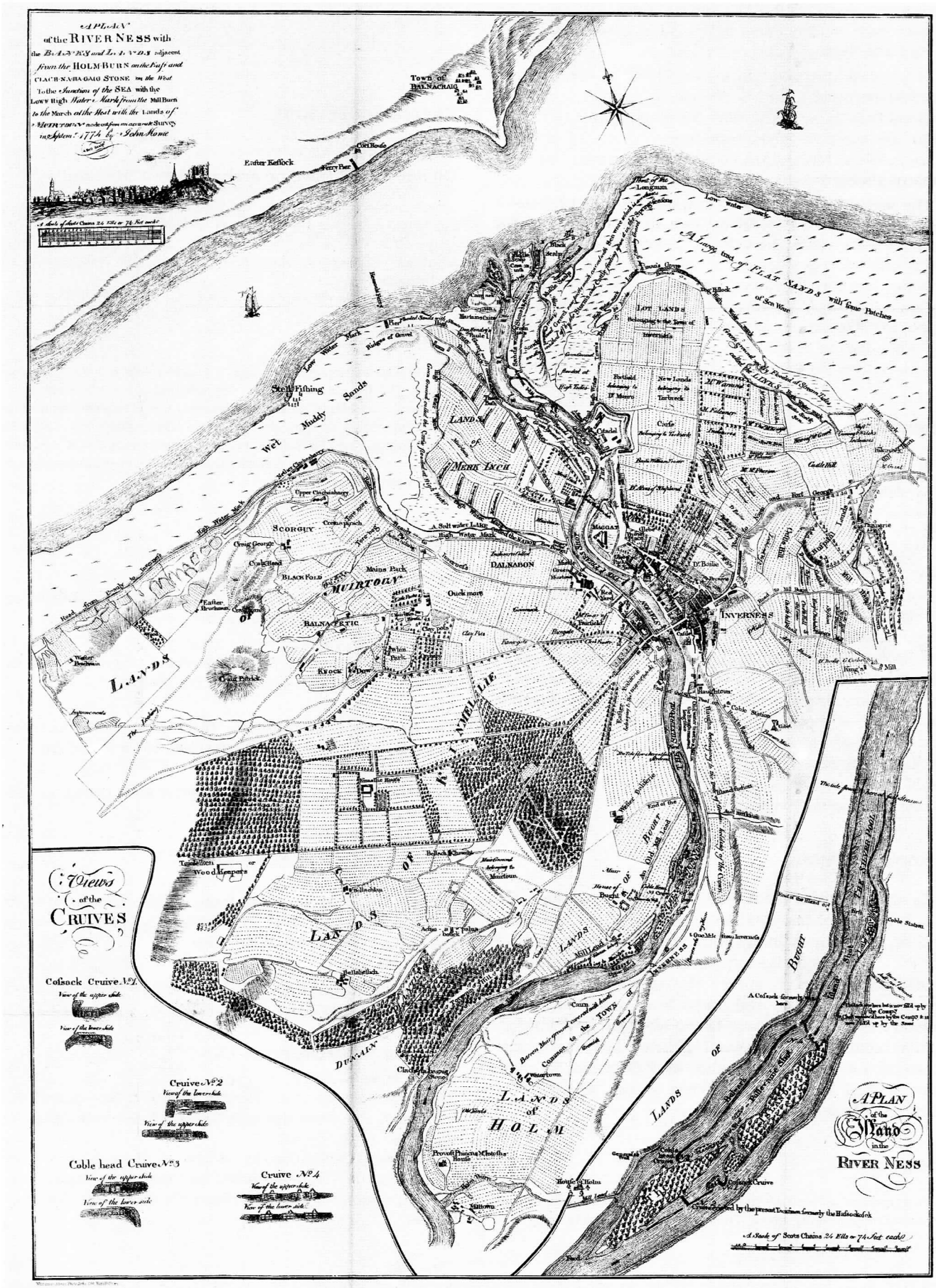

Fig. 8. *Map of river Ness, 1774 (RCAHMS SC 86174).*

rights of a particular Highland river and indicate a necessity to own and control what must have been a valuable resource and envied asset.

A map of Inverness dating to 1774, is of particular interest because it shows the locations and designs of various fish-traps in the river Ness (*fig. 8*; *Home 1774*). They are built to take advantage of the mid-channel islands in the Ness, around which the cruives are built to form a complex set of training walls or 'bulwarks' and traps. In terms of construction, the individual cruives are illustrated and comprise massively built blocking walls, within which the wooden boxes were positioned. This form of cruive gave the fish very little chance of avoiding the trap, because the only route upstream was through the traps. However, in the case of the river Ness traps, the fishermen obviously knew the value of allowing some fish to reach their spawning grounds, because the cruives do not block the entirety of the channel.

Summary

If we reconsider Bathgate's statement mentioned at the beginning of this paper we can conclude that although archaeological literature has not been particularly concerned with fish-traps *per se*, there are documentary sources that are particularly relevant to their study. This paper is the first archaeological study of fish-traps for 60 years. It has attempted to investigate Scottish fish-traps by taking a multi-disciplinary approach that has involved documentary sources, archaeological field survey and map analysis to understand their role as an aspect of water management in the rural economy. In addition to those sources listed it should be acknowledged that ethnographic material has provided an insight into the mechanics and working of more recent fish-traps around Scotland, that could not otherwise have been achieved by analysis of the archaeological evidence alone.

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Abstract

The remains of Scottish fish-traps are found scattered around the coastline and along rivers. Their presence has rarely been considered in the archaeological literature, although they survive in large numbers. By combining archaeological field survey, documentary and cartographic research this paper attempts to contextualise the form and function of fish-traps in Scotland.

Zusammenfassung

Die Überreste von schottischen Fischreusen können verstreut entlang der Küste und an Flüssen festgestellt werden. Ihr Vorkommen findet in der archäologischen Literatur kaum Beachtung, obwohl sie in grosser Anzahl vorhanden sind. Mit einer Verbindung von archäologischer Feldbegehung, dokumentarischen und kartographichen Untersuchungen versucht dieser Artikel Form und Funktion von Fischreusen in Schottland in einen Zusammenhang zu bringen.

Résumé

Les restes d'écossais de piège à poisson sont trouvés dispersés autour du littoral et le long des fleuves. Leur présence a été rarement considérée dans la littérature archéologique, bien qu'ils survivent dans la grande quantité. En combinant l'enquête archéologique de champ, la recherche documentaire et cartographique cet article essaye à contextualiser la forme et la fonction du piège à poisson en Écosse.

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