# Fishing for Vikings in the gene pool of old Merseyside

Steve Harding

The University of Nottingham

bbsrc
biotechnology and biological sciences research council

wellcome trust

# Watson-Crick DNA Anniversary award: Wirral and West Lancashire Viking DNA Project 2002-2007

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UCL

*Mol. Biol. Evol.* 25(2):301–309. 2008

# Excavating Past Population Structures by Surname-Based Sampling: The Genetic Legacy of the Vikings in Northwest England

*Georgina R. Bowden,* Patricia Balaresque,* Turi E. King,* Ziff Hansen,† Andrew C. Lee,*[1] Giles Pergl-Wilson,† Emma Hurley,† Stephen J. Roberts,‡ Patrick Waite,§ Judith Jesch,‖ Abigail L. Jones,¶ Mark G. Thomas,# Stephen E. Harding,† and Mark A. Jobling**

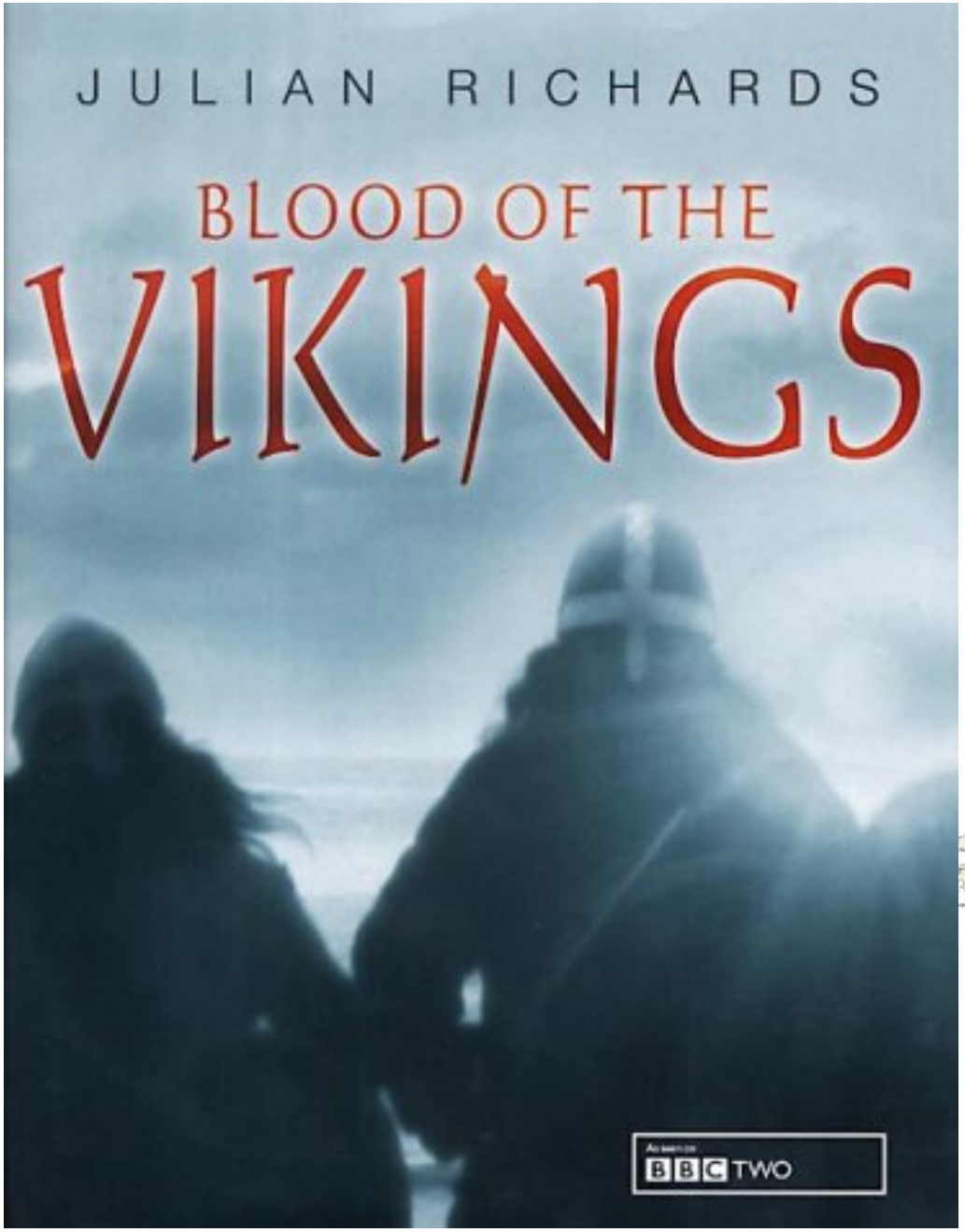
*Department of Genetics, University of Leicester, Leicester, United Kingdom; †National Centre for Macromolecular Hydrodynamics, University of Nottingham, Sutton Bonington Campus, Loughborough, United Kingdom; ‡The Queen Katherine School, Kendal, Cumbria, United Kingdom; §West Lancashire Heritage Association, Ormskirk, United Kingdom; ‖School of English Studies, University of Nottingham, University Park, Nottingham, United Kingdom; ¶The Centre for Genetic Anthropology, Department of Biology, University College London, London, United Kingdom; and #Department of Biology, University College London, London, United Kingdom

The genetic structures of past human populations are obscured by recent migrations and expansions and have been observed only indirectly by inference from modern samples. However, the unique link between a heritable cultural marker, the patrilineal surname, and a genetic marker, the Y chromosome, provides a means to target sets of modern individuals that might resemble populations at the time of surname establishment. As a test case, we studied samples from the Wirral Peninsula and West Lancashire, in northwest England. Place-names and archaeology show clear evidence of a past Viking presence, but heavy immigration and population growth since the industrial revolution are likely to have weakened the genetic signal of a 1,000-year-old Scandinavian contribution. Samples ascertained on the basis of 2 generations of residence were compared with independent samples based on known ancestry in the region plus the possession of a surname known from historical records to have been present there in medieval times. The Y-chromosomal haplotypes of these 2 sets of samples are significantly different, and in admixture analyses, the surname-ascertained samples show markedly greater Scandinavian ancestry proportions, supporting the idea that northwest England was once heavily populated by Scandinavian settlers. The method of historical surname-based ascertainment promises to allow investigation of the influence of migration and drift over the last few centuries in changing the population structure of Britain and will have general utility in other regions where surnames are patrilineal and suitable historical records survive.

## Introduction

Studies of the human past draw on lines of evidence through studies of men sharing surnames (Sykes and Irven 2000; King et al. 2006; McEvoy and Bradley 2006). Al-

# 2001:


JULIAN RICHARDS
BLOOD OF THE
VIKINGS
BBC TWO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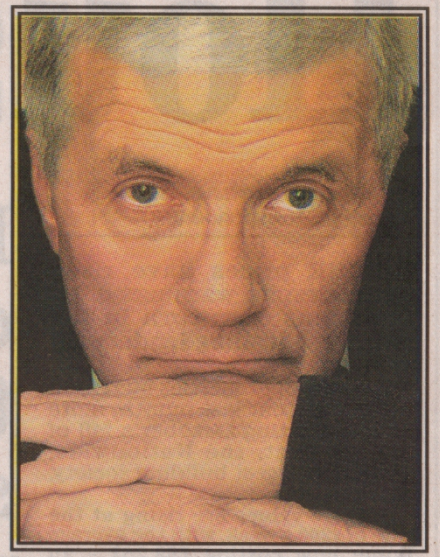
## Trip to the dentist that tracked down a 1,200-year-old family of Vikings

Invaders: The Viking warriors have descendants across Europe

# Found on the Wirral, a man with the blood of a warrior



Norse code: Bill Housley is a true Viking

BILL Housley went to the dentist an ordinary fisherman and emerged a fully-fledged Viking.

By **Adam Powell**

The 63-year-old grandfather was asked for a saliva sample as part of a scientific study into the Norse invaders of Britain.

Amazingly, it proved he is a direct descendant of the sea-faring warriors who plundered the north of England 1,200 years ago.

The wholesale fish merchant's roots only emerged when he received a phone call from Professor David Goldstein of University College, London, who tested his saliva sample for the BBC2 programme Blood Of The Vikings.

Mr Housley's DNA matched ancient records from Norway and also that of three modern-day Norwegians tested for the study.

Only three other matches were found – in Scotland – and their genetic heritage was not as strong.

Mr Housley, from Meols, Wirral, said: 'I always thought we were an ordinary fishing family which could be traced back 150 years.

'I was utterly amazed. I didn't know what I was going to be told but it certainly wasn't that I was a Viking. It means that my sons and their sons are also Vikings which is pretty spectacular when you think most people don't have that kind of history.'

'I was told there are three people in Norway with similar DNA. Sadly I don't know who they are because they were stopped in supermarkets and shopping centres and weren't asked for their details.

'Now I am determined to try to find the rest of my relatives and ancestors.' Mr Housley was one of 2,000 men from Britain, Ireland, Norway, Denmark and northern Germany who took part in the random survey.

Their Y chromosome, which gives information about ancestry, was compared to DNA markers common in Scandinavians.

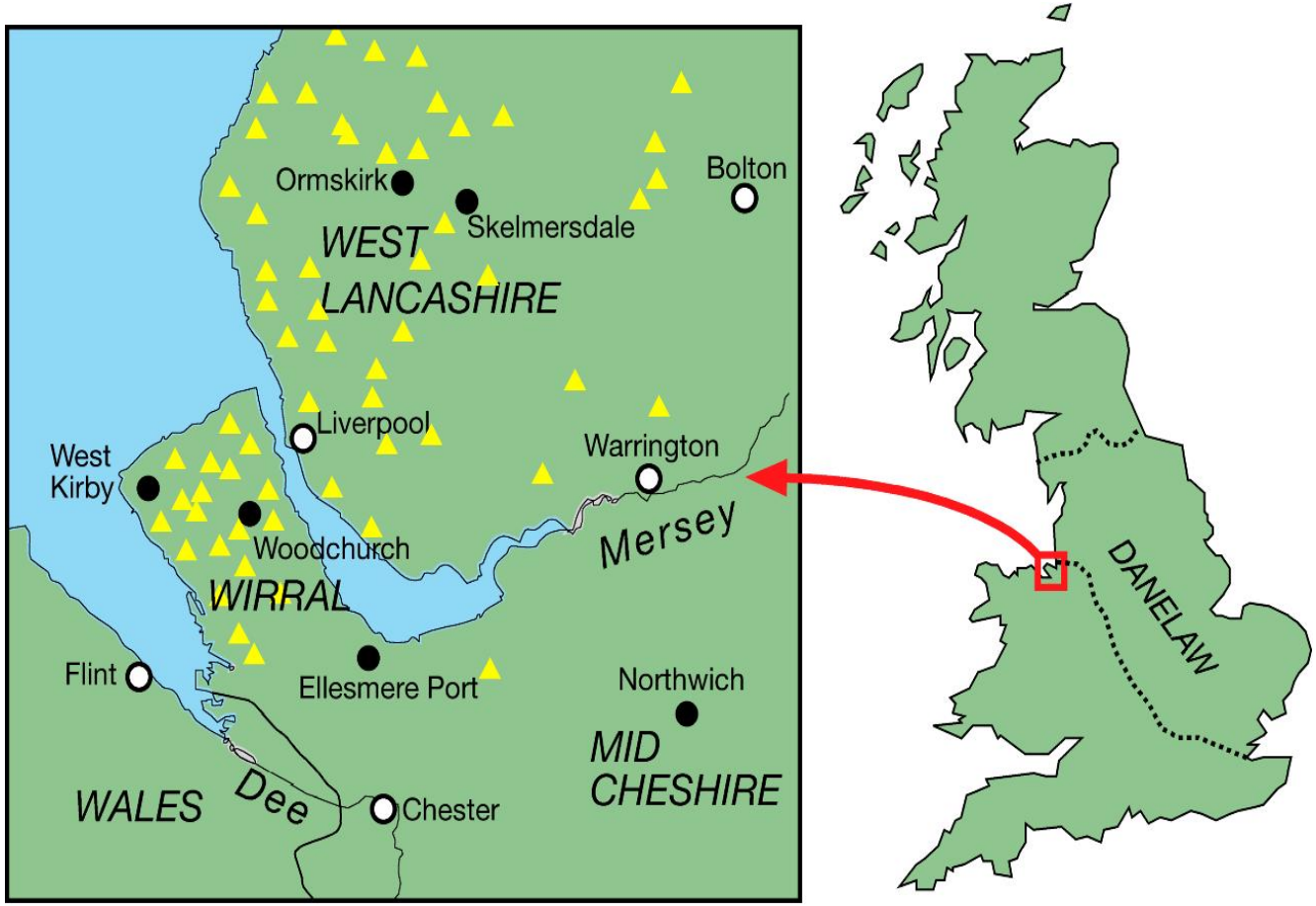
The research revealed that Norwegian Vikings settled in Scotland, Cumbria, the Isle of Man and as far south as Merseyside.

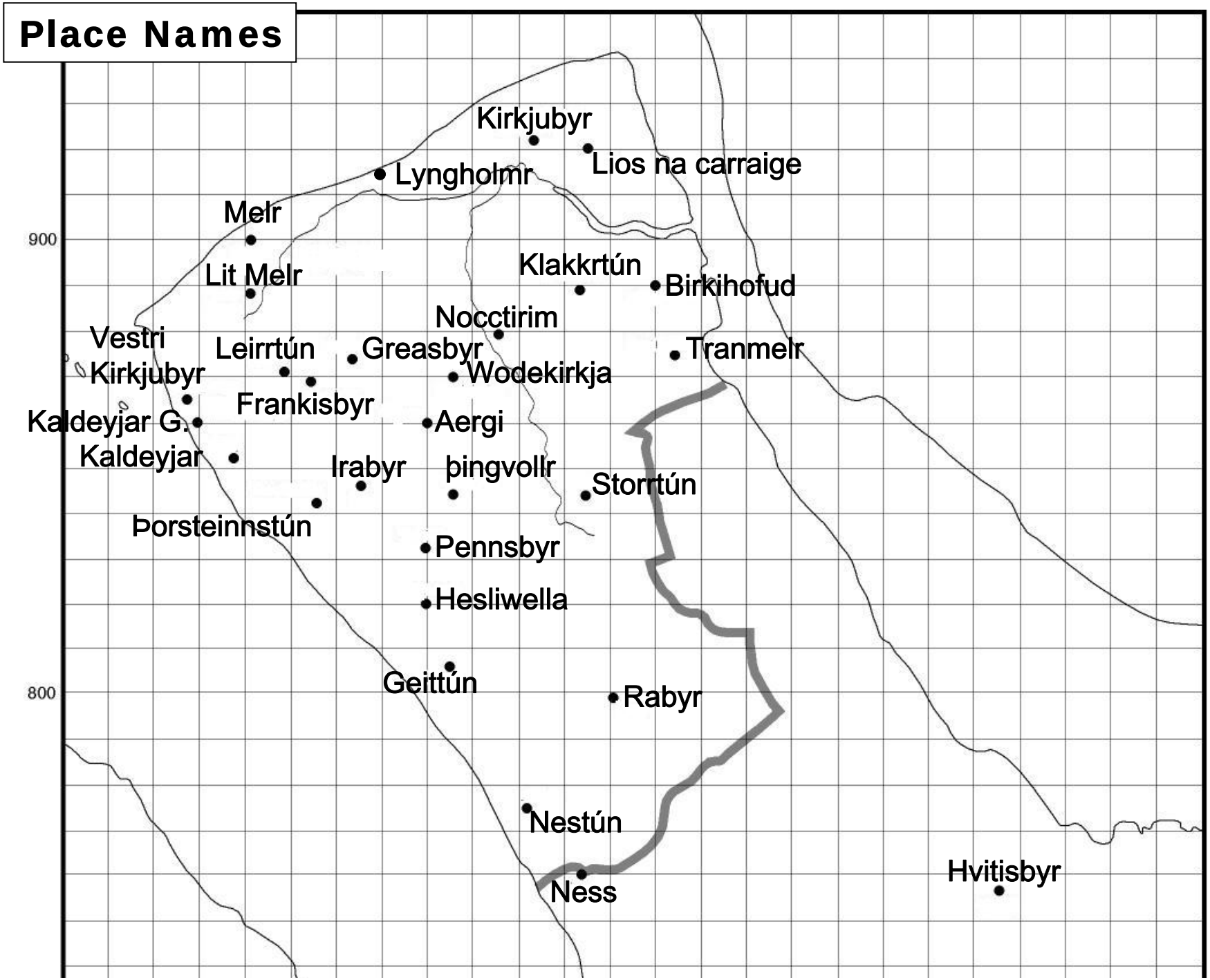
Shetland, Orkney and the far north of Scotland are the most Viking parts of Britain with 60 per cent of men having Norwegian genes. In England, only Penrith in Cumbria has clear evidence of Norwegian influences, while York has the highest Danish genes.

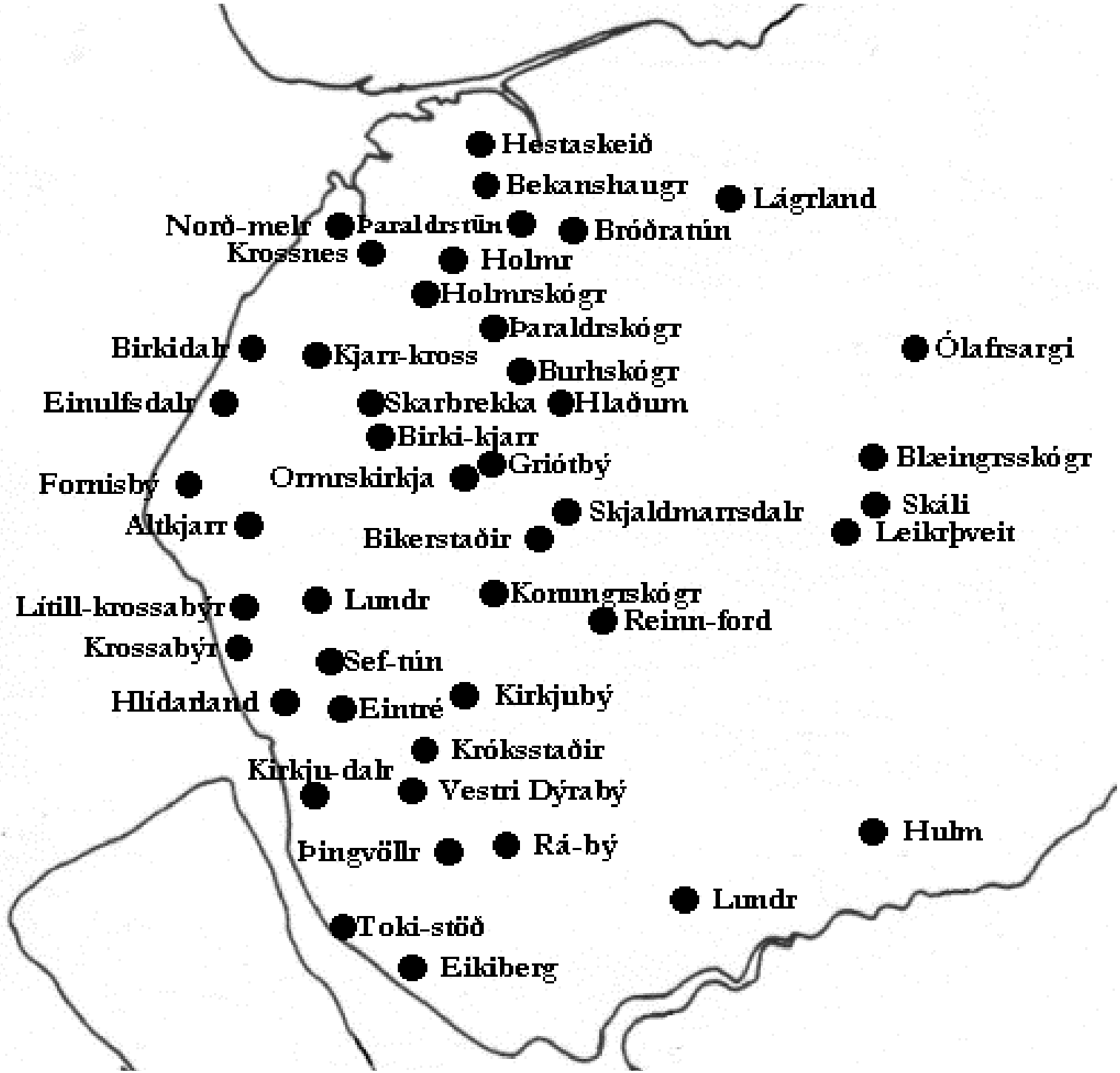
Prof Goldstein said: 'Modern genetics has opened a powerful window on the past. We can trace movements of peoples that have proved difficult through history.'

*a.powell@dailymail.co.uk*

# Wirral & West Lancashire – Vikings in the DNA?




Place Names
Kirkjubyr
Lios na carraige
Lyngholmr
Melr
900
Lit Melr
Klakkrtún
Birkihofud
Nocctirim
Vestri
Kirkjubyr
Leirrtún
Greasbyr
Tranmelr
Wodekirkja
Frankisbyr
Kaldeyjar G.
Aergi
Kaldeyjar
Irabyr
þingvollr
Storrtún
Þorsteinnstún
Pennsbyr
Hesliwella
Geittún
800
Rabyr
Nestún
Hvitisbyr
Ness


Hestaskeið
Bekanshaugr
Lágrland
Norð-melr
Þaraldrstún
Bróðratún
Krossnes
Holmr
Holmrskógr
Þaraldrskógr
Birkidalr
Kjarr-kross
Ólafrsargi
Burhskógr
Einulfsdalr
Skarbrekka
Hlaðum
Birki-kjarr
Griótbý
Blæingrsskógr
Ormrskirkja
Fornisbý
Skjaldmarrsdalr
Skáli
Altkjarr
Bikerstaðir
Leikrþveit
Lítill-krossabýr
Lundr
Konungrskógr
Reinn-ford
Krossabýr
Sef-tún
Hlíðarland
Einmé
Kirkjubý
Króksstaðir
Kirkju-dalr
Vestri Dýrabý
Hulm
Þingvöllr
Rá-bý
Lundr
Toki-stöð
Eikiberg


Króksstaðir:  Krokr's Place

# Trani-melr: Crane sandbank


Black Rock
Kyle Lake
Kirkby
Seome
Leverpole
Meoles
Moreton
Moreton Pri.
Upton
The Ferry
W. Kirkby
Tramnore
Grayesby
Grange
Bebinton
Caldey
Prenton
Tingwall
N. Bebinton
Oldfield
Leighton
Brunburgh
A. Estham
G. Neston
Ness
Burton
Hooton
Pool
Podynton
Whitby
Leddesham
Shotwich Cast
Troughford
Stanlaw
Stanny
Thorn
Dun ham
3 Stanford
Garston
Speak H.
Frode
Dee River
P. of Flint
FLINT

ISSN 1351-3

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EIGHTY-FIRST ANNUAL REPORT

2003–2004


## Revisiting *Dingesmere*

**Paul Cavill, Stephen Harding and Judith Jesch,**
**University of Nottingham**

*Dingesmere* is a place known only from the Old English poem *The Battle of Brunanburh*, found in versions of the Anglo-Saxon Chronicle for the year 937 (A, Corpus Christi College Cambridge 173; B, London, British Library Cotton Tiberius A. vi; C, Cotton Tiberius B. i; and D, Cotton Tiberius B. iv and one manuscript now lost, but copied and published before 1731 when the original was destroyed, Cotton Otho B. xi). After the resounding victory of Æthelstan and Edmund at *Brunanburh*, the coalition of Dublin Norse, Strathclyde Welsh, Picts and Scots split up, with the survivors making their own way home. The Dublin Norsemen sailed away *on dinges mere*.

> Gewitan him þa Norþmen nægledcnearrum,
> dreorig daraða laf, on Dingesmere,
> ofer deop wæter Difelin secan,
> eft Ira land, æwiscmode. (53–6)
> (Then the Northmen, dreary survivors of the spears, went in the nail-studded ships on *Dingesmere*, over deep water, to seek Dublin, went back to Ireland ashamed.)

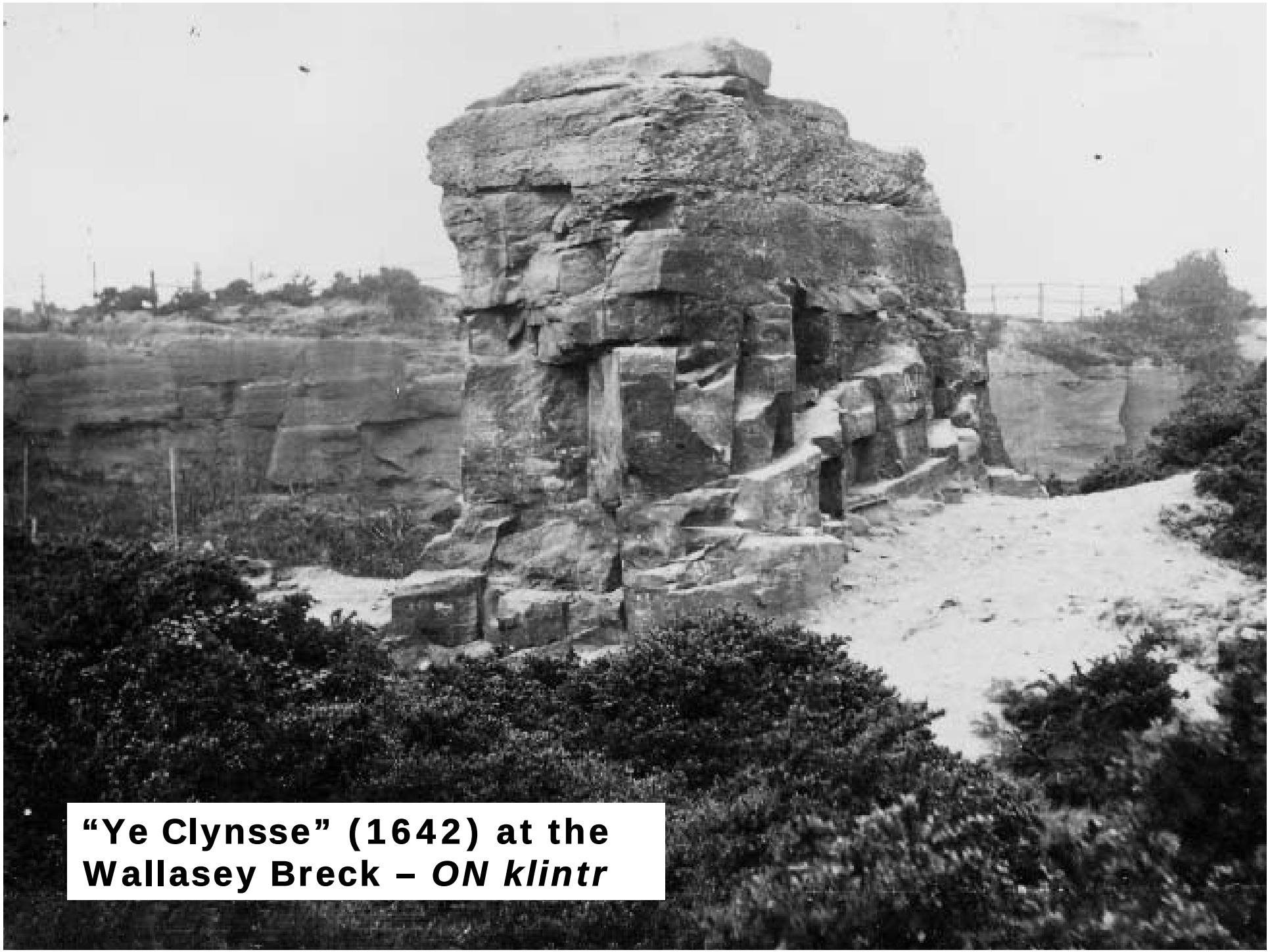
This is Campbell's text (Campbell 1938), and with minor variations of word-division, punctuation and spelling, the text of more recent editors. The manuscript variants of the phrase *on dinges mere* found in the A and C texts are as follows: *on dyngesmere* in B, *on dynigesmere* in D and *on dinnesmere* in Otho.

There are two main lines of interpretation in relation to this phrase. One is that it is not a place-name at all, but that *dinges*, or more particularly *dinnes*, is a noun in the genitive which qualifies *mere* and thus means 'sea of noise' (Bosworth-Toller 1898, s.v. *dynge*), i.e. 'noisy sea' (see, for example, Cockburn 1931). A corollary of this interpretation is that the phrase has no particular relevance to the localisation of *Brunanburh*: it could be any sea. The other approach is that *dinges mere* is a name, with a personal- or place-name in the


Hesketh's, Irby
*ON hesta-skeið* "horse race track"


WALTON BRECK
ROAD
Anfield
BRECKFIELD
Delivering the VISION
SKERRIES
ROAD


The Wallasey Breck (*brekka*)
*þveit*
MILLTHWAITE ROAD
THE BRECK



**“Ye Clynsse” (1642) at the Wallasey Breck – *ON klintr***


EASTHAM RAKE
rák


CARR LANE
kjarr

# 50 CARRS

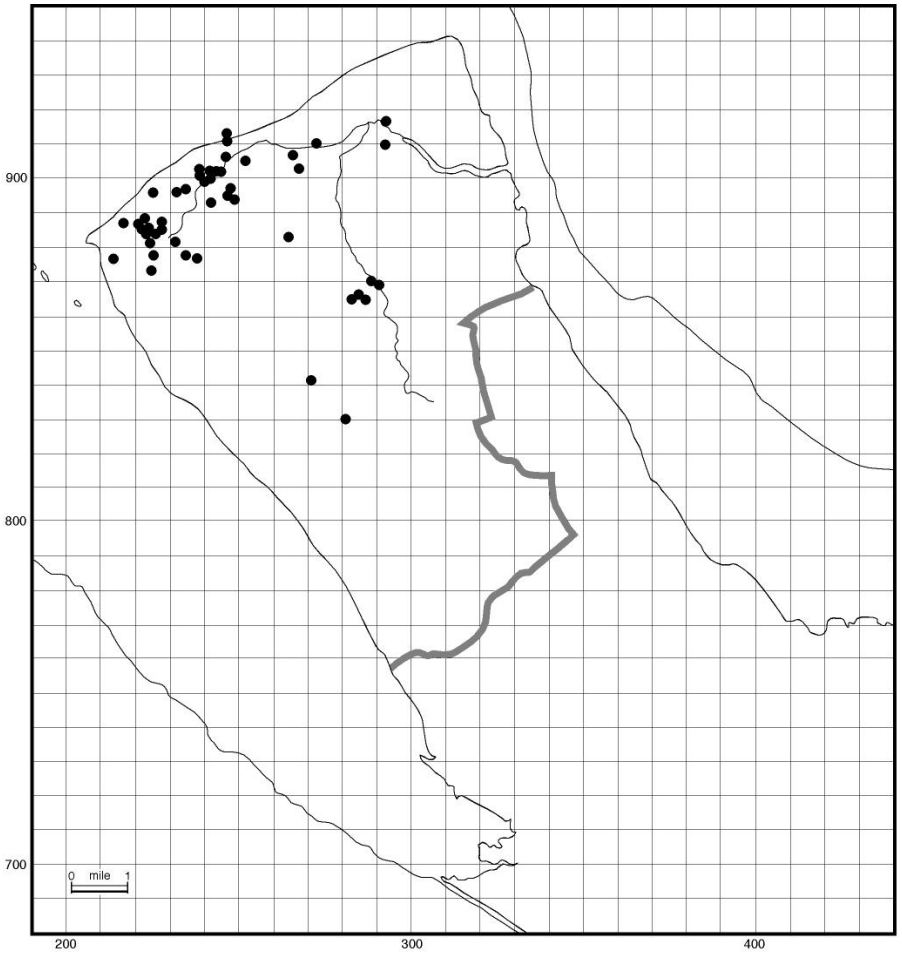



Fig 6c

# 96 RAKES

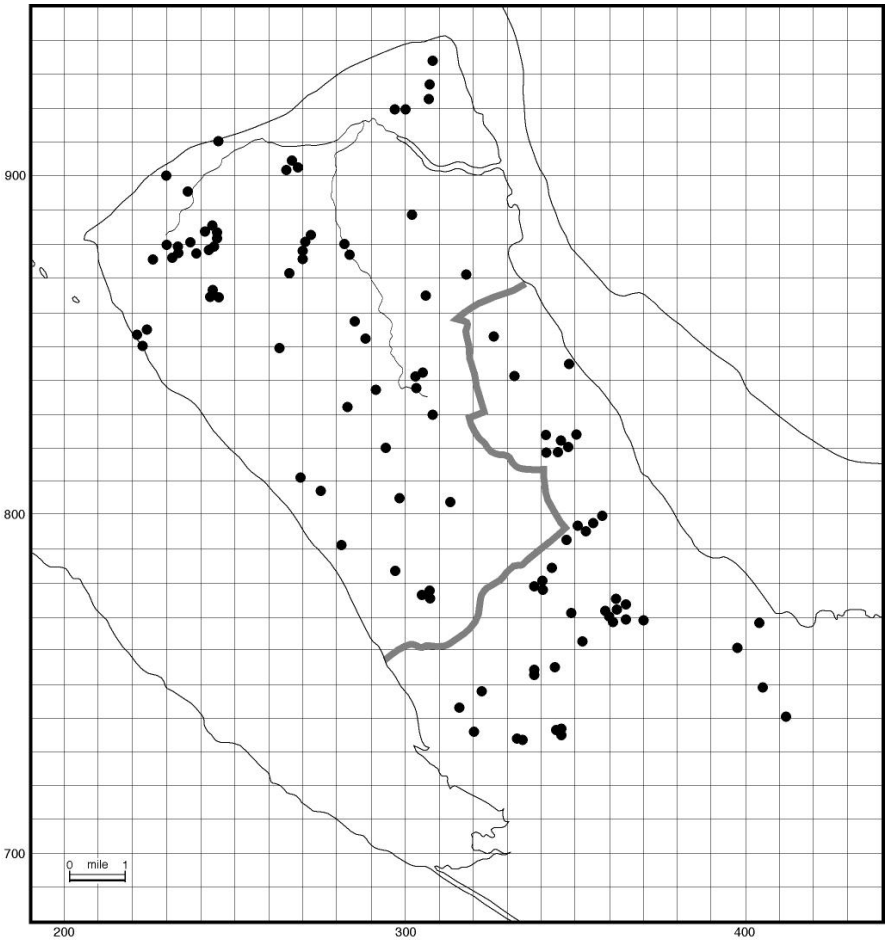
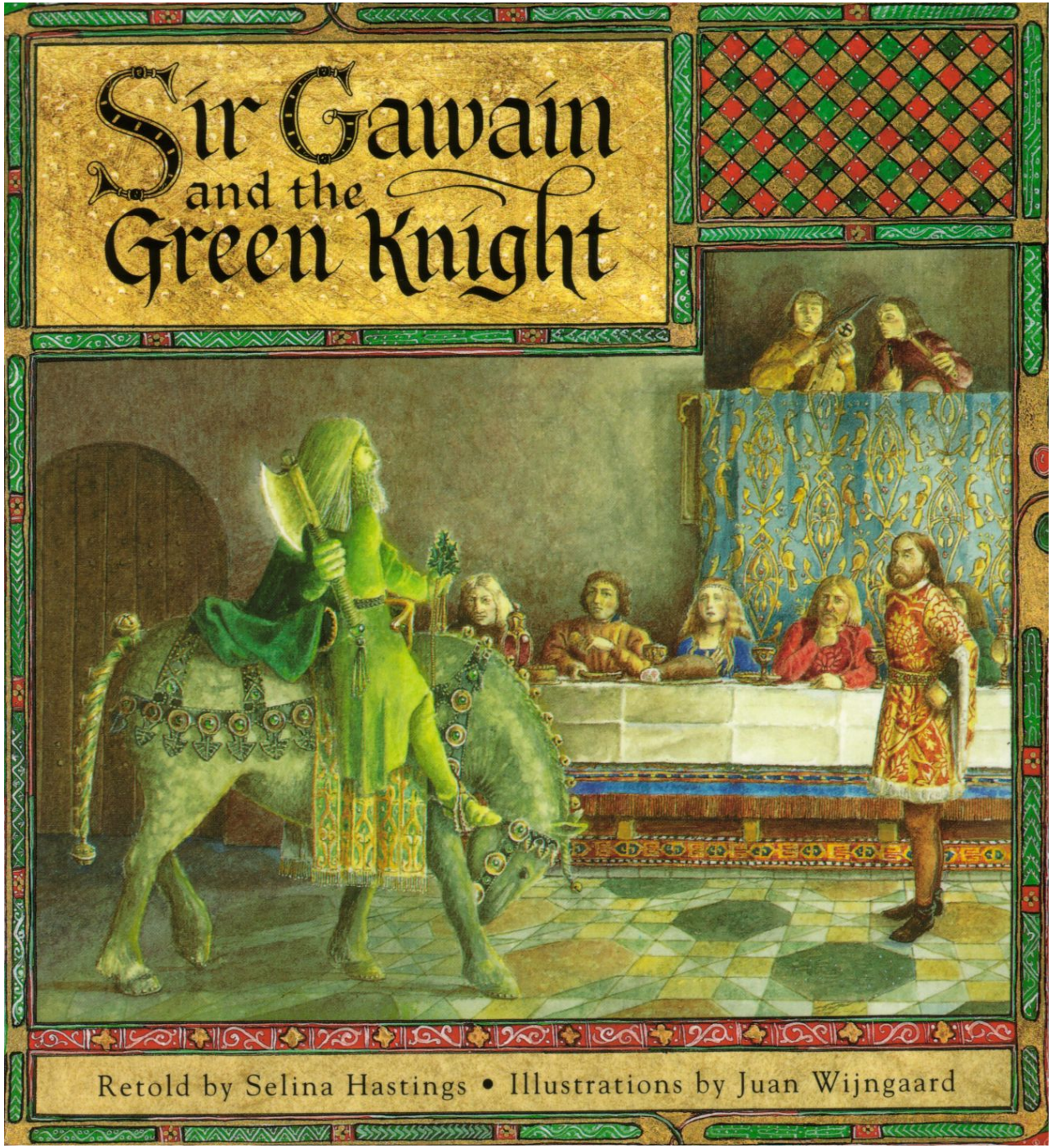
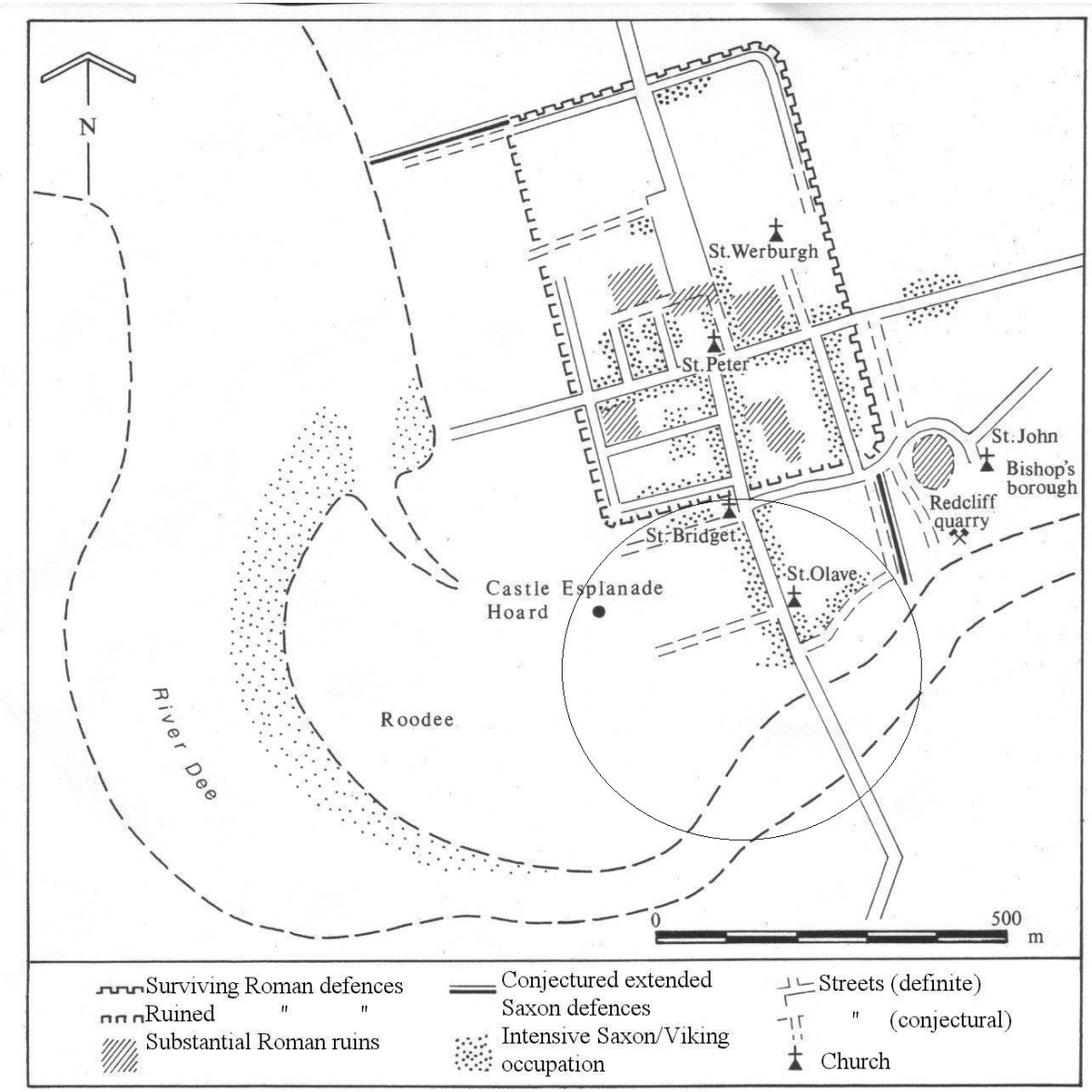



Fig 8
rakes

**14th Century Poem:**

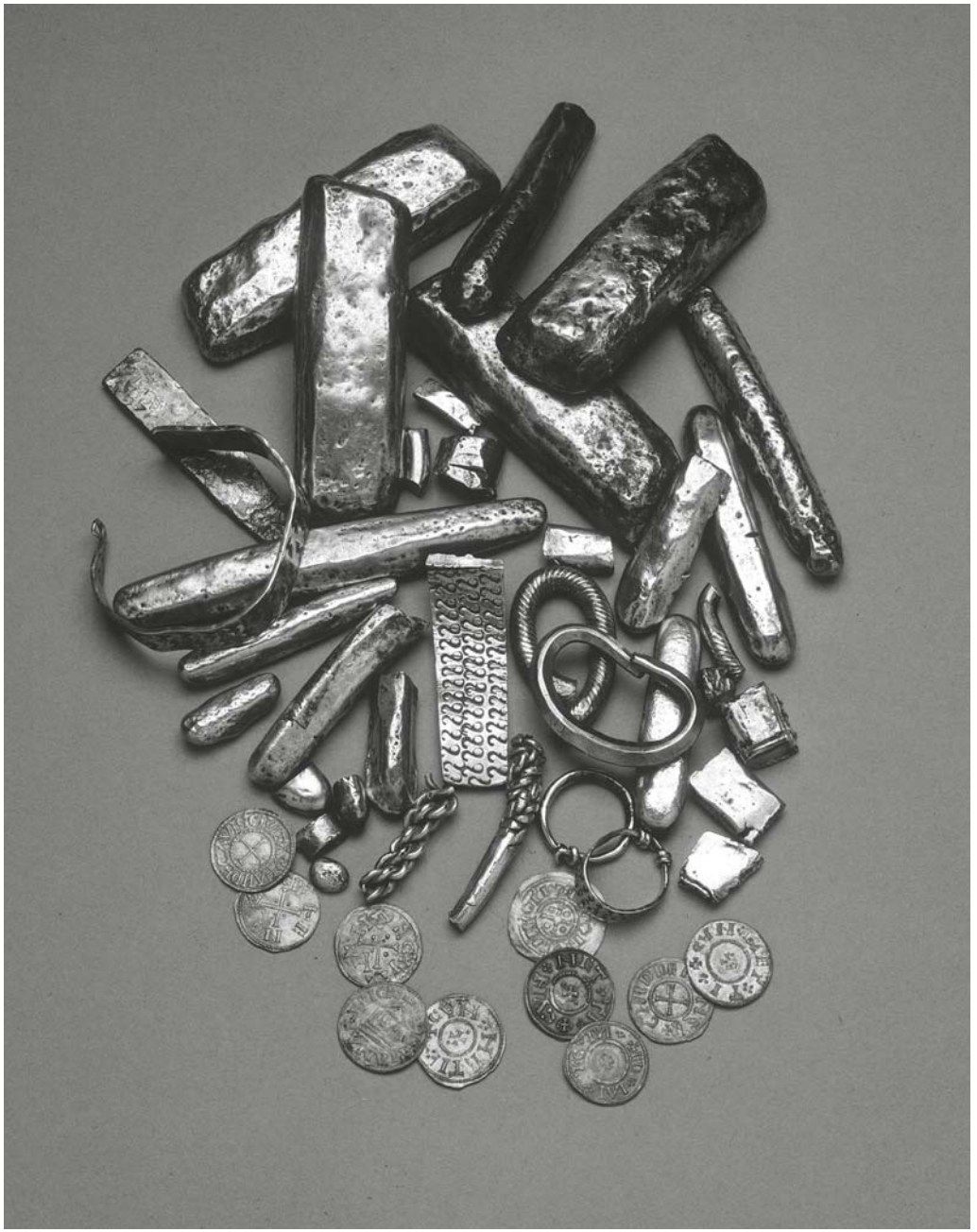
- Some of the important action takes place in Wirral
- Poet/scribe from or near the area – Sir John Stanley of Storeton
- **Full of Norse dialect words: storr, gate, busk, felle, renk, karp, kest, derf, etc.**



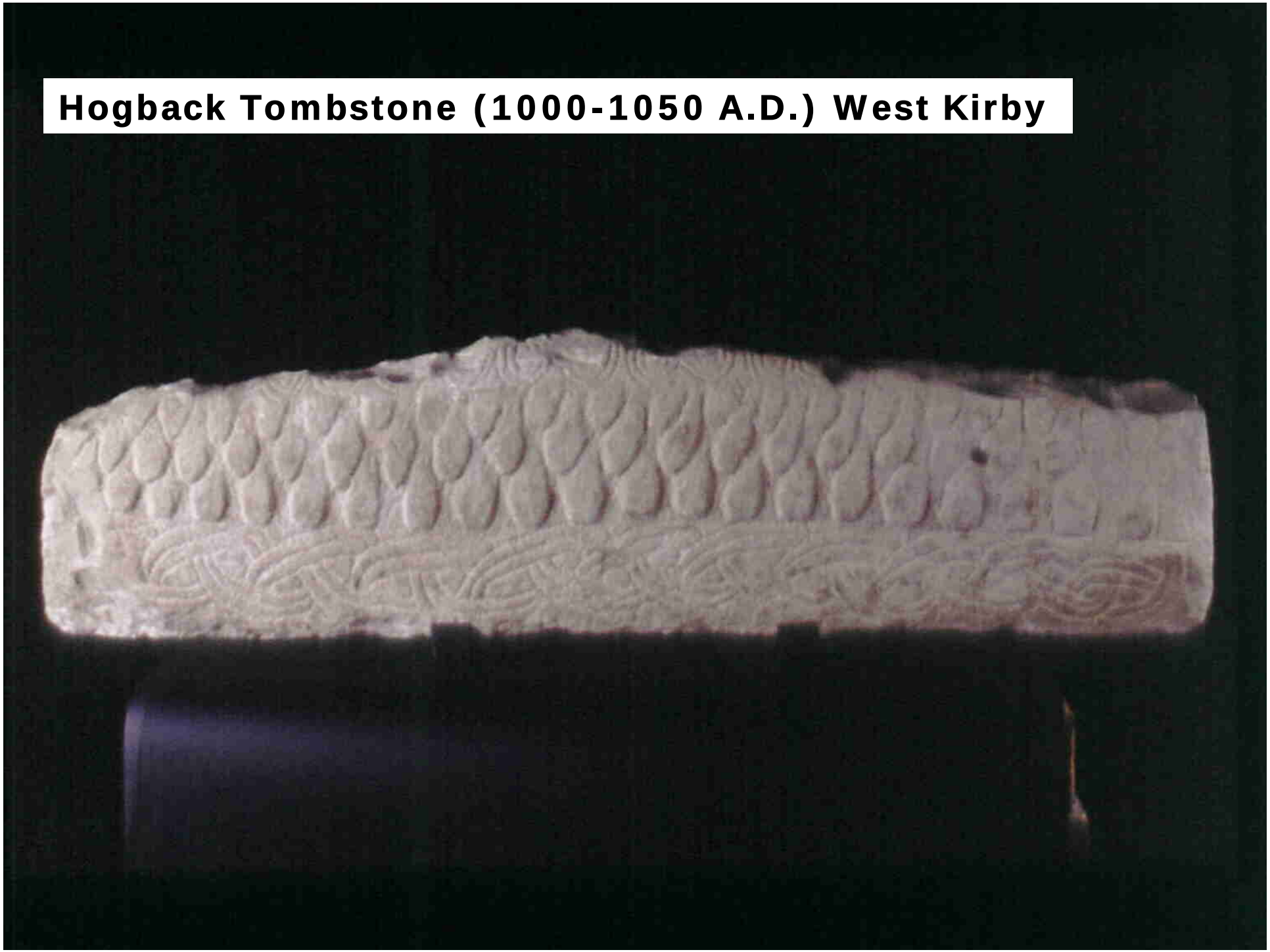


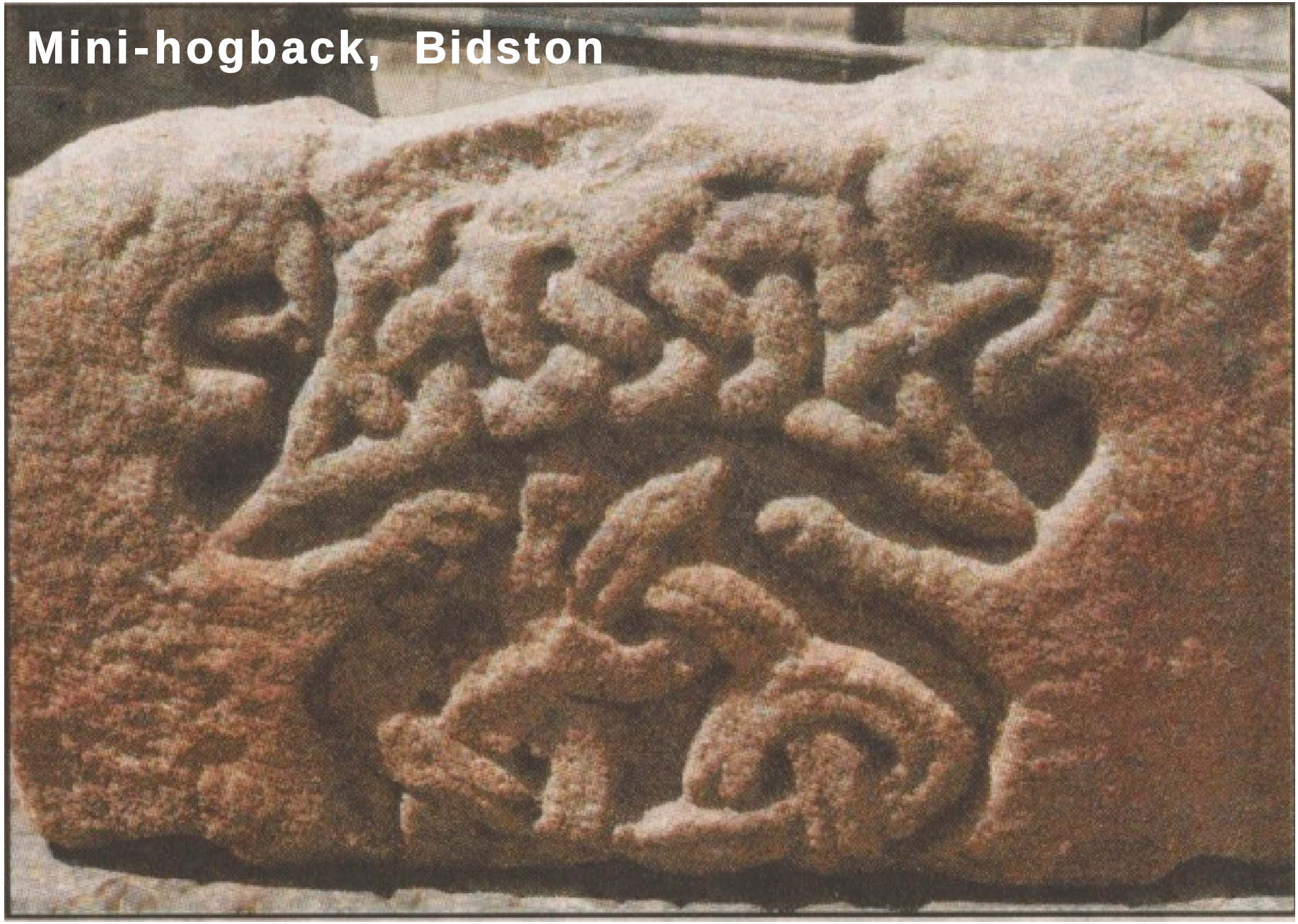

# Castle Esplanade hoard, Chester

# 10th-Century Viking Treasure from Cuerdale

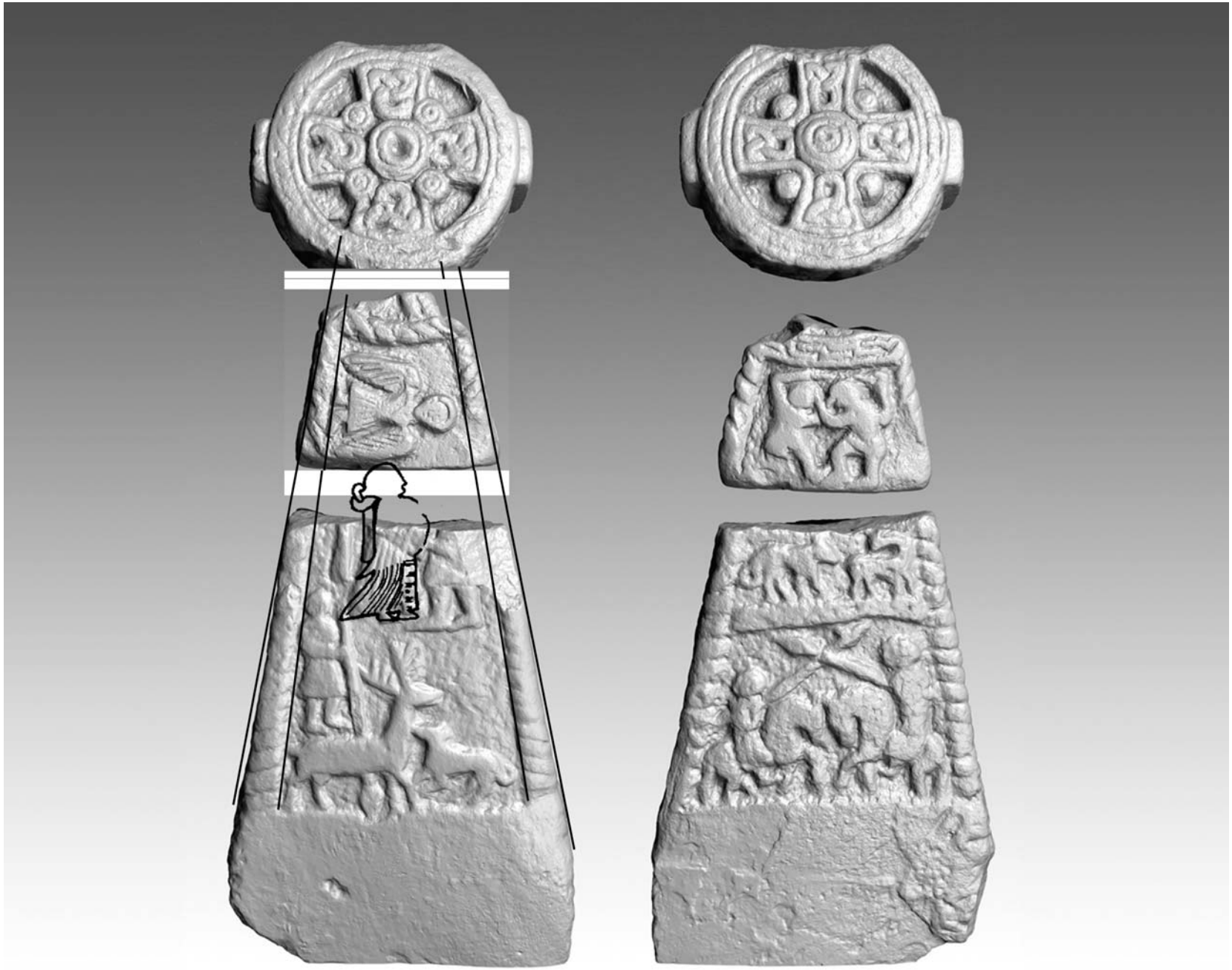



Railway Inn, Meols
LANZAROTE

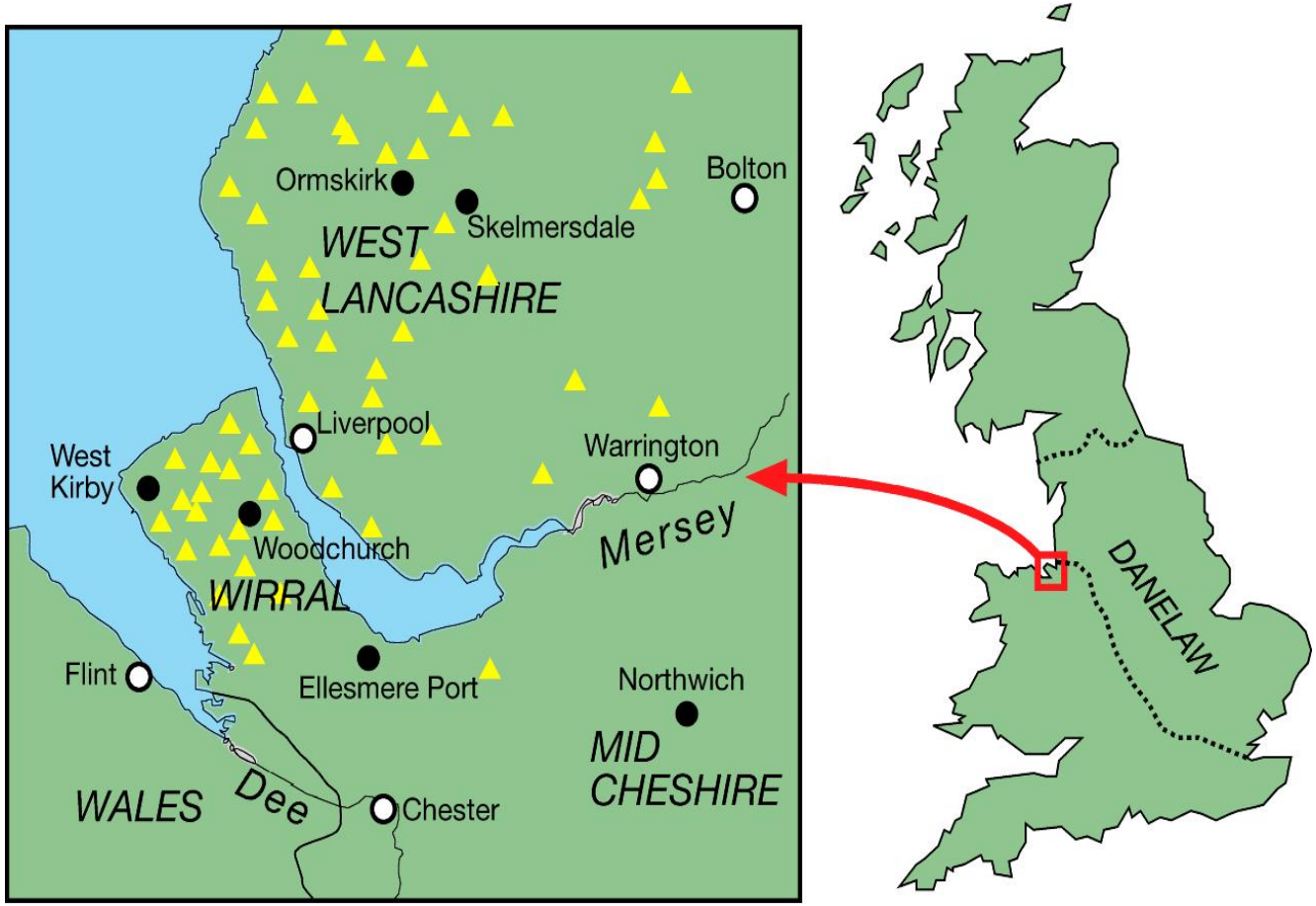

Hogback Tombstone (1000-1050 A.D.) West Kirby


Mini-hogback, Bidston

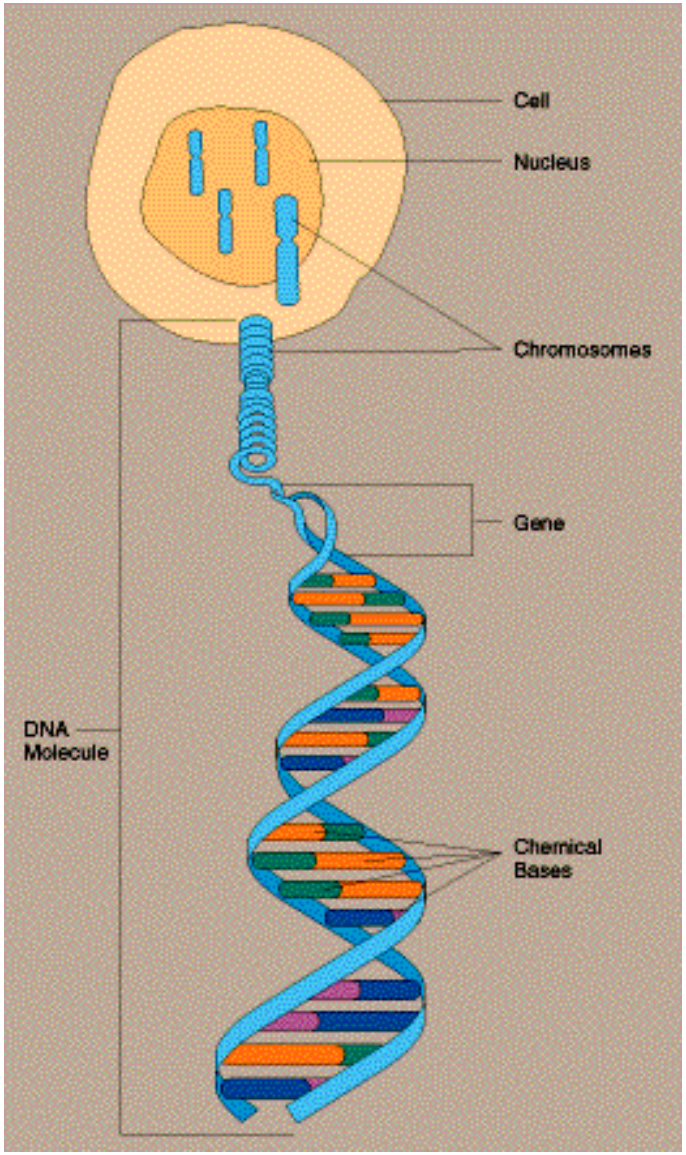

Viking cross fragments - Neston



# Wirral & West Lancashire – Vikings in the DNA?



# DNA - Messages from our ancestors:




**Bases:**

**adenine A**

**Thymine T**

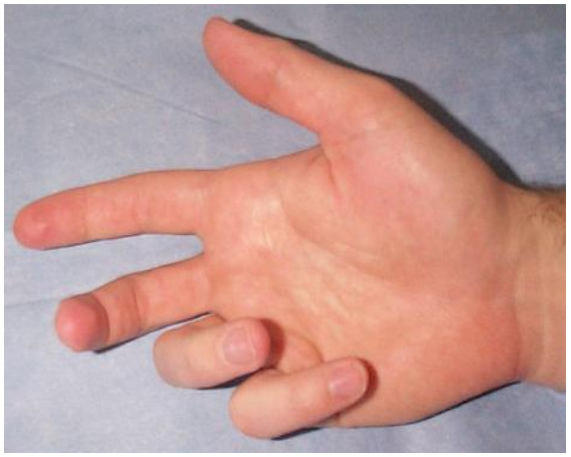
**Cytosine C**

**Guanine G**

# DNA - Messages from our ancestors:

- DNA is a ‘text’ that changes slowly through time, and varies between individuals
- Analyse DNA from skeletons
  - ‘Real’ information about the past
  - Difficult, small sample sizes, prone to modern DNA contamination; maybe no descendants
- Analyse modern people
  - Easy to get samples
  - Can be unrepresentative of past populations, need methods of inference

# Genetics of physical characteristics



- Dupuytren's contracture
- Inherited - dominant
- Distribution suggests possible Viking origin
- Evidence from Icelandic sagas
- More frequent in regions of Britain influenced by Vikings
- But - genetic basis unknown
- Crops up in other populations

# Genetics of physical characteristics

- Blood groups
- Poorly discriminating and widespread

- Pigmentation, stature, facial shape
- Complex, poorly understood, wide distribution in N.Europe

1 A Dane from Jutland, whose facial features remind one irresistibly of his forerunner, Tollund man (1)

10 An Icelander from Reykjavik

LIVING EUROPEAN TYPES

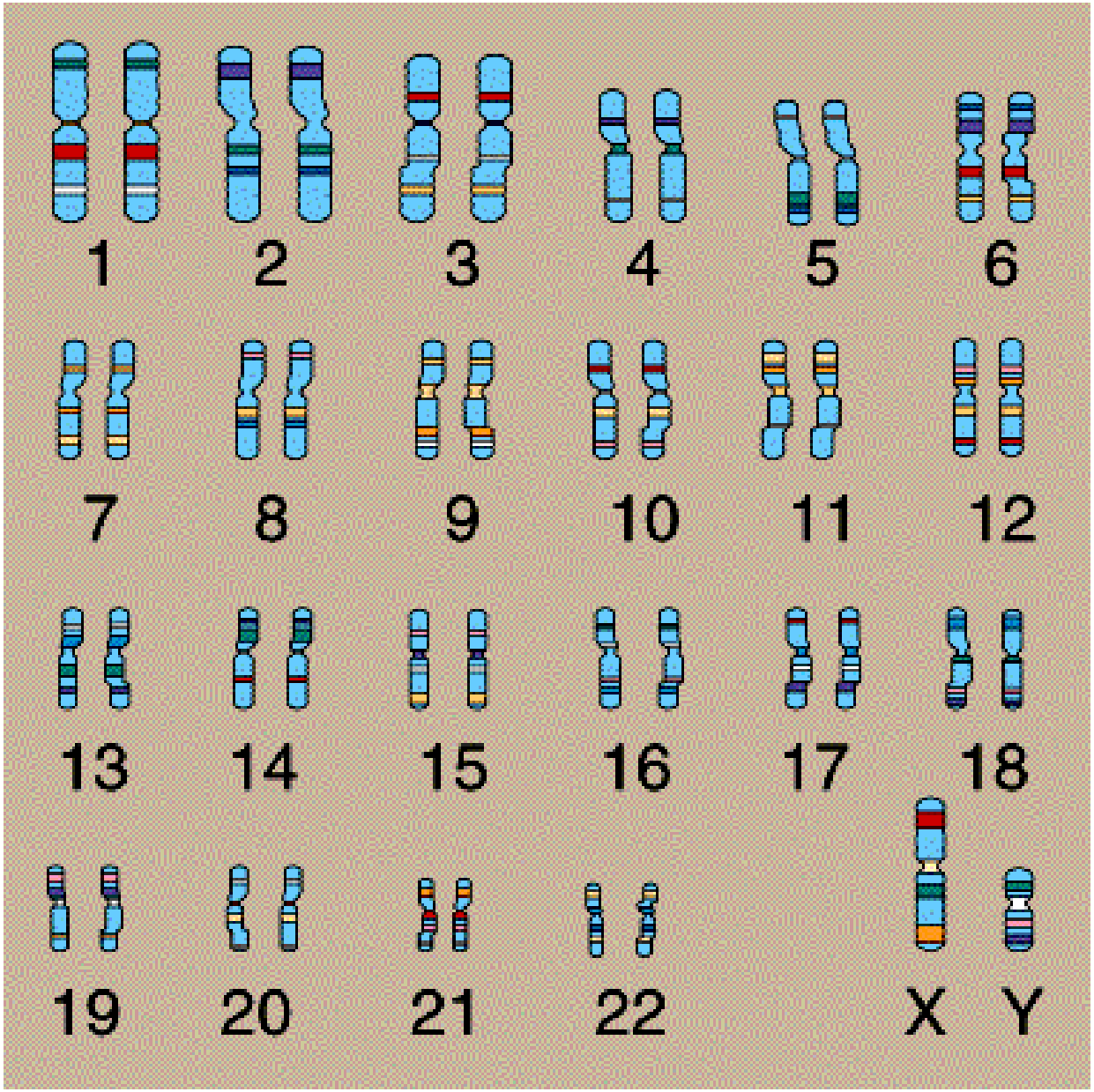
11 A Norwegian woman

12 Max von Sydow, Swedish film actor

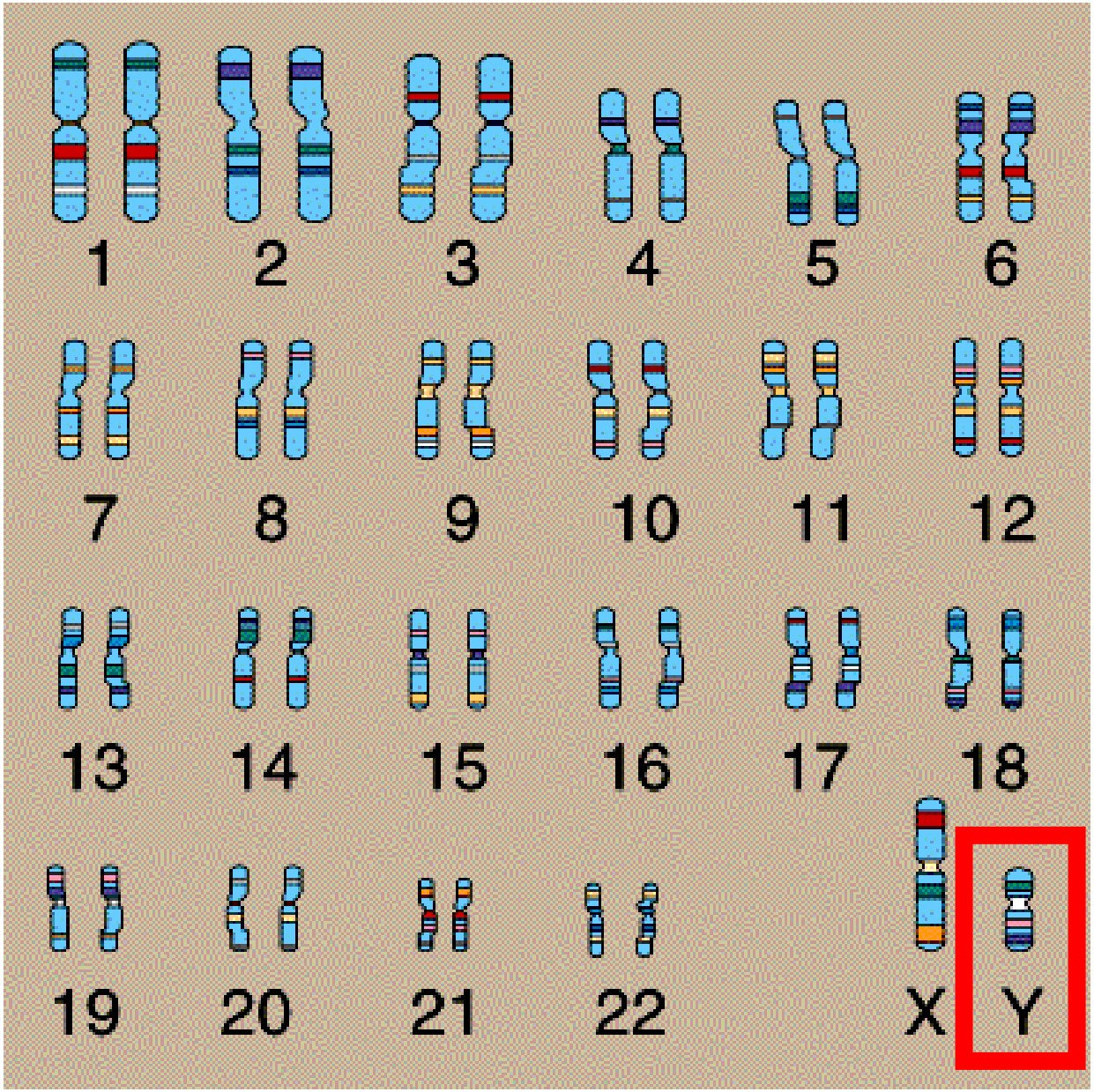
17 An English schoolgirl

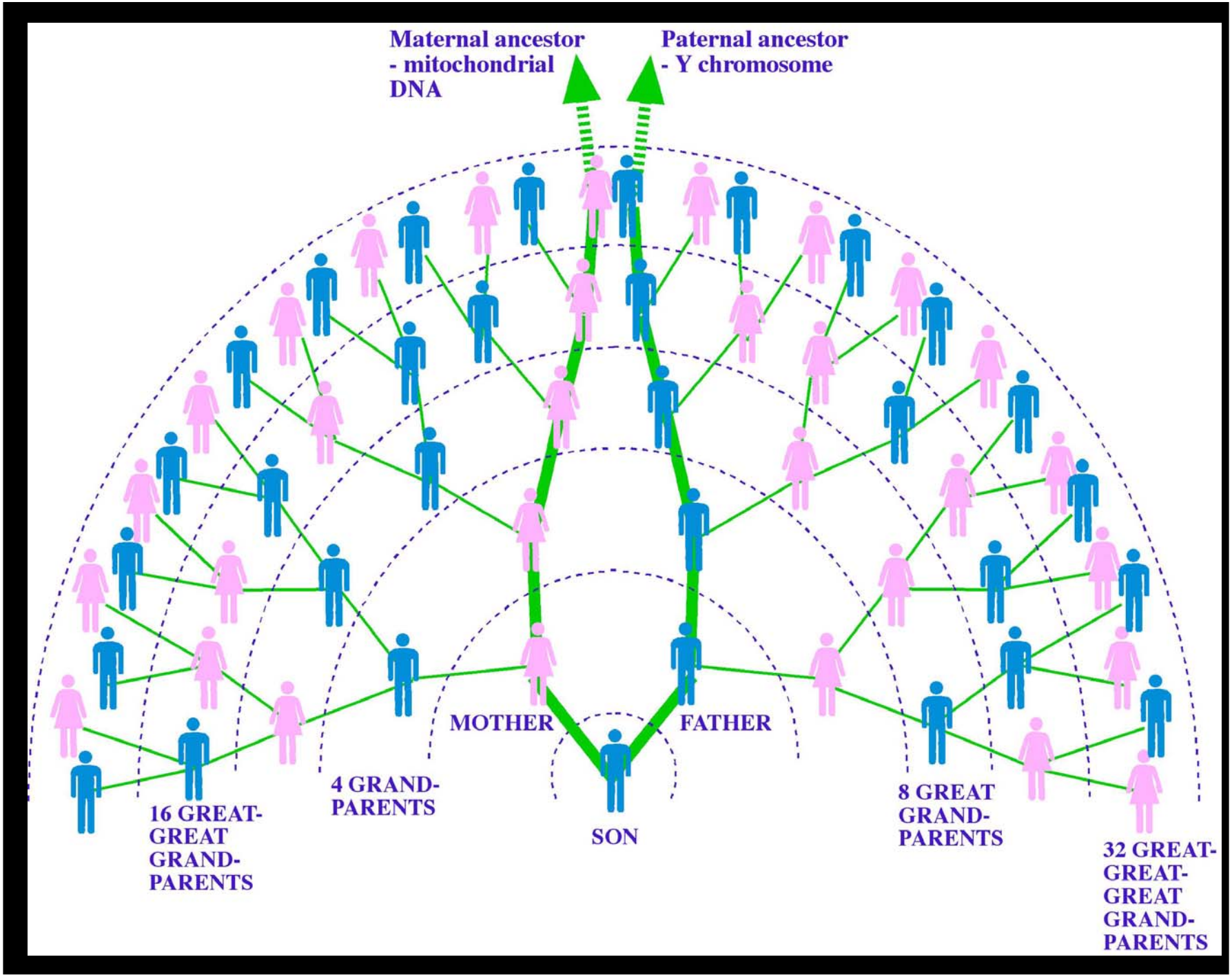
18 Ivor Emmanuel, Welsh singer

In a human cell nucleus there are 23 pairs of chromosomes



In a human cell nucleus there are 23 pairs of chromosomes

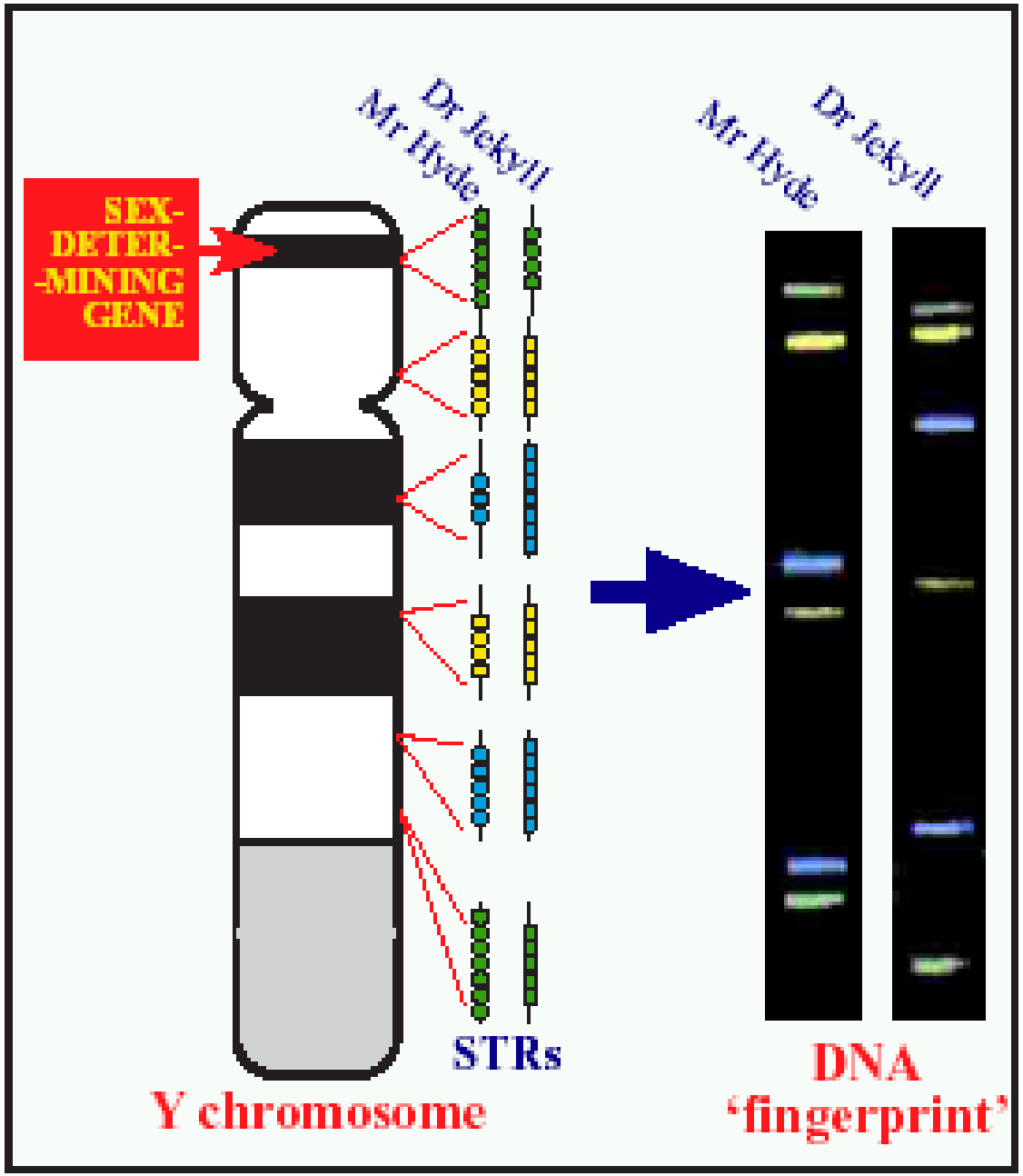


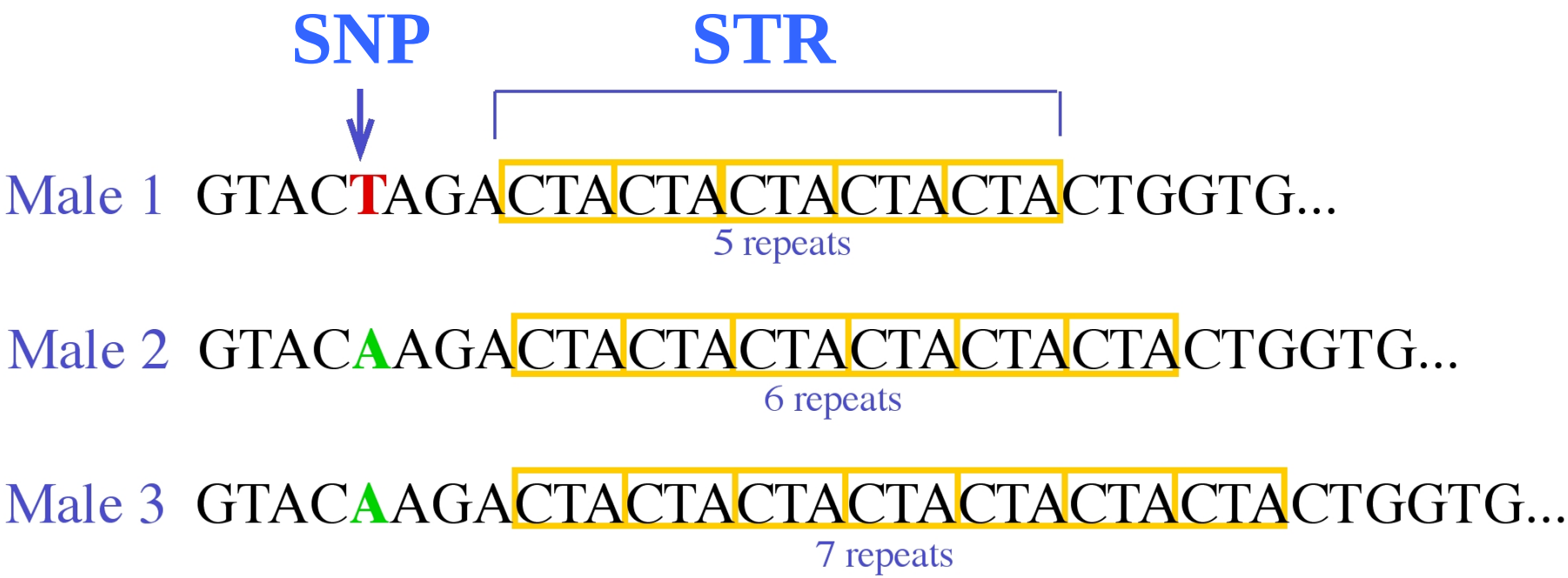

Maternal ancestor
- mitochondrial
DNA
Paternal ancestor
- Y chromosome
MOTHER
FATHER
SON
16 GREAT-
GREAT
GRAND-
PARENTS
4 GRAND-
PARENTS
8 GREAT
GRAND-
PARENTS
32 GREAT-
GREAT-
GREAT
GRAND-
PARENTS

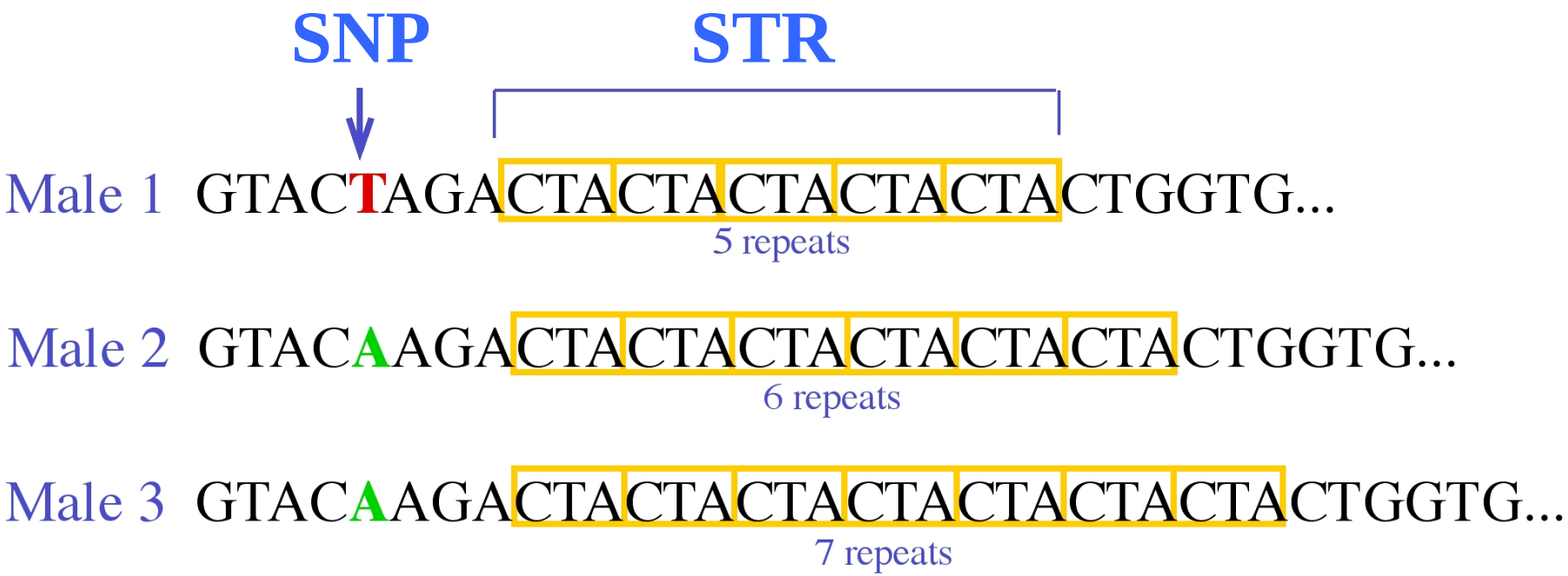
## Y-chromosome **haplotypes**

There are special patterns on the DNA called STRs, which scientists can test for.

The Y-chromosome can be “typed” by a set of 6 or more numbers – this is called a man’s **haplotype**

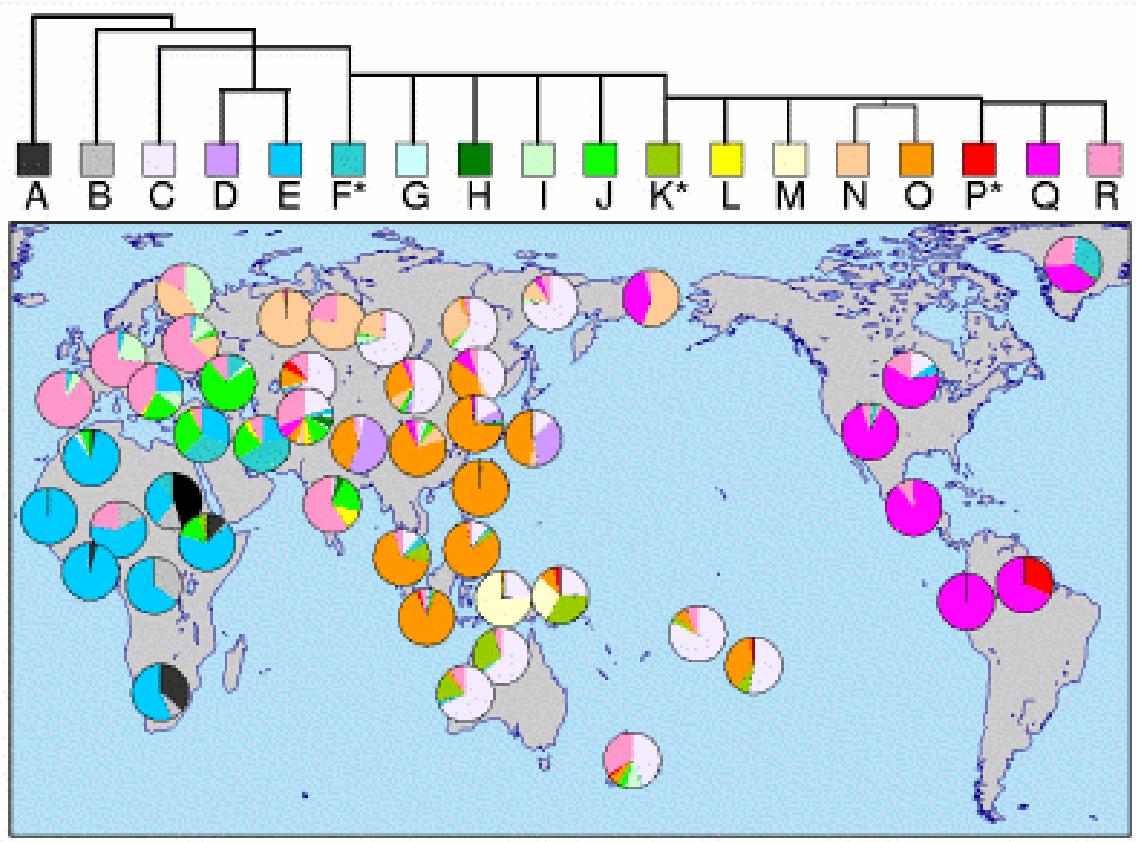



SNP
STR
Male 1 GTACTAGACTACTACTACTACTACTGGTG...
5 repeats
Male 2 GTACAAGACTACTACTACTACTACTACTGGTG...
6 repeats
Male 3 GTACAAGACTACTACTACTACTACTACTACTGGTG...
7 repeats



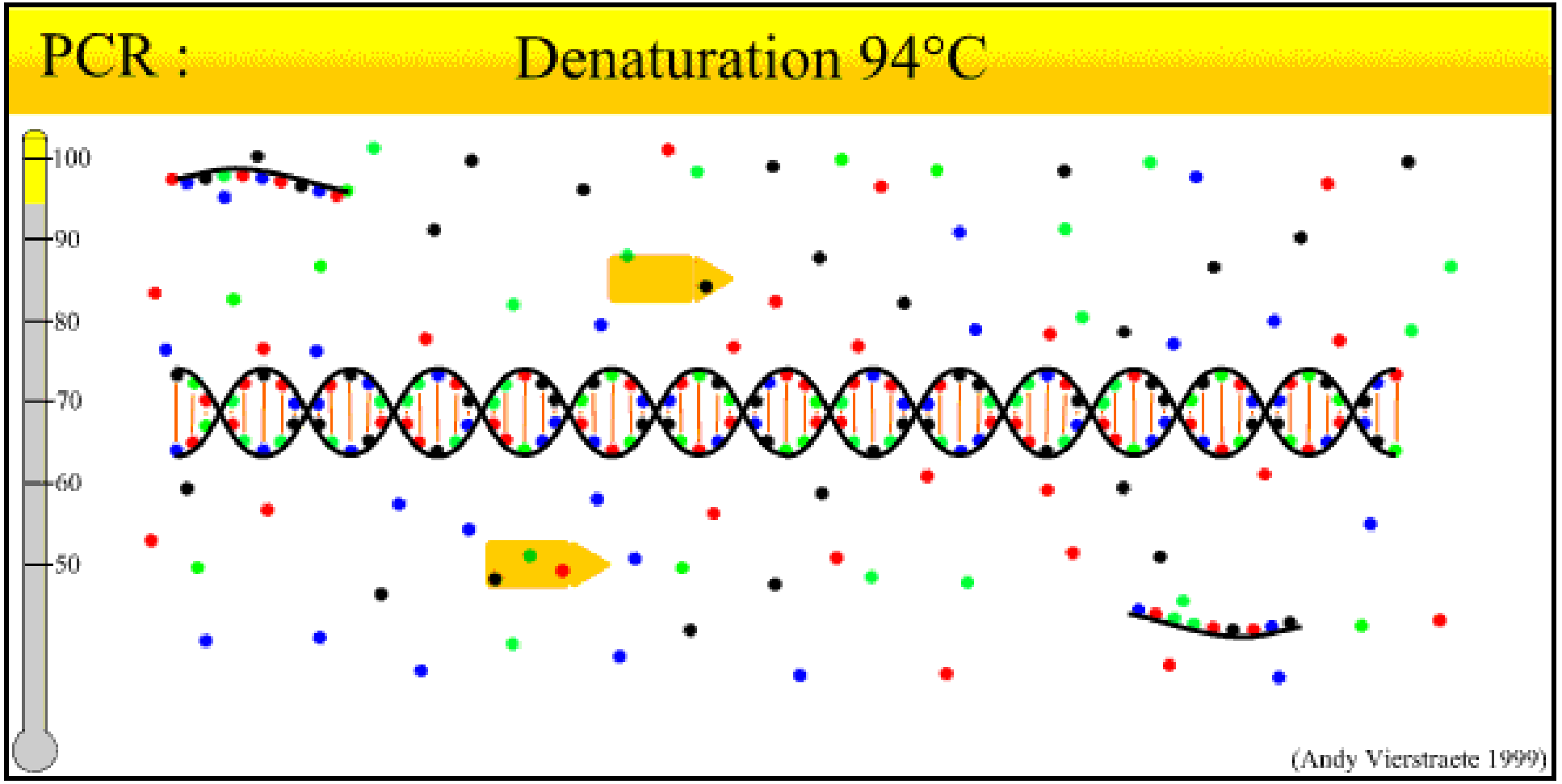

**SNP: Single Nucleotide Polymorphism: Haplogroup**

# Y-chromosome haplogroups




Courtesy of the Sanger Institute

**The Polymerase Chain Reaction "PCR" is used to amplify the signals from a person's Y-chromosome:**



# Individual Viking ancestry?

## HAPLOGROUP

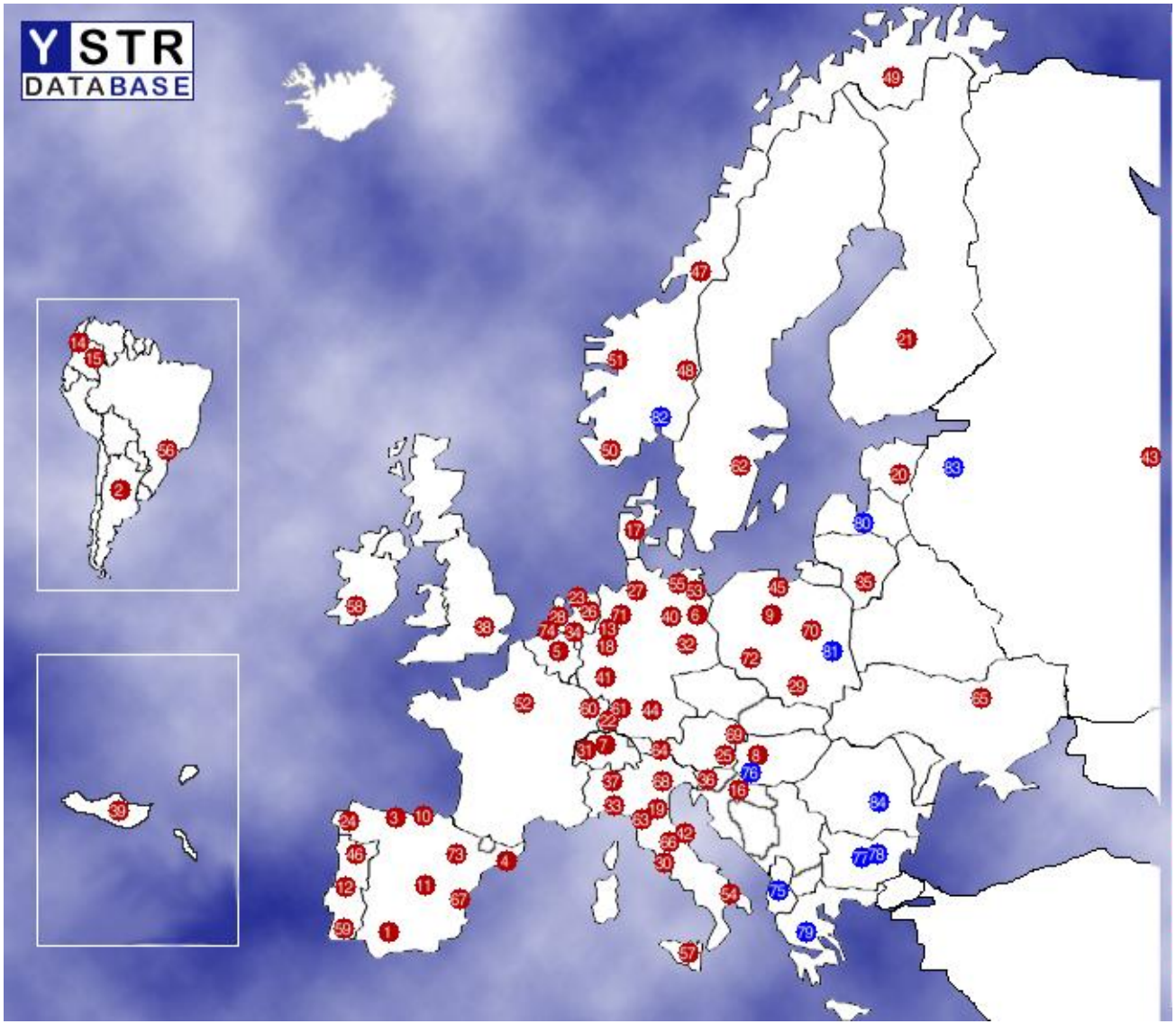
○ A ○ BC ○ DE ○ F* ○ G ○ H ◉ I ○ J ○ K* ○ R1* ○ R1a ○ R1b

## HAPLOTYPE

| | | | | | |
|---|---|---|---|---|---|
| DYS436 | 12 | DYS391 | 10 | DYS3091 | 14 |
| DYS437 | 14 | DYS390 | 23 | DYS389II | 30 |
| DYS438 | 10 | DYS393 | 13 | 461 | 12 |
| DYS434 | 12 | DYS392 | 11 | 462 | 12 |
| DYS435 | 11 | DYS388 | 15 | 460 | 10 |
| DYS439 | 12 | DYS19 | 15 | | |

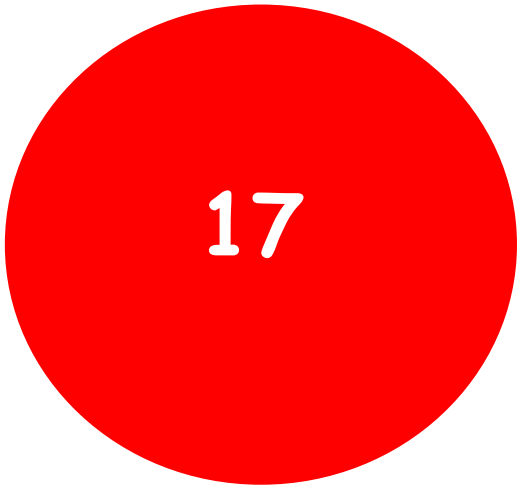
# Kevin Sampson


## 267 matches/13003

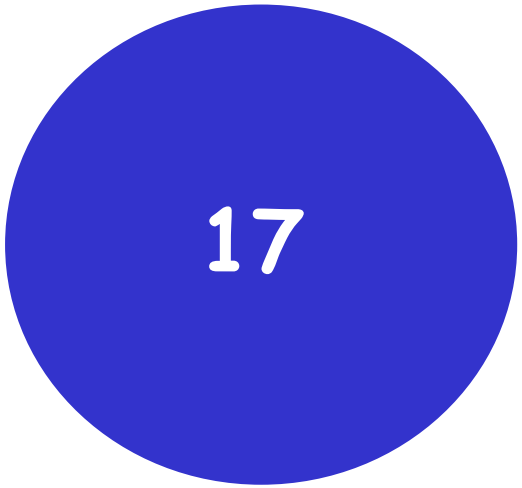



| Population | Count | Frequency % |
|---|---|---|
| Denmark | **10** of 63 | 16 |
| Holland | **13** of 87 | 15 |
| Friesland | **6** of 44 | 14 |
| Groningen | **6** of 48 | 13 |
| Zeeland | **6** of 46 | 13 |
| Belgium | **15** of 125 | 12 |
| Norway South | **3** of 25 | 12 |
| Cologne | **13** of 135 | 10 |
| Strasbourg | **9** of 99 | 9 |
| Stuttgart | **13** of 155 | 8 |
| Asturias | **6** of 90 | 7 |
| Central-EastSpain | **10** of 148 | 7 |
| Freiburg | **32** of 433 | 7 |
| London | **17** of 247 | 7 |
| Pomerania | **14** of 208 | 7 |
| Berlin | **32** of 548 | 6 |
| Düsseldorf | **9** of 150 | 6 |

HIT

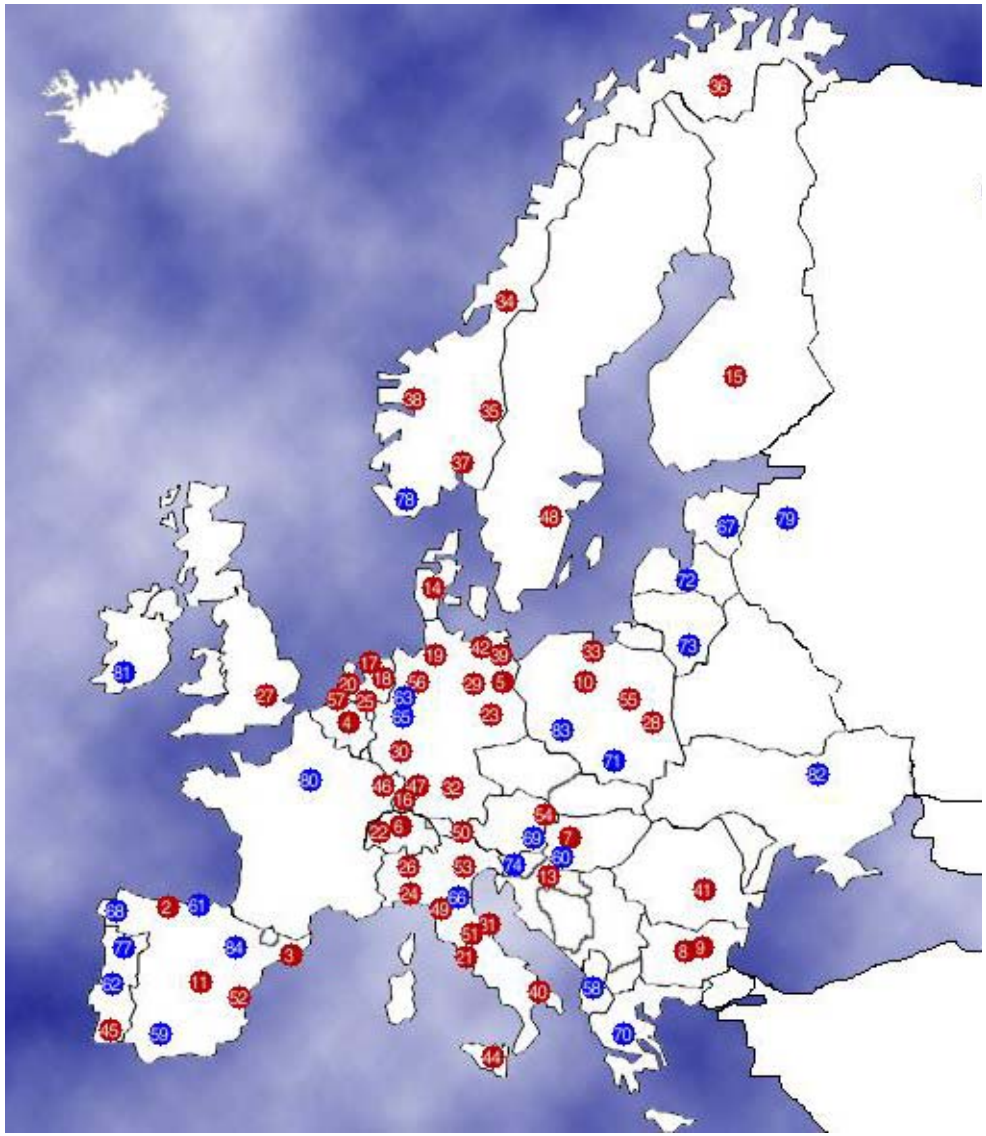



MISS



# Peter Forshaw (Irby)

**166 matches / 13003**



| Population | Count | Frequency % |
|---|---|---|
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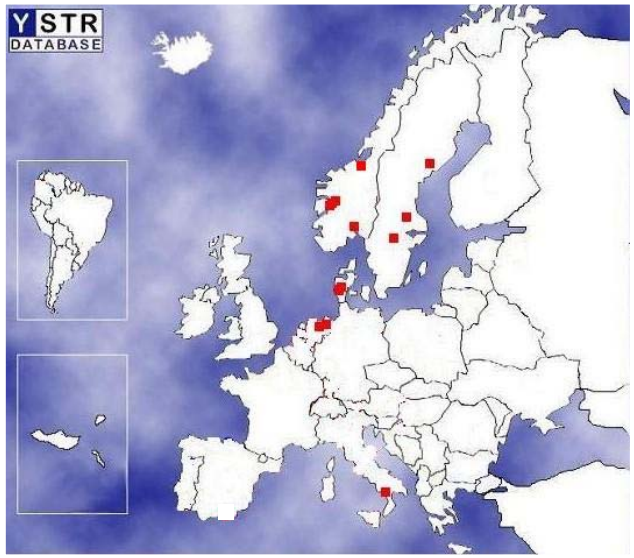
| Norway West | **2** of 64 | 3 |

# Richard Harding's y-chromosome group




**No mutation, top matches:**

**Ostgotland-Jonköping, and Gröningen, ~8% of men have a match.**

**One step mutation of one of his STR's:**
**Top matches for each mutation:**

**West Norway (2ce)**

**Oslo**

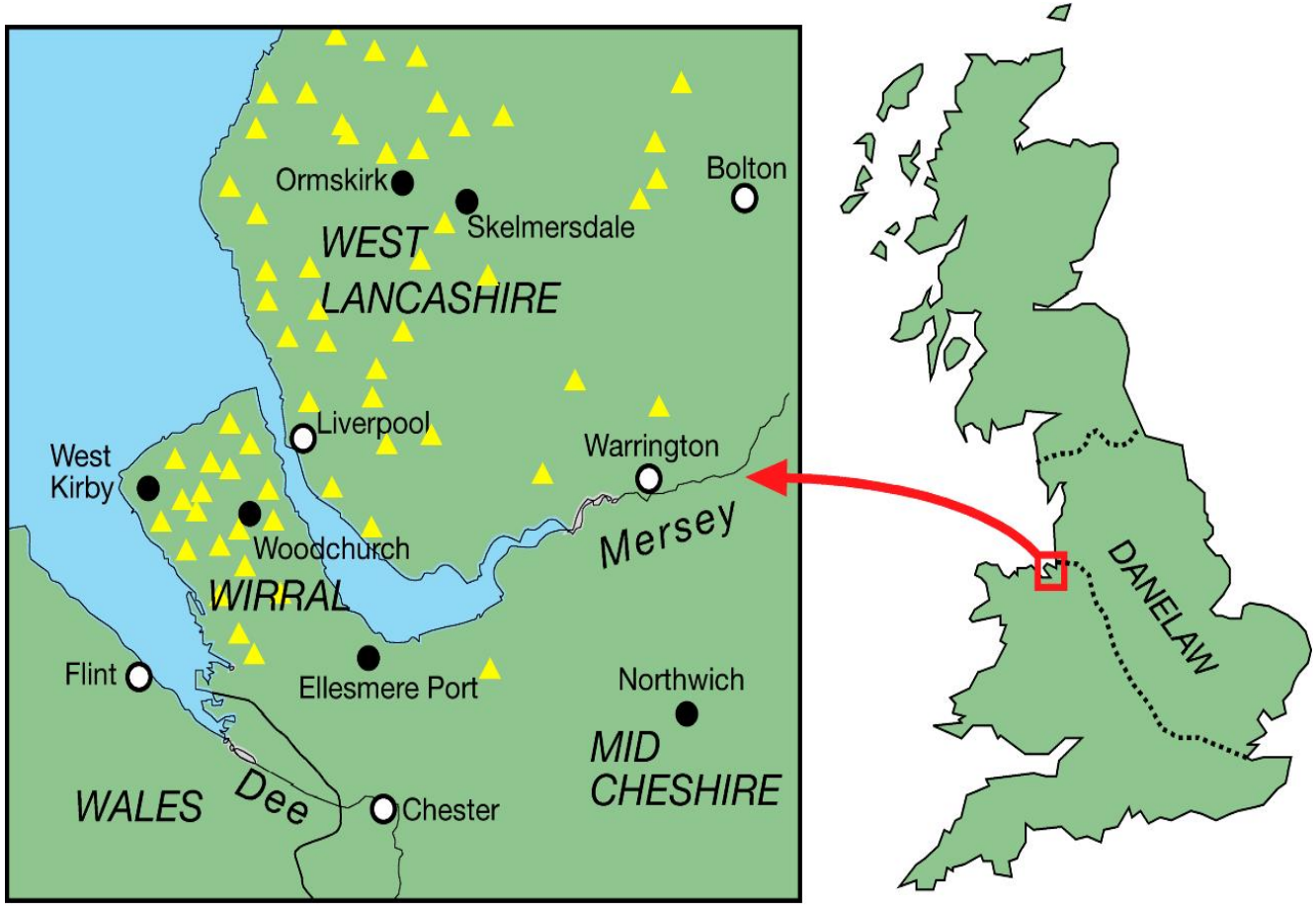
**Puglia**

**Vasterbotten, Sweden**

**Uppsala**

**Denmark**

# Wirral & West Lancashire – Vikings in the DNA?



# Medieval Wirral Taxpayers/Criminals/Ale house records:

Adam, Allin, Alleyne, Andrew, Ball, Barber, Barker, Barrell, Barrow, Bailiff, Beck, Bennett, Bergs, Billing, Bird, Blackburne, Boland, Brant, Bratherton, Browne, Brunt, Burscough, Bryde, Burrows, Bushell, Caley, Carr, Carlile, Carlisle, Challoner, Charnock, Chantrell, Coley, Colley, Colton, Coke, Corf, Corfe, Corness, Cotton, Cowper, Cross, Dalby, Dane, Danold, Davey, Davy, Denham, Denson, Dobb, Doe, Done, Duke, Dunn, Edmonds, Edmunds, Ellcock, Fazackerley, Fiddler, Fidler, Foreshaw, Forshaw, Fox, Francis, Gallie, Gardener, Gardiner, Gardner, Garratt, Garrett, Gibson, Gill, Gleave, Glegg, Goodacre, Grace, Gray, Gregory, Grey, Grice, Hale, Hancock, Hand, Harding, Hare, Harper, Harrison, Harvey, Heath, Helsby, Hesketh, Hey, Heyward, Hide, Hill, Hogg, Hole, Holme, Holmes, Home, Hough, Hulme, Hulmes, Humphrey, Huntington, Hynes, Jennion, Jensen, Jeunds, Johnson, Jump, Kemp, Kirk, Kirkby, Leck, Lancelyn, Ledsham, Leighton, Lennard, Leonard, Ley, Lightfoot, Linacre, Little, Lunt, Macklin, Massie, Massey, Matthew, Mayle, Mayles, Middleton, Milner, Molyneuz, Moss, Moulding, Mutton, Nelson, Newbold, Newton, Otter, Otty, Page, Parr, Pearson, Pemberton, Pendleton, Pennington, Penketh, Penney, Philip, Phylip, Pigot, Pinnington, Plumbe,Poole, Potter, Prenton, Pye, Pyke, Radcliffe, Rathbone, Richardson, Rider, Ridley, Rimmer, Robinson, Rogerson, Russell, Rutter, Saddler, Sadler, Sampson, Scarff, Scarffe, Scarisbrick, Sclater, Scriven, Sefton, Sharpe, Shephard, Shepherd, Sherlock, Skinner, Smalley, Smythe, Spenser, Stones, Swain, Swaine, Swarbrick, Swindley, Tarleton, Taskar, Tellett, Thomason, Thomasson, Thomson, Threadgill, Threadgold, Tottey, Totty, Tumath, Tyldesley, Wade, Wainwright, Walley, Walton, Warburton, Waring, Warington, Watmough, Watt, Whalley, Wharton, Wilkinson, Williamson, Whitby, Whitehead, Whitelaw, Whitfield, Whitmore, Whittle, Whyte, Williamson, Willoughby, Worral, Woods, Woodward, Wilcock, Wise, Wyse, Young, Yoxon.

# Volunteers

- **“Modern” Wirral and West Lancashire Volunteers**

  100 volunteers from Wirral and 49 volunteers from West Lancashire satisfying the “2 generation” criterion – paternal grandfather born in the area.

- **“Old” or “Medieval” Wirral and West Lancashire Volunteers**

  37 volunteers from Wirral and 42 volunteers from West Lancashire satisfying the “2 generation” criterion – paternal grandfather born in the area **AND** possessing a surname present in the area before 1600.

# The “Medieval” names - the volunteers

- **Wirral (1545 subsidy rolls of Henry VIII, criminal and ale house records):**

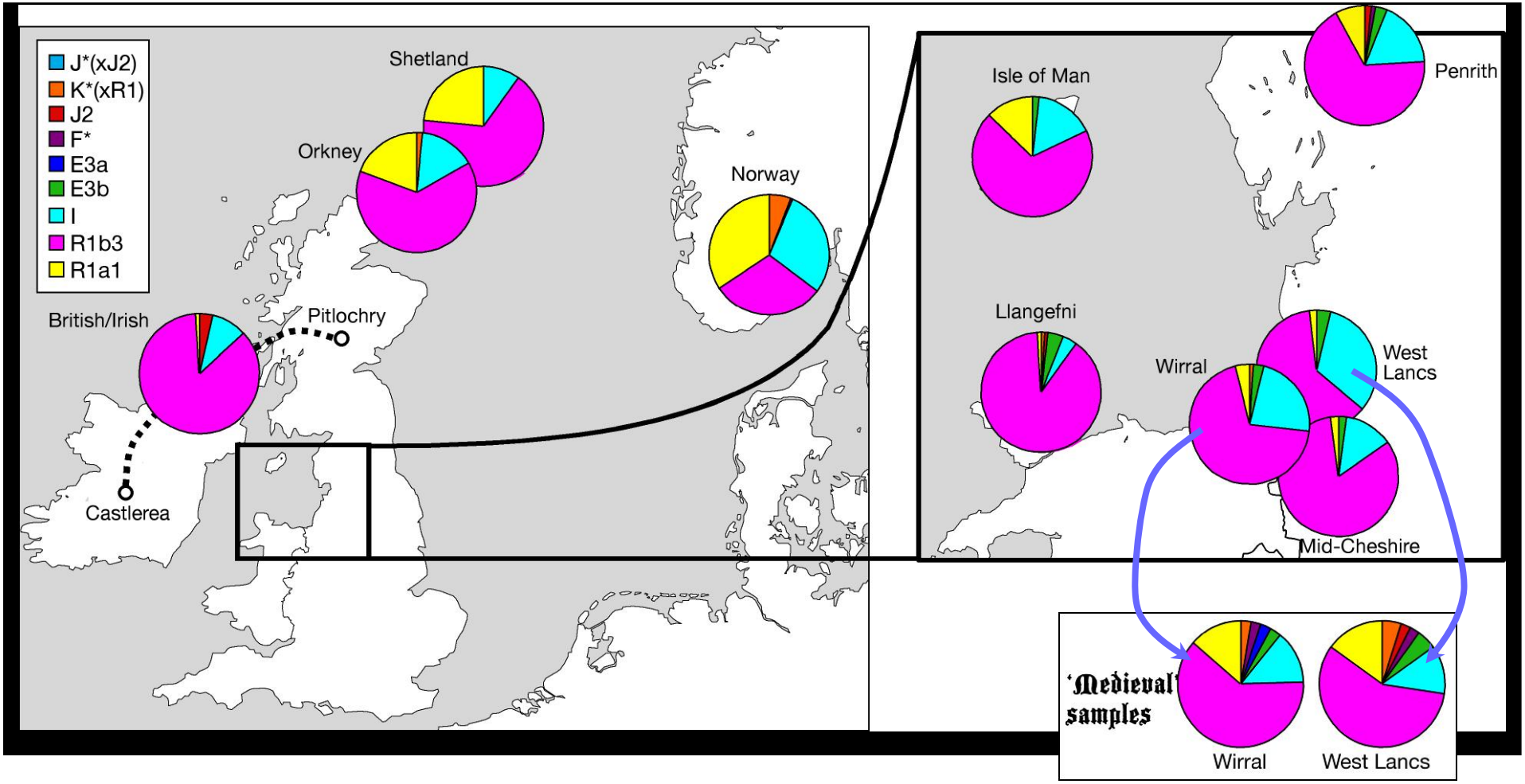
  Barker, Beck, Bennett, Billing, Bird, Bryde, Bushell, Colley, Corfe, Edmunds, Forshaw, Gill, Green, Harding, Hesketh, Holmes, Hough, Joynson, Kemp, Kirk, Kirkby, Lunt, Rathbone, Richardson, Rimmer, Robinson, Sampson, Scarisbrick, Sherlock, Skinner, Taskar, Tellett, Tottey/Totty, Young, Oxton, Raby, Upton.

- **West Lancs (names of those promising to contribute to the stipend of the priest of the altar of Our Lady of Ormskirk, 1366; plus place-names):**

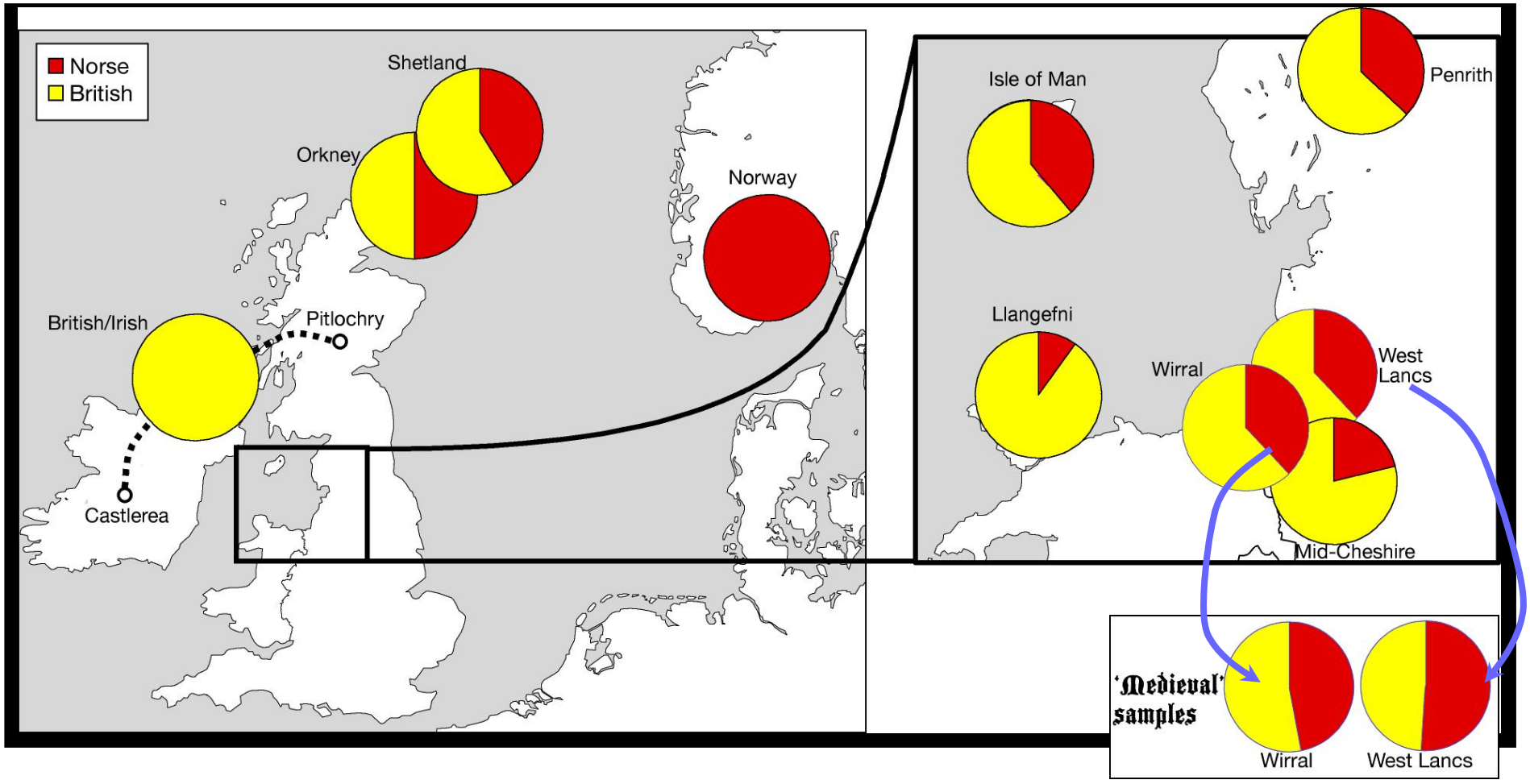
  Balshaw, Brown, Carr, Coly, Cook, Cooper, Fletcher, Gray, Holland, Holmes, Jones(son), Leyland, Melling, Molyneux, Otty, Prescott, Rimmer, Serjeant, Thomasson, Walsh, Webster, Westhead, Alker,

  Bilsborrow, Charnock, Corfe, Crombleholme, Gill, Hesketh, Hulme, Lunt, Pendleton, Penketh, Pennington, Rigby, Risley, Roby, Scarisbrick, Sephton, Swarbrick

# Y-chromosome distributions for the north west



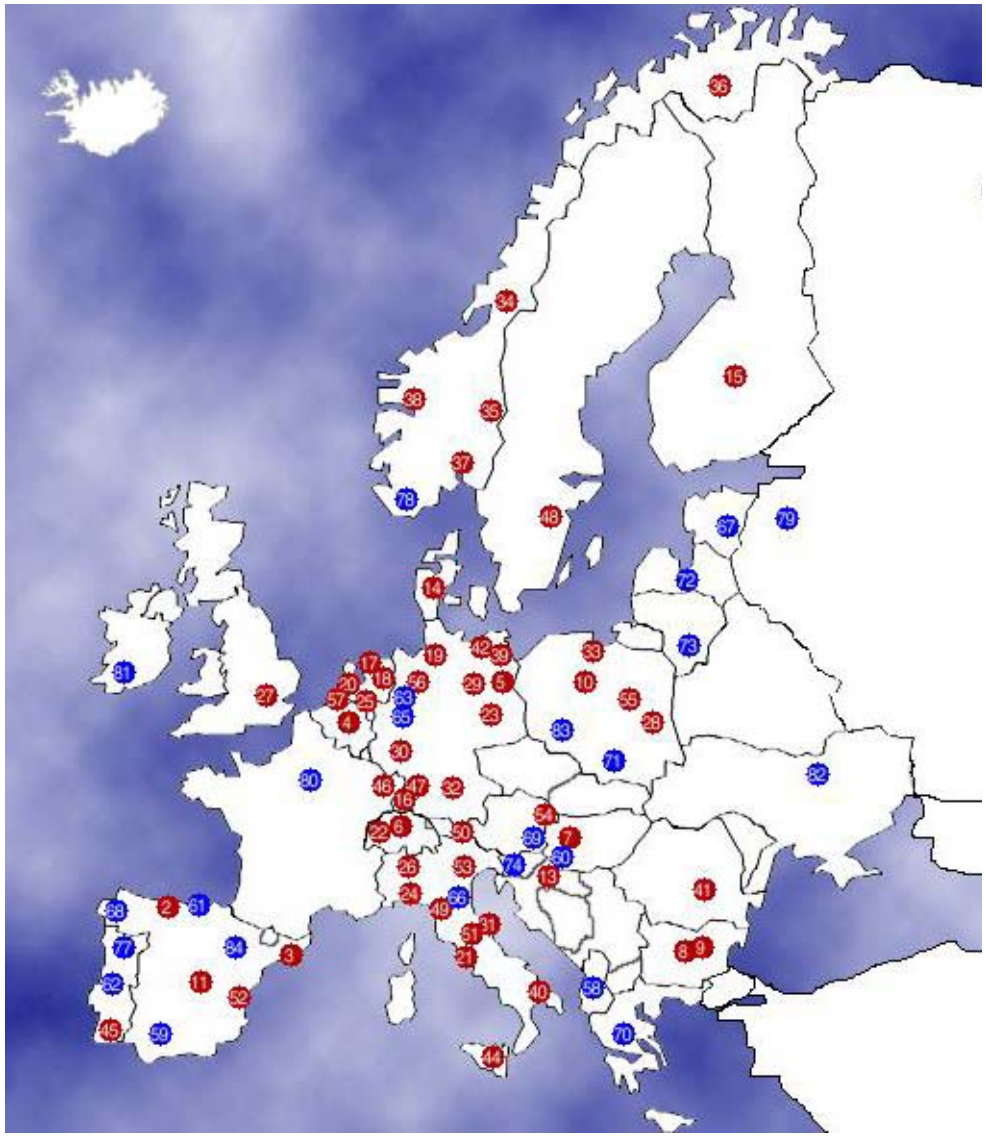
# Viking admixture results




~ 50% Scandinavian

# Tony Tottey (Moreton)

**166 matches / 13003**



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Winter Walkabout: Red Rocks, West Kirby, Caldy, Fr

# The last of the Wirral Vikings.

by Jim Barrow

## STORYTIME

. . . at Heswall library with 23-year-old Christine Payne of Irby.

## THE NORSEMAN

Mr Gordon Tottey, his forefathers landed with Vikings invaders.

RED ROCKS is a tiny finger of sandstone pointing out into the Irish Sea from the extreme western point of the Wirral Peninsula.

Bright sunshine warmed the soft redrock and glinted on the tiny waves breaking on them, as Eddie Barford, and I started our walk—with more than 100 miles of Cheshire and North Wales ahead of us.

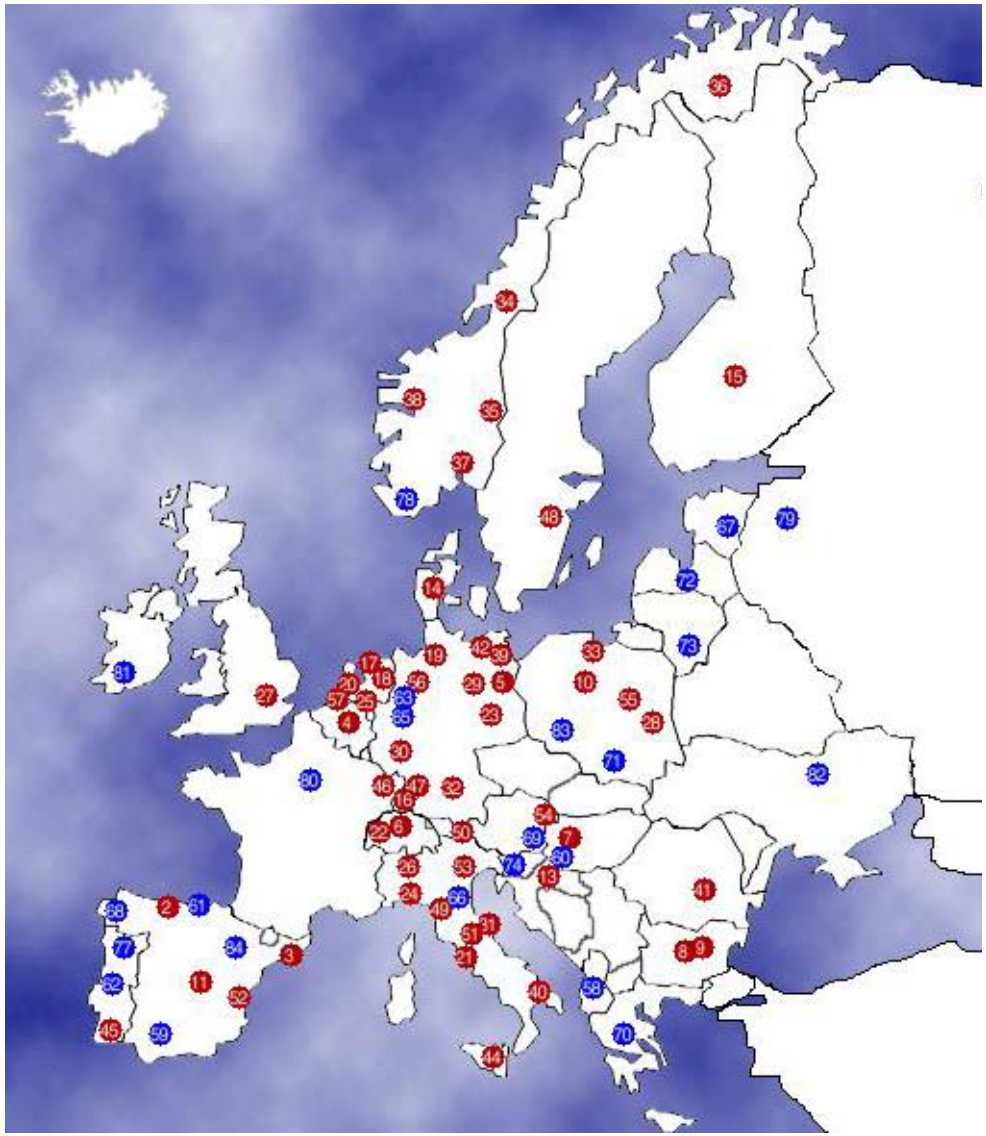
Red Rocks, our starting point, looked east to Hoylake, and a deserted sweep of beach. To the West on Hilbre Island, in the Dee Estuary, now a bird sanctuary, the building sparkled white in sunshine.

The island, said to have been the home of a recluse monk, 900 years ago, was undergoing close scrutiny from two ladies sitting on the bare rock and looking out to sea.

We spoke briefly to 73-year-old Mrs Lucy Weston and 69-year-old Mrs Mary Winters, who were staying at

# Peter Forshaw (Irby)

**166 matches / 13003**



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# My Viking Dad with my Viking dog!

Viking beer!

**From Abigail Forshaw**

# Merseyside Young Archaeologists,  January 2003

# Next project: N. Lancashire, Cumbria and N. Yorks

# … and a closer look at old Scandinavia


## Thingwall – Steve & Prof. T. Titlestad, Univ. Stavanger