# Family History through DNA: Help or Hindrance

Nick Rossiter

# Overview

- DNA basics: what do we inherit
- Use for family historians
  - Genetic astrology
  - Genetic genealogy
- Examples of application of genetic genealogy
- Discussion
  - What is learnt
  - Uncertainties that remain

# **DNA Basics**

- DNA is <u>Deoxyribonucleic acid</u>
- Molecule carrying genetic instructions
  - development, functioning and reproduction of all known living organisms
- Within cells, DNA is organized into long structures called chromosomes
  - The Y chromosome is one of two sex chromosomes in mammals (other is X)
- Organisms store most of their DNA inside the cell nucleus and some of their DNA in organelles (specialised subunits), such as mitochondria
  - Mitochondria produce energy from glucose

# **DNA Basics 2**

- Except for identical twins, each person's DNA is unique
- The zygote, new organism in reproduction, inherits DNA
  - One set of chromosomes from each parent

# Genes

- A gene is a length of DNA that codes for a specific protein e.g. insulin
- Genes are the basic unit of genetics
- Human beings have 20,000 to 25,000 genes (about 3% of our DNA)

# Number of Ancestors

- Number of ancestors builds up rapidly
- Exponential rate of increase (power of 2)
- So 10 generations back,
  - You have  $2^{10}$  ancestors, that is 1,024 people
  - That's perhaps in 250-300 years
- 20 generations back,
  - $2^{20}$  ancestors, that is 1,048,576 people
  - That's perhaps in 500-600 years

# Implications

- Cousin marriages, marriages in small communities mean build up not (nearly) as fast as this
- Indeed some people calculate the whole of the planet is related if you go back 3,500 years
- Population of England was 3 million in 1530
  - So very significant 'inbreeding'
- At 15 generations back, ancestors = 2<sup>15</sup> or 32768 people, more than the 20,000-25,000 genes we have
  - So some ancestors must be left out!
  - That's in 375-450 years

# Inherited DNA

- Most of what we inherit through the generations is a mishmash of the DNA of our ancestors
- But 2 components endure throughout:
  - In Y-Chromosome
    - the father-of-father characteristics is preserved
    - no tests are available on female side
  - In Mitochondria
    - the mother-of-mother characteristics is preserved
    - sons inherit their mother's mtDNA but cannot pass it on
- Inheritance is usually faithful but at intervals mutations occur
  - Such mutations 'label' populations and migrations

# **DNA** Profiling

- The lengths of variable sections of repetitive DNA, such as short tandem repeats (STR)/ mini-satellites, are compared between people
- STR change relatively frequently between generations (finer-tuning)
- Also look at Y-Chromosome and Mitochondria (coarser-tuning)
- Much used in paternity/maternity testing

- Important financial motivation

- Uniqueness of DNA gives major forensic uses
- How can genetic genealogy benefit?

# Genetic Genealogy

- On male side places ancestors in a Y-Haplogroup (population with same markers in Y-Chromosomes) – 2,500-4,000 years ago
- On female side places ancestors in a mtDNA Haplogroup (population with same markers in mitochondria) – 2,500-4,000 years ago
- On both male and female side compare STR markers against populations 'known' to be carrying such markers – 500-2,000 years ago
- In all methods, take into account documentary records (traditional genealogy)

# How it Works

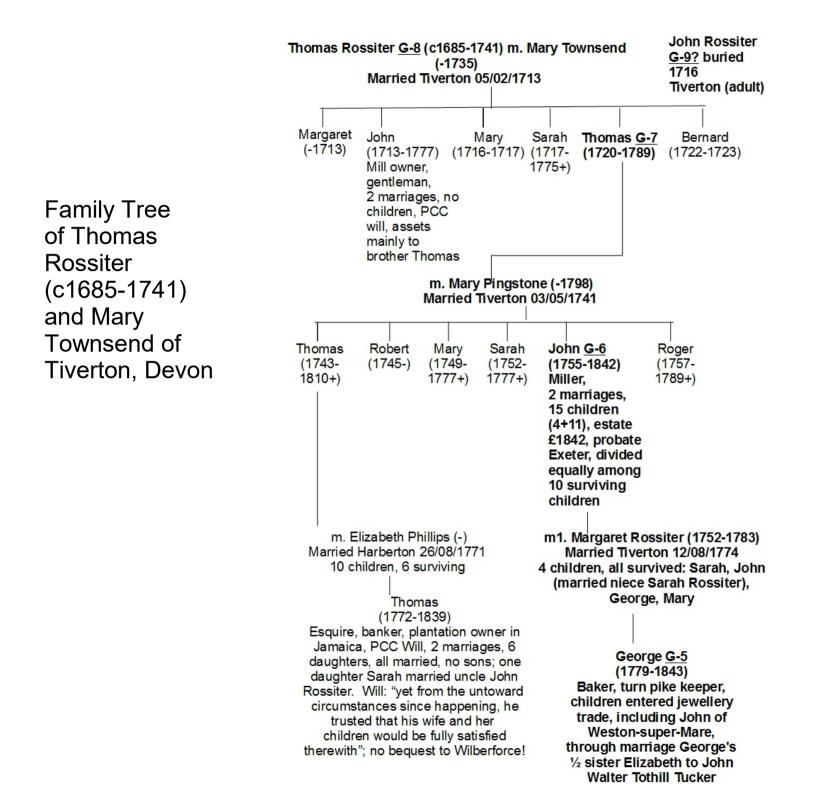
- You
  - Take a swab from the inside of your cheek
  - Place it in a container
  - Send container off in a supplied envelope
  - Enclose some \$!
- They
  - Receive the swab
  - Create an account for tracking and placing results
  - Perform some DNA analysis
  - Transfer results to your on-line account

# Examples

- Male side mine (well documented with missing link before DNA tests)
  - Surname constant over generations
- Female side mine (poorly documented before DNA tests).
  - Surname changes every generation

# Male side

- Teignmouth (Devon)
  - Back to grandfather George (1876-1946), gtgrandfather Ebenezer (1848-1888), jewellers, 3 generations back
- Weston-super-Mare (Somerset)
  - Back to gt-gt-grandfather John (1811-1893), jeweller, 4 generations back
- Tiverton (Devon)
  - Back to gt-gt-gt-gt-gt-gt-grandfather Thomas (c1685-1741), 8 generations back



# **Properties of Family**

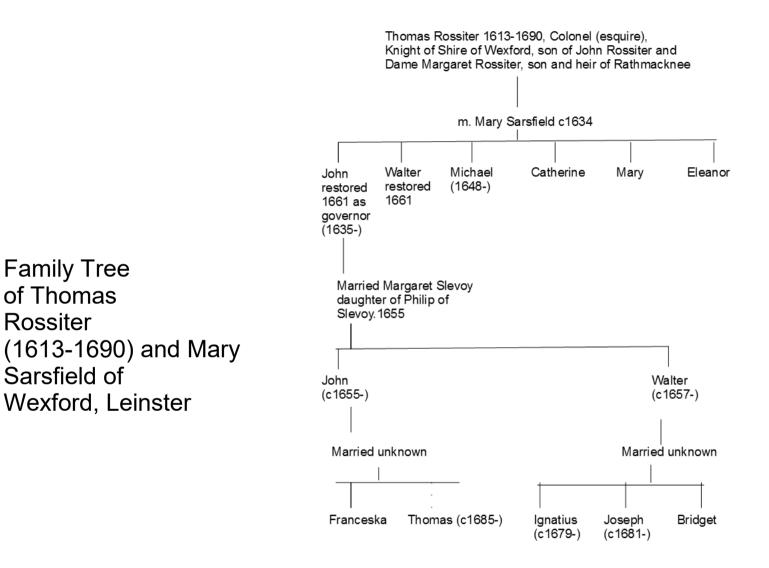
- Liked names John, Thomas, Margaret; Church of England
- Prosperous by 2<sup>nd</sup> generation in Tiverton
  - Mill owners, slave trade
- No obvious connection to other SW families
  - Main family prior of Edward Rossiter (Combe St Nicholas, Somerset) had emigrated to Boston on Mary & John in 1630 (puritans, 17 in his party)
- Pioneer Thomas may have been a little raw:
  - Appeared before Bishop of Exeter in 1713 with wife on charge of prenuptial fornication!

# Speculation about an Irish Connection

- Rossiter is an Irish name, fairly common in Wexford (Leinster)
- Is there any link?
- Rathmacknee is centre of family's influence
- 'Well-established' landowners
  - Arrived with Strongbow in 1169 ('Normans')
  - de Roucestre (of Rochester, land owners in eastern England and Boulogne)
- Names: John, Thomas, Margaret
- Catholics



-



1641: Thomas Rossiter joined rebellion against English as part of Leinster forces

1649: Cromwell defeats rebellion. Thomas Rossiter has his lands confiscated and is transplanted to Connaught

1661: Some restoration in Ireland of estates on end of Cromwell era and restoration of Charles II. Return to Rathmacknee of sons of Thomas and Mary: John acting Governor of Rathmacknee while his father was away at wars, Walter, together with their children

1691: Rathmacknee lost for good to protestants

### Rathmacknee Castle, Wexford



## Rathmacknee Castle sign

### RATHMACKNEE CASTLE CAISLEÁN RÁTH MHIC NAOI

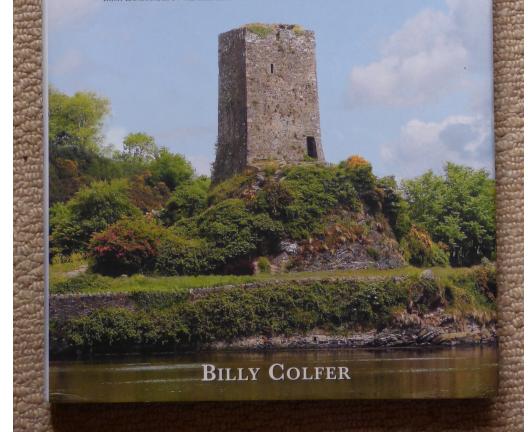
This castle was probably erected by John Rosseter around 1450. The tower and bawn are well preserved and give a good idea of what many other similar towers throughout the Irish countryside must once have looked like when they were complete.

Is dócha gurbh é Seán Rosaitear a thóg an caisleán seo timpeall na bliana 1450. Tá bail mhaith ar an túr agus ar an mbábhún agus tugann siad barúil mhaith do dhuine cad leis a raibh a leithéidí eile ar fud na tire cosúil nuair a bhí siad slán.

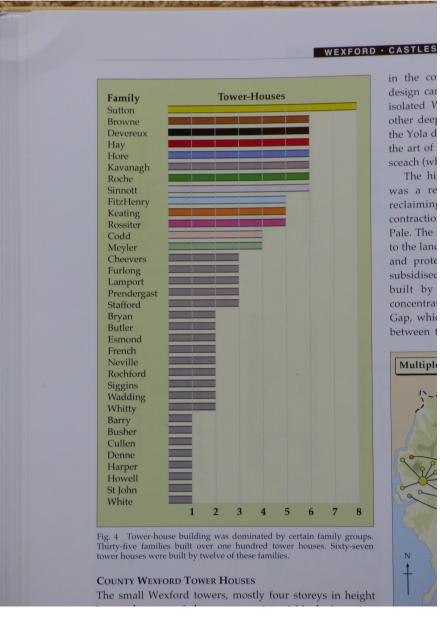
# Wexford Castles Book

## WEXFORD CASTLES LANDSCAPE · CONTEXT · SETTLEMENT

IRISH LANDSCAPES IV GENERAL EDITORS: F. H. A. AALEN • KEVIN WHELAN • MATTHEW STOUT



# League Table for Norman castleowners in Wexford



# Map of Main Castles in Wexford

and protected the Wexford Pale were strengthened by

subsidised towers. The small number of tower houses built by the Kavanaghs in the county are mostly concentrated in the Fassagh of Bantry near the Pollmounty Gap, which gave access to Wexford from county Carlow between the Blackstairs and the Barrow. The impressive Multiple tower-house builders 8 7 family groups. ses. Sixty-seven evs in height 6 miles Metres OD had modest Principal tower house Family Principal tower house Family because of Ballybrennan () Sinnott (6) Ballykeerogemore O Sutton (8) or sixteenth-Kilcavan O FitzHenry (5) Mulrankin Browne (6) almost all of a Kilcowan () Keating (5) Ballymagir Devereux (6) t with design Rathhmacknee Rossiter (5) Hillcastle Hay (6) on template. Clougheast O Codd (4) Horetown Hore (6) Rosegarland Duncormick Meyler (4) Artramon Roche (6) ly projecting ninor stairway

Fig. 5 'Parent' castles can be identified in the south of the county, mostly in Forth and Bargy, from which families expanded to build tower houses elsewhere in the county. The Suttons (eight) were the most prolific builders, followed by the Brownes, Devereuxes, Hays, Hores, Roches and Sinnotts (six each). A similar number is attributed to the MacMurrough Kavanaghs, principally in the Fassagh of Bantry. itectural form

Fig. 6 graveyar Tellaroug vanished have disa visual i flat lan their ef status, Fiel 137 tov tentati physic tower preser 'extens 'fragm eight source 'defin the distri the ir towe descr locate late more Т towe

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untry and in

Wexford type

# Wexford Youth Today







MEN'S FAI CUP FINAL 2015



stadium showpiece game spot-on in Aviva

'S FAI CUP FINAL 2015





w Michael Carthy



Shelbourne Ladies FC 2

Wexford Youths Women 2 0+5. Delahunty 105 ouths won 4-2 on pens

Women are





# Norman names are part of the modern mixture

had saved from Noelle Murray and Shauna Newman hit the crossbar.

Shelbourne Ladies: Niamh Reid Burke, Keeva Keenan, Niamh Walsh, Pearl Slattery (capt.), Shauna Newman, Siobhan Killeen (Dearbhaile Beirne 85), Rachel Graham (Lauren Dwyer 68), Jamie Finn, Grace Murray (Sarah Rowe 59), Rebecca Creagh, Noelle Murray. Subs Not Used: Amanda McQuillan, Fiona Donnelly, Avril Brierley, Sinead Taylor.

Wexford Youths: Mary Rose Kelly (Tamara Furlong 32), Nicola Sinnott, Ruth Fahey, Edel Kennedy, Ciara Rossiter, Linda Douglas (Maria Delahunty 61), Kylie Murphy (capt.), Emma Hansberry, Aisling Frawley (Rianna Jarrett 77), Carol Breen, Claire O'Riordan. Subs Not Used: Orlaith Conlon, Jessica Gleeson, Becky Cassin, Rachel Hutchinson.

Referee: Paula Brady. Assistant Referees: Michelle O'Neill, Natasha Valentini. Fourth Official: Deirdre Nolan.



Ciara Rossiter celebrates with team-mate Maria Delahunty, 20, after scoring the equalising goal. Pic: David Maher / SPORTSFILE

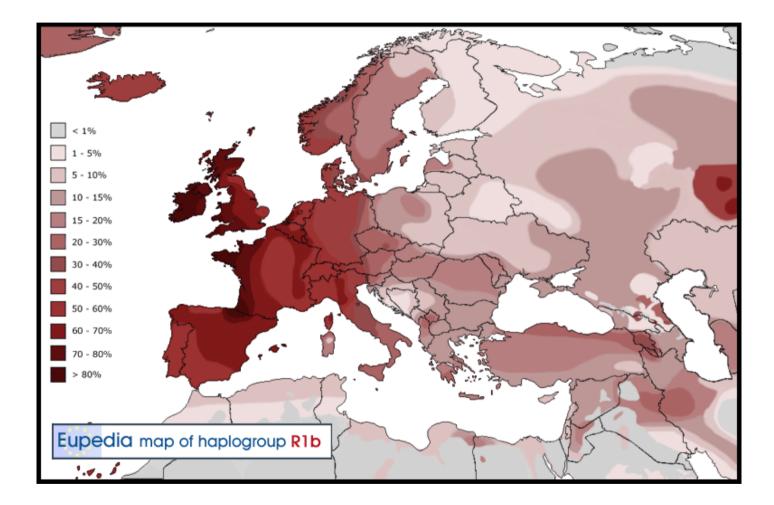


Wexford Youths celebrate winning the penalty shoot-out. Pic: ©INPHO/Donall Farmer

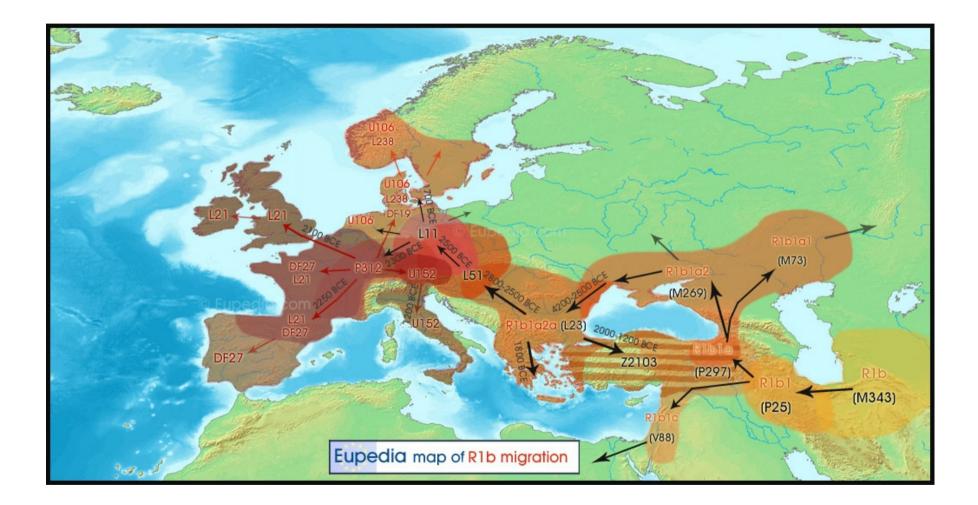
# Fortunes of Catholics in Ireland

- Old gentry was Catholic
- New gentry was Presbyterian Church of Ireland, started in Elizabeth I times (plantations)
- Cromwell invaded Ireland (battles Rathmines, Drogheda, Wexford 1649-50) and dispossessed Catholics
- Charles II 1660s granted significant restorations to Catholics (about 1/3)
- William of Orange invaded Ireland 1688-91(battles Boyne, Limerick)
- Initial Treaty of Limerick 1691 was relatively fair to Catholics, but was not ratified by protestant parliament
- Penal laws, from 1690s, dispossessed nearly all Catholics for good
- Flight of the Wild Geese 1691: Jacobite Army with dependents left Ireland for France, under Patrick Sarsfield

# My Paternal Clade R1b

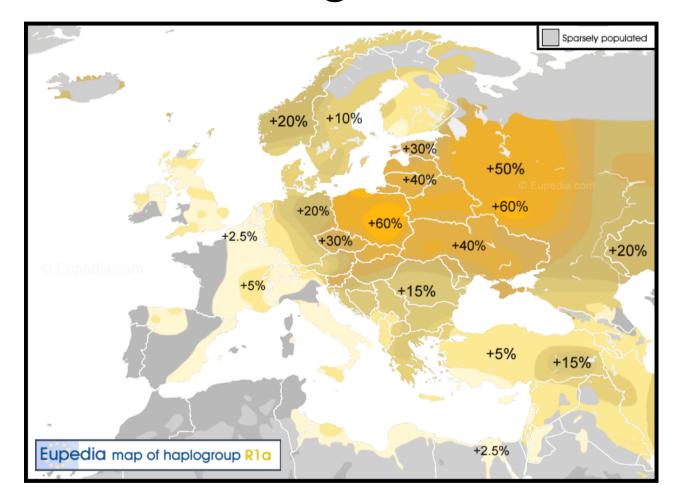


# **R1b Migration Map**

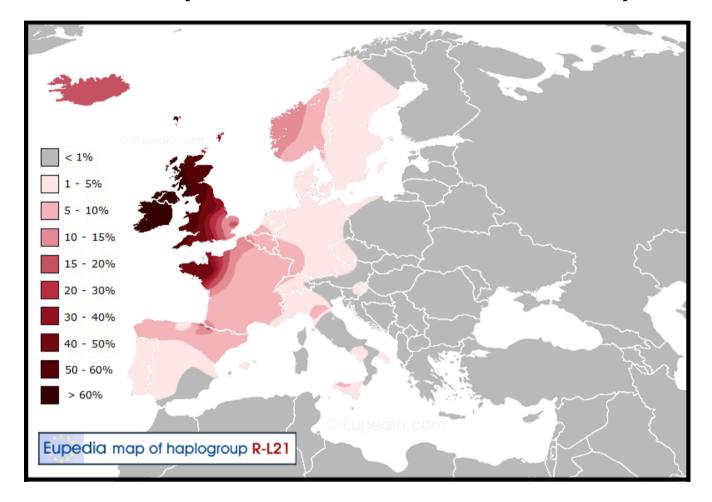


BCE – Before the Common Era (same as BC)

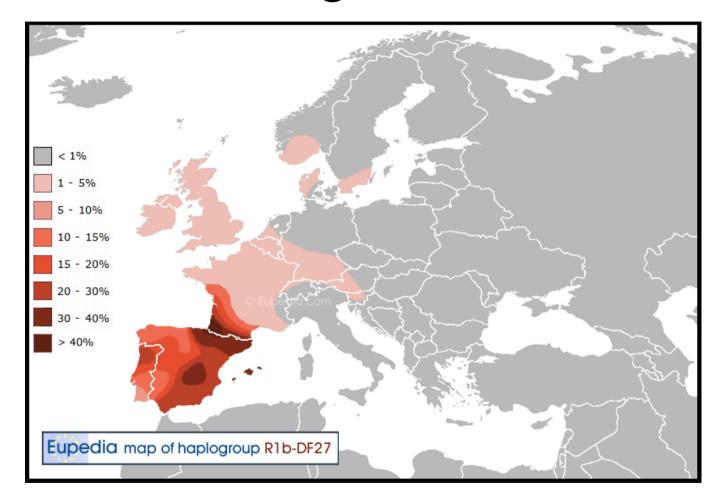
# Other Major European Clade R1a --Negative



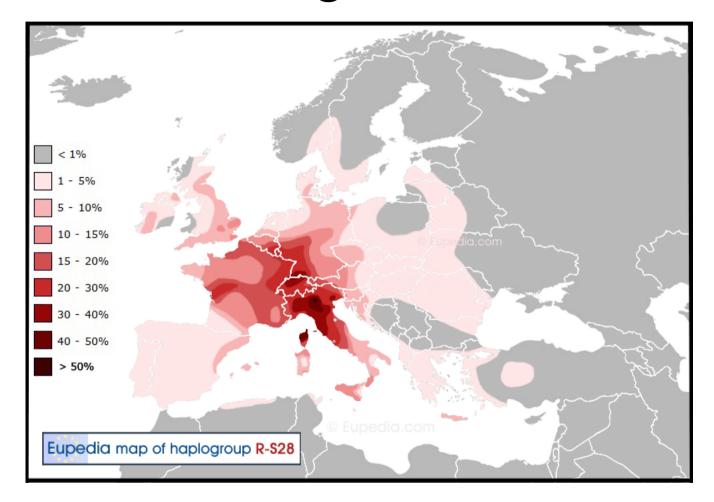
# My Paternal Subclade R1b-L21(Western Atlantic)



# Other R1b Subclades – DF27 -negative



# Other R1b Subclades – S28 – negative



me	Profile	Family	Tree	Media DNA Reunion	DNA Archaeology	Indigenous DNA	DNA Haplogroups	Orders		
				Distribution frequer	ncy of terminal Y-D	NA SNP marker,	L21			
				The L21 SNP marker is found predominantly in Europe. The detailed distribution frequency of L21 and its ancestors is as follows:						
				Population (Study Size)	% of Population belonging to R1b1a2a1a2c	% of Population belonging to R1b1a2a1a2	% of Population belonging to R1b1a2a1a	% of Population belonging to R1b1a2a1	% of Population belonging to R1b1a2a	% o bt
				Ireland South (24)	6	6	C	C	C	
					68.5%	87%	95.3%	95.3%	95.3%	
				Ireland East (16)	-	•	6	6	6	
					56.3%	75.1%	75.1%	81.4%	81.4%	
				Ireland North (21)	-	-	6	6	6	
					47.6%	61.9%	76.2%	76.2%	76.2%	
				(22)	-	<b></b>	6	6	6	:
					45.4%	68.1%	72.6%	72.6%	72.6%	
				England North (28)	-	-	6	6	6	
					39.3%	53.6%	78.6%	78.6%	78.6%	
				England Southeast (25)	-	-	6	6	6	
					28%	52%	76%	76%	76%	

Lapurdi/Baztan,

France

# Information gained from DNA

- Statistics supports origin from 'Celtic' area, particularly Ireland South
- But it's not proof
  - Could theoretically be from other areas with diminishing probability
  - Sample sizes are often small
  - The milkman in Tiverton might have been Irish! (false paternity)
- Relates to 2,500 to 4,000 years ago

# **More Recent Information**

- DNA STR markers
- 500-2000 years ago



#### Indigenous Y-DNA Search

The <u>Y-DNA of Brian Nicholas Rossiter</u> was compared to a dataset of **240** populations in **16** journals using **6** Y-DNA STR markers. The closest matches in a set of **240** populations are listed in the table below:

lrish	DMI: 40.70
Pyrenees, Spain, Vall D' Aran (Lerida)	RMI: 13.73
Tyrences, span, van bi Aran (centa)	RMI: 12.66
Pyrenees, Spain, Alt Urgell (Lerida)	RMI: 11.29
Pyrenees, Spain, Cerdanya (Gerona)	
	RMI: 11.16
Modena, North Italy	RMI: 11
Pyrenees, Spain, Jacetania	RMI: 10.61
Caucasian, United Kingdom	RMI: 10.6
Belgian	RMI: 9.77
Cantabria, Northern Spain	RMI: 9.69
Asian, United States	RMI: 9.55
US Caucasian	RMI: 9.54
Catalonia, Spain	RMI: 9.5
Valencia, Spanish (eastern coast of the Iberian Peninsula)	RMI: 9.49
Majorca (Spanish)	RMI: 9.33
Brescia (Northern Italy)	RMI: 9.29



#### Indigenous Y-DNA Search

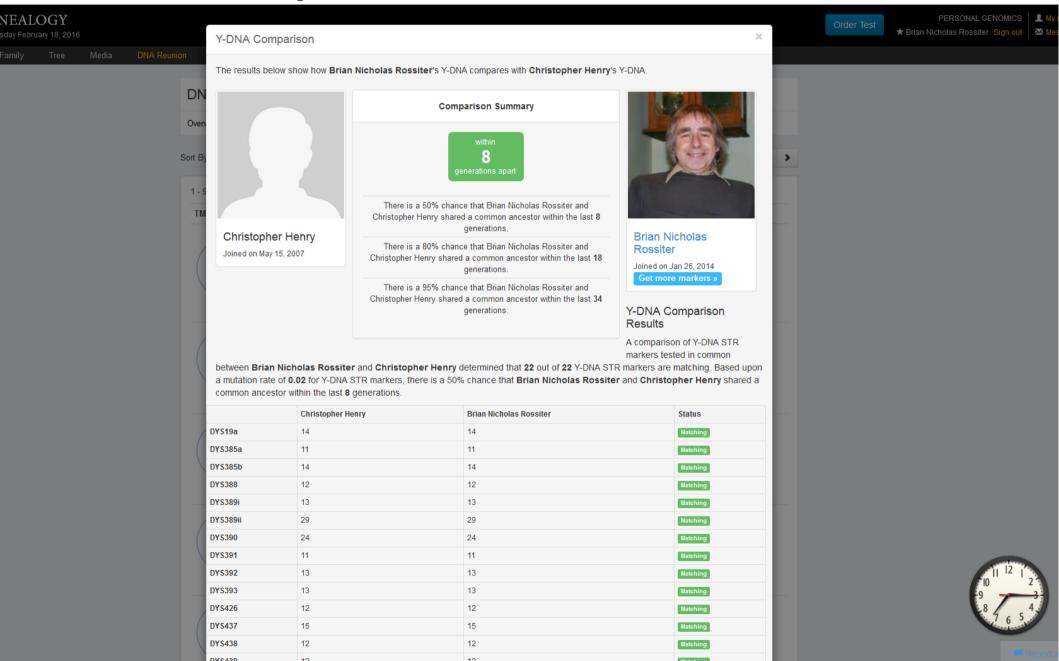
The <u>Y-DNA of Brian Nicholas Rossiter</u> was compared to a dataset of **238** populations in **14** journals using **12** Y-DNA STR markers. The closest matches in a set of **238** populations are listed in the table below:

Pyrenees, Spain, Vall D' Aran (Lerida)	RMI: 23
Irish	RMI: 17.08
Pyrenees, Spain, Alt Urgell (Lerida)	RMI: 16.67
Pyrenees, Spain, Cerdanya (Gerona)	RMI: 15.2
Brescia (Northern Italy)	RMI: 13.29
Modena, North Italy	RMI: 12.93
DS Caucasian	RMI: 12.01
Valencia, Spanish (eastern coast of the Iberian Peninsula)	RMI: 11.83
Caucasian, United Kingdom	RMI: 11.81
Belgian	RMI: 11.77
DS Caucasian	RMI: 11.55
Maracaibo, Northwest Venezuela	RMI: 11.44
Caucasian, United States	RMI: 11.33
Ibiza (Balearic Islands)	RMI: 11.3
Catalonia, Spain	RMI: 11.28
Northern Portugal	RMI: 10.74
Majorca (Spanish)	RMI: 10.7
Cantabria, Northern Spain	RMI: 10.66

## **STR Markers**

- Results vary with choice of markers, number of markers, comparison datasets
- Statistical minefield
- Need to have a documented family tree to make some sense of it all
- My results again support an Irish origin at the time of settlement in Wexford
- But are the Spanish suggestions significant?

### Pen-pals – closest matches



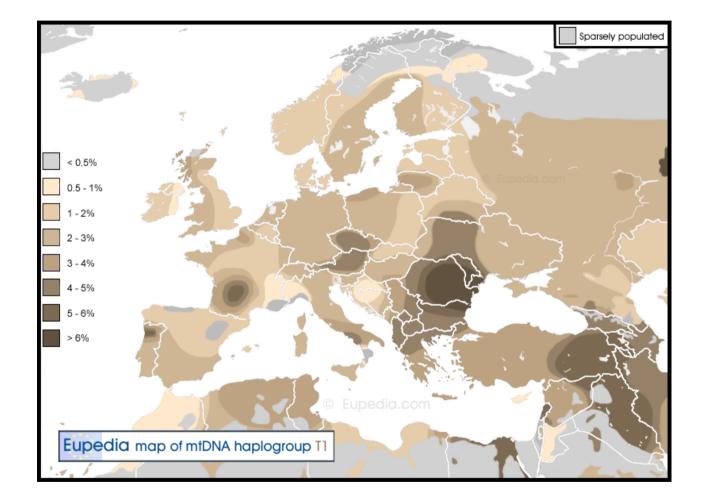
## Female side

- Told relations went back for centuries in the westcountry
- One previous attempt by a relative at doing female side
  - Following male side of my mother's parents (Nicholls)
- Not a lot of encouragement

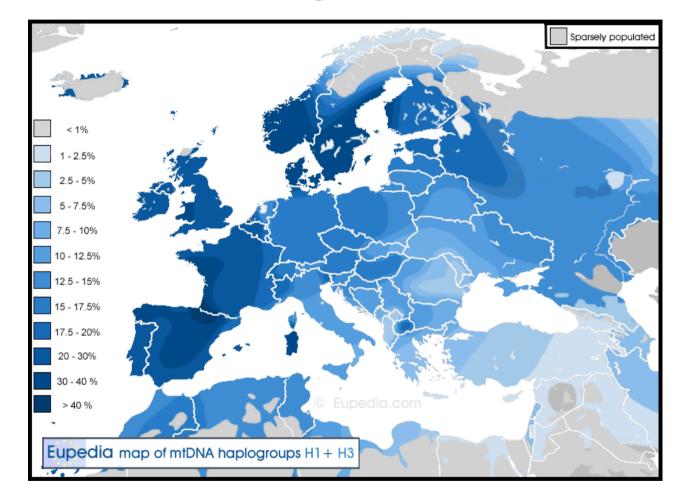
# DNA evidence

- So asked for sample to be tested for mtDNA haplogroup
- Very surprised at result
  - Haplogroup T1
  - Not that prevalent anywhere but mainly from the East

### My Female Clade T1



### Main Western Clades H1+H3 --Negative



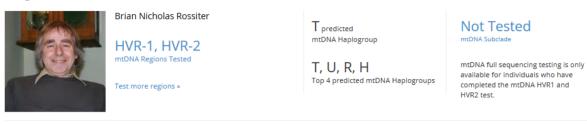
Media

**DNA Reunion** 

DF

#### Indigenous mtDNA Search

DNA Archaeology

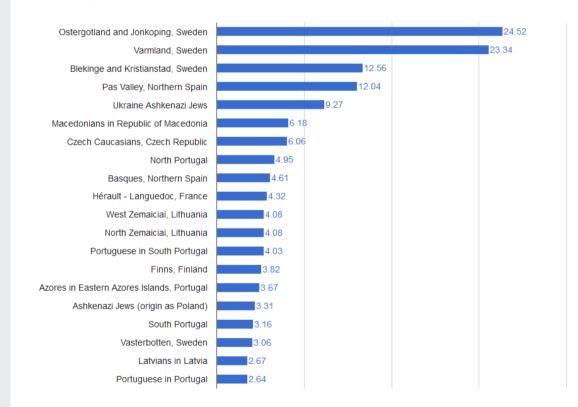


Orders

**DNA Haplogroups** 

#### Relative Match Index Comparison (RMI)

Comparison Using mtDNA Mutations between the Locations of 16090 and 16340.



Appendix A: Raw Comparison Results

The results of this comparison are based on the following raw analysis data:

### STR Markers Maternal Side

Home

Profile

#### Indigenous DNA Database

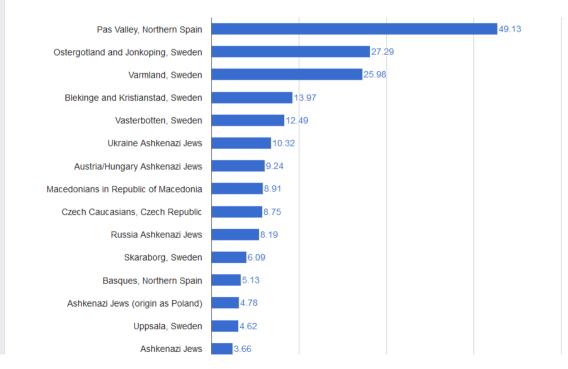
Overview

Indigenous mtDNA Search



#### Relative Match Index Comparison (RMI)

Comparison Using mtDNA Mutations between the Locations of 16090 and 16519.



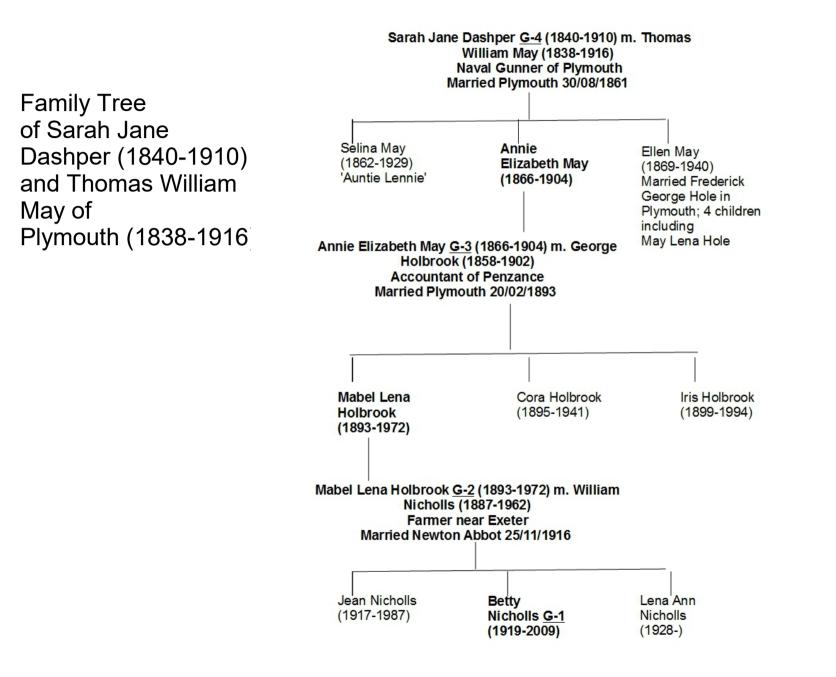
### STR Markers Maternal Side

### Pen-pal – near misses

GENETIC GENEALOGY Order Test 🖈 Brian Nic × mtDNA Comparison The results below show how Brian Nicholas Rossiter's mtDNA compares with Elena Valer'evna losilevich's mtDNA. Comparison Summary Regions Compared: HVR1 and HVR2 # Mismatching Markers: 1 Elena Valer'evna **Brian Nicholas** losilevich Rossiter Joined on Jun 09, 2008 Joined on Jan 26, 2014 mtDNA HVR1 and HVR2 Comparison Results Based on a comparison of Brian Nicholas Rossiter's mtDNA HVR1 and HVR2 markers against the HVR1 and HVR2 markers of Elena Valer'evna losilevich, Brian Nicholas Rossiter's HVR1 and HVR2 markers do not match the mtDNA markers found in Elena Valer'evna losilevich's mtDNA at one location. This suggests that Brian Nicholas Rossiter is not closely linked to Elena Valer'evna losilevich through his maternal line. **Regions Compared** Mutational Distance Elena Valer'evna losilevich Brian Nicholas Rossiter HVR1 16051G 16126C 16294T 16296T 16304C 1 16126C 16294T 16296T 16304C 16519C HVR2 0 73G 263G 309insC\* 315insC\* 73G 263G 309insC\* 315insC\* Total Mutational Distance = 1 # Mismatching Markers E View Details HVR1 and HVR2 Victor Tastanagi Nighthawk Regions Compared Joined Mar 26, 2007 E Send Message HVR1 and HVR2 1 # Mismatching Markers E View Details HVR1 and HVR2 Mark Williams Regions Compared Joined Dec 15, 2011 E Send Message HVR1 and HVR2 # Mismatching Markers

# So Urgent Work on family tree Mother of Mother

- Prevalence of name Lena in various forms
- A suicide leaving my grandmother and her 2 sisters as orphans
- An unexpected name mid-19<sup>th</sup> century (Dashper)



### Death of Annie Holbrook 7 July 1904 at Penzance

GIFTS + SUBSCRIBE + 195 CREDITS + ACCOUNT + HELP + BRIAN NICHOLAS ROSSITER + REGISTERED MEMBER + SIGN OUT

REUNITED Home Family Tree Relatives Keepsafe Community Messages News Search	ı Q
British Newspaper Article	
PENZANCE LADY FOUND DEAD THE HARBOUR. On Wednesday morning, about 4.20, the body of Mrs. Annie Holbrook, North-parade, Penzance, widow	?
Edit Keepsafe details Remove from Keepsafe	
are leaving for Rockall.	
PENZANCE LADY FOUND DEAD IN THE HARBOUR On Wednesday morning, about 4.20, the body of Mrs Annie Holbrook, North-parade, Penzance, widow o Mr. Geo. Holbrook, was found in Penzance harbour. De ceased, who was fully dressed, was first seen by Wm George, who gave information to the police. No evidence has been forthcoming up to the time of going to press, but no doubt some light will be thrown of the matter at the inquest, which will be held a 12.30 p.m.	· f ) - 5 n
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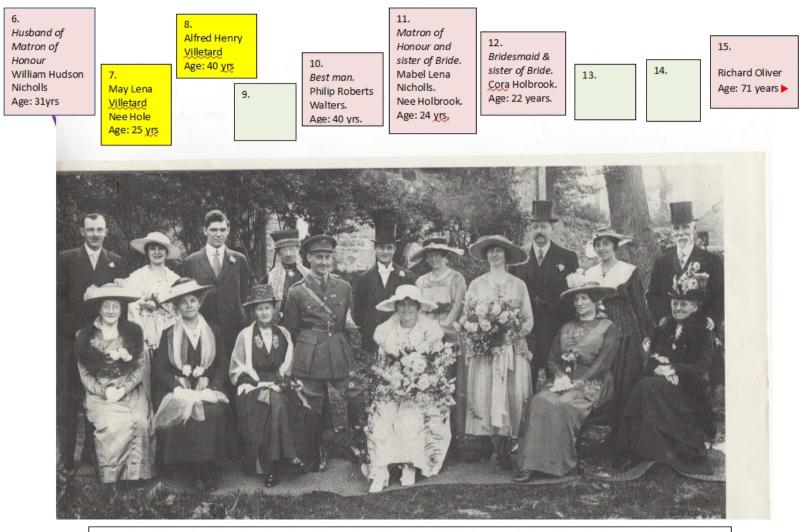
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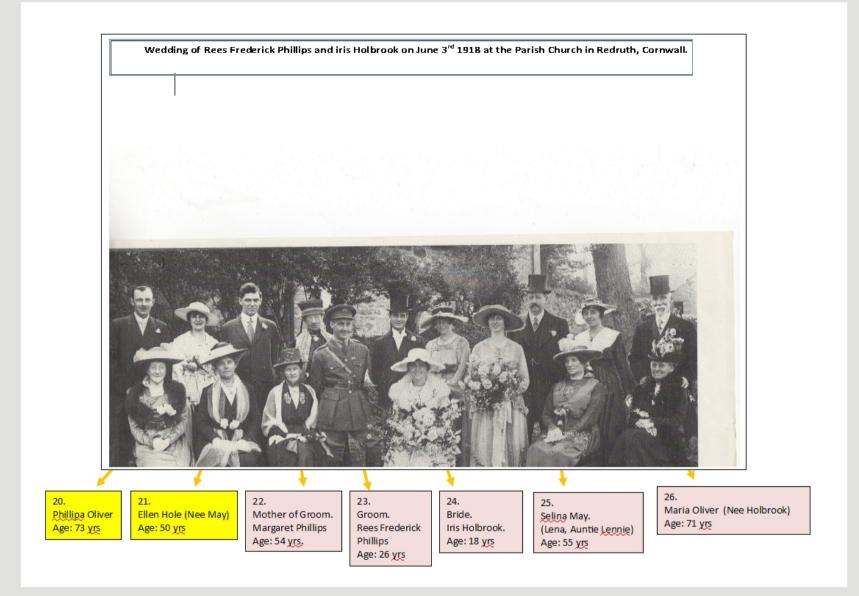
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Wedding of Rees Frederick Phillips and iris Holbrook on June 3rd 1918 at the Parish Church in Redruth, Cornwall.



# **Questions on Sarah Jane Dashper**

- Surname may be an adaption of an eastern European name (common in 19<sup>th</sup> century)
- Quite a few immigrants came over from eastern Europe in mid-19th century
  - Some were on their way to America but never made it
- Why is she not called a variant of Lena?
- Plymouth would be a natural arrival port
- Needs a lot more research, but she could have been:
  - Yelena Dashpevsky??

# Has DNA been useful?

- It's another point of view, totally independent from the documentary side
  - Always valuable where some subjectivity
- It's added support on paternal side for an Irish origin
- It's initiated a totally new view on maternal side

# Caution/Forward

- Methods are in their infancy
- Statistical tests need great care in interpretation
- Without traditional documentary side, would not like to rely on results

 Suspect that DNA techniques will rapidly advance giving much more refined Subclade information on bigger and better sample sizes