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Pinpointing DON ANDERSON'S Scottish Paternal Ancestral Genetic Homelands

A Scottish Case Study

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Introduction

A simple painless commercial ancestral Y chromosome DNA test will potentially provide one with the names of many hundreds of individuals with whom one shares a common male ancestor, but what often perplexes people is how one can match individuals with many different surnames? The answer is quite simple. Roughly 1,000 years ago one's direct medieval male ancestor, the first for example to call himself 'MacCulloch' was living in close proximity to others with whom he was related but who inherited other surnames like Hannah, MacWhirter, MacCracken, MacCulloch and Ferguson. Given that 1,000 years have passed since paternally inherited surnames became common, there will be many descendants of those individuals some of whom will today undergo commercial ancestral Y-DNA testing. Hence the surnames of one's medieval ancestor's neighbours will be revealed in today's Y-DNA test results.

Early 19th century census data demonstrates that Scottish surnames could still be found concentrated in the areas from which they originated. One can therefore use census data to determine the origin of the surnames that appear in one's Y-DNA results, identifying an area common to all, and reveal ones '**Paternal Ancestral Genetic Homeland**.' The genetic homeland is the small area (usually within a 5 mile radius) where one's ancestors lived for hundreds if not thousands of years. It is the area where one's ancestor first inherited his surname surrounded by relatives who inherited others. It is the area where ones ancestors left their mark in its placenames, its history, and in the DNA of its current inhabitants. Since modern science can pinpoint a paternal ancestral genetic homeland it can also be used to confirm it by DNA testing individuals from the pinpointed area.

Notes of caution!

1. In Ireland each of the estimated 1,500 distinct surnames had a single founding ancestor, that's an estimated 1,500 Adams from whom anyone with Irish ancestry can trace direct descent. But science has demonstrated that only 50% of individuals with a particular Irish surname will be related to the surnames founding ancestor (the surname Adam), the other 50% of males will have an association that has arisen as a result of what are called 'non-paternal events' usually a result of adoptions or maternal transfer of the surname. Since Scotland adopted a similar Clan based society these scientific findings can be applied to Scotland and people with Scottish paternal ancestry.
2. Often people are looking for their DNA results to trace back to a specific area. One must remember that the results typically reflect one's ancestor's neighbours from around 1,000 years ago. As a result, if one's Scottish ancestor was descended from an Anglo-Saxon settler, Viking raider, or 12th Century Norman one's DNA results will reflect earlier English, Welsh, French, and possibly Scandinavian origin. One must approach this process with an open mind!

Interpreting the Y-DNA test results

To pinpoint a paternal ancestral genetic homeland one must first identify the surnames that appear as one's closest Y-DNA genetic matches, see **Figure 1**. Those surnames, particularly one's that recur throughout one's Y-DNA results will typically reflect the surnames of one's medieval ancestral neighbours. The test subject's closest genetically recurring surname matches as revealed in the FTDNA databases are detailed in **Figure 2**.

111 Marker Matches				
Genetic Distance	Last Name	Earliest Known Ancestor	Y-DNA Haplogroup	Terminal SNP
2	McIntosh	G. McIntosh1700 LochTayPerthshireSCT BIGY A17455	I-Y12715	Y12715
9	Henderson	peter henderson 1818 ?	I-M223	
9	Thompson		I-M223	
9	McCavour		I-M223	
9	McGinnis	Daniel McGinnis, 1830-1886	I-Y4751	Y4751
9	McGuiness	Daniel McGennis b1800 d 1841	I-BY3810	BY3810
9	Mills	James A. Mills, b. 01/06/1805 SC d. 1890 MS	I-Y4752	Y4752
9	Dimond	Dominick Dimond b.abt 1750 d.PA1809 Y4751+ Y4752-	I-BY3096	BY3096
9	Jobe	Tom1720-John1749-John1773-Tom1798-Joe1855-Walt1893	I-M223	
10	Hanna	Robert Hannah,b.circa 1742(?), prob.Northern Irela	I-Y4751	Y4751
10	Parker		I-M223	
10	Parker	Josey Parker	I-M223	
10	Smith	John Hanna	I-M223	
10	Atchison		I-M223	
10	Arvin	Thomas Arvin b.1714, d.1800, Maryland	I-M223	
10	McGuiness	Michael Magennis Co clare 1781-1871	I-Y4751	Y4751
10	Davis	Samuel Davis, b.1702 and d.	I-M223	
10	Diamond	James Oliver Diamond b1872 WV or PA BIGY BY3096	I-BY3096	BY3096
10	Gunning	John Gunning>Francis b1844 m1868 CoDownIRE BIGY	I-Y12339	Y12339
10	Taggart	Alexander Taggart, b. 1825, d. 1865	I-Y12339	Y12339
10	Gillespie c[illegible] McKenzie	ThoGillespie b1719d1797RowanCoNC>Isaac>ThoT>T BIGY	I-A5860	A5860
10	Gillespie	WmGillespie c1745VA mAlcorn dc1817SumnerCoTN BIGYp	I-M223	

Figure 1: *Snapshot of test subject Anderson's closest genetic surname matches as revealed at the Y-DNA111 marker level. The more Y-DNA markers two people share the more recent their shared paternal ancestor once lived. The test subject's closest Y-DNA matches are* ***NOT RANDOM****, they are dominated by individuals with Scottish or Irish-associated surnames; many of whom have surnames like McGuinness (red arrows), Diamond (green arrows), Parker (yellow arrows) and Gillespie (blue arrows) that recur among his genetic matches.*

Y-DNA Test Results							
		111 Markers			67 Markers		
Test Subject	Haplogroup	-2	-9	-10	-5	-6	-7
Anderson	M223/M284	**McIntosh (x3)**	Thompson (x4)[1] **McGuinness (x6)** Mills (x2)[1] **Dimond (x3)**	Hannah (x3)	Gillespie (x8)[17]	Burgess (x3)[1] **McWhirter (x6)** Malone (x5)[1] McKeen (x2) Rice (x2)	Clark (x2) Dempsey (x2) Ferguson (x5) Gordon x2) **McCracken (x3)** Nelson (x2) Taggart (x2)

Figure 2: *Mr Anderson's closest genetically recurring surname matches are a mix of Irish and Scottish surnames. An examination of the test subject's genetically recurring surname matches reveals that they are dominated by exclusively-Scottish, exclusively-Irish or Scottish/Irish-associated surnames. This mix is not uncommon and reflects the shared ancestry among the Scots and Irish; the results of many population movements back and forth over many millennia. Surnames appear at the point at which they first appear as a genetic match e.g. the first 'McIntosh' to appear as a match shares 109/111 markers, although not every McIntosh will match at that level. Figures in brackets denote the number of individuals with each surname who appear as a Y-DNA genetic match.* [1]*Possible members of the same close family recruited for Y-DNA testing and excluded from further analysis. Surnames in* ***bold*** *occur three times or more at the 111 and 67 marker levels.*

Mr Anderson was adopted and did not know the surname of his biological father prior to taking a commercial ancestral Y-DNA test in 2014. In 2017 his closest recurring matches (by far) are to multiple individuals named McIntosh, which indicates that MacIntosh was indeed the surname of his biological father, see **Figure 1** and **2**. MacIntosh is a Gaelic surname that is associated exclusively with Scotland, where there are an estimated 6 distinct Clans that used that surname, one of whom the test subject is directly descended from, see **Figure 3**.

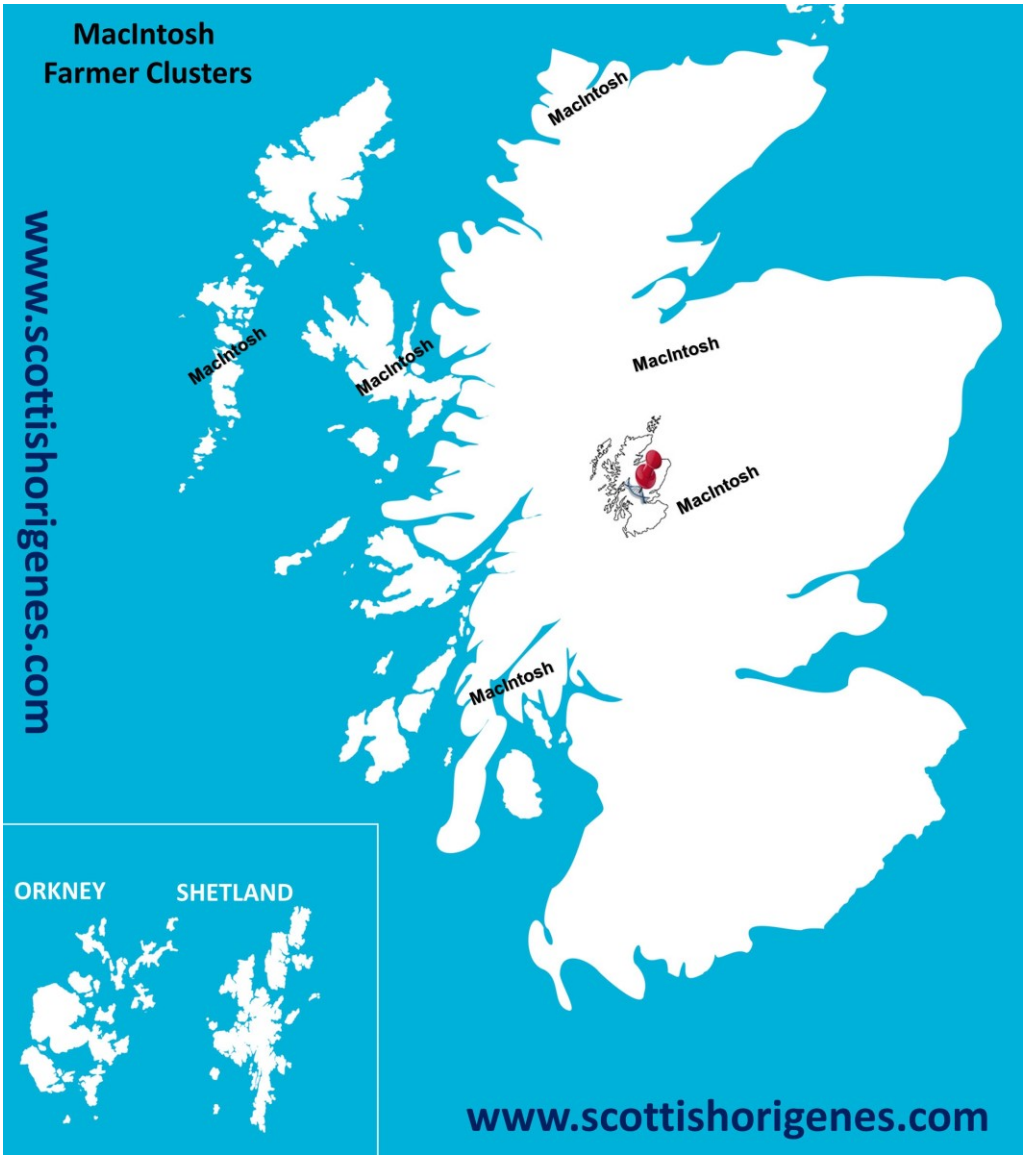

Figure 3: *Scottish MacIntosh. Farmers with each surname still concentrated in early census data in the area where their surname first appeared, and an examination of the distribution of Scottish MacIntosh farmers reveals 6 distinct groups. Each group potentially represents a genetically distinct MacIntosh Clan (unrelated to one another). Since the Y-DNA results confirm that his biological father was a Scottish MacIntosh, then Mr Anderson's paternal ancestry is linked to one of these 6 locations within Scotland. Each surname is positioned in the area where farmers with that surname concentrate in early census data. All of the MacIntosh Clans are associated with the Highlands and Islands of Northwest Scotland.*

A Paternal Ancestral link with Gaelic Southwest Scotland

The method of using genetic surname matches as revealed by commercial ancestral Y-DNA testing to pinpoint a paternal ancestral genetic homeland works by exploiting the link between the Y chromosome, surname and land; which are typically passed from father to son through the generations. In the absence of a link to the land the process becomes more challenging. The link with the land is greatest among the farming community, and since farmers in Scotland can still be found farming the land where their ancestor lived when he first inherited his surname, or where one's ancestor first settled within Scotland, one can plot where farmers with the surnames that appear in one's Y-DNA results cluster and identify an area common to all. This means for example that upon Y-DNA testing a MacIntosh from South Uist will be a genetic match to males with surnames like MacPhee, MacIsaac and MacQueen; surnames associated with the Western Isles of Scotland. While in contrast a MacIntosh from Aberdeenshire will upon Y-DNA testing have genetic matches to males called MacPhail, MacKillican and Fraser; surnames associated with Northern Scotland. Hence it is Mr Anderson's closest and most frequent Scottish genetic surname matches identified in Figure 2 that will reveal where his Scottish paternal ancestors originated.

The surnames Hannah, MacCracken, MacWhirter and Ferguson appeared as the test subject's *closest and most frequent* Scottish-associated matches. Distribution mapping of farmers named Hannah, MacCracken, MacWhirter and Ferguson reveals that they only occur together within the far southwest of Scotland, far removed from the MacIntoshes of the Scottish Highlands and Islands, see **Figure 4**. The Scottish Origenes Surnames and DNA Map of Scotland details where farmers with each surname concentrated in early census data, and an examination of Southwest Scotland as it appears on that map reveals an area dominated by surnames of Gaelic (usually beginning with 'Mac') origin, many of which appear among his closest genetic relatives, see **Figure 2** and **5**.

Ireland lies approximately 21 miles from Southwest Scotland and the test subject's I-M223/M284 Y-DNA Haplogroup is associated with both Southwest Scotland and Southeast Ulster in Ireland, see **Figure 6**. This close proximity between Scotland and Ireland resulted in many movements of people back and forth over millennia, which is evident from the test subject's Y-DNA genetic matches which are a mix of exclusively Irish (McGuinness / Diamond), exclusively Scottish (McWhirter / McCracken), and surnames that can be of Scottish or Irish origin (Hannah), see **Figure 2**. When one examines the distribution of the test subject's closest Irish associated genetic matches it reveals that they are found together within Southeast Ulster where the test subject's I-M223 marker predominates in today's Irish male population, see **Figure 7**.

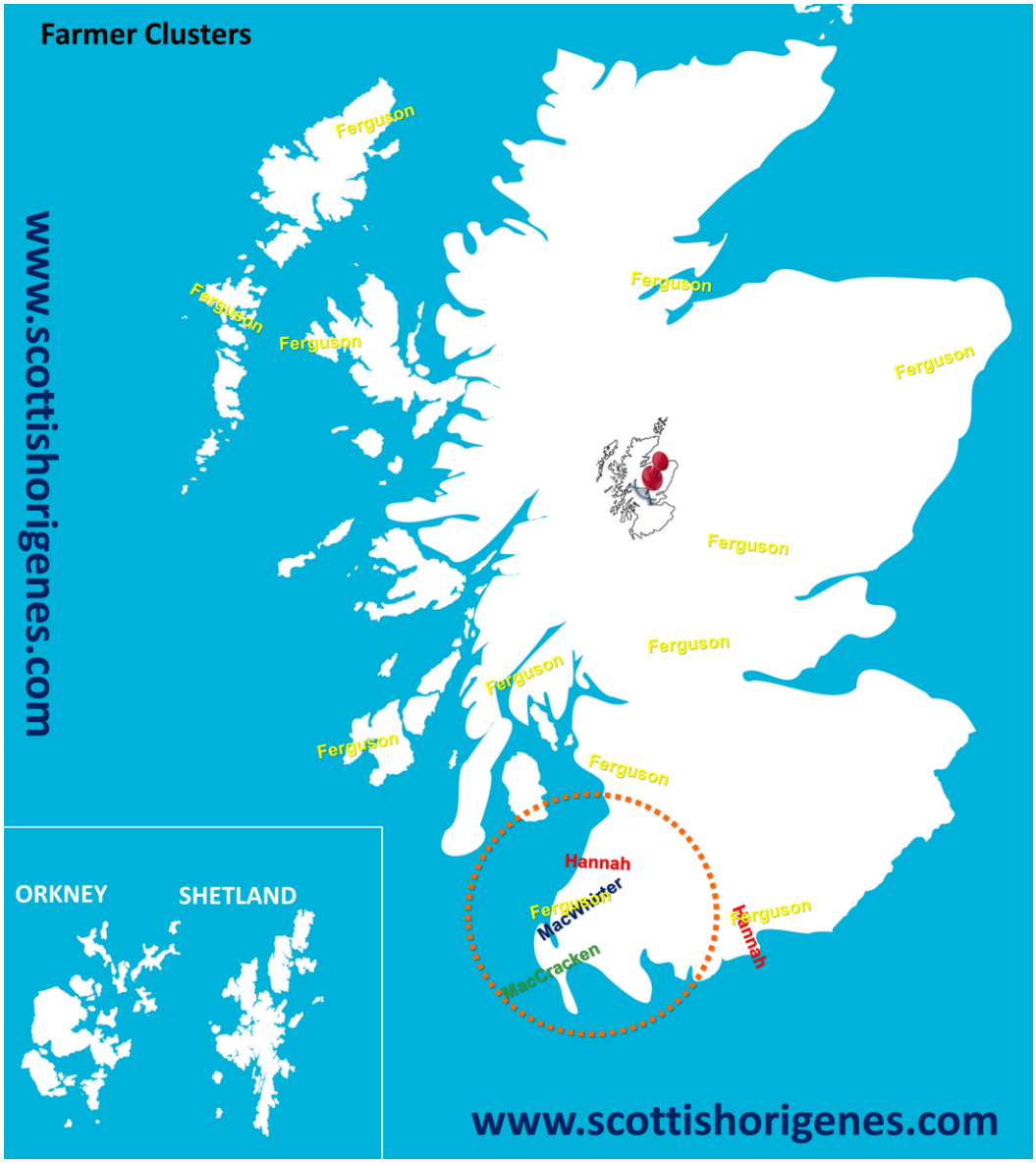

Figure 4: *The test subject's closest Scottish-associated recurring Y-DNA genetic matches reveal a paternal ancestral origin within Southwest Scotland. Distribution mapping of the Hannah, MacCracken, MacWhirter and Ferguson farming communities reveals that they only occur together within Southwest Scotland (**red broken circle**) far removed from the Highlands and Islands where the Scottish MacIntosh surname originates. Each surname has been placed on the map in the area where farmers with that surname concentrated in early census data.*

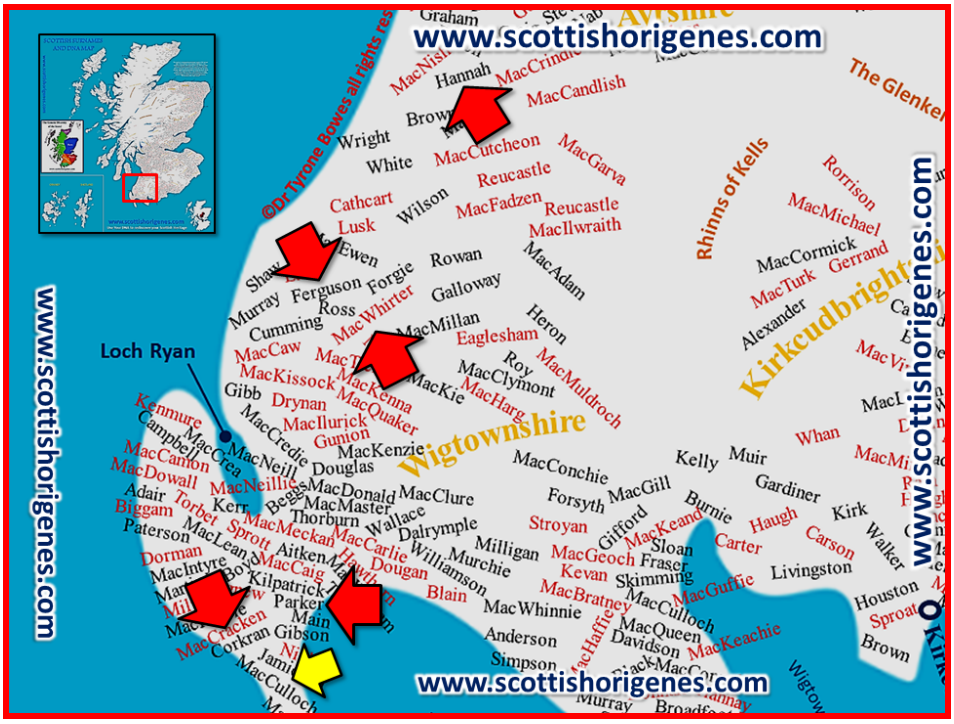

Figure 5: *The Surnames of Southwest Scotland. An examination of Southwest Scotland as it appears on the Scottish Origenes Surnames and DNA map reveals a number of surnames that appear among the test subject's closest genetically recurring matches including Hannah, MacCracken, MacWhirter, Parker and Ferguson (**red arrows**) together with MacCulloch (**yellow arrow**) which appears as a close singular match at the 67 marker level. Each surname has been placed on the map where farmers with that surname concentrated in early census data. Surnames in **red font** (like **MacCracken** and **MacWhirter**) are associated with a single geographical area within Scotland. The Hannah, MacCracken, MacWhirter, Parker, Ferguson and MacCulloch surnames arose among a tribal group of related males living in Southwest Scotland an estimated 1,000 years ago.*

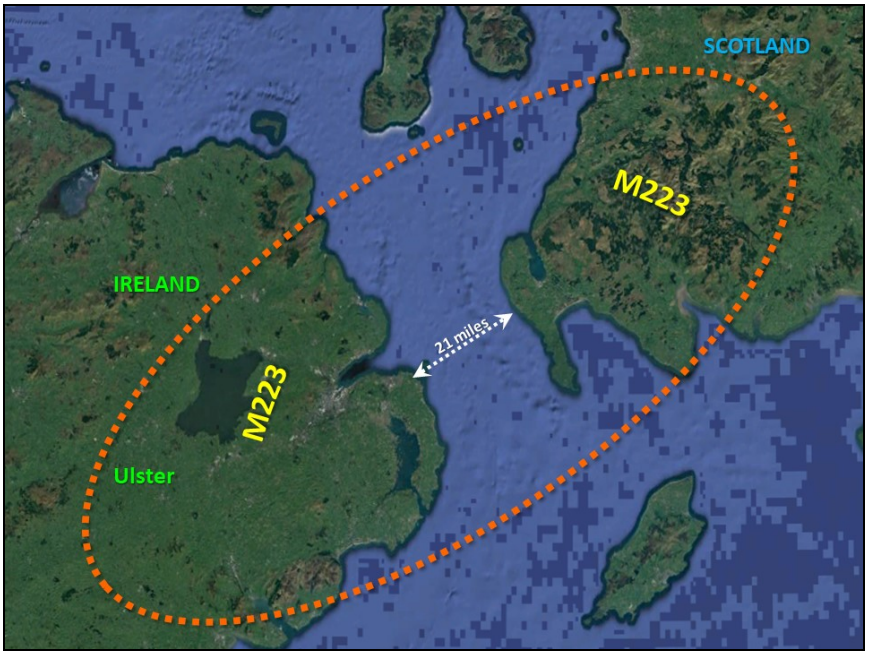

Figure 6: *Distribution of the Scots-Irish I-M223 Y-DNA genetic marker. Extensively Y-DNA Studies have revealed that the test subject's paternal I-M223 haplogroup occurs in equal measure within Southwest Scotland and Southeast Ulster (**orange broken circle**). Given the close genetic relationship between the Scots and Irish (the result of many migrations back and forth over millennia) it is not yet possibly to determine whether I-M222 first appeared within Southeast Ulster in Ireland or Southwest Scotland.*

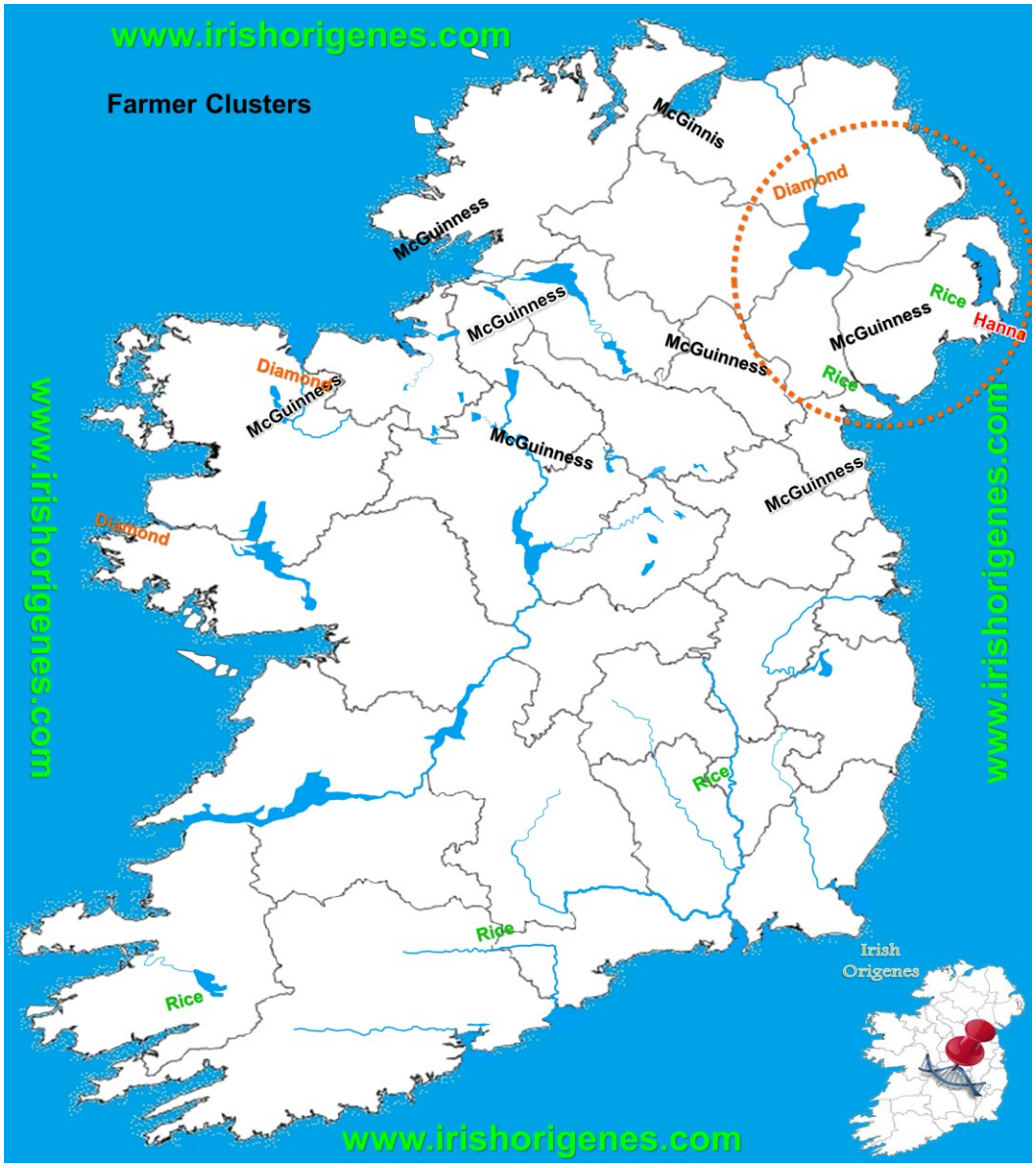

Figure 7: *The test subject's Irish-associated genetically matching surnames are associated with Southeast Ulster. An examination of the distribution of the McGuinness, Hannah, Diamond and Rice surnames which appear among the test subject's closest Irish-associated genetically recurring surname matches reveals that they are found in closest proximity to one another within Southeast Ulster (**orange broken circle**) where today the test subject's I-M223 Y-DNA marker predominates in the local male population.*

The Clan Territories of Southwest Scotland

By examining the locations of the castles and towerhouses that are historically associated with a particular surname, it reveals that Medieval Scotland was a patchwork of territories dominated by notable Clans and Families. Almost everyone with Scottish paternal ancestry will be genetically related to at least one of these prominent Clans or families that once ruled over one's paternal ancestral genetic homeland. An examination of the castles and towerhouses of Southwest Scotland reveals a mix of prominent Clans and Families of predominantly Picto-Gael and Norman origin, see **Figure 8**. The test subject's Gaelic Ferguson and MacWhirter genetic relatives dominated parts of Southern Ayrshire, while the Norman 'Gordons,'

and Viking 'Neilsons' (Nelson), also appear as less frequent genetic relatives, and dominated areas to the west and south respectively, see **Figure 8**.

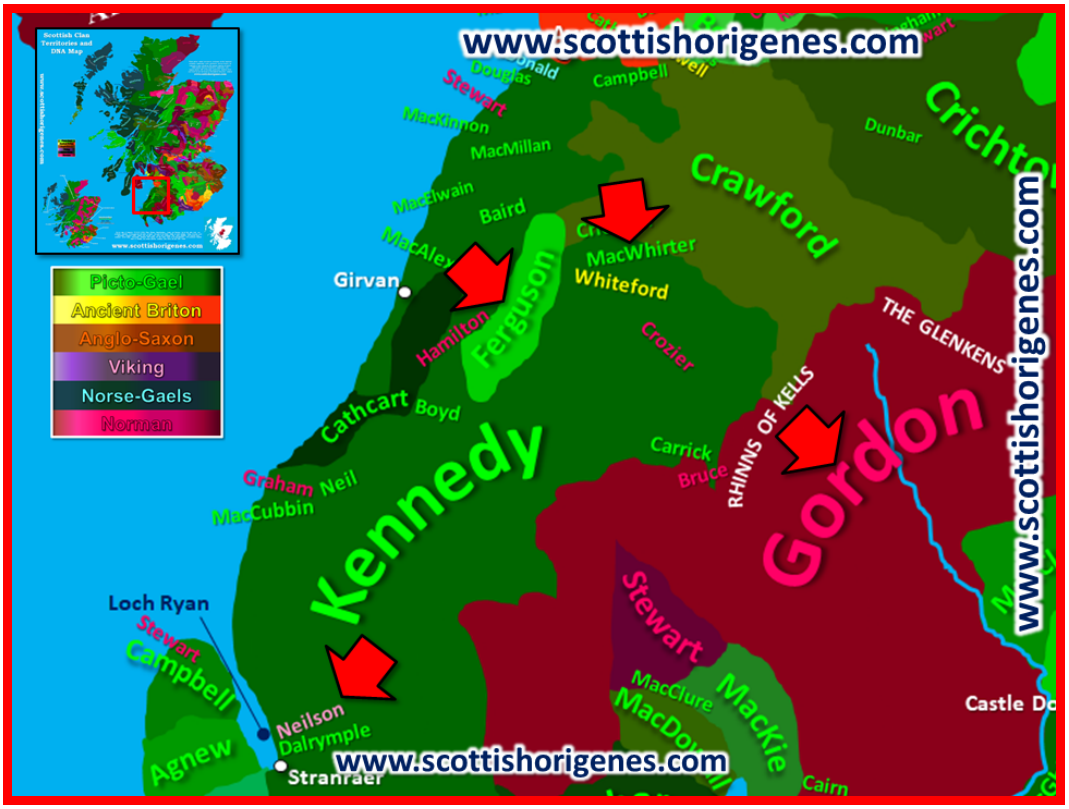

Figure 8: *The principal Medieval Clans and Families of Southwest Scotland. Southwest Scotland was dominated by a variety of Clans and Families that claim Picto-Gael, Viking and Norman origin. The Fergusons, MacWhirters, Neilsons (Nelson) and Gordons all appear among the test subject's closest and most frequent genetic surname matches and dominated various parts of Southwest Scotland (**red arrows**).*

Mr Anderson's Earliest Scottish Paternal Ancestral Genetic Homeland in Southern Ayrshire

Mr Anderson's Y-DNA results revealed that his earliest Scottish paternal ancestral genetic homeland is located within the neighbouring parishes of Ballantrae and Colmonnell in Southern Ayrshire in the far southwest of Scotland, see **Figure 9**. It was in the far south of Ayrshire that Mr Anderson's direct male ancestor lived when surnames first appeared within Scotland an estimated 1,000 years ago. His paternal ancestor lived in a tribal group of Picto-Gaelic males among whom arose the Ferguson, MacWhirter, Hannah, MacCracken, MacCulloch and Parker surnames; all of which occur in the farming community of Ballantrae and Colmonnell parishes in Southern Ayrshire in early census data. When one's ancestors have been associated with an area for a long time one will often find evidence of their long ancestral links with that area in the surrounding castles and placenames. An examination of Southwest Scotland reveals castles and placenames which are historically associated with a number of the test subject's genetic relatives, see **Figure 9**. The test subject's paternal ancestors will also have left evidence of their ancestral links with this area in both the history of this location and in the DNA of the areas current inhabitants.

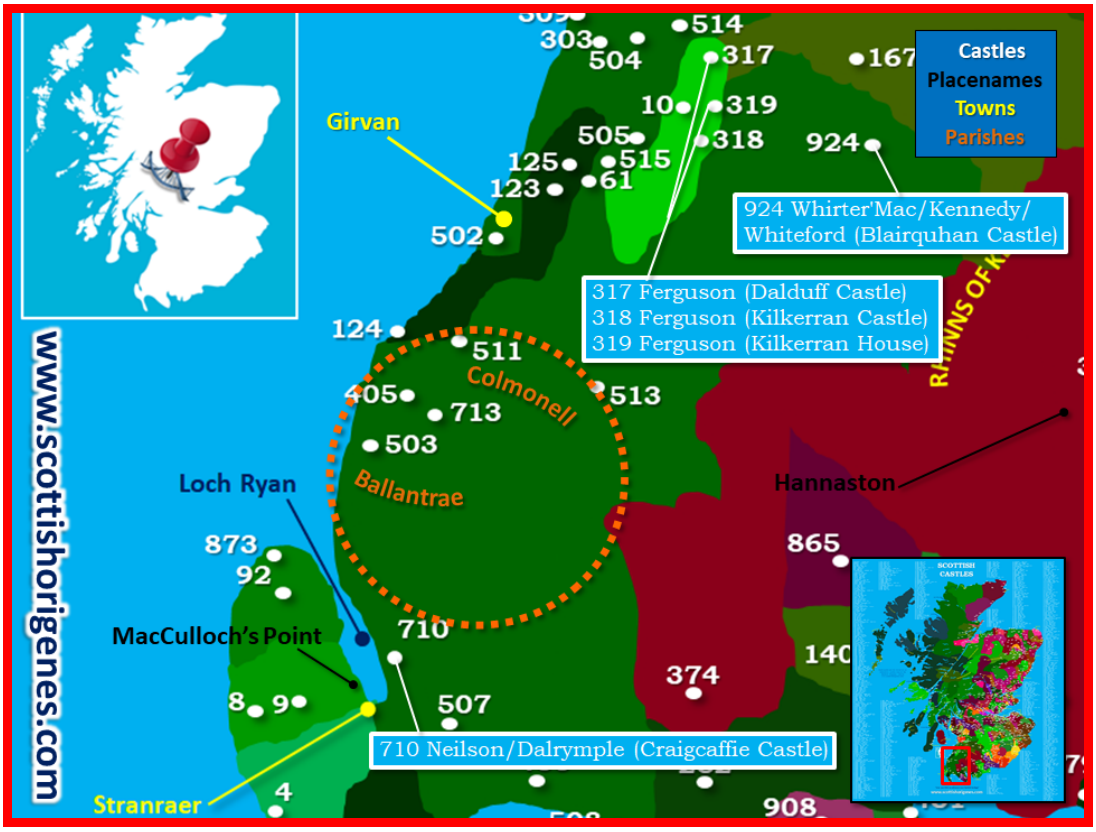

Figure 9: *Mr Anderson's Earliest Scottish Paternal Ancestral Genetic Homeland. Mr Anderson's paternal ancestral genetic homeland (**orange broken circle**) is centred upon the parishes of Ballantrae and Colmonnell in Southern Ayrshire where Ferguson, MacWhirter, Hannah, MacCracken, MacCulloch and Parker farmers reach their highest concentration in early census data. It was there that the test subject's paternal ancestor lived an estimated 1,000 years ago when surnames first appeared within Scotland. Some of the test subject's genetically related Clans and Families have left evidence of their long ancestral links with this area in the surrounding castles and placenames.*

FROM LOWLAND GAEL TO HIGHLAND MACINTOSH

Mr Anderson's Most Recent Scottish Paternal Ancestral link with Perthshire

Autosomal DNA testing and traditional papertrail genealogy identified an individual named 'McIntosh' as the test subject's biological father, which more recent Y-DNA testing confirmed, see **Figure 1**. By using the timetable to a shared paternal ancestor developed at Scottish Origenes, which is based on the number of shared markers at the 67 and 37 marker levels, it reveals that the MacIntosh surname had been in Mr Anderson's biological fathers paternal line for approximately 600 years, see **Figure 10**. However, MacIntosh is a Highland surname, found far removed from the Scottish lowlands of the southwest where Mr Anderson's paternal ancestors originated 1,000 years ago. One must therefore explore the test subject's genetic matches for clues as to where in the Scottish Highlands his paternal ancestor migrated in approximately 1400AD. An examination of Mr Anderson's 67 marker matches reveals that his closest genetic match (excluding MacIntoshes) was to an individual named '*Crerar*,' see **Figure 11**. What is striking is that 'Crerar' and 'MacIntosh' are both surnames

associated exclusively with the Scottish Highlands, see **Figure 12**. What is even more striking is that the Crerar surname associated exclusively with the farmland that lies near Loch Tay in Perthshire, where recent investigations by Mr Anderson has identified an origin for his earliest MacIntosh paternal ancestor, see **Figure 13**.
The event that triggered the migration of the test subject's paternal ancestor in about 1400AD from one Gaelic heartland in Southwest Scotland to another deep in the Scottish Perthshire Highlands remains a mystery, see **Figure 14**. We can also only speculate as to why his paternal ancestor (who may have been named MacWhirter, MacCracken, MacCulloch, Hannah or Ferguson) acquired the MacIntosh surname? It may not necessarily have been a non-paternal event, as new Gaelic surnames (which were usually earned through a notable deed) were still appearing until relatively recently, see **Figure 15**.

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YDNA67		
Genetic distance	**Estimated time to a shared paternal ancestor/years**	**AD**
exact	0-100	1900-
1	100-200	1800-
2	200-300	1700-
3	300-400	1600-
4	400-500	1500-
5	500-600	1400-
6	600-700	1300-
7	700-800	1200-

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YDNA37		
Genetic distance	**Estimated time to a shared paternal ancestor/years**	**AD**
exact	0-200	1800-
1	200-400	1600-
2	400-600	1400-
3	600-800	1200-
4	800-1000	1000-

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Figure 10: *Putting a timeframe to Y-DNA STR matches. The timeframe to a shared paternal ancestor is based on the Y-DNA STR results of a 'closet MacGregor;' someone with the surname 'Valentine' but whose Y-DNA results revealed he is descended from the chiefly line of the outlawed 'MacGregors.' Mr Valentine can trace his paternal ancestry to Montrose in the late 1700's where the Valentines concentrate in early census data, yet his closest Y-DNA genetic match is to the current chief of Clan MacGregor who originate near Loch Lomond. This means that his paternal ancestor had to have changed his surname soon after the MacGregors were outlawed in around 1600AD. Using the genetic difference between Mr Valentine and the current chief of the MacGregors, one can put together a timeframe to a shared paternal ancestor based on their Y-DNA STR difference at the 67 and 37 marker levels. Using this timetable and in particular the genetic distance at the 67 marker level, it indicates that the MacIntosh surname has been in the test subject's paternal line for approximately 600 years.*

67 Marker Matches				
Genetic Distance	Last Name	Earliest Known Ancestor	Y-DNA Haplogroup	Terminal SNP
1	McIntosh	G. McIntosh1700 LochTayPerthshireSCT BIGY A17455	I-Y12715	Y12715
3	Crerar	Alexander Crerar, b. 1808 and d. 1893	I-M223	
3	McIntosh	Peter McIntosh 1770	I-Y4751	Y4751
4	McGinnis	Daniel McGinnis, 1830-1886	I-Y4751	Y4751
5	Gillespie	ThoGillespie b1719 d1797 RowanCoNC>Geo>John BIGY	I-A5860	A5860
5	Gillespie	Tho Gillespie 1719-1797 Rowan Co NC>Geo>Geo	I-A5860	A5860
5	Gillespie	WmGillespie c1745VA mAlcorn dc1817SumnerCoTN BIGYp	I-M223	
5	McCahill	Alexander McCail 1759-unknown, Taynish, North Knap		
5	McGuiness	Daniel McGennis b1800 d 1841	I-BY3810	BY3810
5	McGuinness	Michael McGennis 1781-1871	I-M223	
5	McIntosh		I-M223	
5	Mills	James A. Mills, b. 01/06/1805 SC d. 1890 MS	I-Y4752	Y4752
5	Quinn	John Quin b. 1777, Co. Tipperary, Ireland	I-Y4751	Y4751
5	Radcliffe	Robert Ratliff, b 1758, Ireland	I-M223	
5	Reese	William W. Reese, b.Abt. 1837, Georgia, USA	I-M223	

Figure 11: *Snapshot of the test subject's closest genetic matches at the 67 marker level. An examination of Mr Andrson's 67 marker matches reveals that his closest matches are to the Highland surnames of MacIntosh and Crerar. The most distant MacIntosh genetic relative shares 62/67 markers which indicates that the test subject's paternal ancestor had acquired the MacIntosh surname by 1400AD. The Crerar surname was presumably acquired via a non-paternal event between Crerar and MacIntosh neighbours within the Scottish Highlands which occurred (based on a genetic distance of 3 at the 67 marker level) in approximately 1600AD.*

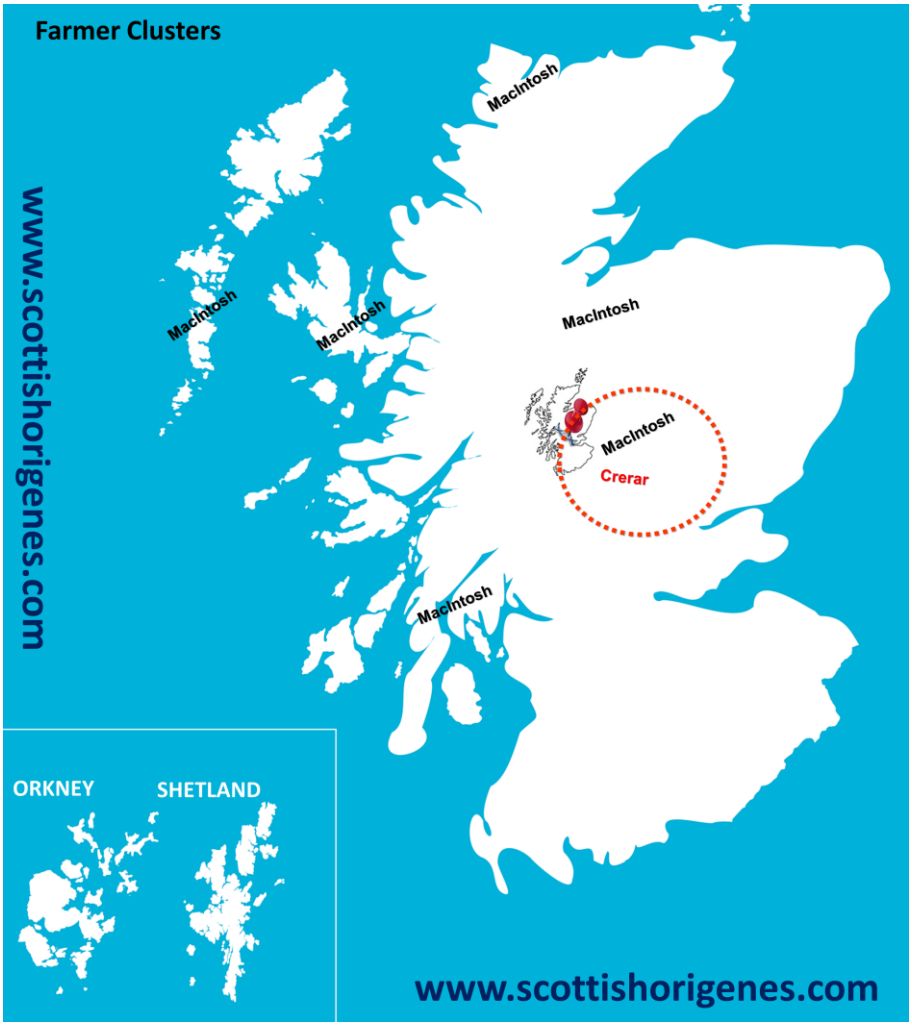

Figure 12: *MacIntosh and Crerar farming communities. Distribution mapping of the MacIntosh and Crerar farming communities reveals that they only occur together within Perthshire in the Scottish Highlands (**red broken circle**). Each surname has been placed on the map in the area where farmers with that surname concentrated in early census data.*

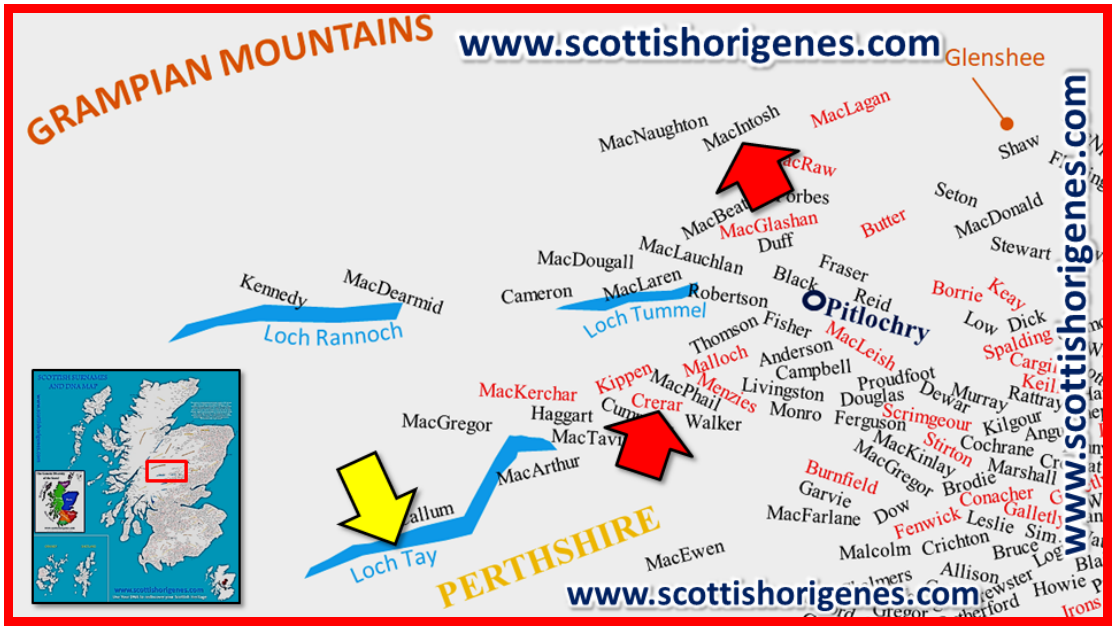

Figure 13: *The Surnames of the Perthshire Highlands. An examination of the Perthshire Highlands as it appears on the Scottish Origenes Surnames and DNA map reveals the MacIntoshes and Crerars (**red arrows**) close to Loch Tay (**yellow arrow**) where the test subject's earliest MacIntosh ancestor was recorded. Each surname has been placed on the map where farmers with that surname concentrated in early census data. Surnames in **red font** (like **Crerar**) are associated with a single geographical area within Scotland. The test subject's paternal ancestor settled in this area in about 1400AD where his paternal ancestor then acquired the MacIntosh surname. In approximately 1600AD a non-paternal event occurred in this area which resulted in a MacIntosh acquiring the Crerar surname.*

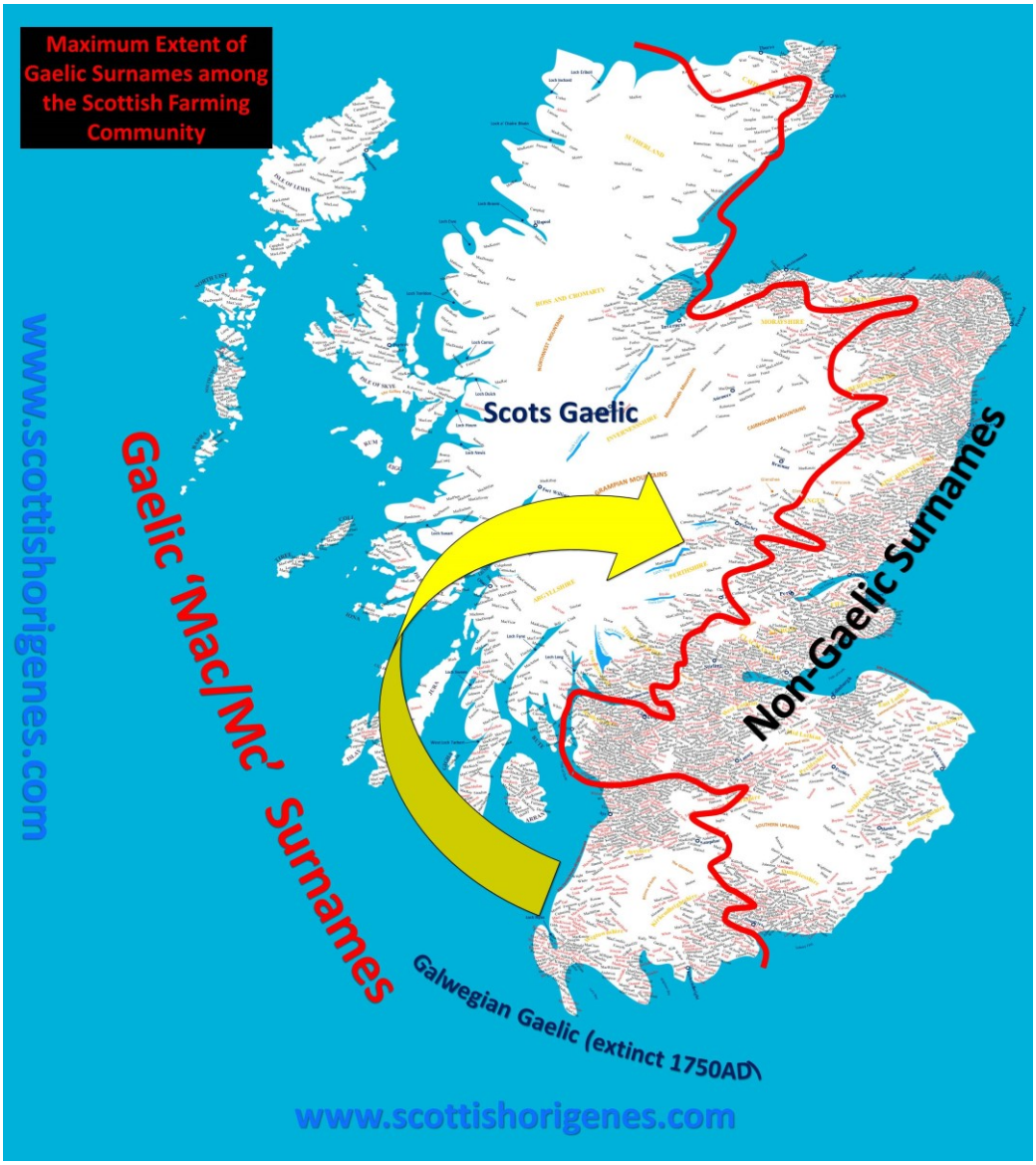

Figure 14: *The migration north. An examination of the distribution of Gaelic 'Mac' surnames reveals a distinct borderland between the Gaelic and non-Gaelic worlds of Scotland (**red line**). The test subject's Y-DNA matches reveal that his paternal ancestor migrated in about 1400AD from one Gaelic area located in Galloway in Southwest Scotland to another Gaelic area deep in the Perthshire Highlands, a migration which also resulted in his paternal ancestor acquiring the MacIntosh surname. What triggered the migration and surname change can only be speculated upon.*

Figure 15: *Tartan, crest and moto of the Highland MacIntosh.*