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AN EXTENSIVE SYSTEM OF MEDIEVAL EARTHWORKS IN NORTHEAST ICELAND

A complex system of interconnected earthworks, preserved primarily in moorland pastures, was recorded in the county of Suður-Þingeyjarsýsla, NE-Iceland. Indications are that these earthworks date from the Middle Ages and that they were a common feature of the landscape all over Iceland, but have survived relatively well in this region. Studies of aerial photographs revealed about 150 km of earthworks. They form a pattern which suggests a role as boundaries between adjacent farms and fencing off their homelands from the commons. Gaps in the pattern suggest that other 50-100 km may have disappeared due to soil erosion or solifluction.

An ongoing project aims to fully map these earthworks, date them, establish their function and to analyse their implications for the socio-economic and environmental history of the first centuries of settlement in Iceland.

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Introduction

Over the past two centuries ancient earthworks on the hillsides and moorlands above the present settlement in northeastern Iceland have been recorded by a variety of authors, including farmers, parish-priests, natural-historians and antiquarians.

Although these earthworks have not been the subject of systematic studies, two different functions have been ascribed to them: on the one hand they are supposed to have fenced off pastures and on the other they are supposed to have been made as tracks, for both people and livestock. In accordance with this they are variously called "vörslugarðar" and "varnargarðar" (lit. dykes for keeping or obstructing), "merkjagarðar" (lit. boundary dykes), "göngugarðar" (lit. dykes for walking), "reiðgarðar" (lit. dykes for riding), or "rekstrargarðar" (lit. dykes for herding) and even "grannagarðar" (lit. neighbours' dykes) and "engjagarðar" (lit. meadow dykes).[1]

In the 19th century some of the more monumental earthworks had become the stuff of folklore, their making attributed either to famous historical personages or supernatural beings.[2] As a rule 19th cen-

1 Early occurrences of most of these terms are in SSÞ, 183.

2 ÞJÁ II, 95, 137-38; IV, 141; SSÞ, 183.

tury commentators preferred the explanation that the earthworks were built as tracks, arguing that in regions of heavy snowfall such dykes would be very useful as a means of driving sheep to pastures and to make travel easier.[3] It is clear from their writings that these earthworks were long out of use, so that no memories had survived of their original function.

In the 20th century, several attempts have been made at dating and even mapping individual dykes (see below) and while they have invariably been shown to be high-medieval in date, no systematic attempt has been made to understand their function.

The extraordinary number and length of the earthworks in Suður-Þingeyjarsýsla has long been known and commented on by observers.[4] This region was therefore a natural place to start a systematic survey of the earthworks.

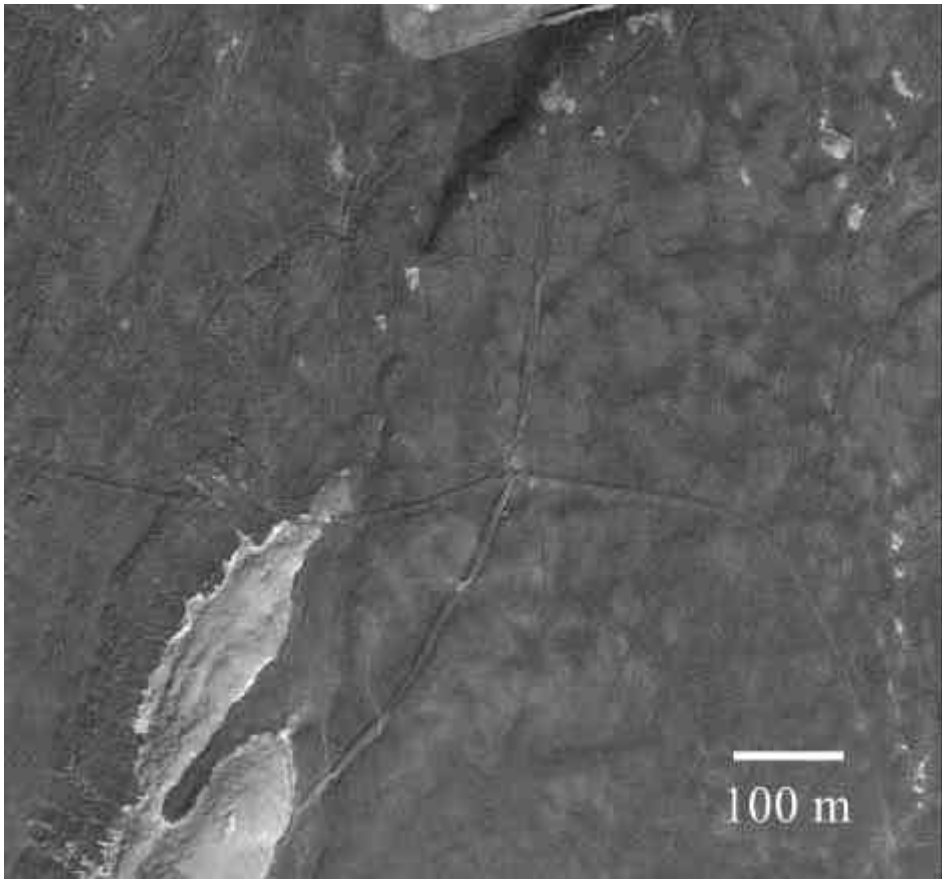

Fig. 1: A vertical aerial photograph showing two earthworks crossing each other in the Múlaheiði. Tveir garðar sem liggja í kross á Múlaheiði. (With permission of Landmælingar Íslands).

3 E.g. SSÞ, 183

4 E.g. Sigurður Þórarinsson 1982.

Having established that most of the earthworks are clearly visible on standard aerial photographs (fig. 1) we decided to use available series of aerial photographs to make a survey over a large area. This paper reports the main results of this initial survey. Although much ground-truth remains to be worked out, the aerial photographs reveal the general characteristics of the earthwork system. Reporting these initial results will help formulate further research questions and will hopefully stimulate a search for similar systems elsewhere in Iceland and neigbouring countries in and around the North Atlantic.

Study area

The study area (1200 km^2, Fig. 2) stretches from the outlet of Lake Mývatn in the south to the tip of Tjörnes peninsula in the north. The highlands east of the presently inhabited area mark the eastern boundary of the study area and the River Skjálfandafljót forms its boundary to the west. The study area was limited to that area where earthworks occur as an interconnected system. Outside the study area earthworks seem to be scarce and only seen as individual dykes.

The coastal lowland plain Aðaldalur is divided into several valleys towards the south (Fig. 2). These are from the west:

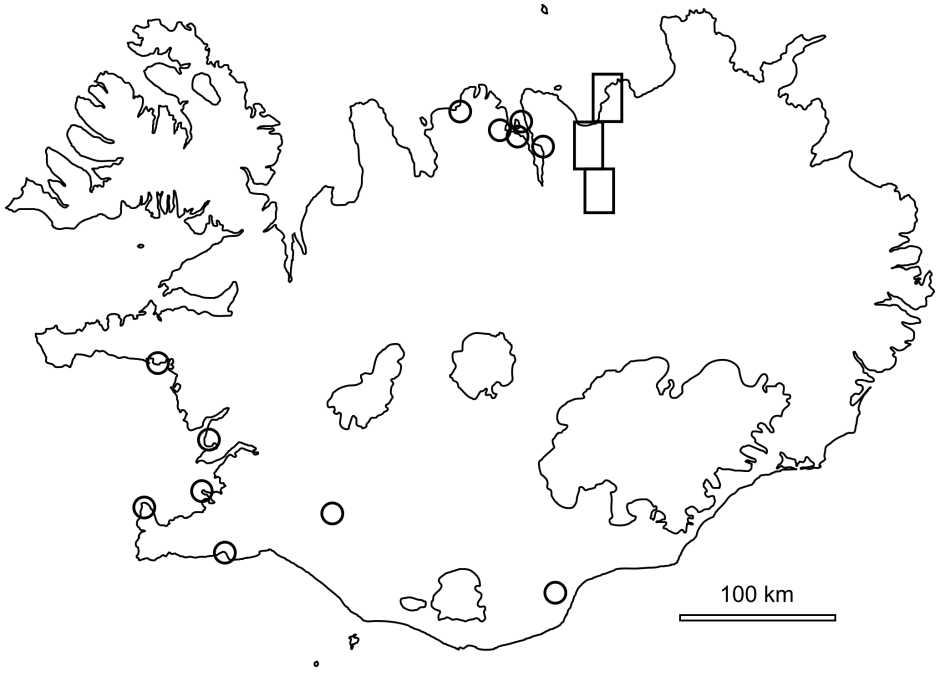

Fig. 2: The study area. The squares mark the parts of the study area that are mapped in figs. 3-5. Locations of other ancient earthworks mentioned in the text are indicated by circles.
Rannsóknarsvæðið. Ferhyrningar marka svæðin sem sýnd eru á 3.-5. mynd. Hringir marka staði þar sem forn garðlög hafa fundist og nefnd eru í greininni.

Bárðardalur, Seljadalur, Reykjadalur, Þegjandadalur, Laxárdalur and Reykjahverfi. The valleys are separated by low hills lying in a N-S direction, forming extensions of the highlands to the south. The hills are, listed from the west: Fljótsheiði, Narfastaðafell, Laxárdalsheiði; which divides into two towards the north: Múlaheiði and Þorgerðarfjall, and finally Hvammsheiði. Most of the hills rise only 100-300 m above the coastal plain although single knolls are higher (416 m). Most of the present farms are situated along both sides of the valleys, at the foot of the hills. The Tjörnes area is somewhat different. The central highland of the peninsula slopes gently towards the ocean on the west side and there is no coastal plain. The farms are situated along the western margin of the peninsula. The inhabited part is cut by several small rivers that have eroded deep gullies.

The soil in the dry hilly part of the study area is only about 1 m thick. As steep slopes are uncommon the soil cover is more or less unbroken, except for the highest points where erosion by wind and water has exposed the underlying moraine. The hills are vegetated by dwarf shrubs (*Betula nana*, *Empetrum sp.*, *Vaccinium spp*.) and lichens (*Cladonia* and *Alectoria*) are prominent, especially on the hilltops. Small bogs occur in depressions, becoming more extensive towards the highlands in the south. Remains of birch *Betula pubescens* woodlands occur in several places, mostly in the hillslopes but generally the study area is characterized by short vegetation that does not obstruct the visibility of the earthworks.

Methods

Standard black and white aerial photographs taken on the 2nd and 10th September 1976 were used for the study. We used contact copies with about 60% overlap and in the scale of 1:35,000. Aerial photographs taken by the US Air Force on the 24th of August 1960 were used for comparison. The photographs were studied stereographically by two people simultaneously using a Wild Aviopret (APT 2) 30-50x zoom stereoscope fitted with a "discussion tube" alternatively using transmitted and incident lighting. The earthworks were traced on an overlaid transparency. These were then reduced to the scale of 1:50,000 and traced on a map (Army Map Service) of that scale. As the photographs were not orthophotos, this method may have caused some bias as to the exact location of some of the earthworks.

Results

Altogether about 150 km of earthworks were observed (Table 1, Figs. 3-5). By adding the obvious gaps, where earthworks have disappeared because of erosion or construction work, the total length of earthworks in the study area can be estimated as having been well over 200 km.

The vast majority of the earthworks were found in the moorland pastures, and only a few were located on the lowland plain. The preservation varied much within the area but the earthworks in the

TABLE 1. Total lengths (km) of earthworks seen on aerial photographs of the study area. Earthworks surrounding hayfields in the immediate vicinity of farmhouses are excluded. / Samanlögð lengd garða sem sjást á loftmyndum af rannsóknarsvæðinu. Túngarðar ekki teknir með.

Area/Svæði	Length/Lengd (km)
Tjörnes North of Húsavík	20.2
Tjörnes South of Húsavík	10.7
Reykjahverfi East of Reykjakvísl	18.3
Hvammsheiði	20.7
Múlaheiði - Þegjandadalur	11.5
Fljótsheiði	38.2
Narfastaðafell - Reykjadalur	13.0
Laxárdalur	18.2
TOTAL	150.8

southern (higher) part of the study area were more fragmented than those in the northern (lower) parts of the area.

The pattern that emerges is a system of more or less square enclosures, apparently surrounding individual farms (Figs. 3-5). A distinction can be made between earthworks that run parallel to the contours of the landscape and those that go perpendicular to the slopes. These can be termed horizontal and transverse earthworks respectively. The horizontal earthworks typically follow the edges of the moorlands and tend to fence the farms off from the overlying moors, whereas the transverse earthworks form boundaries between adjacent farms. One exception to this system is found in Hvammsheiði, where a number of earthworks run across the moorland from one river (Laxá) to the other (Reykjakvísl) (Fig. 4). In Tjörnes, Fljótsheiði and Reykjadalur there are also examples of two horizontal earthworks running side by side without evidence of a farm between them. This may indicate a more complex function or two systems of a different age.

The transverse earthworks seem more poorly preserved than the horizontal ones, probably because by running downhill transverse earthworks are easily eroded by water and soil slumping.

Where the transverse and horizontal earthworks enclose abandoned farmsteads (as in Þegjandadalur) the farmstead homefield is normally enclosed by a smaller dyke. A variation occurs at several farms in the upper reaches of Laxá river where a much larger area than the homefield is enclosed by a separate dyke. Many of the more fragmented dykes observed in the lowland areas seem to be of this kind. These home- and infield dykes are as a rule less substantial than the earthworks on the moorlands. From the still rather limited field observations we have made, it seems that a typical earthwork is about 6 m wide, 0.7-0.8 m high with a 2-7 m wide trench on one or both sides (Table 2, Fig. 6). The total width of the construction, including the trenches, may therefore reach 18 m.

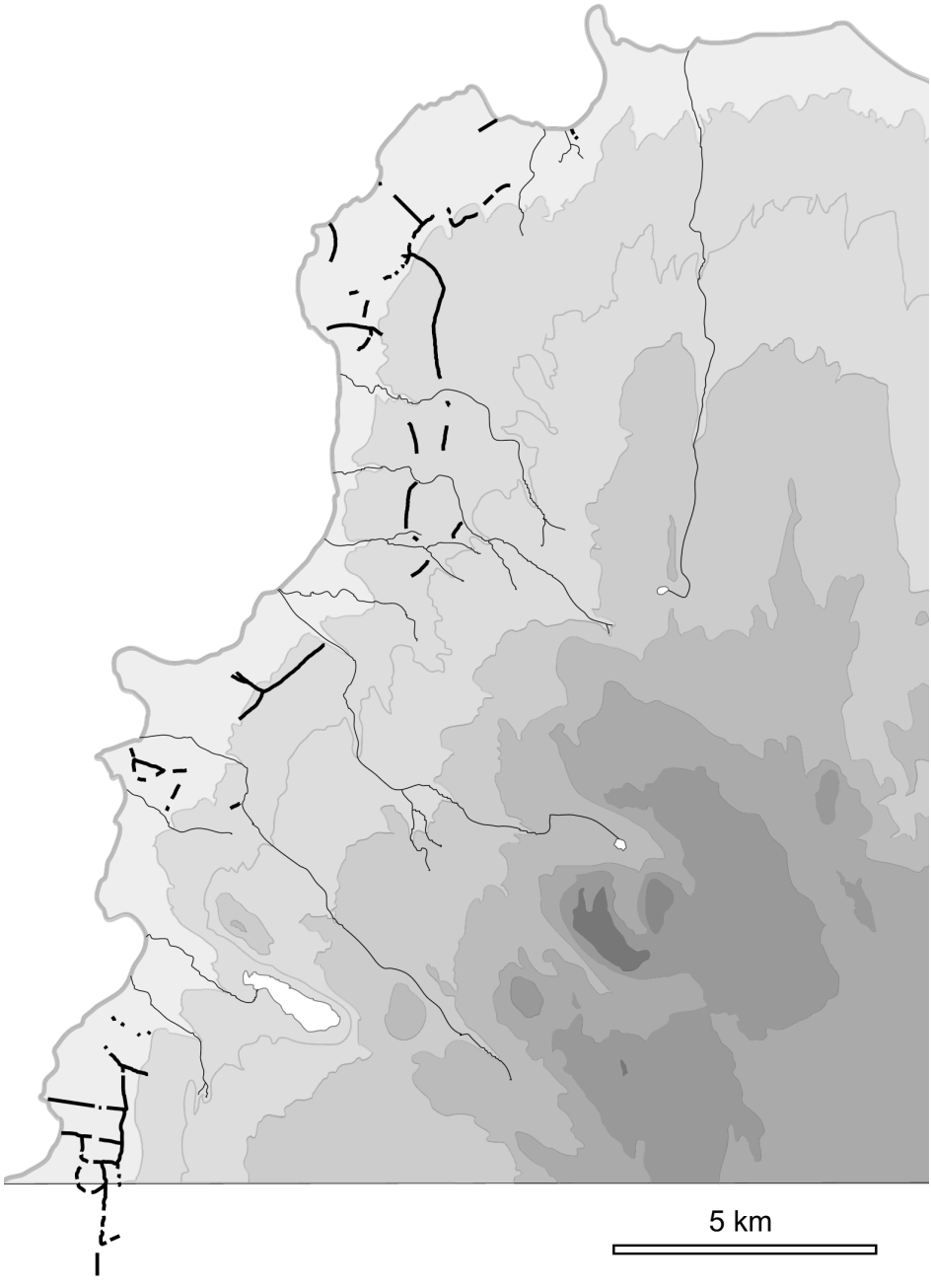

Fig. 3: Earthworks visible on aerial photographs of the northern part of the study area (Tjörnes). Contours at 100 m intervals.
Garðar sem sjást á loftmyndum af norðurhluta rannsóknarsvæðisins (Tjörnesi). Hæðarlínur með 100 m millibili.

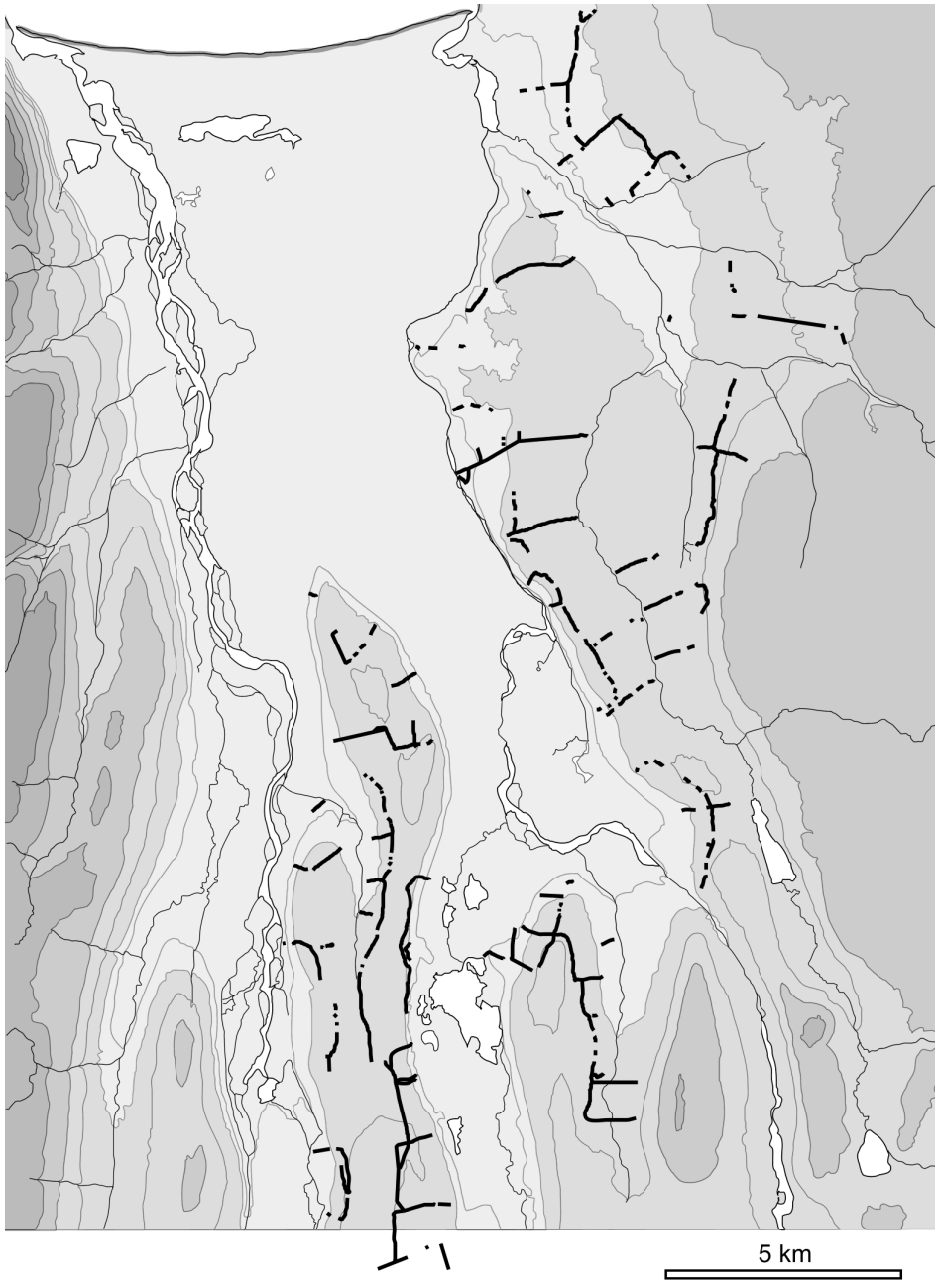

Fig. 4. Earthworks visible on aerial photographs of the central part of the study area (Aðaldalur and environs). First contour at 70 m.a.s.l. Other contours every 100 m.
Garðar sem sjást á loftmyndum af miðhluta rannsóknarsvæðisins (Aðaldal og nágrenni). Neðsta hæðarlína við 70 m.y.s. aðrar hæðarlínur með 100 m millibili.

Fig. 5: Earthworks visible on aerial photographs of the south part of the study area (Reykjadalur, Seljadalur, Laxárdalur). Contours at 100 m intervals.
Garðar sem sjást á loftmyndum af suðurhluta rannsóknarsvæðisins (Reykjadal, Seljadal og Laxárdal). Hæðarlínur með 100 m millibili.

Quite frequently only a trench is visible on the photographs. We hypothesize that in such cases the central earthwork has been eroded, or perhaps there was only a trench on one side and the earthwork has become completely flattened out.

A profile was measured across one of the horizontal dykes in Fljótsheiði (Fig.

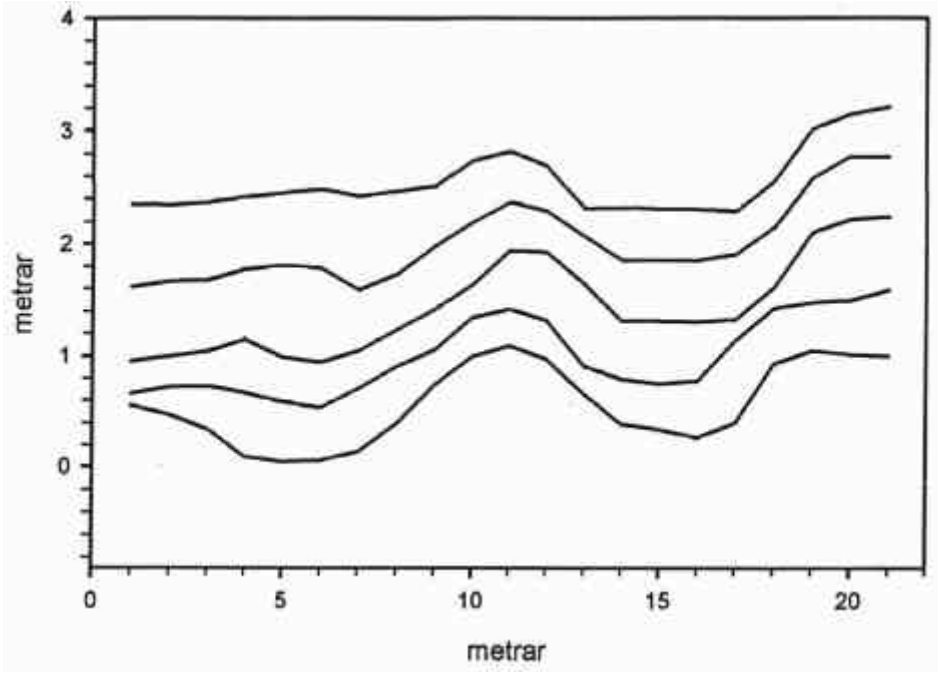

Fig. 6: Five profiles measured at 10 m intervals across an earthwork at Fljótsheiði.
Hæðarmælingar á fimm þversniðum með 10 m. millibili yfir garð á Fljótsheiði nálægt þjóðveginum.

6). The earthwork proper was 5 m wide and rose 0.8-1.0 m above the bottom of the trenches. The infield dyke at Hofstaðir in Mývatn (which was investigated during archaeological excavations on the farm in 1999), is much less substantial, some 2 m wide at the base and 1 m high, with only a 0.6 m wide and 0.3 m deep ditch on the outside.[5]

Discussion

The earthwork system in our study area forms the most extensive archaeological feature known in Iceland. Three main conclusions can be drawn from the available data:

(1) the fact that the earthworks form a coherent system suggests that they were built and maintained in the same period;
(2) the pattern of earthworks suggests that they reflect property division and
(3) the earthworks were built as fences to manage the pastures.

Although the width might well have made the earthworks useful as walkways, riding paths or herding routes, this must have been a secondary function as the dykes only rarely connect points which people or animals might actually have been travelling between. It is also likely that this function only became viable after the earthworks began to collapse and became flattened out.

The date of the dykes has not been determined yet. A mid-nineteenth century parish description from the area

[5] Lucas 1999.

TABLE 2. Widths (m) of earthworks and their accompanying trenches at some field observation sites in the study area. / Breidd (m) garða og pælunnar sitt hvorum megin skamkvæmt mælingum á jörðu niðri.

		Trench	Rise	Trench	
Hofstaðir, Laxárdalur	W	3.5-4	3.5-4	4-5	E
Hofstaðir (infield/túngarður)	W	0	2	0.6	E
Kollás 1, Laxárdalsheiði	N	6	6	4	S
Kollás 2, Laxárdalsheiði	N	0-1	6	6	S
N of Narfastaðir 1, Reykjadalur	N	3	6	3	S
N of Narfastaðir 2, Reykjadalur	W	6	6	3	E
Above Lyngbrekka, Reykjadalur	N	2	6	6	S
Beinisstaðir, Laxárdalur	W	0	4	0	E
Fljótsheiði, south	W	4.5-4	5	2-5	E
W of Langavatn, Reykjahverfi	N	6	4	2	S
S of Hveravellir, Reykjahverfi	N	4	7	7	S
S of Hveravellir, Reykjahverfi	N	3	6	3	S

describes the earthworks as ancient.[6] A late 13th century charter describing the boundaries of the farm Garður in Aðaldalur mentions the great earthwork that runs down the Fljótsheiði moor.[7] A charter of a similar date mentions an earthwork fencing off the whole scattered hamlet of Selvogur in Southwest Iceland from its outfields.[8]

Inspection of an erosion face of a dyke on Laxárdalsheiði and another running past Saltvík south of Húsavík suggests that those dykes had collapsed well before the deposition of a tephra dated to 1477 A.D.[9] The infield dyke at Hofstaðir has also been dated to well before 1477. Before that it had seen two major repairs but had still collapsed completely before the tephra was deposited.[10]

Dating by tephrochronological methods has confirmed the age of two similar earthworks in South Iceland, Bjarnagarður in Landbrot (constructed around 1200 A.D., original length about 7.7 km),[11] and Þrælagarður in Biskupstungur (around 900 A.D.).[12] A boundary dyke in Seltjarnarnes has also been dated to before 1226 A.D.[13]

The earthwork system has been particularly well preserved in our study area, probably because of a combination of a flat landscape and dry climate. Similar earthworks have been reported from a number of locations in the Eyjafjörður area, including the island of Hrísey,[14] and the districts of Svarfaðar-

6 SSÞ, 183.

7 DI II, 3-5.

8 DI II, 124.

9 Árni Einarsson, field notes.

10 Lucas 1999.

11 Sigurður Þórarinsson 1982.

12 Bryndís G. Róbertsdóttir & Haukur Jóhannesson 1986.

13 Jóhann Helgason 1995.

14 Orri Vésteinsson 1999.

dalur,[15] Höfðahverfi,[16] Árskógsströnd[17] and Fljót;[18] also from Miklaholt in Snæfellsnes[19] and Melasveit in Borgarfjörður.[20] There is every reason to expect the discovery of similar earthwork systems in other parts of the country.

Grágás, the collection of laws from the Icelandic commonwealth preserved in mid- and late 13th century manuscripts, indicates that earthwork construction was an integral part of the running of a medieval Icelandic farmstead.[21] A standard earthwork had to be five feet thick at the base and three feet across the top and reach to the shoulder level of a man of average height. A standard gate had to be an ell and a fathom wide (ca. 2.5 m), turning on iron hinges and it was to be possible to open it from horseback.[22] Three months a year, two months in spring and one month in late summer, earthwork construction was to be given priority over most other work. In Jónsbók, the lawbook introduced in 1281, earthworks were still treated in much the same way as in Grágás, but according to an amendment ("réttarbót") from 1294 the lack of a dyke was no longer a defense for unlawful grazing on another's property.[23]

Our hypothesis is that the system of earthworks described in this paper dates from the Commonwealth period and that the legislation reflects a countrywide system of property divisions and grazing management which had already become outdated around 1300.

In this paper we have reported the initial findings of an ongoing project. The next step will be to collect historical data on the location and function of individual earthworks, primarily from place name inventories and boundary descriptions. Fieldwork will be needed to look for earthworks that are not visible on the aerial photographs and to use tephrochronological methods to determine how and when the earthworks were constructed. A final step will be a synthesis of the data in order to explain the function of the earthworks and see what light they throw on the social and economic structure of medieval Iceland.

Acknowledgements

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15 Kristmundur Bjarnason 1978, 32-39; ÍSLEIF.

16 SSÞ, 37; ÍSLEIF; Jón Bjarnason 1982, Valdemar Kristjánsson 1983.

17 ÍSLEIF; Helgi Hallgrímsson 1982.

18 Páll Sigurðsson 1979.

19 FF, 309.

20 FF, 273.

21 Grágás 1b, 90-91, 95-96, 120-121; Grágás II, 450-453.

22 Grágás 1b, 90.

23 Jónsbók, 282.

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FF: *Frásögur um fornaldarleifar 1817-1823*, Sveinbjörn Rafnsson gaf út, Reykjavík

SSÞ *Þingeyjarsýslur, Sýslu- og sóknalýsingar Hins íslenska bókmenntafélags* 1839-1844, Reykjavík 1994

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Íslenskur útdráttur

FORN GARÐLÖG Í SUÐUR ÞINGEYJARSÝSLU

Ýmsar heimildir frá síðustu einni og hálfri öld greina frá fornum garðlögum á heiðum uppi í Suður Þingeyjarsýslu. Engar beinar heimildir virðast til um aldur garðanna eða hlutverk, ef undan er skilið landamerkjabréf frá 13. öld sem nefnir þann hinn mikla garð er gengur ofan eftir Fljótsheiði. Flestir seinni tíma heimildamenn sem lýsa þingeysku görðunum, eða samsvarandi görðum við utanverðan Eyjafjörð, álíta þá hafa verið einhvers konar vegi, og er venja að kalla þá göngugarða. Þessi skýring er að því leyti nærtæk, að garðarnir eru útflattir (allt að 7 m breiðir) og liggja langar leiðir, oft fleiri kílómetra. Á síðari öldum hafa þeir nýst sem samgöngubót í

snjóþungu landi. Eftir að hafa séð þessi garðlög á loftmyndum kviknaði hjá okkur áhugi á að kortleggja þau. Athuganir á nokkrum görðum á vettvangi sumarið 1999 sannfærðu okkur um að loftmyndaskoðun myndi henta vel til að fá góða yfirsýn yfir garðlögin. Við öfluðum okkur loftmynda af nær allri sýslunni austan Skjálfandafljóts og norðan Stangar í Mývatnssveit og skoðuðum þær á kerfisbundinn hátt í þrívídd. Í þessari grein eru niðurstöður loftmyndatúlkunarinnar kynntar. Niðurstöðurnar eru fyrsta skrefið í rannsóknaverkefni sem búast má við að taki nokkur ár. Skoðun garðanna á jörðu niðri mun án efa fylla í ýmsar eyður í þeim gögnum sem hér eru kynnt - við vitum þegar um garða sem ekki sjást á myndunum. Okkur þykir þó ómaksins vert að birta fyrstu niðurstöður, því að þær sýna vel hve umfangsmikil garðlögin eru. Einnig sýna þær garðlagamynstrið í stórum dráttum, en af því má draga ályktun um hlutverk garðanna. Alls sáust um 150 km af görðum á athugunarsvæðinu, og eru þá túngarðar og gerði ekki talin með (Tafla 1). Víða eru eyður í garðamynstrið og giskum við á að 50-100 km til viðbótar hafi horfið vegna jarðvegseyðingar, en garðarnir virðast hvarvetna gerðir úr torfi einvörðungu. Garðarnir mynda nær samfellt kerfi ofan frá Hofstöðum í Mývatnssveit norður á ystu strendur Tjörness. Aðeins vantar garða á nokkurra kílómetra kafla í utanverðum Laxárdal milli Þverár og Brúafossa. Samfella garðlaganna bendir til þess, að garðarnir séu flestir frá sama tíma. Frumathuganir á gjóskulögum benda til þess, að þeir hafi verið hættir að gegna upphaflegu hlutverki sínu og fallnir talsvert fyrir seinni hluta 15. aldar.

Núverandi breidd garðanna er á bilinu 3,5-7 metrar (Tafla 2), og venjulega er 2-7 m breið pæla hvorum megin sem byggingarefnið hefur verið stungið úr. Garðarnir standa nú aðeins nokkra tugi sentimetra upp yfir landið í kring (6. mynd).

Til hægðarauka má gera greinarmun á görðum sem liggja lárétt í landinu, oftast langs ofan við heiðarbrúnir, og görðum sem liggja þvert á landið, þ.e. beint upp eftir brekkum og hlíðum. Garðarnir virðast hafa myndað kerfi hólfa, sem bendir til þess, að um vörslugarða hafi verið að ræða. Þvergarðarnir hafa þá verið á landamerkjum milli bæja, en langgarðarnir hafa hugsanlega girt heimalönd frá afrétti. Sums staðar, t.d. á Tjörnesi, eru garðlögin flóknari, sem gæti bent til flóknara hlutverks eða mis-gamalla garðlaga.

Aldur og umfang garðanna í Suður Þingeyjarsýslu gæti komið heim og saman við þá miklu löggarða sem Grágás, lagasafn þjóðveldistímans, greinir frá. Löggarðar voru staðlaðir garðar milli granna og milli jarða og afréttar. Frekari rannsóknir á aldri og byggingarlagi garðanna þarf til að prófa þá tilgátu, að um eitt og sama fyrirbærið sé að ræða.