2 RELATIONSHIP NETWORKS

The People of Medieval Scotland database has the capacity to provide datasets for two broad categories of social networks. The first, and simpler, category is defined by relationships which are explicitly defined in the database, and thus, in the medieval sources. One of the four factoid types in the PoMS database is the relationship factoid (the others are transactions, possessions, and titles/occupations) (Bradley and Pasin, 2013). These relationship factoids represent explicit statements about relationships made in the sources. This chapter examines the networks revealed by putting these data through SNA software. The second broad category are inferred relationships between individuals, which are drawn from information embedded in the transaction factoids. The most common of these are the (implicit) relationships between grantors and beneficiaries (examined in chapter three) and between individuals who witness alongside one another (examined in chapters four and five).

There are currently 191 distinct relationship types in the PoMS database, though many of these were only added in the second phase of the project, covering the years 1286-1314. There were 158 relationship types as of the end of the first phase of the project, and these are reflected in what follows. Of these, 40 are categorised as 'Familial relationships', while 81 are described as 'Employment relationships' and 36 are described as 'Tenurial and lordship relationships'. (One, 'infirm', is categorised only as 'other'.) We are going to now examine the networks of these three categories of explicitly-defined relationships in turn.

Part One: Familial Relationships

It is very important to remember that the sociogram of family relationships reflects only those statements which have been explicitly made in the written sources. While these are fairly frequent in terms of father-son relationships, e.g., as expressed in patronymic name forms, statements about daughters and mothers are made much less often in the documents. There is, moreover, an element of randomness in the evidence about maternal relationships, which tend to rely on joint donations to religious establishments and land transactions regarding marriage portions and dowerlands. Most significantly is the division immediately noticeable between the most powerful in society (represented in the two basic sociograms immediately following) and the less powerful. We have a relatively good understanding of marriages among the royal family and higher aristocracy, especially in the thirteenth

century, while for the lower aristocracy and middling sorts, we often only know the names of one or two relatives. Thus the kingdom's elites appear as a highly interconnected group in the core region, while the lesser families appear as a constellation or penumbra surrounding them. This is not entirely a matter of the survival of sources. While better documentary evidence would certainly reveal a good deal more interconnection, the central place of the royal family and kingdom's magnates would not change; indeed some of the additional interconnectedness would likely result in an even thicker web linking up this power elite.

Table 2.1. Familial Relationships

The following table lists the 40 specific familial relationship types.

Relationship Types
Ancestor
Aunt
Bride/betrothed (f.) (*sponsa*)
Bridegroom/betrothed (m.) (*sponsus*)
Brother
Children (*liberi*)
Cognata (kinswoman/female cousin)
Cognatus/*consanguineus* (kinsman/male cousin)
Consort
Countess
Daughter
Father
Father-in-law
First-born (*primogenitus*)
Foster-brother (*collactaneo*)
Grandfather
Grandmother
Great-grandfather
Great-grandmother
Great-great grandfather (*abavus*)
Great-great-great grandfather (*atavus*)
Heir
Husband (*maritus*)
Man [husband] (*vir*)
Mother
Nepos (nephew/grandson)
Neptis (niece/granddaughter)
Parents (*parentes*) [recté: kindred]
Queen (i.e. consort/wife)

Sister
Son
Son-in-law (*gener/filius in lege*)
Sororius (sister's husband/sister's son)
Stepmother
Stepson (*priuignus*)
Successor
Uncle - maternal (*avunculus*)
Uncle - paternal (*patruus*)
Widow (*vidua*)
Wife (*uxor*)

Even though the evidence for the core elite network of family relationships is incomplete and indicative rather than exhaustive, it still illustrates a very real phenomenon whereby social 'connections' reinforced and reproduced wealth and power in society. Sociologist Robert Merton dubbed this the 'Matthew effect'; this concept of accumulated advantage applies to status, fame, and economic wealth (Merton 1968). This concept has been usefully applied to many areas of endeavour, including the network dynamics of Hollywood "A-Listers" (Currid-Halkett 2010). If research on the Matthew effect can be successfully applied to the Scottish case, we might surmise that family connections between the most powerful and wealthiest society are a proxy for more social relationships of other kinds between the same families, in terms of friendships, formal landholding and 'business' ties, and so on. This means that this core group spends more time with each other, leading to a self-replicating structure of power. Further, because these elites have more landed and other interests spread across a wider geographical range, and because we see them operating in more social, judicial, and political arenas in a broader variety of roles, offices, and contexts, they are likely to be connected to more people than non-elites (for example, as co-witnesses), and more of their connections are likely to be 'weak ties' rather than strong ones. While strong ties are necessary for protection and security, it is through weak ties that new information, ideas, money, or other things pass into a network. This is reflected in the density of their ego-networks, a concept to which we will return in chapter 8. Opinion leaders in a network are characterised by low ego-network densities. For now, we can simply posit a hypothesis that the elites of Scottish society, as illustrated (albeit imperfectly) by the family relationships sociograms, have more weak ties and lower ego-network densities than their less powerful contemporaries. We will return to this hypothesis in the book's conclusion.

Core-and-periphery in family relationships

Figure 2.1. Gephi-generated sociogram, using Force Atlas 2.
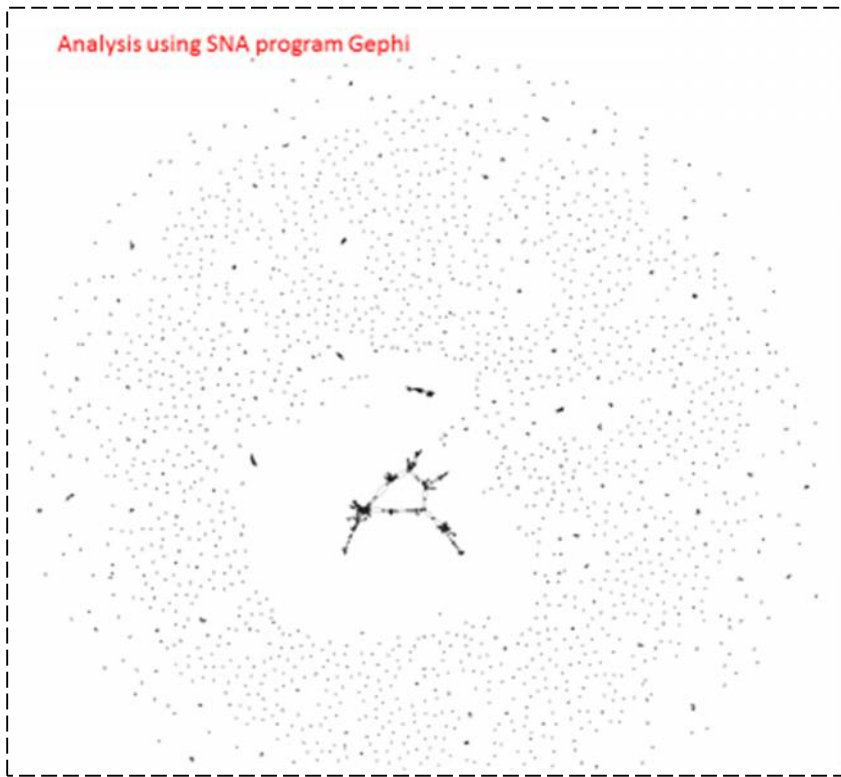

Analysis using SNA program Gephi

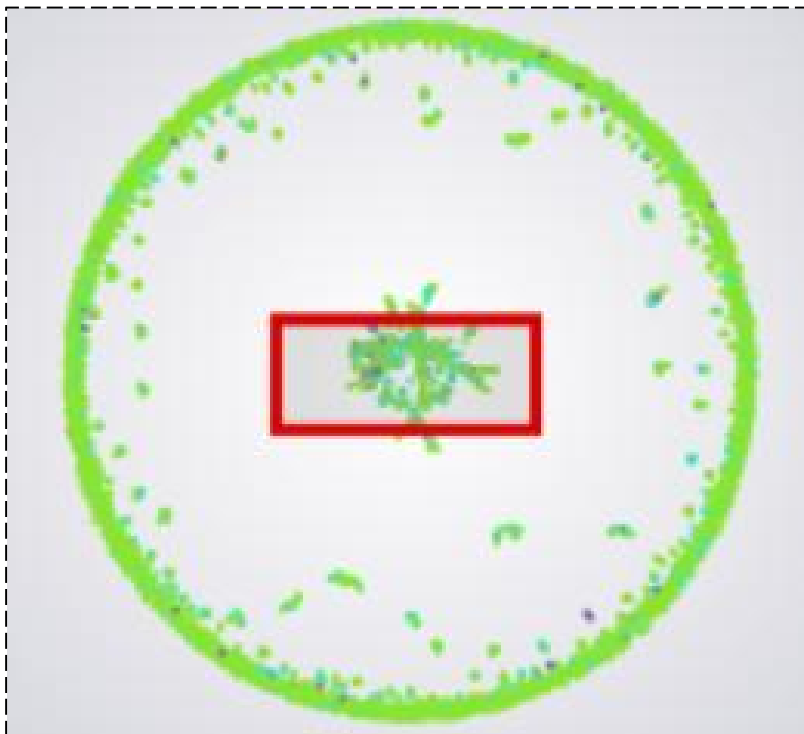Figure 2.2. Gephi-generated sociogram, using Yifan Hu.

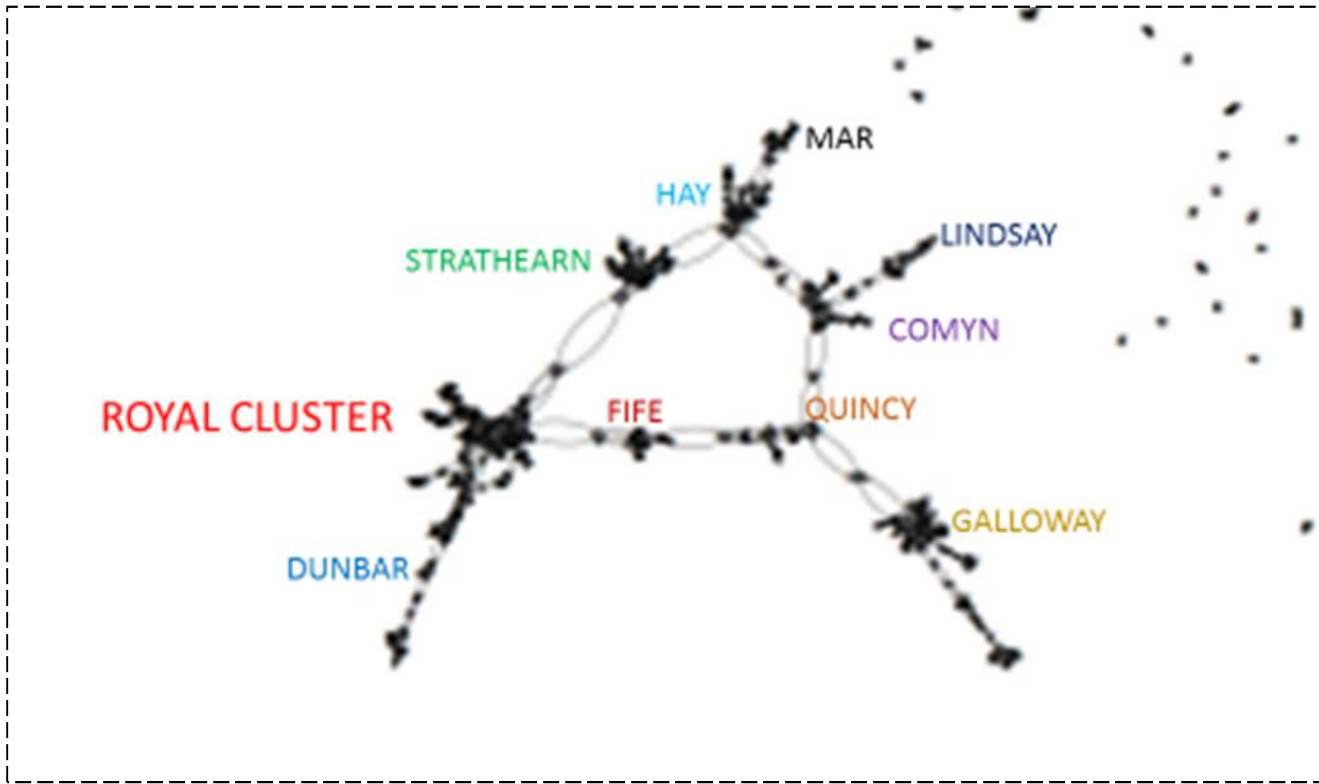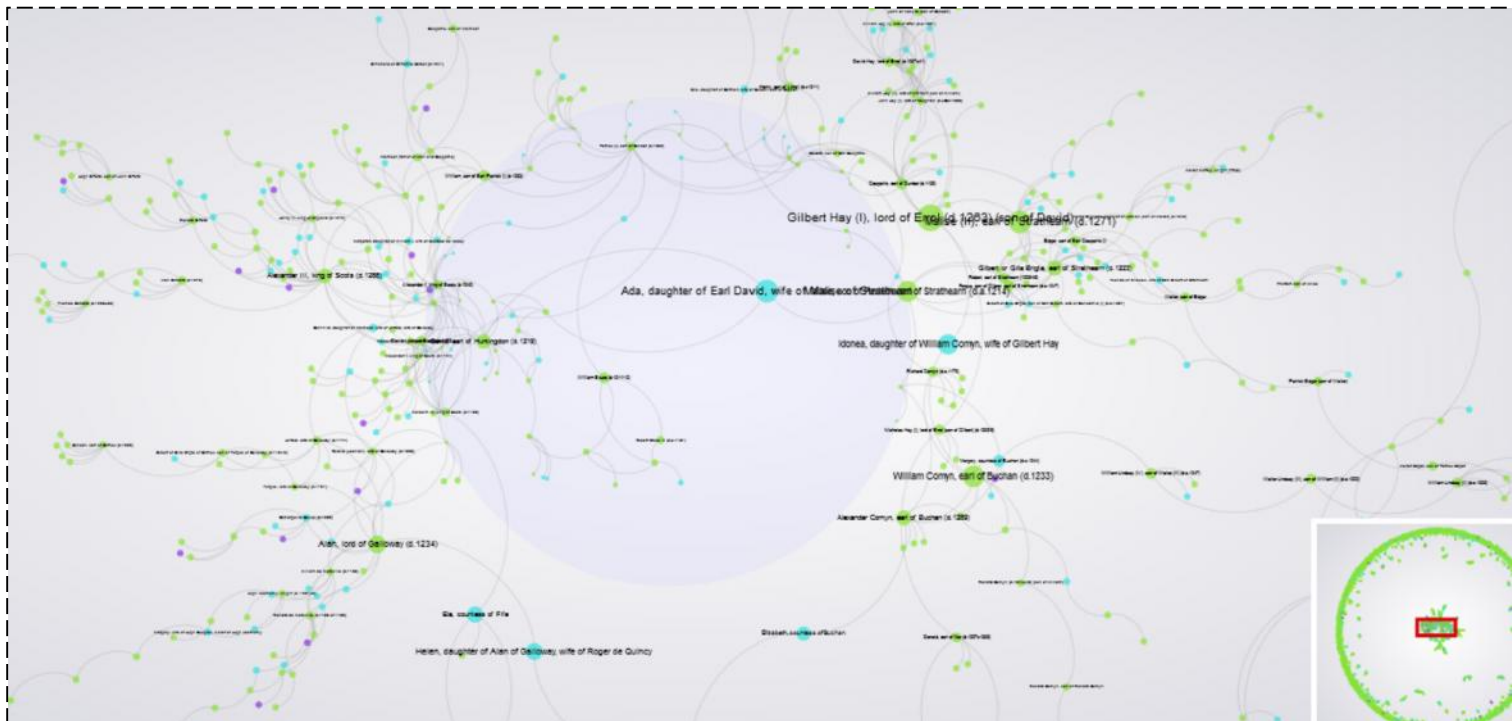Figure 2.3. Elite family groups, simplified

Figure 2.4. Core section, Gephi Yifan Hu. Node size and text size reflects betweenness centrality

Because family groups cluster together in the sociogram, it is possible to think of the core elite section as a collection of families. These are represented in simplified form in Figure 2.3. The largest of these groups is the royal family. It is possible to 'tour' this elite circle relatively easy; Figures 2.5 though 2.9 illustrate a clockwise movement from the royal family through the various elite families. The best represented families are those based around the earldoms of Fife, Dunbar, Mar, Strathearn, the lords of Galloway, and the noble families of Hay, Lindsay, Comyn, and Quincy, although members of other families are sometimes interspersed. These sociograms were made using the Force Atlas 2 design in Gephi[1]; the use of Person ID numbers instead of names makes the images less crowded, although this sacrifices legibility. The size of the nodes reflects the betweenness centrality of the persons, a point to which we will come on soon.

Figure 2.5. Core elite group

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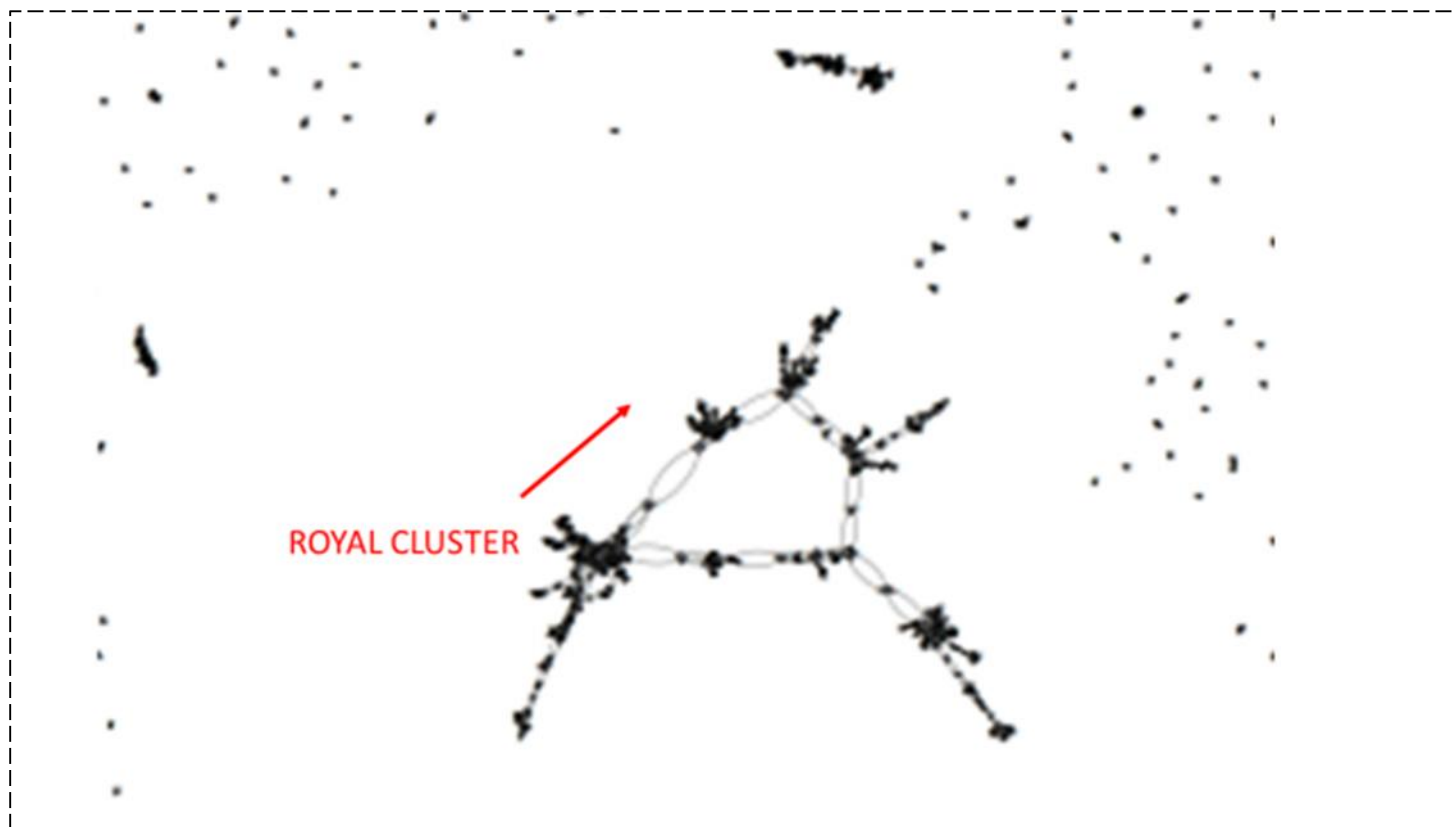
[1] Old dataset

Figure 2.6 illustrates the link between the royal grouping and the Strathearn comital grouping by means of Ada, illegitimate daughter of David earl of Huntingdon (d. 1219), the younger brother of King Malcolm (Mael Coluim) IV (1153-65) and King William I (1165-1214). Ada's marriage to Malise (Mael Ísu) son of Earl Ferteth and brother of Earl Gilbert of Strathearn tied the two families together.

Figure 2.6. Connecting the royal and Strathearn groupings
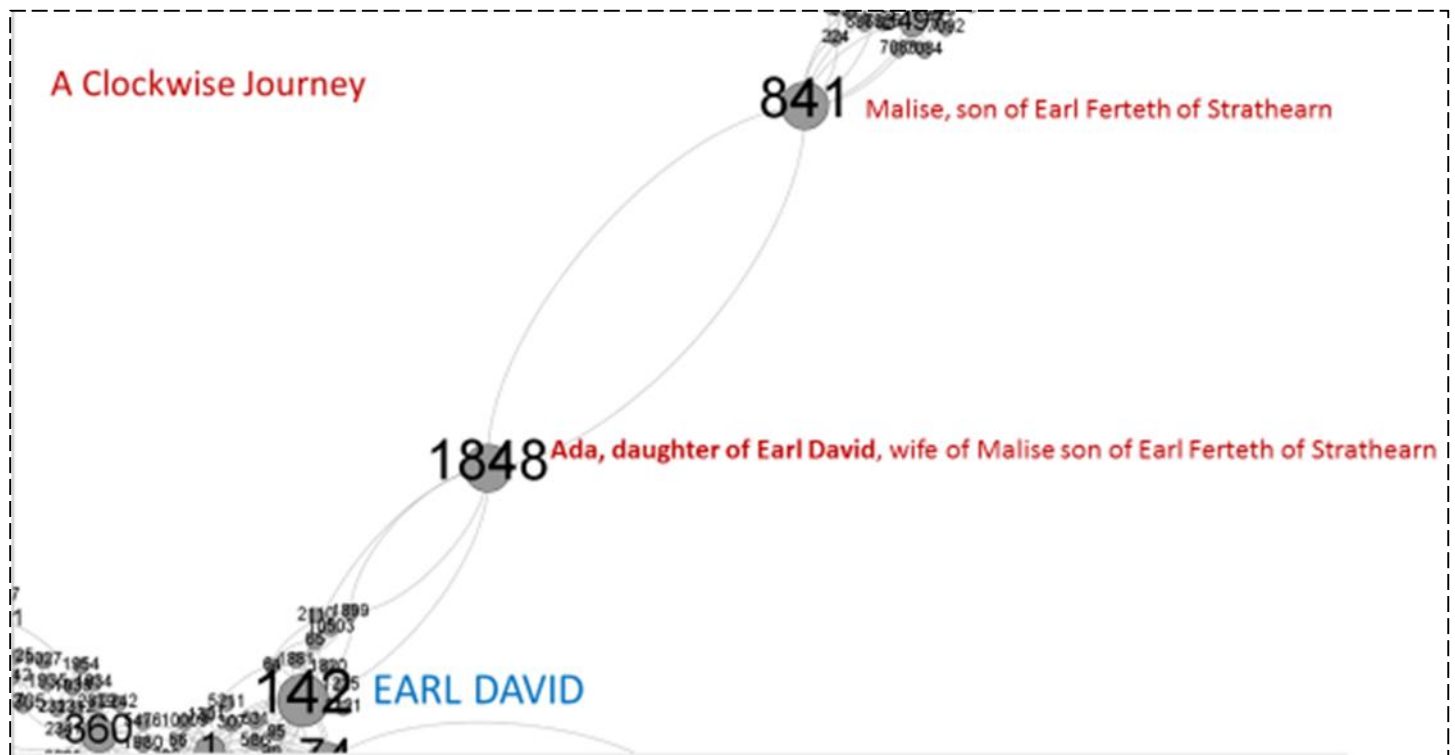
The size of the nodes and the Person ID numbers is adjusted based on a concept called 'betweenness centrality' in social network theory. This concept was first developed by sociologist Linton Freeman in 1977. This is a mathematical calculation intended to represent the relative importance of individuals in the network, based on their position within the network (as opposed to, for example, how many other agents they are connected with). Actors with high betweenness centrality are seen as vital components in maintaining the integrity of the network; their importance lies in connecting up other disparate individuals and groups. Mathematically, this number is calculated by determining how many times an actor sits on the shortest path between two other actors (or nodes). Actors with high betweenness

potentially are very influential in that they can control the flow of information or power between other individuals and groups (Prell 2012, 103-4). These notions seem to work well with what we know about the dynamics of medieval family and kinship groups, particularly in the sense that marriages were brokered between two families for strategic reasons, in forming alliances and friendships, healing past rifts and feuds, gaining land, power, wealth, or political influence. This is one type of network where we can witness the vital role of women in forming the bridges linking up these family groups. The importance of women as actors with agency in these sociopolitical dynamics has recently been emphasised by medieval historians. While it is important to remember that our knowledge of marriages is incomplete, there is still clearly some validity in the relative importance based on betweenness visible in Figure 2.7. The individuals linking up the families in the core 'circle', such as Malise II, earl of Strathearn, Gilbert Hay, lord of Errol, and William Comyn, earl of Buchan, is represented in the size of their nodes. The key role of William Comyn's daughter, Idonea, in linking up that family with the Hay family is also reflected. The Mar and Lindsay families, by contrast, while still important, have less betweenness centrality because they are tangential to the core circle.

Figure 2.7. Strathearn, Hay, Comyn, Lindsay groupings
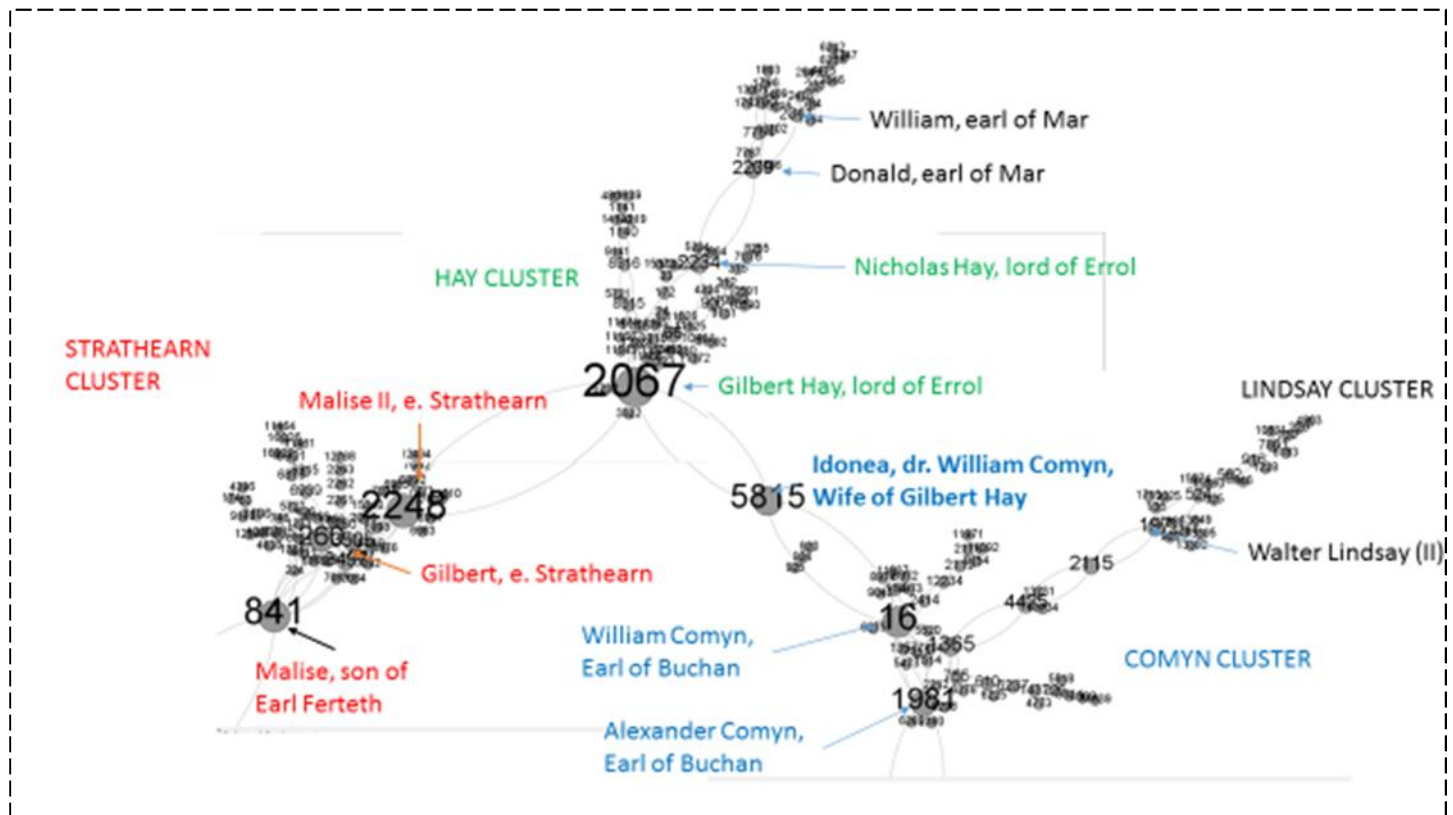
In Figure 2.8, the key role of women in linking up family groupings is even more evident. It is interesting here that Ela countess of Fife has a higher betweenness centrality than her husband Earl Duncan II of Fife (d.1204), a person to whom we will return. That earl's brother, Adam, is also important, because his marriage to Orable, daughter of Ness, widow of Robert de Quincy and mother of Saher de Quincy earl of Winchester, creates the link between the Fife and Quincy houses. Examination of the importance of individuals according to this regime and their places in the network should flag up areas of potential profitable enquiry by the historian. Roger de Quincy is linked through his daughter Elizabeth to the Comyn earl of Buchan and through his wife Helen with the house of Galloway. Countess Ela of Fife also links up the Fife family with the royal family (Figure 2.9). The royals are connected with the comital house of Dunbar by means of an illegitimate daughter of King William, Ada countess of Dunbar. Alan Durward and his family are also linked to the royal family by means of an illegitimate daughter, this time of Alexander II.

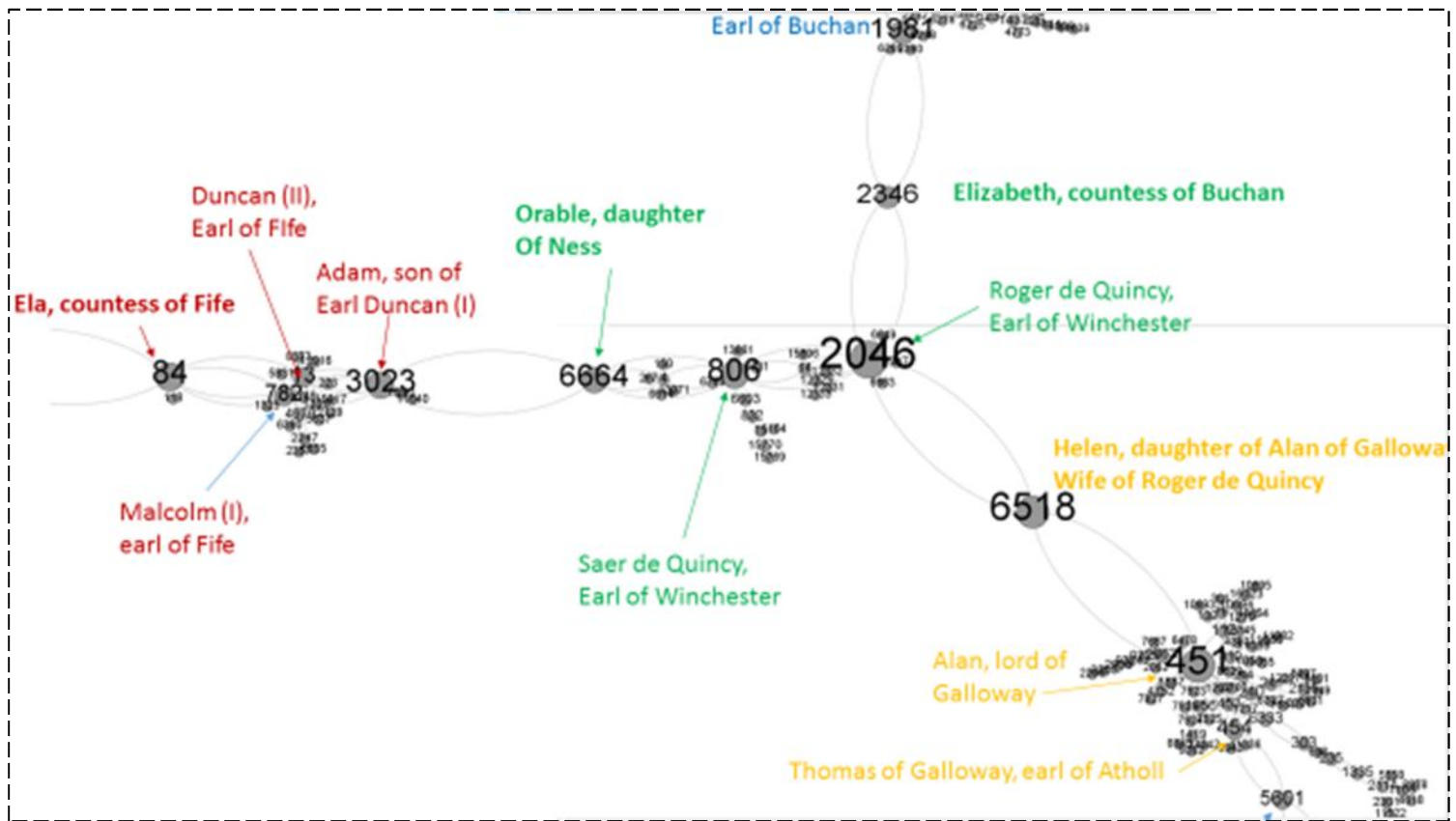Figure 2.8. De Quincy, Fife, and Galloway groupings
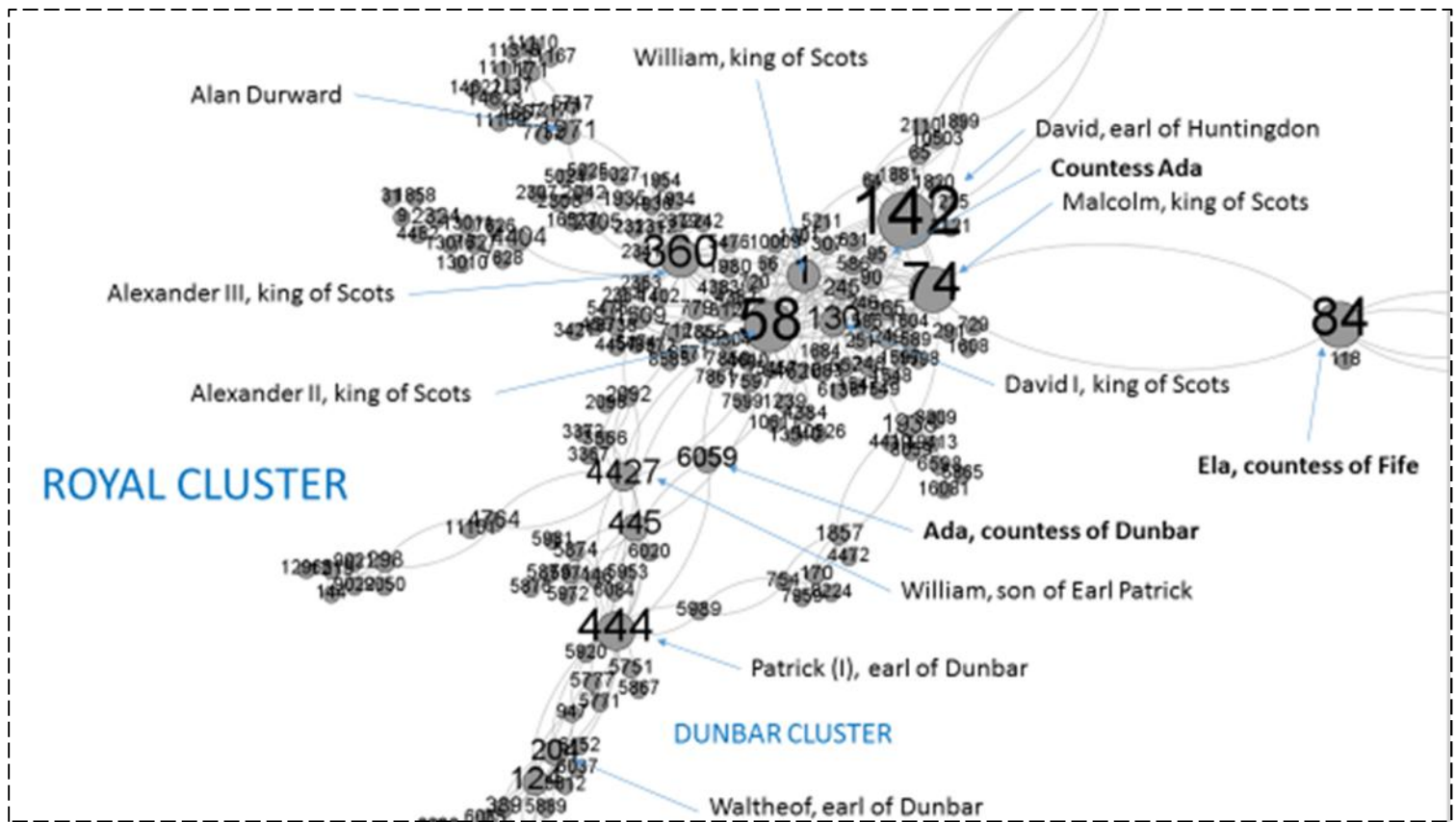
Figure 2.9. Royal family and Dunbar grouping

Table 2.2, below, gives the top thirty individuals in the family relationship sociogram according to their betweenness centrality.[2] Seven of these thirty are women (highlighted in light blue). This reflects their importance in connecting distinct family groupings, and any potential study of the social role of women in forging alliances should begin with these women. The remaining 23 men are indicative of the top families in this elite circle, and their betweenness often further reflects the ways in which individual actors within family groupings are linked up. Individuals from (Scottish) comital families are given in dark blue, making up twelve, or just over one third, of the top 30. They represent the comital kinship groups of Strathearn, Fife, Buchan, and Dunbar, with Mar, Angus, Atholl, Menteith, Lennox, Carrick and Ross being noticeably absent. Five individuals are from the royal family (in purple), with David earl of Huntingdon being the most central in terms of betweenness. The families of Hay, de Quincy, and Galloway are among the remaining.

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[2] New dataset

Table 2.2. Top 30 people in family relationships sociogram, by betweenness

Id	Name	Gender	Betweenness Centrality
2067	Gilbert Hay (I), lord of Errol (d.1263) (son of David)	M	69778.39649
2248	Malise (II), earl of Strathearn (d.1271)	M	55702.77745
142	David, earl of Huntingdon (d.1219)	M	54994.28946
16	William Comyn, earl of Buchan (d.1233)	M	52837.68221
1848	Ada, daughter of Earl David, wife of Malise of Strathearn	F	50112.63935
841	Malise, son of Ferteth earl of Strathearn (d.a.1214)	M	50086.80602
2046	Roger de Quincy, earl of Winchester (d.1264)	M	49534.59398
5815	Idonea, daughter of William Comyn, wife of Gilbert Hay	F	47810.51554
58	Alexander II, king of Scots (d.1249)	M	43981.18103
451	Alan, lord of Galloway (d.1234)	M	38706.45178
6518	Helen, daughter of Alan of Galloway, wife of Roger de Quincy	F	36380.88512
806	Saer de Quincy, earl of Winchester (d.1219)	M	34881.62732
74	Malcolm IV, king of Scots (d.1165)	M	34311.72077
84	Ela, countess of Fife	F	33954.48446
3023	Adam of Kilconquhar, brother of Earl Duncan (father of Duncan)	M	32156.05589
6664	Orable, daughter of Ness son of William	F	31585.3416
260	Gilbert or Gilla Brigte, earl of Strathearn (d.1223)	M	30646.06867
1981	Alexander Comyn, earl of Buchan (d.1289)	M	30292.26349
444	Patrick (I), earl of Dunbar (d.1232)	M	28533.59844
360	Alexander III, king of Scots (d.1286)	M	27886.83267
2346	Elizabeth, countess of Buchan	F	26335.1422
1	William I, king of Scots (d.1214)	M	21559.72018
1365	Margery, countess of Buchan (d.c.1244)	F	18432.11007
782	Malcolm (I), earl of Fife (d.1229)	M	18042.24223
13	Duncan (II), earl of Fife (d.1204)	M	18042.24223
443	Cospatric, earl of Dunbar (d.1138)	M	17228
4427	William, son of Earl Patrick (I) (d.1253)	M	16360.62631
3497	Fergus, son of Gilbert, earl of Strathearn (d.c.1247)	M	15747.98534
4425	William Lindsay (IV), son of Walter (III) (d.c.1247)	M	15036

Of course, the strength in the family relationships sociograms, and sociograms of all kinds, lies in the ability to visualize things in a broader and novel way compared to what was possible beforehand. The SNA visualizations on the PoMS website (http://db.poms.ac.uk/sna/all/) have all the nodes colour-coded according to sex/gender and labelled with the full display name of the individual. This makes it possible for users to explore the sociograms without needing to resort to a cumbersome list of Person

ID numbers, but it also makes the graphs more crowded. This also means the displays of relationship groupings do not reveal the patterns as clearly as the Gephi sociograms we have been using up to now (which employ the 'Force Atlas 2' design format). The following uses the 'Yifan Hu' design format in Gephi[3]:

Figure 2.10. Royal family grouping, Yifan Hu.
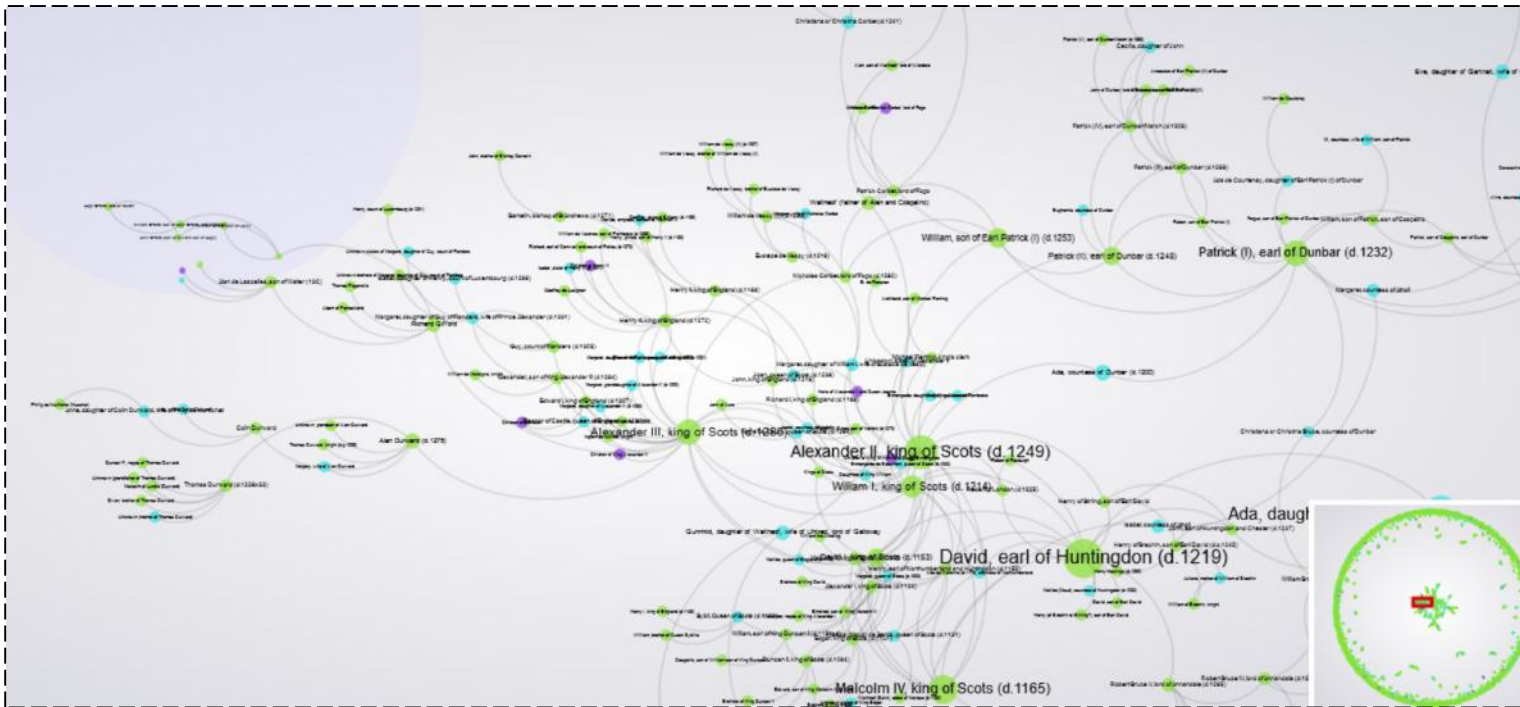
Figures 2.11 and 2.12 below reveal the extent to which families and individuals were interconnected. Alan, lord of Galloway (d. 1234) is the most central person in this segment of the elite core group. To his left and down, we see the Moreville family and their connections. To the right and down, we see the family of the earls of Atholl. Above and to the left of Alan we see the Galloway family itself and its collateral branch, the earls of Carrick. Also linked to this group are the descendants of Waltheof, lord of Allerdale, and through them, the de Mowbray family. Hugh Abernethy, a relative of Alan of Galloway, links this group in with the Abernethy and Douglas families.

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[3] New dataset

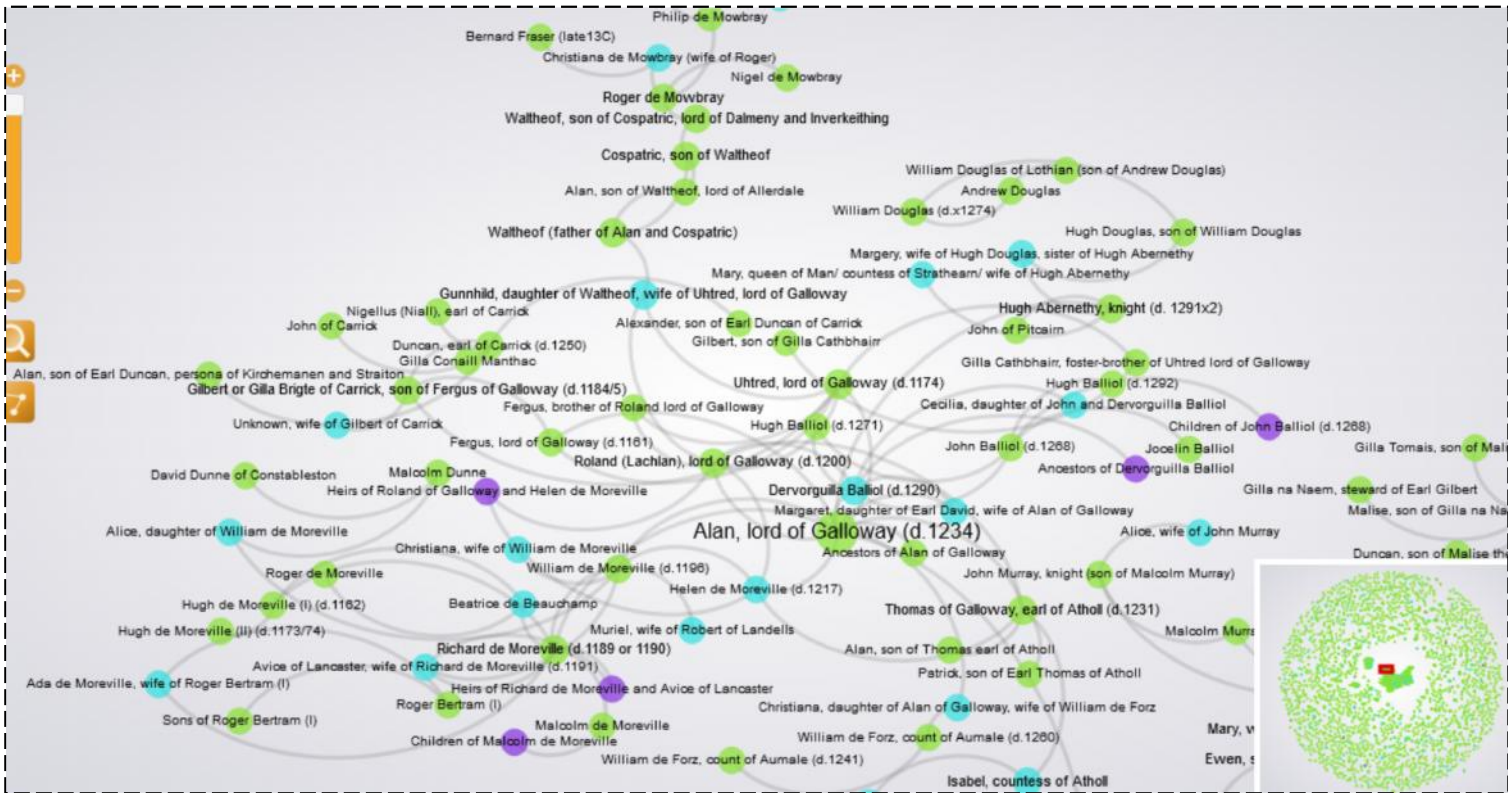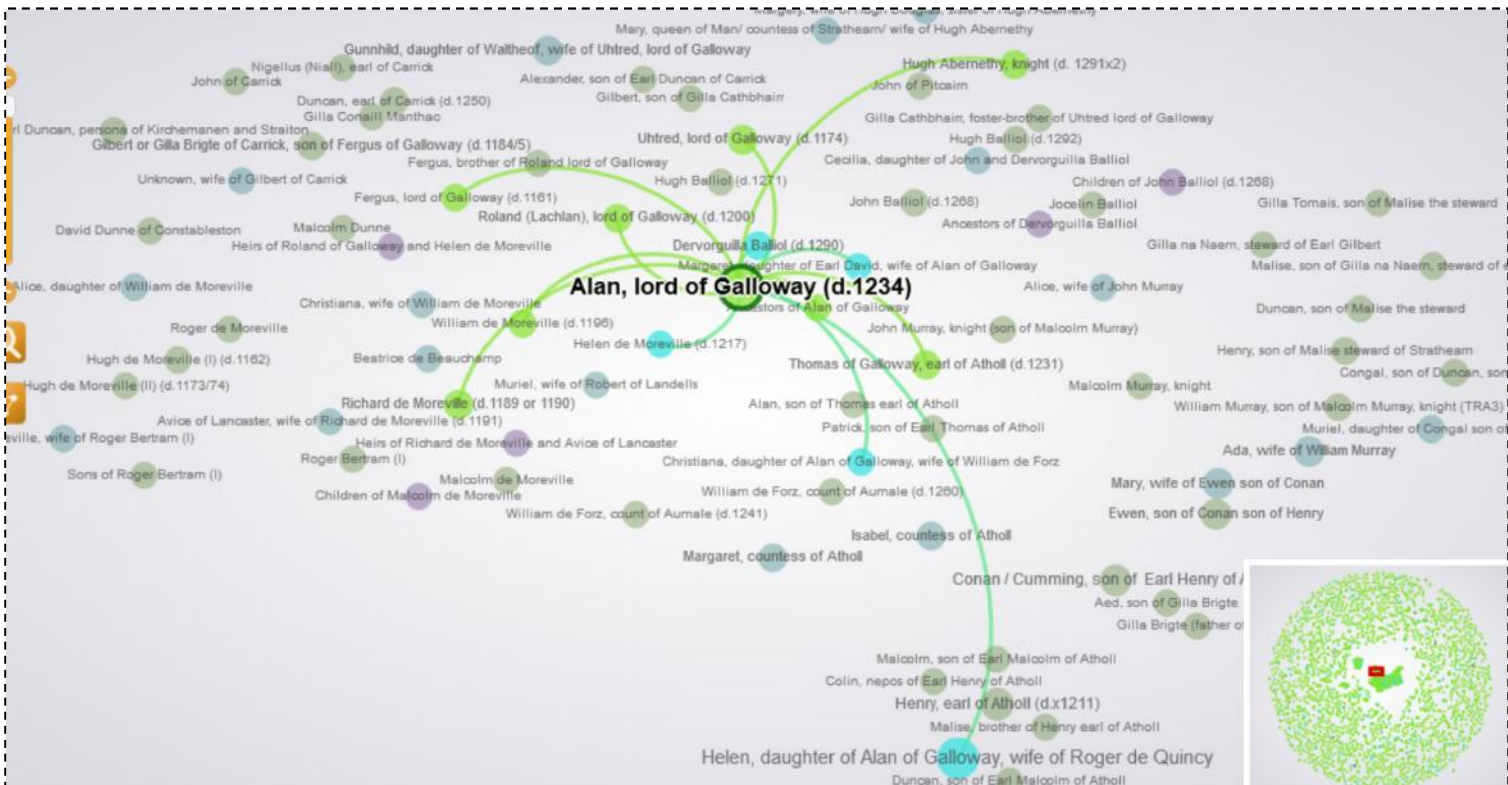Figure 2.11. Close-up on segment of inner main segment.

Figure 2.12. Close-up, with direct connections of Alan, lord of Galloway, highlighted.

We are going to use these Yifan Hu sociogram close-ups to examine some of the groupings which are not in the core linked-up elite area, but which still represent important players in the Scottish kingdom. Figures 2.13 and 2.14 give two different layouts of an important network that developed around Bishop Robert of St Andrews (d. 1159). It should be noted that two of the familial relationship types are 'ancestor' (antecessor, which can also be translated as predecessor or forebear), and 'successor'. These are often used by lay families to refer to their 'blood' kindred, but were also used by churchmen such as bishops. So not all the relationships referred to by churchmen were 'real' family relationships. However, churchmen often wrote about their predecessors and peers using the metaphor of family, so it is perhaps not too far off the mark. In any event, this grouping reveals the importance of siblings, nephews, and in all probability, illegitimate children, to networks around bishops.

Figure 2.13. Robert, bishop of St Andrews, with direct links highlighted.
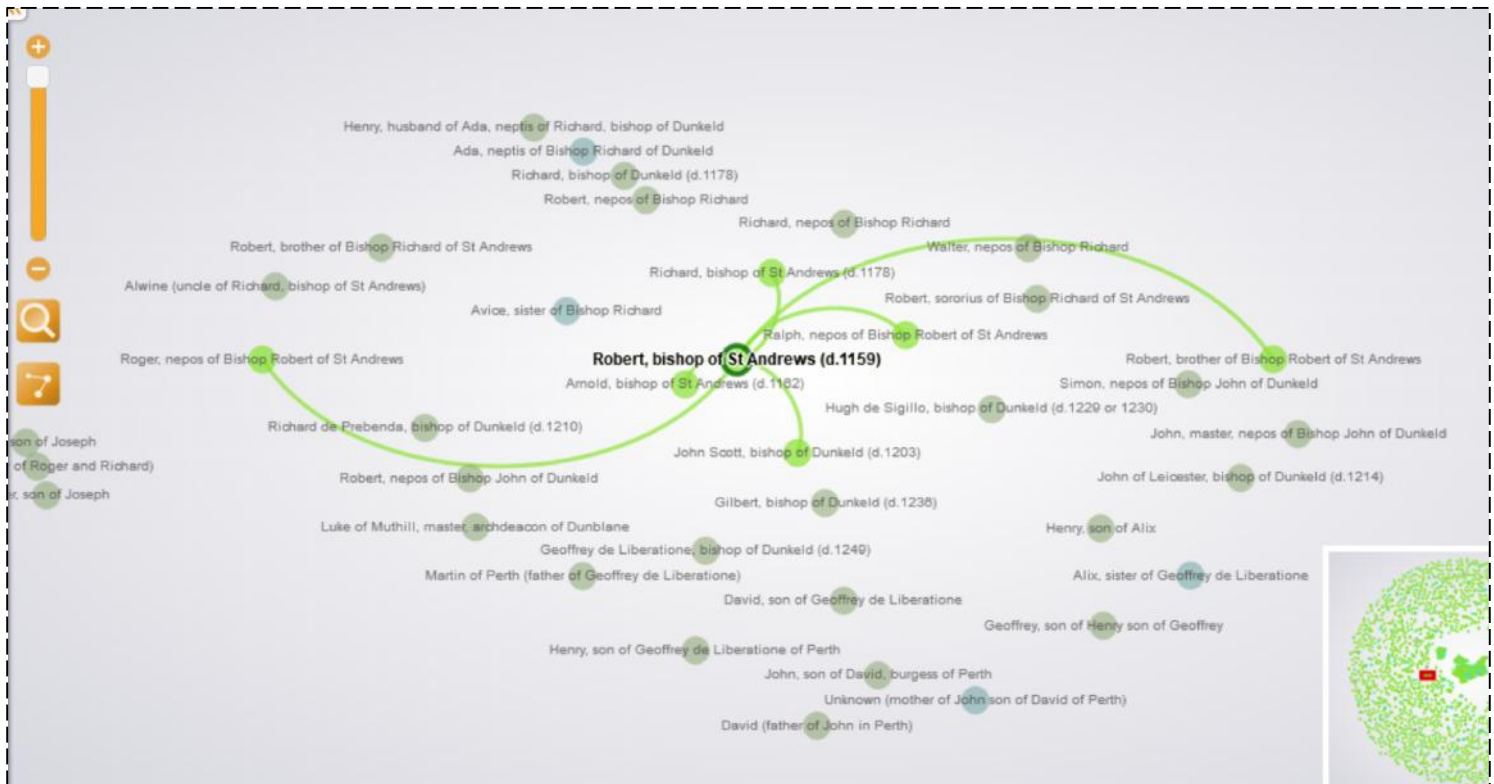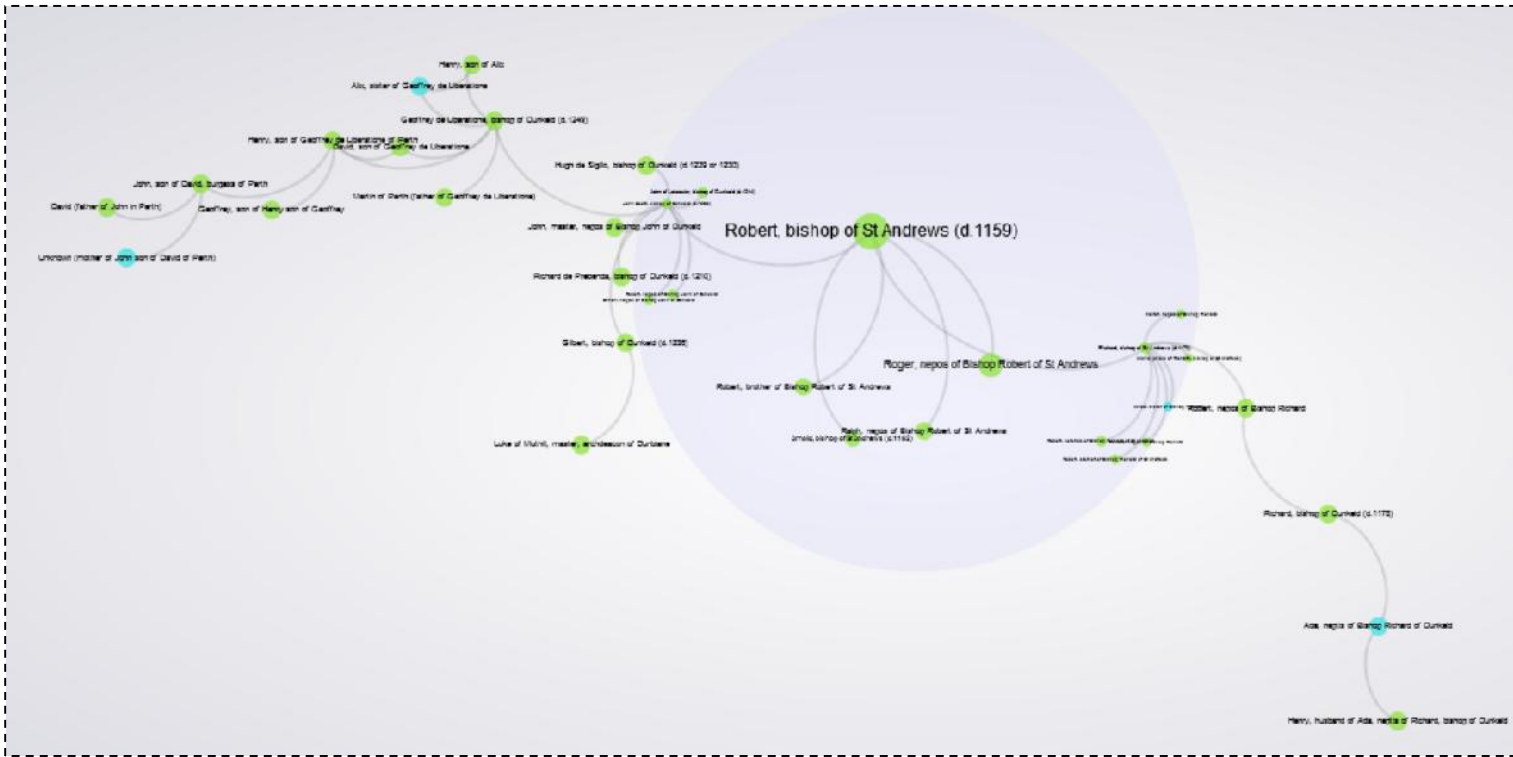
Figure 2.14. Network of Bishop Robert of St Andrews (d. 1159).

Figures 2.15 and 2.16 below show the largest interconnected group of nodes outwith the main core component in the family relationships sociogram. This reveals the prolific comital family of Lennox, who were connected by marriage to the Stewarts, their neighbours to the south in Renfrewshire. The Stewarts in turn were connected through Walter son of Alan (I)'s wife, Eschina, to the Avenel family, landholders in the border region. It is possible to visualize other family groupings who were not linked up (at least in our surviving Scottish evidence) with the core group, including the Melvilles (Figure 2.17), the Grahams (Figure 2.18), and the Murrays (Figure 2.19). The outside penumbra consists of many many groups of two and three individuals, such as fathers and sons, as demonstrated by the close-up view in Figure 2.20.

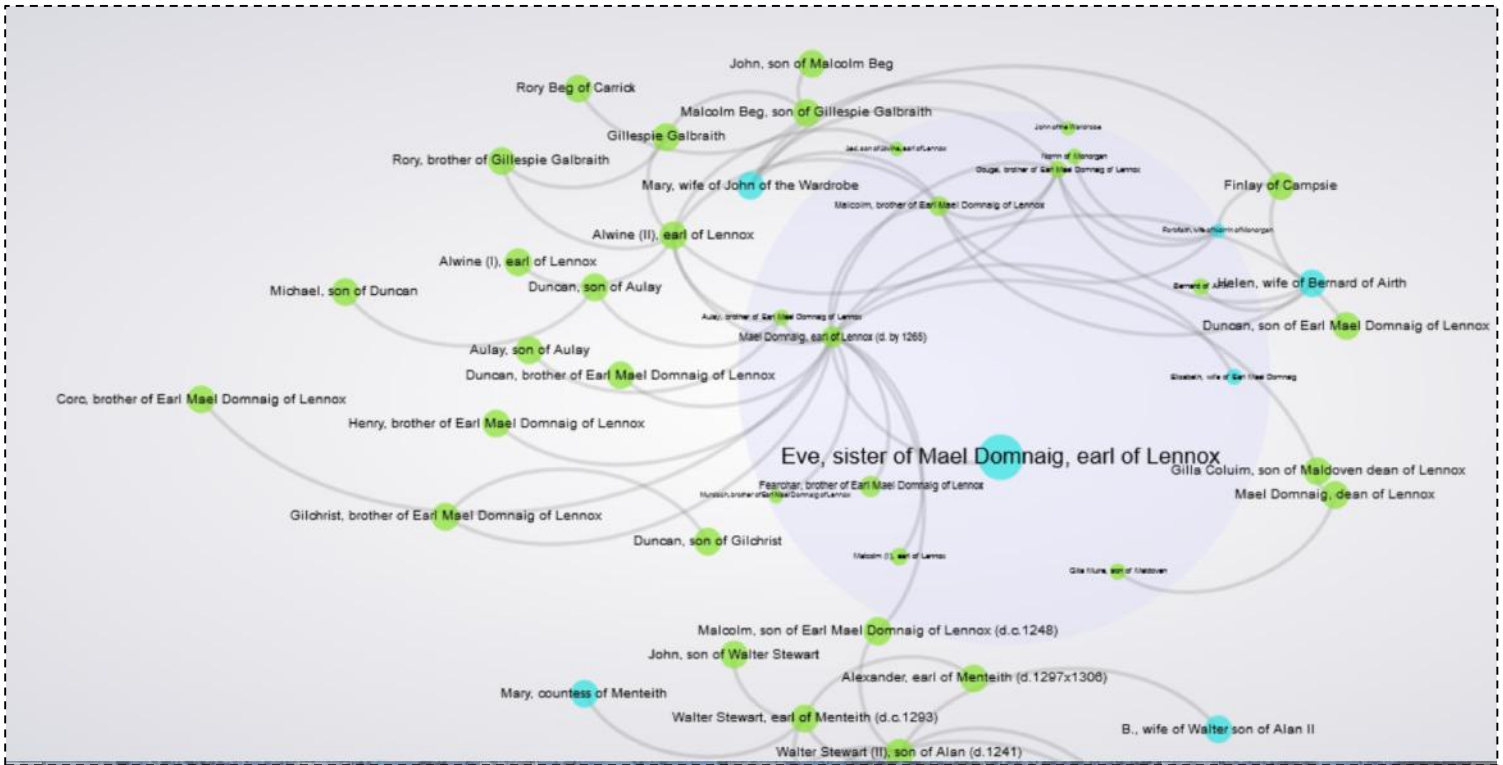Figure 2.15. Lennox/ Stewart/ Avenel group, top half

Figure 2.16. Lennox/ Stewart/ Avenel group, bottom half
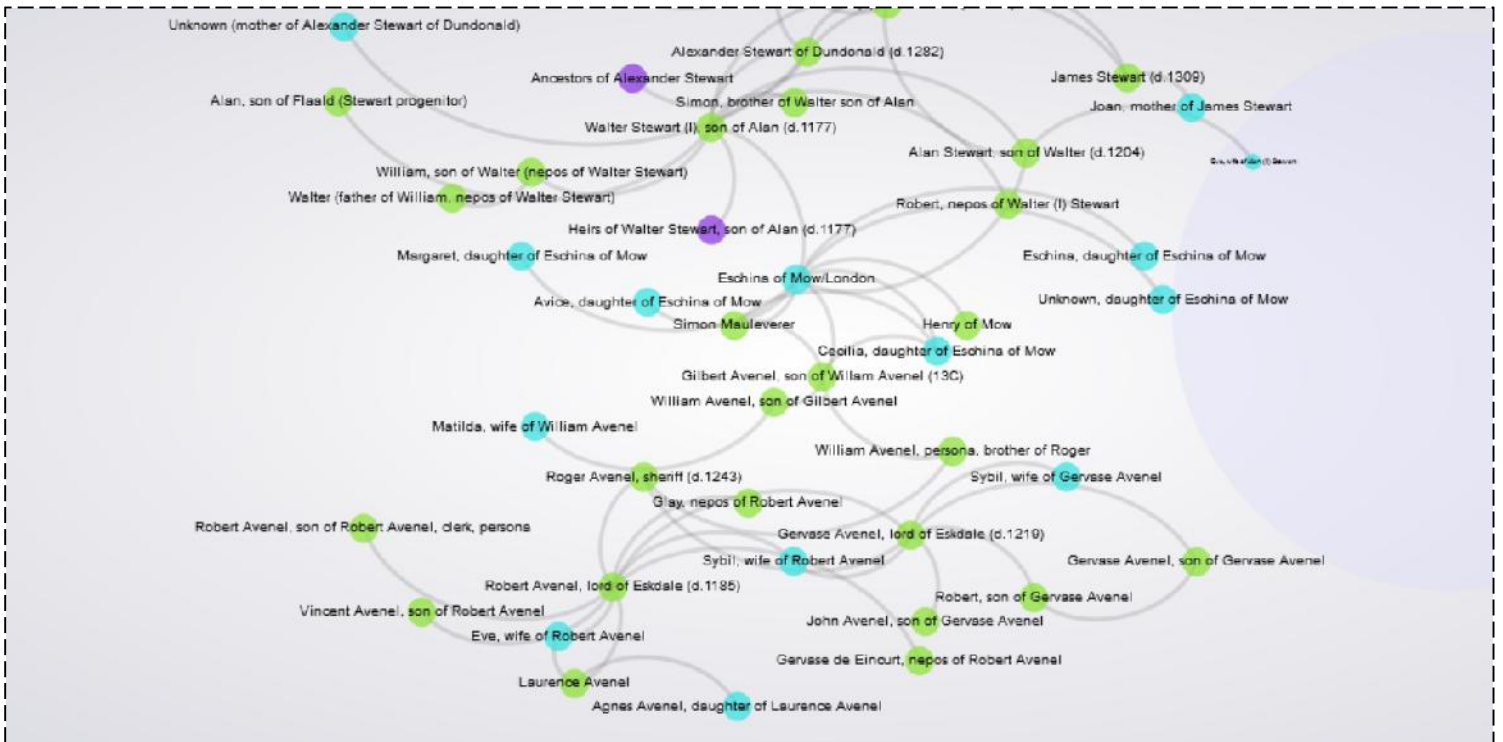
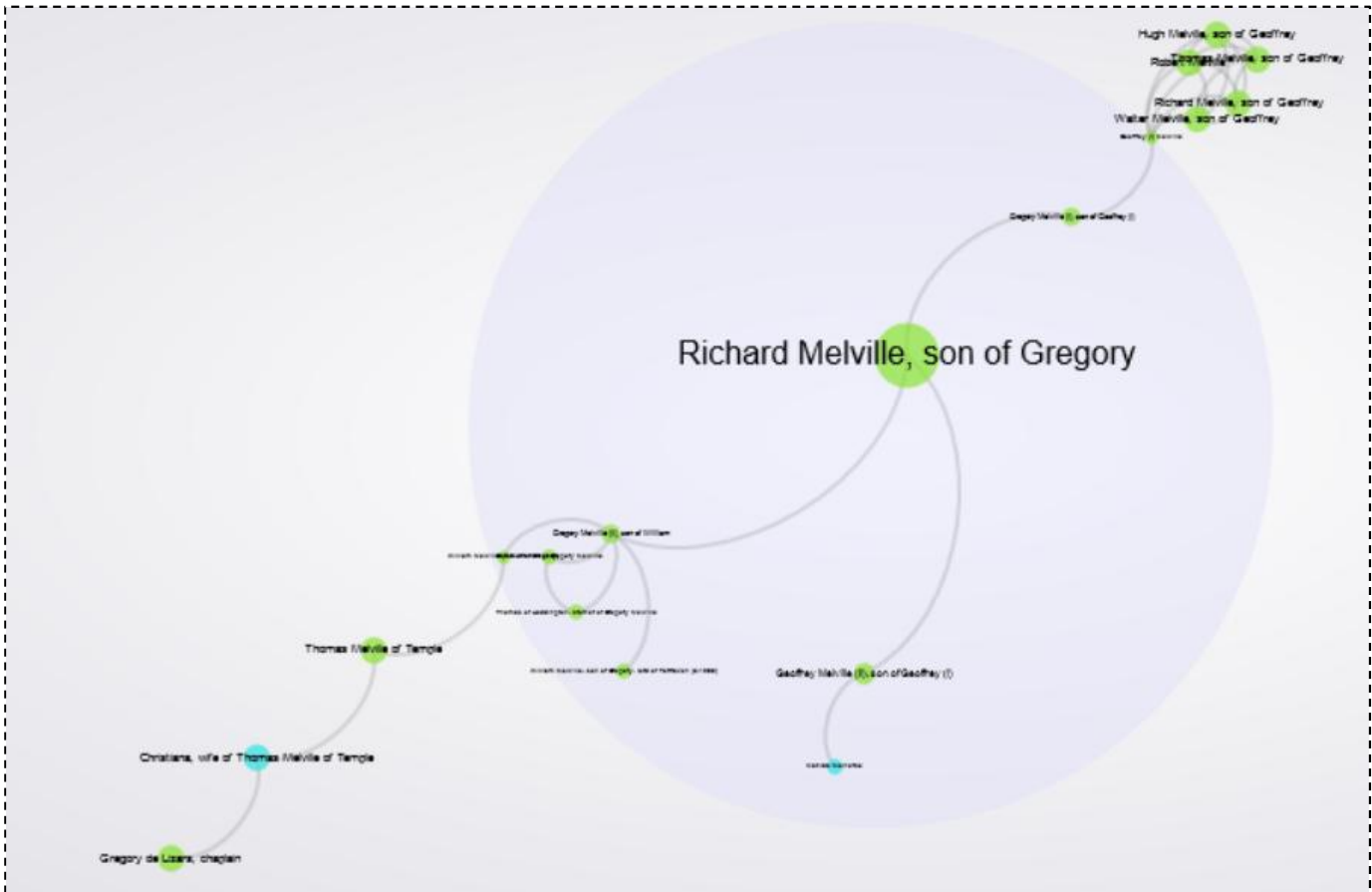Figure 2.17. Melville family grouping
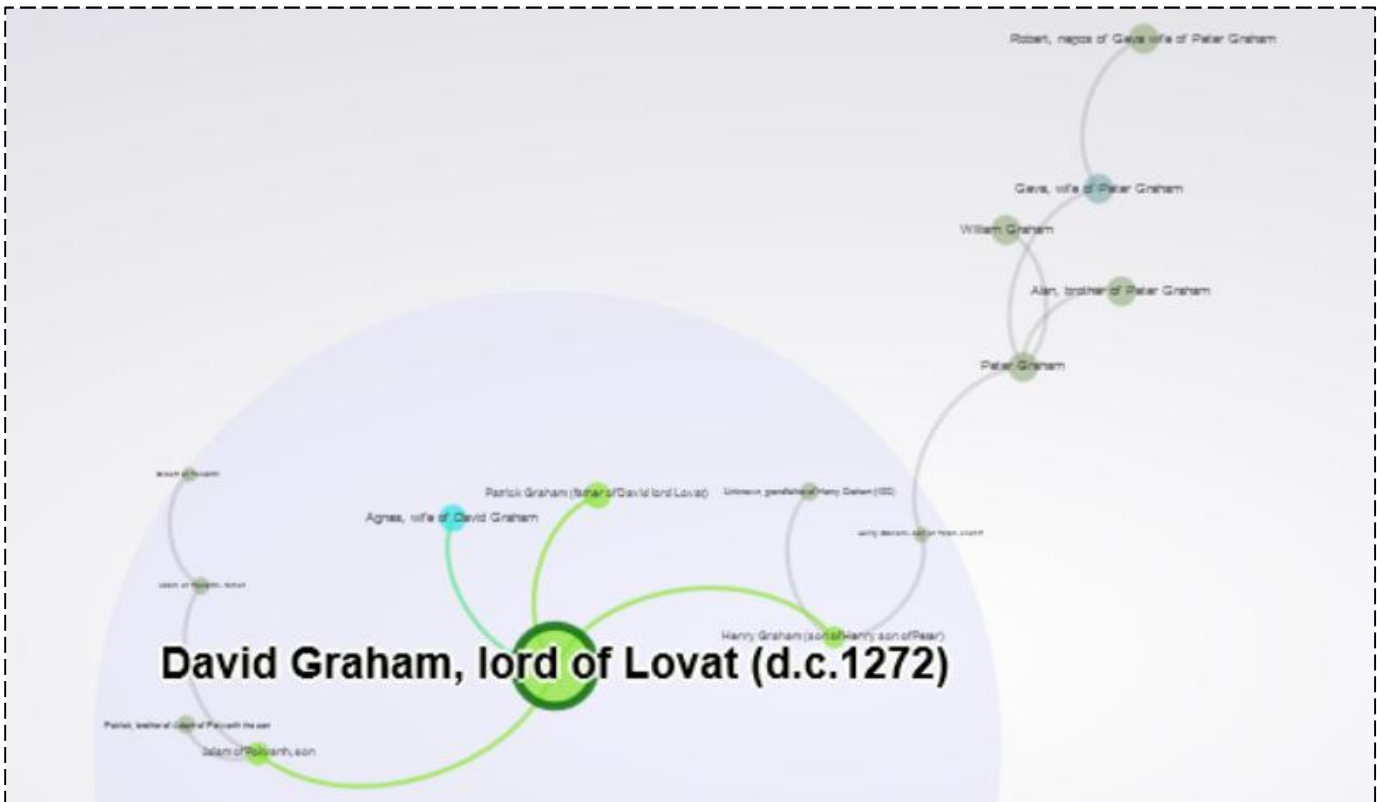

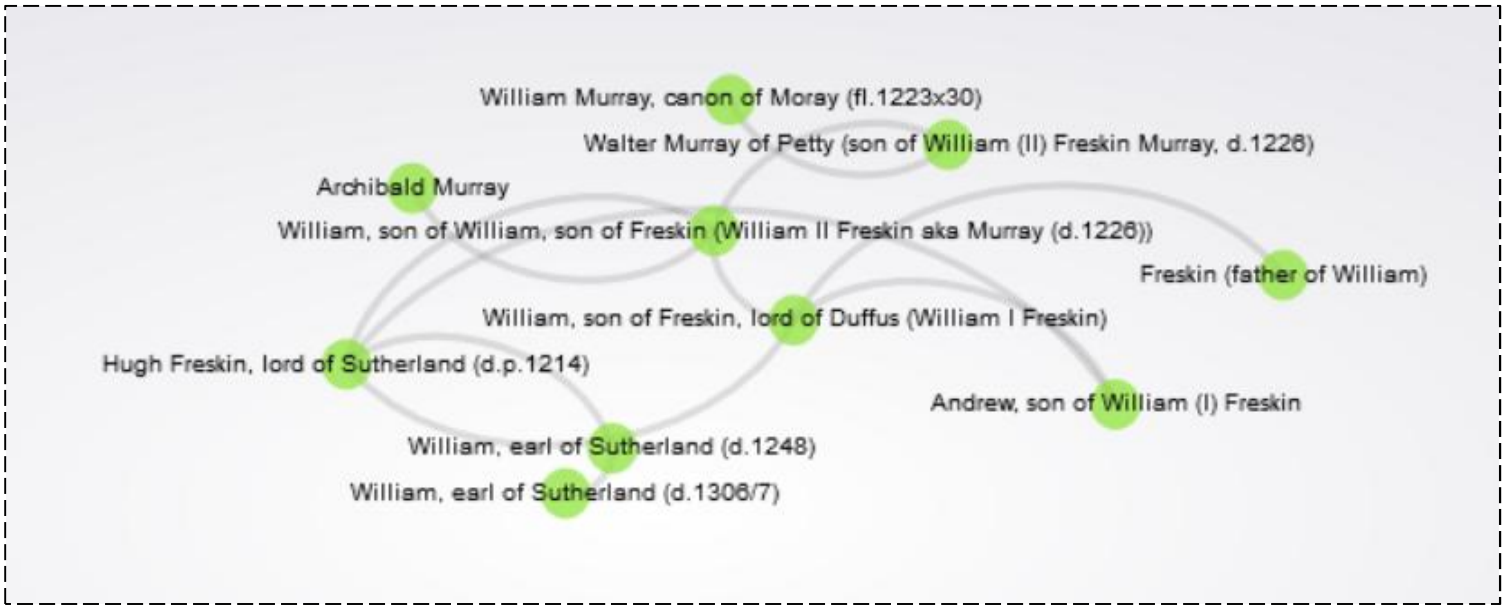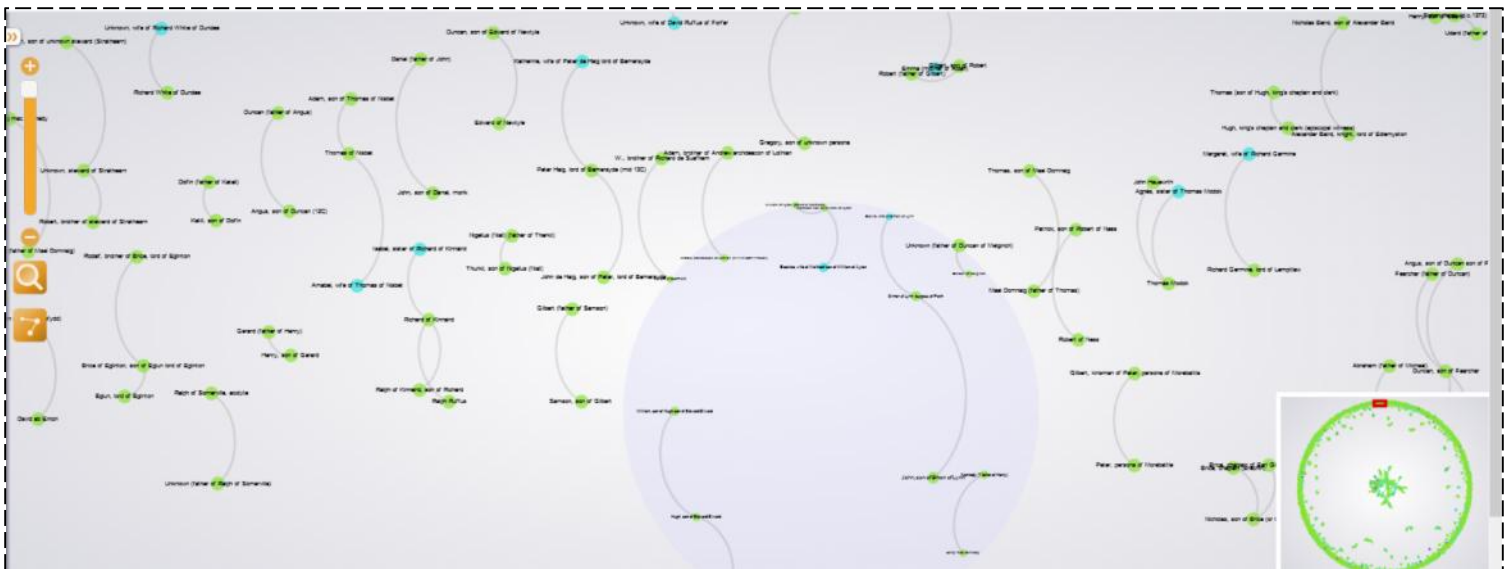Figure 2.18. Graham family grouping

Figure 2.19 Murray family grouping

Figure 2.20. Close-up of the outer edge of family relationships sociogram

Part Two: Employment relationships

There are 81 distinct employment relationship types in the PoMS database, for the pre-1286 phase, reflecting explicit statements of employment made in the medieval sources (see Table 2.3). An example of this would be when a king refers to an individual as 'my clerk', 'my physician', 'my baker', etc., in one of his charters.

Table 2.3. Employment relationship factoid types

Advocate/attorney
Ambassador/envoy
Archdeacon
Armour-bearer/Esquire
Auditor
Auditor contradictarum
Baillie
Baker
Brewer
Butler (*pincerna*)
Canon
Chamberlain
Chancellor
Chaplain
Chaplain (king's)
Chaplain (papal)
Clerk
Commissary
Confessor
Constable
Cook
Counsellor
Crossbowman
Deacon
Dean
Deputy
Deputy-executor
Dispenser
Doorward
Executor
Expensarius
Falconer
Familiars/domestics

Fermer
Forester
Grieve
Groom
Guardian (*custos*)
Horn-blower
Janitor
Judex
Judge-delegate
Justice
Justiciar
Legate (papal)
Mair
Marischal
Master
Merchant
Messenger (*nuncius*)
Miller
Miner
Notary
Official
Official (minister)
Pantler
Penitentiary
Physician (*medicus*)
Precentor/Chanter
Priest
Procurator
Puer (servant)
Rannaire
Receiver
Reeve
Scribe
Scribe (papal)
Servant (*famulus*)
Serviens (servant/sergeant)
Shepherd
Sheriff
Smith
Squire
Steward
Sub-deacon (papal)
Sub-delegate
Tailor

Treasurer
Vicar
Vice-Chancellor
Vicegerent

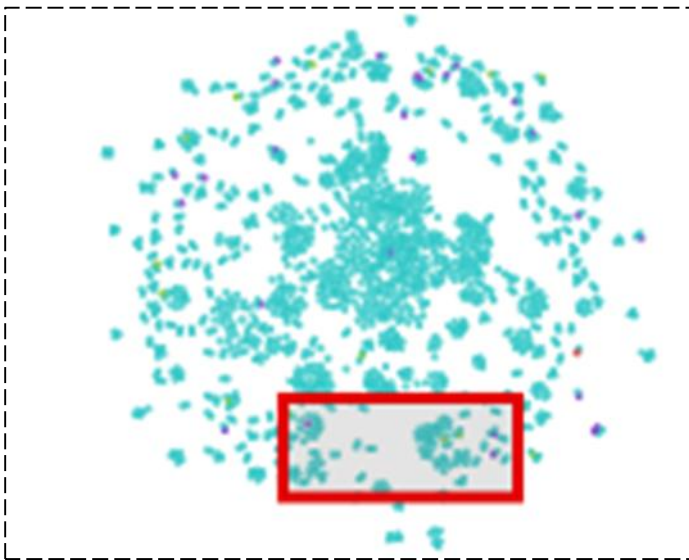Figure 2.21. Overview of Gephi sociogram of employment relationships

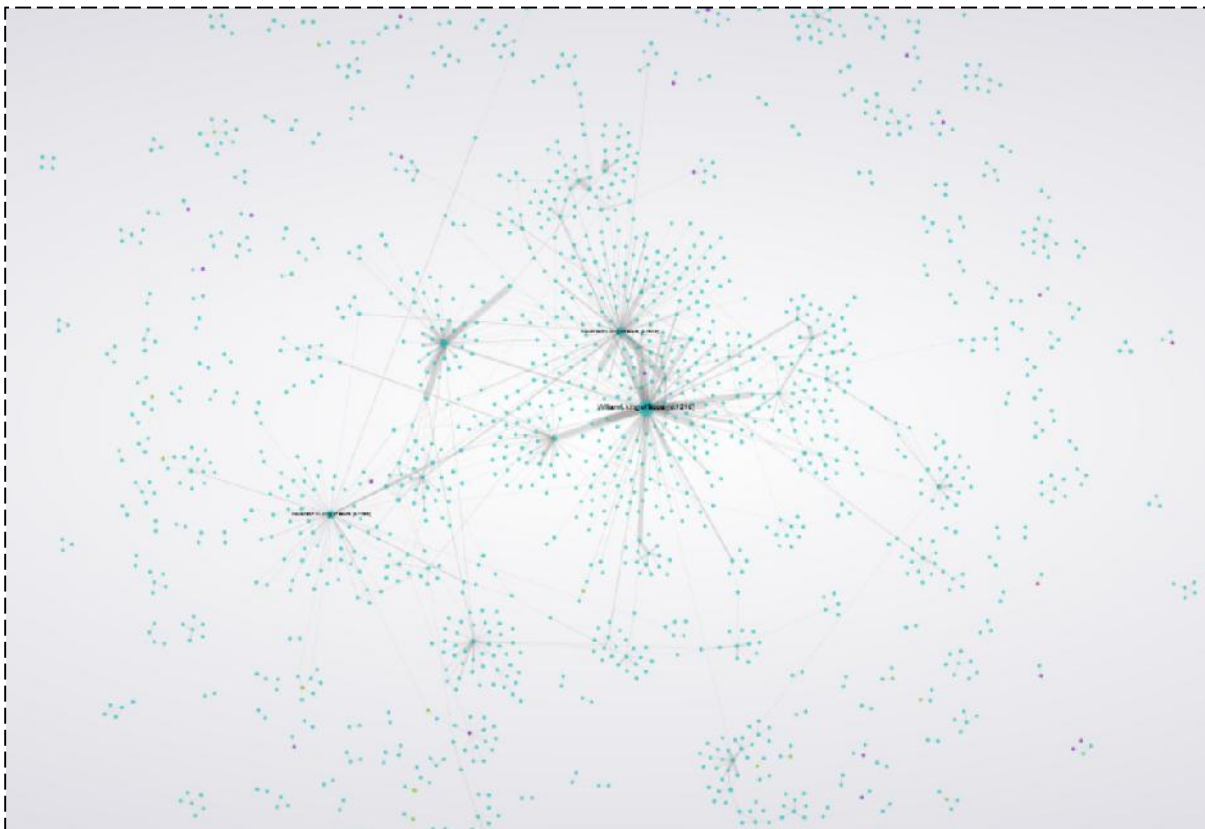Figure 2.22. Employment relationships sociogram

Figure 2.23. Gephi sociogram, with edges enhanced to demonstrate network structure
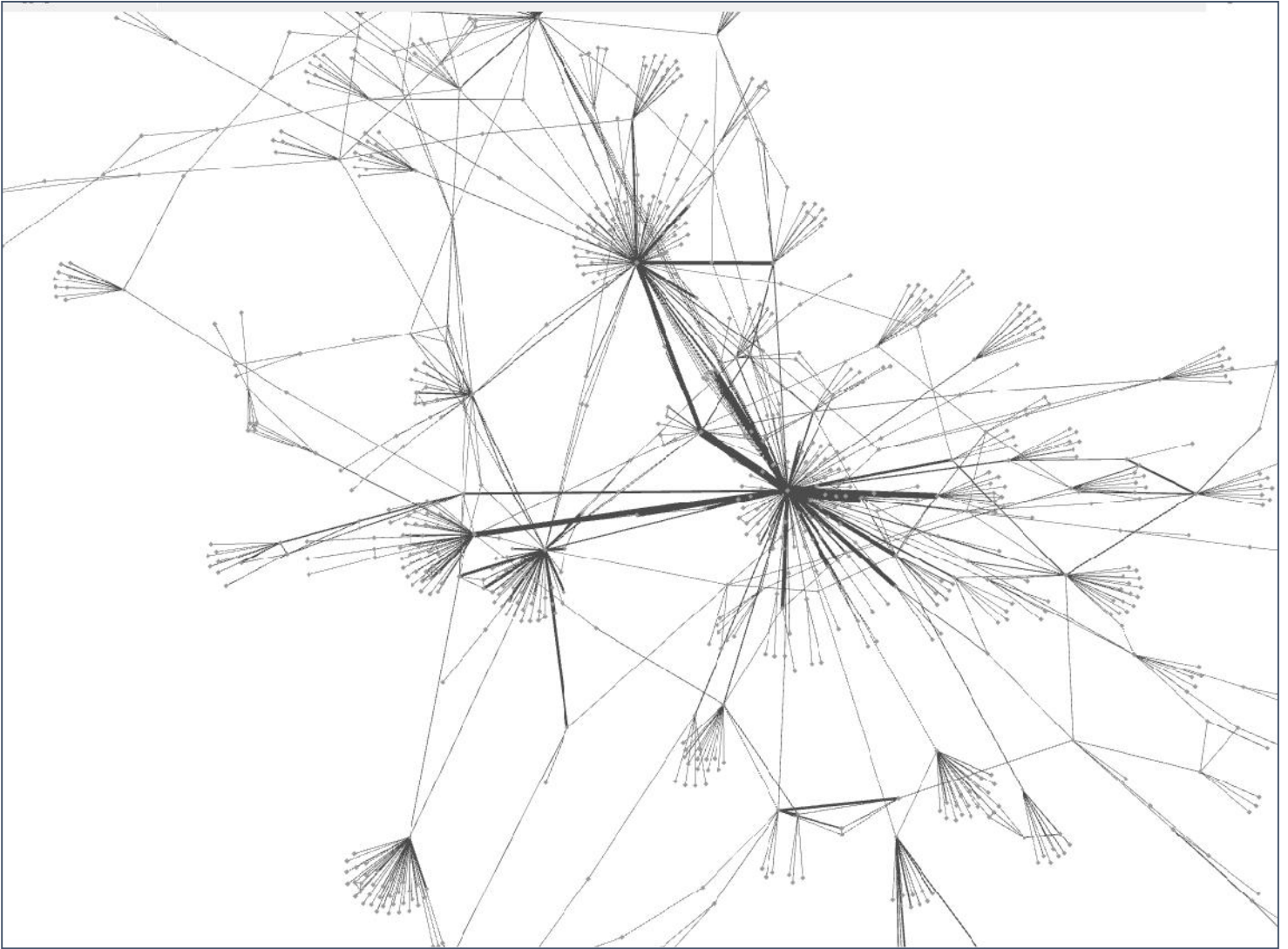

Figure 2.21 gives an overview of all the employment relationships in the Gephi sociogram, where male actors are coloured blue, female actors are green, and institutional actors are purple. As Figures 2.22 and 2.23 make clear, the employment relationships sociogram reveals a number of key 'employers' with their 'employees' connected around them. Key actors are connected in various ways, meaning that most of the actors are connected in some way to the core group. This is because a person can be an 'employee' in one context and an 'employer' in another. For example, figure 2.24 shows the employment connections of Walter of St Albans, bishop of Glasgow (d. 1232). Walter is connected to King William (1165-1214) because he was for many years a chaplain of that king; arrayed around Walter are his own 'employees' as bishop – his own clerks, chaplains, stewards, and so forth. King William (see Figure 2.25) was connected to a number of other key actors in this manner, including William Malveisin, bishop of St Andrews (1202-38), Florence, bishop of Glasgow (d. 1210), William del

Bois, chancellor (d. 1232), Richard de Prebenda, bishop of Dunkeld (d. 1210), and Matthew, bishop of Aberdeen (d. 1199). In this way, King William is the central uniting figure of this sociogram, and it is King William who has the highest betweenness centrality and the highest eigenvector centrality in this sociogram (see Tables 2.4 and 2.5). Eigenvector centrality is a calculation that reflects the importance of an actor based not only on how many other actors to whom that actor is connected, but also by considering the actors to whom they are connected. It aims to give a sense of whether one's connections are themselves influential, central figures, or merely lesser, peripheral figures (Predd 2012). Table 2.4 lists the top ten actors in this sociogram based on eigenvector centrality. There are more than one way of calculating eigenvector centrality; Gephi favours a method which gives the most central person a value of 1 (perhaps better thought of as 100%) and expresses the relative eigenvector centrality of the other actors as a proportion or percentage of that number.

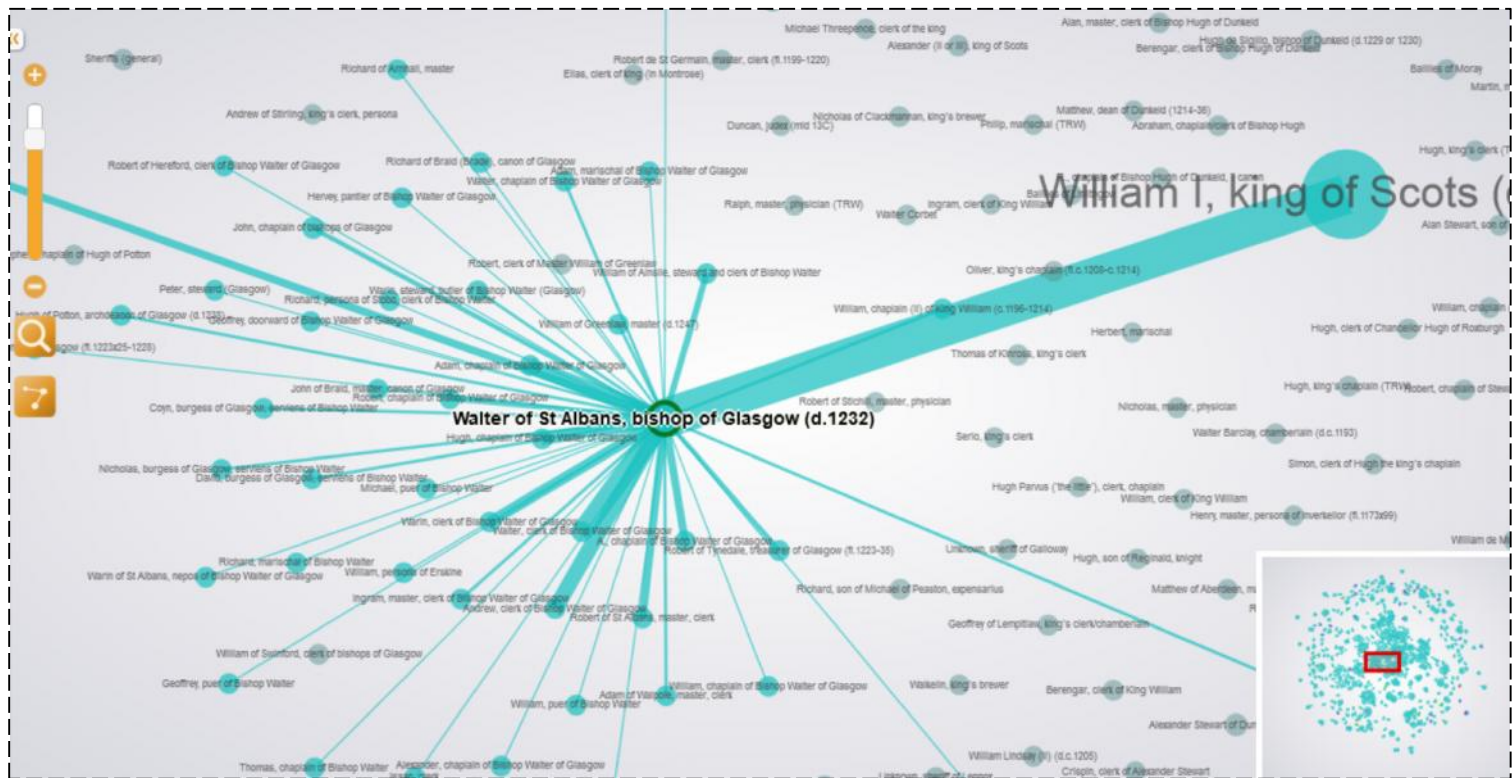Figure 2.24. Employment connections of Walter of St Albans, bishop of Glasgow (d.1232)

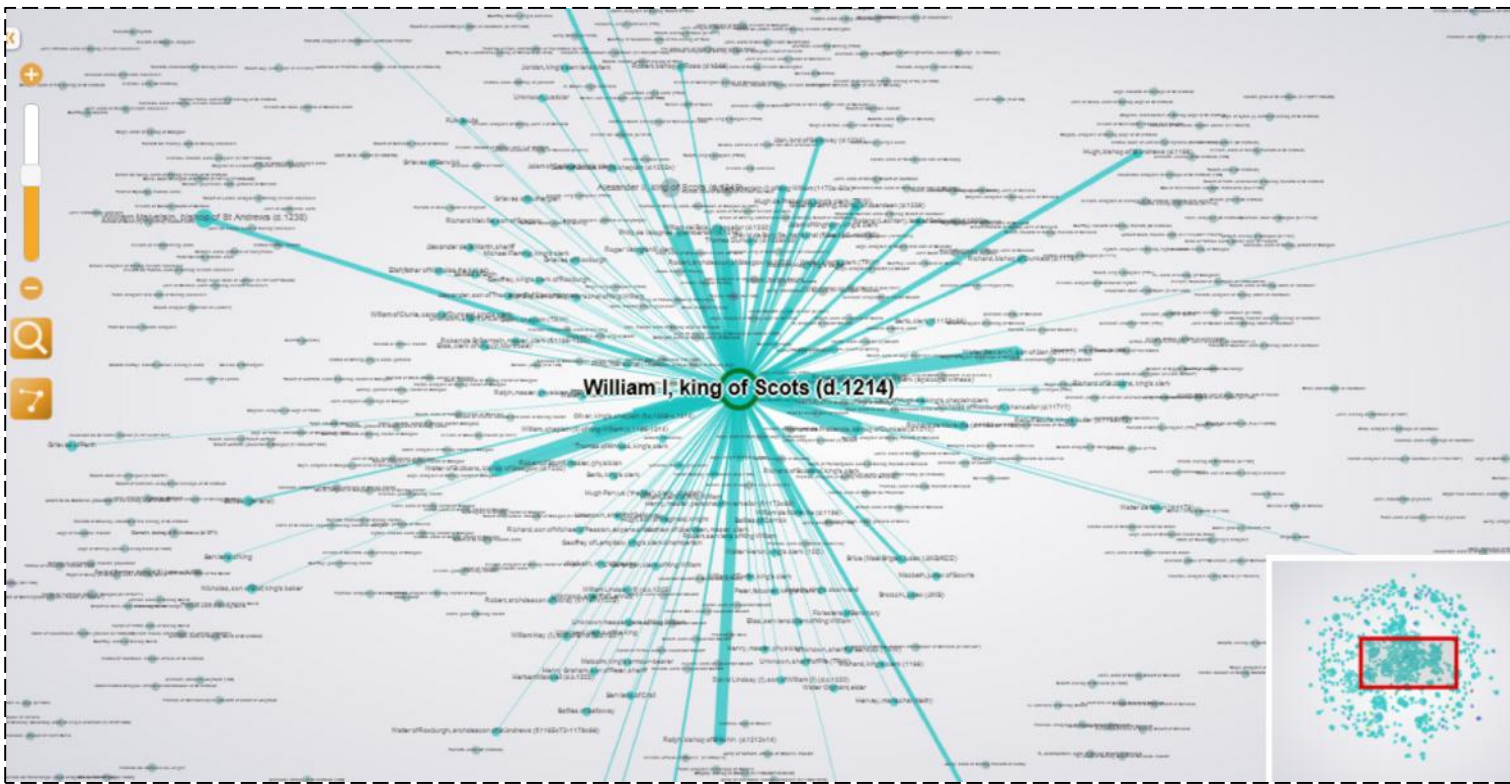Figure 2.25. Employment connections of King William I (1165-1214)

Figure 2.26. Employment connections of Alexander II, king of Scots (d. 1249)
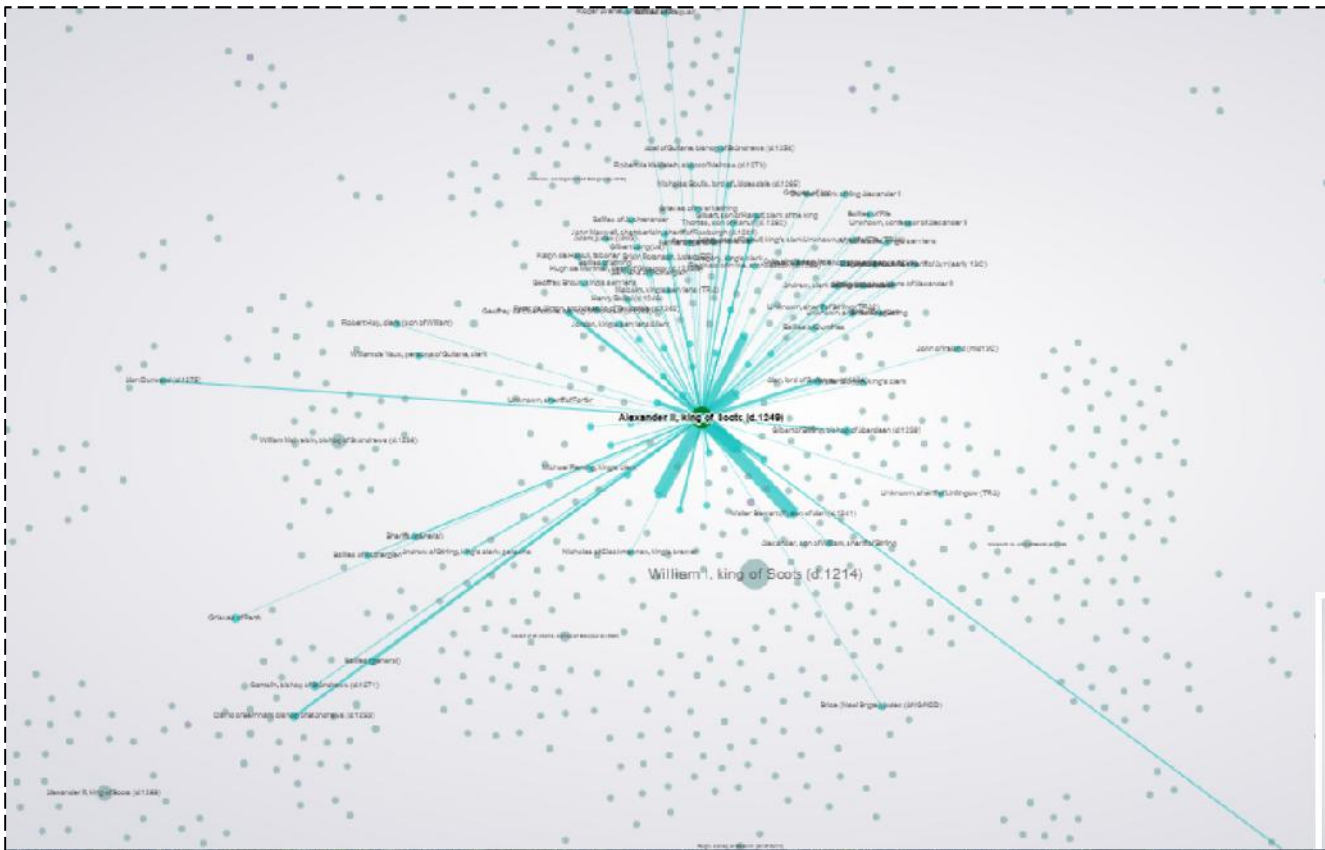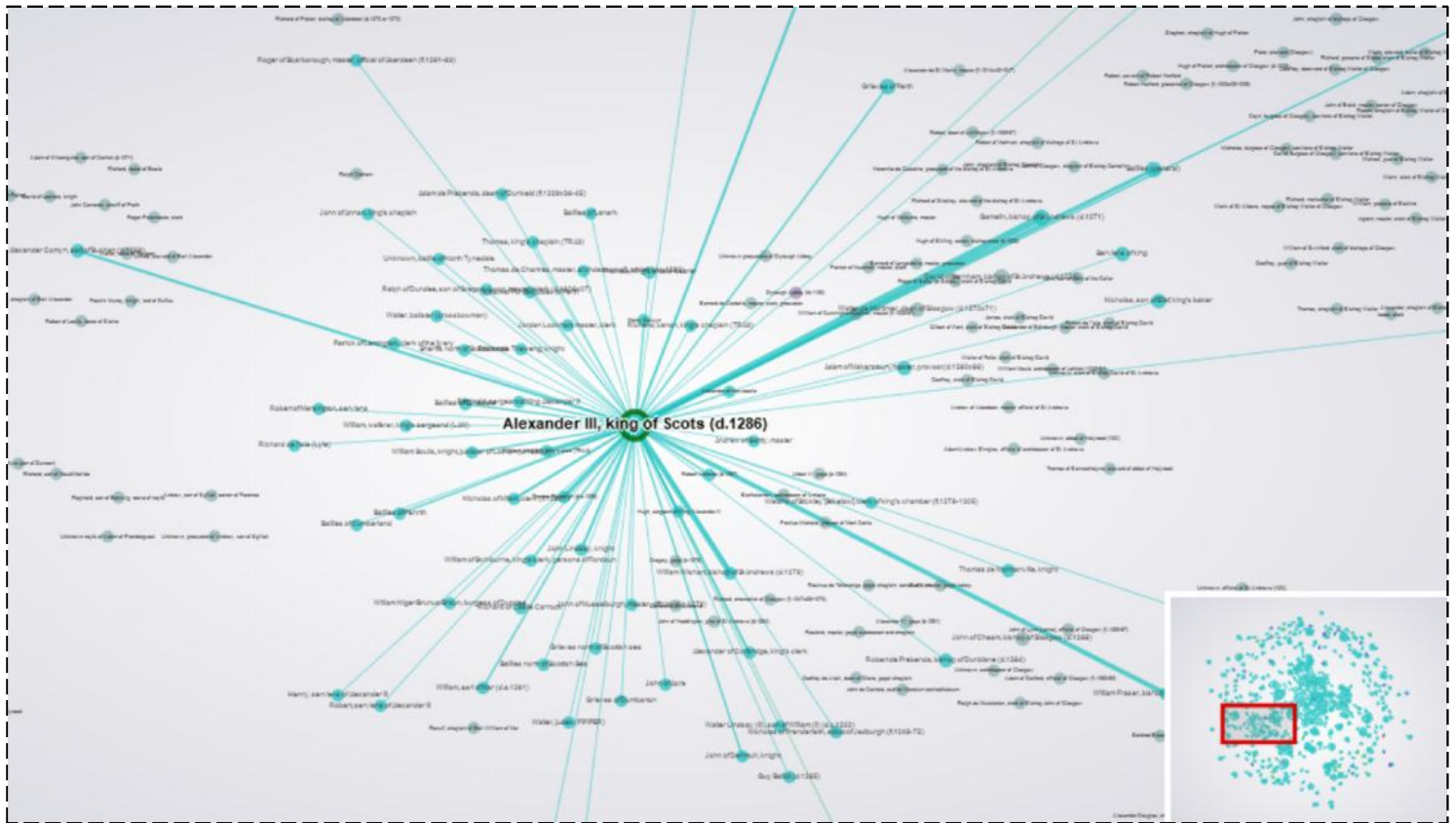
Figure 2.27. Employment connections of Alexander III, king of Scots (d. 1286)

William, king of Scots (d. 1214) is the person with the highest centrality in terms of three types of centrality: eigenvector, betweenness, and degree. Degree, the most basic form of centrality, is simply a calculation of all the actors with whom there is a direct tie. The eigenvector table gives an indication of the importance of King William in this graph; his son Alexander II (see Figure 2.26)'s centrality is less than 54% that of his father. This should be considered alongside the chronological significance of William; not only was his reign long (49 years), but it also occupied a central position in our time period allowing for many connections to actors who continued to be active long after his death. There is also a particular spot that William's reign plays in the documentary record, which will explore in greater depth in a later chapter. Nevertheless, kings play an important role here. Their employees are more likely to be mentioned as such in charters, but they were also among the only employees who would then go out and fulfil important roles themselves as 'employers'. The degree table demonstrates that King William was connected to 130 actors in employment relationship factoids, while Alexander II was linked to 92, and his own son Alexander III was linked to 72. While bishops are clearly the other main power players in this particular study, the most significant of these, William Malveisin, bishop of St

Andrews (d. 1238), was connected to 58 actors and had an eigenvector centrality of about a third of King William's (see Figure 2.28) . All of the top ten by degree were either kings or bishops. However, the eigenvector table shows that other actors were significant in this network, despite having fewer connections. William del Bois (d.1232) was a long-serving royal clerk and chancellor; however, unlike many others on his career path, he was never made a bishop (see Figure 2.29). Thus he had a degree of only 16: he was connected to 16 individuals, as compared to 47 for his contemporary Walter of St Albans, bishop of Glasgow. Yet in terms of eigenvector centrality, William is one notch above Walter in the league tables. This is because the people to whom he was connected were themselves more important figures in the network. These included King William, King Alexander II, and Bishop William Malveisin, Gilbert of Stirling, bishop of Aberdeen, numbers 1, 2, 3, and 7 in the eigenvector list, respectively.

Table 2.4. Top 10 Actors, by Eigenvector Centrality

Id	Name	Gender	Degree	Closeness Centrality	Betweenness Centrality	Eigenvector Centrality
1	William I, king of Scots (d.1214)	M	130	2.983903421	337787.259	1
58	Alexander II, king of Scots (d.1249)	M	92	3.671026157	131945.3364	0.537622721
40	William Malveisin, bishop of St Andrews (d.1238)	M	58	3.461770624	117671.5903	0.329647149
360	Alexander III, king of Scots (d.1286)	M	72	3.88028169	123538.1579	0.294567364
42	William del Bois, chancellor (d.1232)	M	16	3.456740443	16207.97688	0.232958497
858	Walter of St Albans, bishop of Glasgow (d.1232)	M	47	3.825955734	54197.38863	0.222394286
1204	Gilbert of Stirling, bishop of Aberdeen (d.1239)	M	12	3.563380282	32072.60488	0.179660244
432	David of Bernham, bishop of St Andrews (d.1253)	M	24	3.740442656	27004.21203	0.156485537
451	Alan, lord of Galloway (d.1234)	M	13	3.61167002	14017.04227	0.152953126

Table 2.5. Top 10 Actors, by Betweenness Centrality

Id	Name	Gender	Degree	Closeness Centrality	Betweenness Centrality	Eigenvector Centrality
1	William I, king of Scots (d.1214)	M	130	2.983903421	337787.259	1
58	Alexander II, king of Scots (d.1249)	M	92	3.671026157	131945.3364	0.537622721
360	Alexander III, king of Scots (d.1286)	M	72	3.88028169	123538.1579	0.294567364
40	William Malveisin, bishop of St Andrews (d.1238)	M	58	3.461770624	117671.5903	0.329647149
858	Walter of St Albans, bishop of Glasgow (d.1232)	M	47	3.825955734	54197.38863	0.222394286
260	Gilbert or Gilla Brigte, earl of Stratherarn (d.1223)	M	15	3.873239437	41476.5	0.112558044
788	Andrew Murray, bishop of Moray (d.1242)	M	40	4.354124748	40126.0394	0.118634521
74	Malcolm IV, king of Scots (d.1165)	M	25	4.658953722	32223.24237	0.090796138
1204	Gilbert of Stirling, bishop of Aberdeen (d.1239)	M	12	3.563380282	32072.60488	0.179660244

Table 2.6 Top actors by degree

Id	Name	Gender	Degree
1	William I, king of Scots (d.1214)	M	130
58	Alexander II, king of Scots (d.1249)	M	92
360	Alexander III, king of Scots (d.1286)	M	72
40	William Malveisin, bishop of St Andrews (d.1238)	M	58
858	Walter of St Albans, bishop of Glasgow (d.1232)	M	47
788	Andrew Murray, bishop of Moray (d.1242)	M	40
74	Malcolm IV, king of Scots (d.1165)	M	25
432	David of Bernham, bishop of St Andrews (d.1253)	M	24
2	Matthew, bishop of Aberdeen (d.1199)	M	22
448	Florence, bishop-elect of Glasgow (d.1210)	M	17

It is noteworthy while half of the actors are on all three lists (Kings William, Alexander II, Alexander III, Bishop William Malveisin, Bishop Walter of St Albans), there is considerable variation in the other half. Andrew Murray, bishop of Moray (d. 1242) had and impressive 40 employment connections, but he is way down at number 28 in the eigenvector list, with 11.8% compared to King William's 100%. He is still quite important in terms of betweenness centrality: he was not connected by employment with top players, but this did not prevent him from occupying a place of potential influence in the

overall graph structure. Gilbert or Gilla Brigte, earl of Strathearn (d.1223) had a degree of only 15 but appears as number six in betweenness centrality (see Figure 2.30). This is because of his connections with King William and Bishop Matthew of Aberdeen.

Figure 2.28. Employment connections of William Malveisin, bp. St Andrews (d. 1238)

Figure 2.29. Employment connections of William del Bois, chancellor (d. 1232)
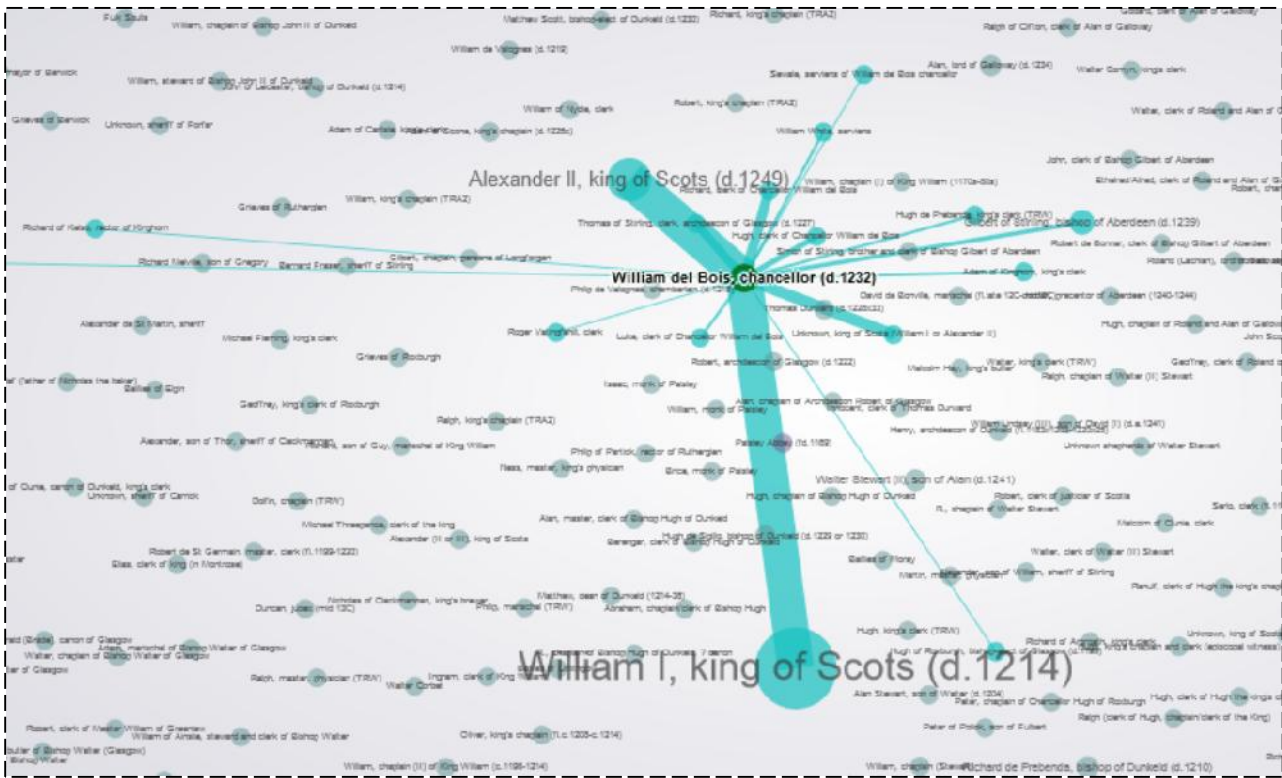
Figure 2.30. Employment connections of Gilbert, earl of Strathearn (d. 1223)
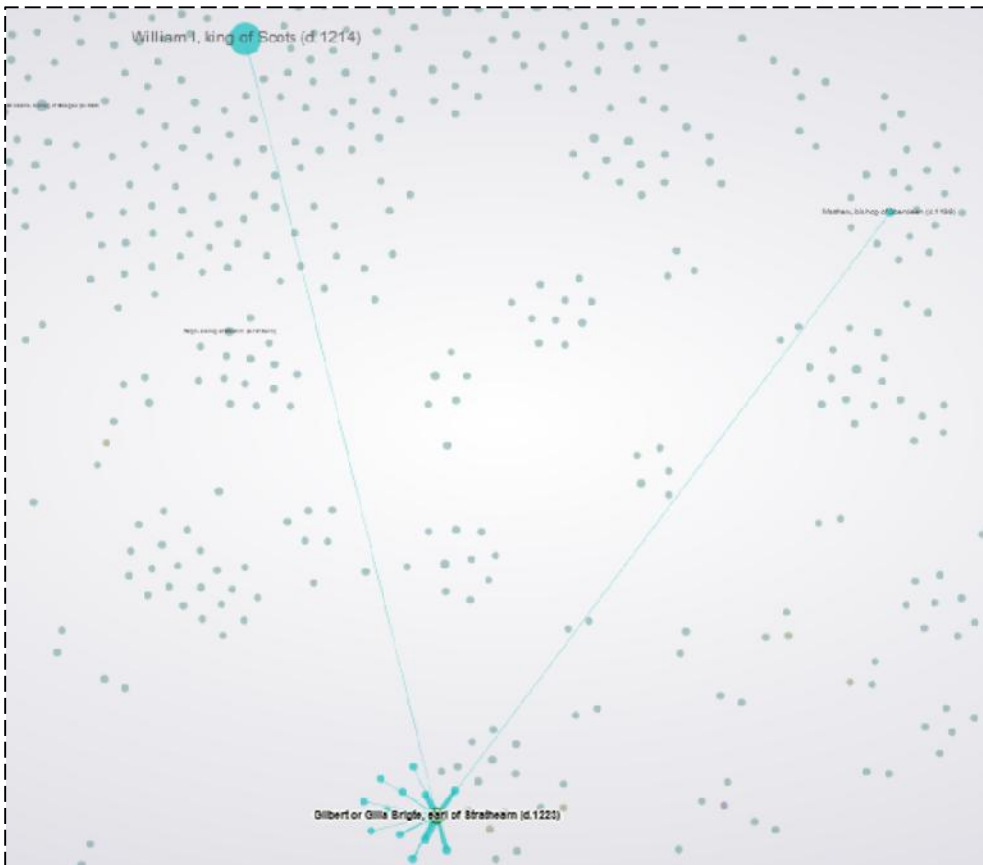
It is also important to remember that just because people are not connected in the context of employment relationships does not mean they may not have been connected in other ways. A good example is the disconnected (for the main core segment) group of people around Ermengarde de Beaumont, queen of Scots (d. 1233). Ermengarde's employees are shown in Figure 2.31. While she would obviously be connected through family relationship to her husband, King Alexander II, the two individuals are not connected in this sociogram.

Figure 2.31. Employment connections of Ermengarde, queen of Scots (d. 1233)
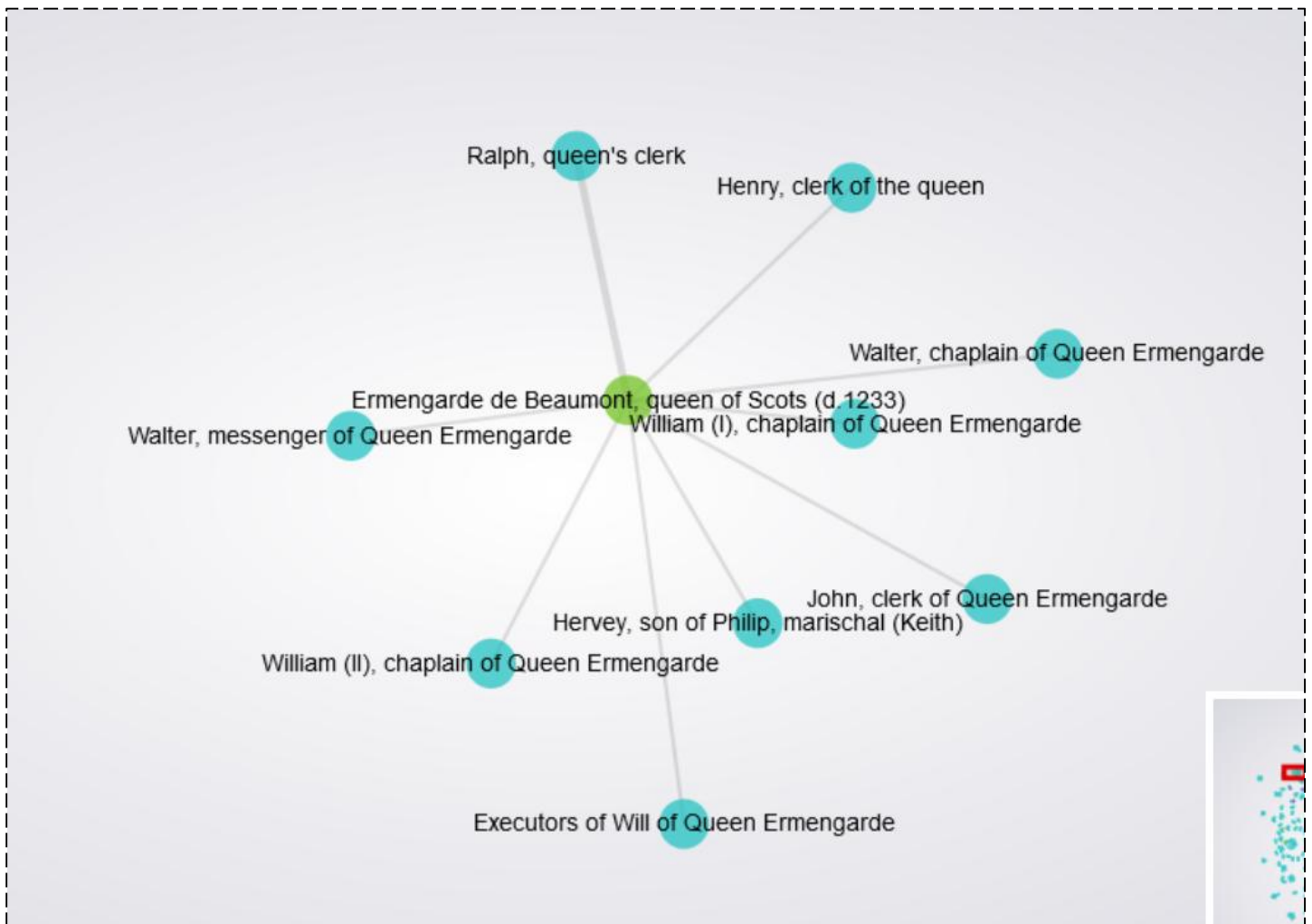
Part Three: Tenurial and lordship relationships

There are 36 types of tenurial and lordship relationships in the pre-1286 PoMS database. It must be remembered that these only reflect explicit statements of lordship (etc.) in the documents, and do not include social relationships of this type which historians might infer from transactions in charters.

Table 2.7. Types of tenurial and lordship relationships

Archbishop
Assignee
Baron
Bishop
Burgess
Confraternity (monastic)
Cottar
Daughter church
Dependant (Cell)
Earl
Feudator
Fidelis (sworn man)
Franklin
Friend (f.) (*amica*)
Friend (m.) (*amicus*)
King
Knight (*miles*)
Lady (*domina*)
Liege Man (*homo ligius*)
Lord (*dominus*)
Man (*homo*)
Metropolitan
Monk
Mother church
Parishioner
Patron
Predecessor
Religious house (*Domus*)
Serf/Neyf
Socius (companion/associate)
Suffragan
Tenant
Thane
Vassal (*vassallus*/*cliens*)
Vavassor (undertenant)
Woman (*femina*)

The following Gephi sociogram shows a dense network of lordship relations in the late thirteenth century. References to lordship were more frequent in the later part of our time period. This illustration shows that 'Lord (dominus)' was the most commonly used tenurial and lordship relationship type.

Figure 2.32. Dense web of lordship relationships in late thirteenth century
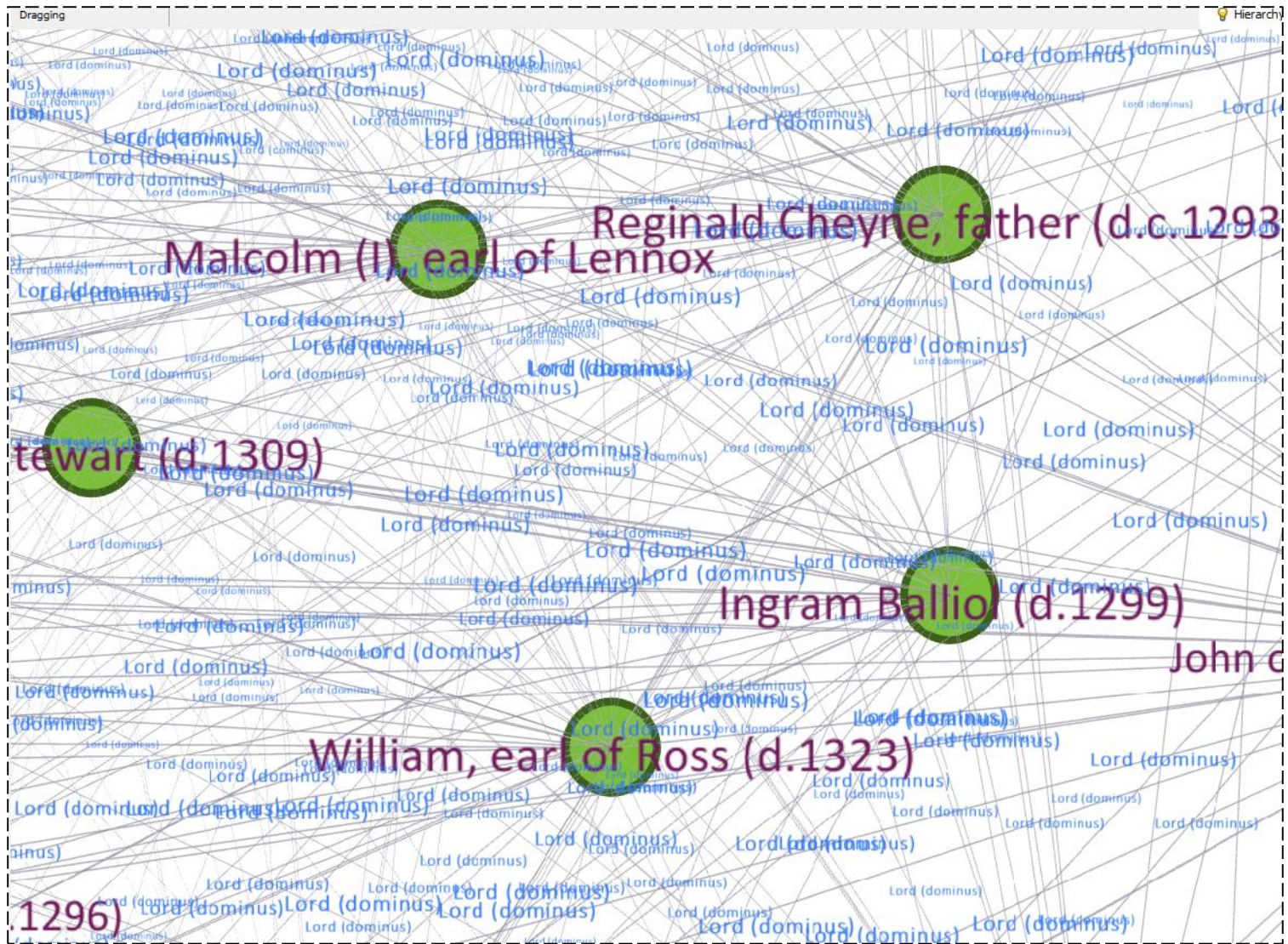
Strictly defined lordship relationships were not the only kind of bond tying together laymen. The following sociogram shows the various types of relationship between people connected to the baron Philip de Mowbray, including 'Socius (companion/associate)' and 'Friend (m.) (amicus)'.
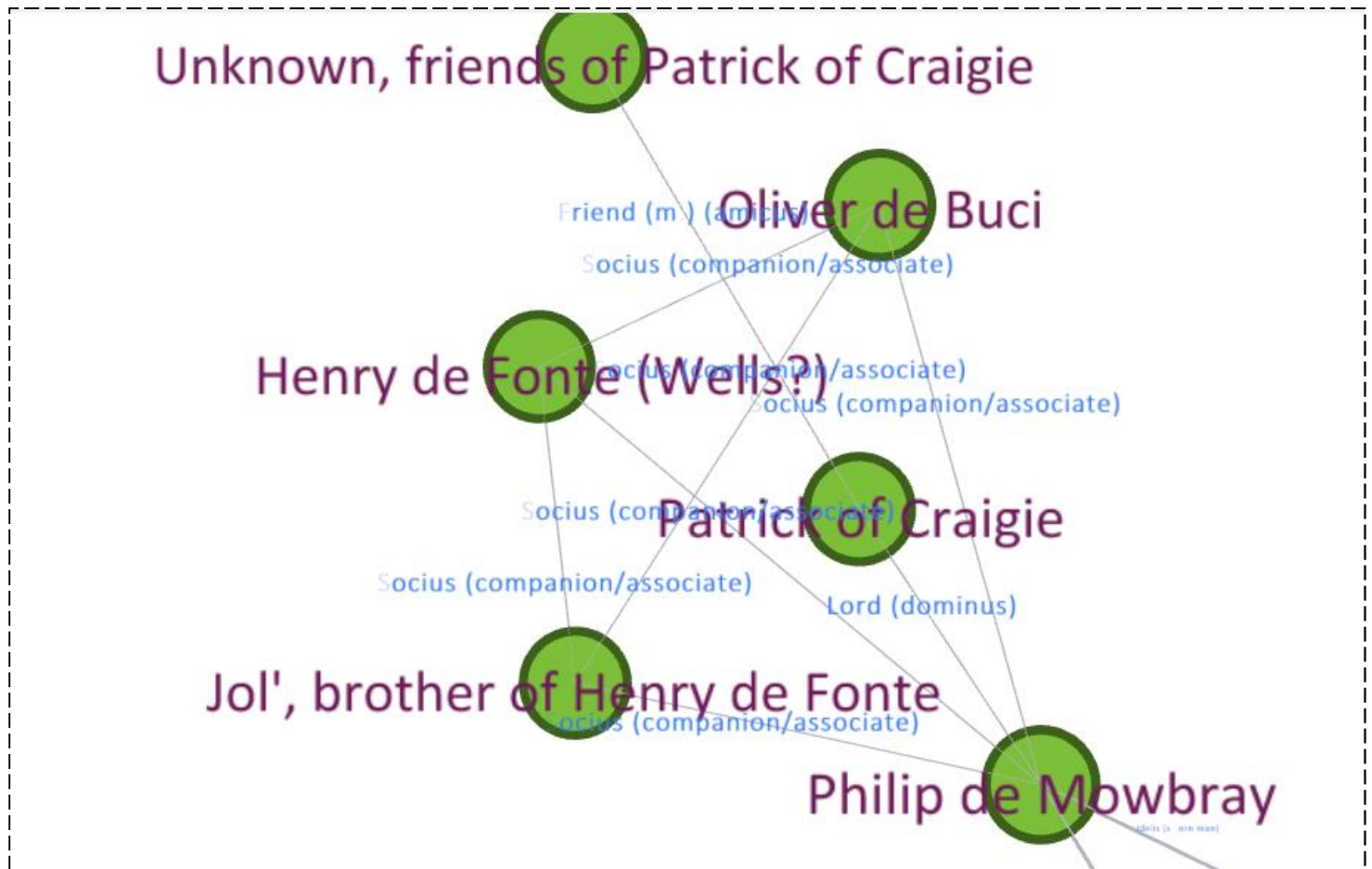
Figure 2.32. Associates of Philip de Mowbray

Figure 2.33 illustrates the variety of forms of social relationship which could tie the earls of Fife to those around them. William of Holderness was described as the 'knight (miles)' of Duncan (II), earl of Fife (d. 1204), while Milo de Raiville was described as his 'man (homo)'. Malcolm (I), earl of Fife (d. 1229) was the 'patron' of Culross Abbey, and the 'lord (dominus)' of Duncan, son of Michael Scott, while Ness Ramsay and William of Wyville were each termed his 'Socius (companion/ associate)'.

Figure 2.33. Social relationships of the earls of Fife.
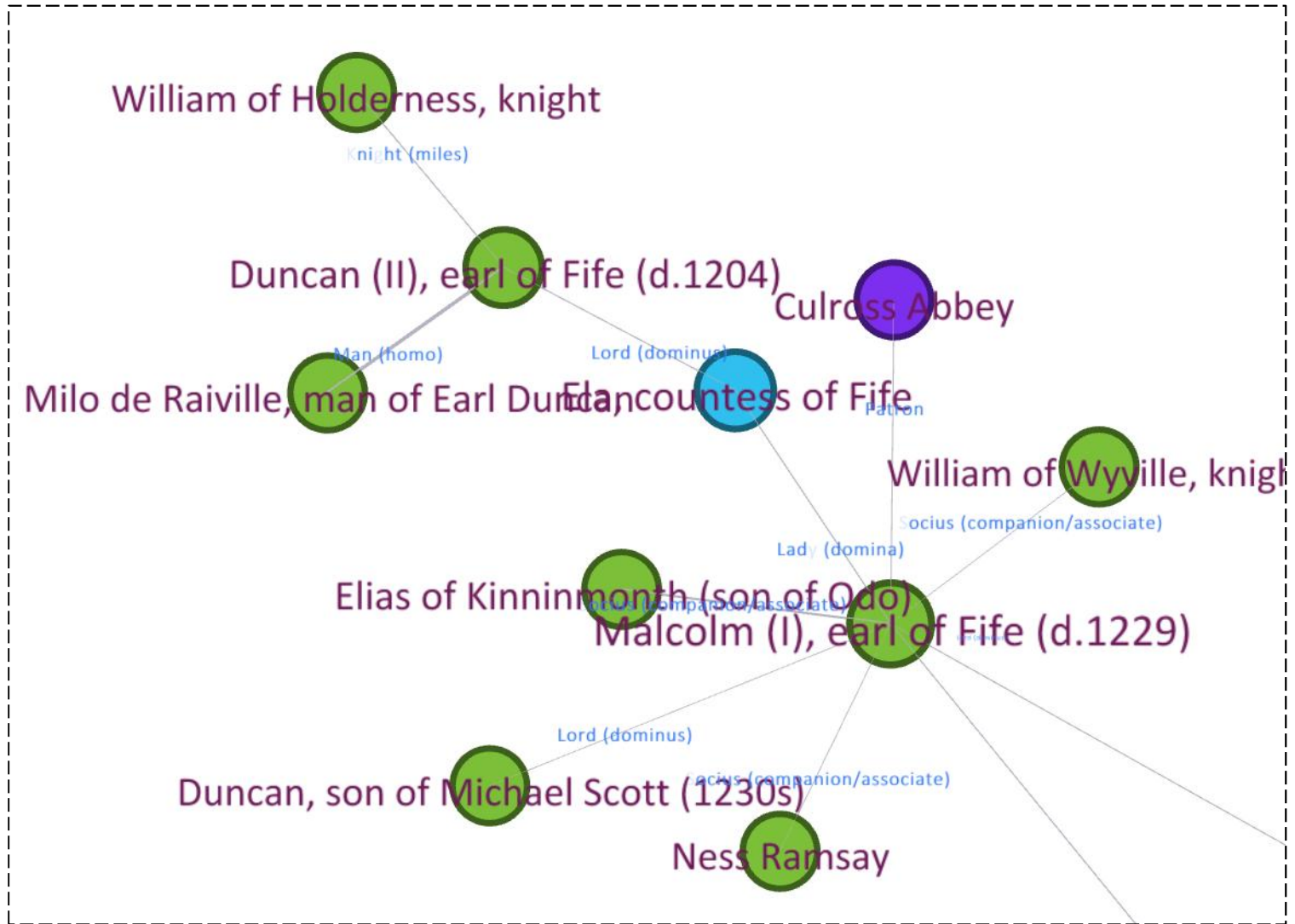
The following sociogram (Figure 2.34) illustrates some more lordship and tenurial relationship types. A number of individuals are described as 'Fidelis (sworn man)' of King Alexander III, while others are termed his barons, burgesses, or knights.

Figure 2.34. Tenurial and lordship relationships of Alexander III.
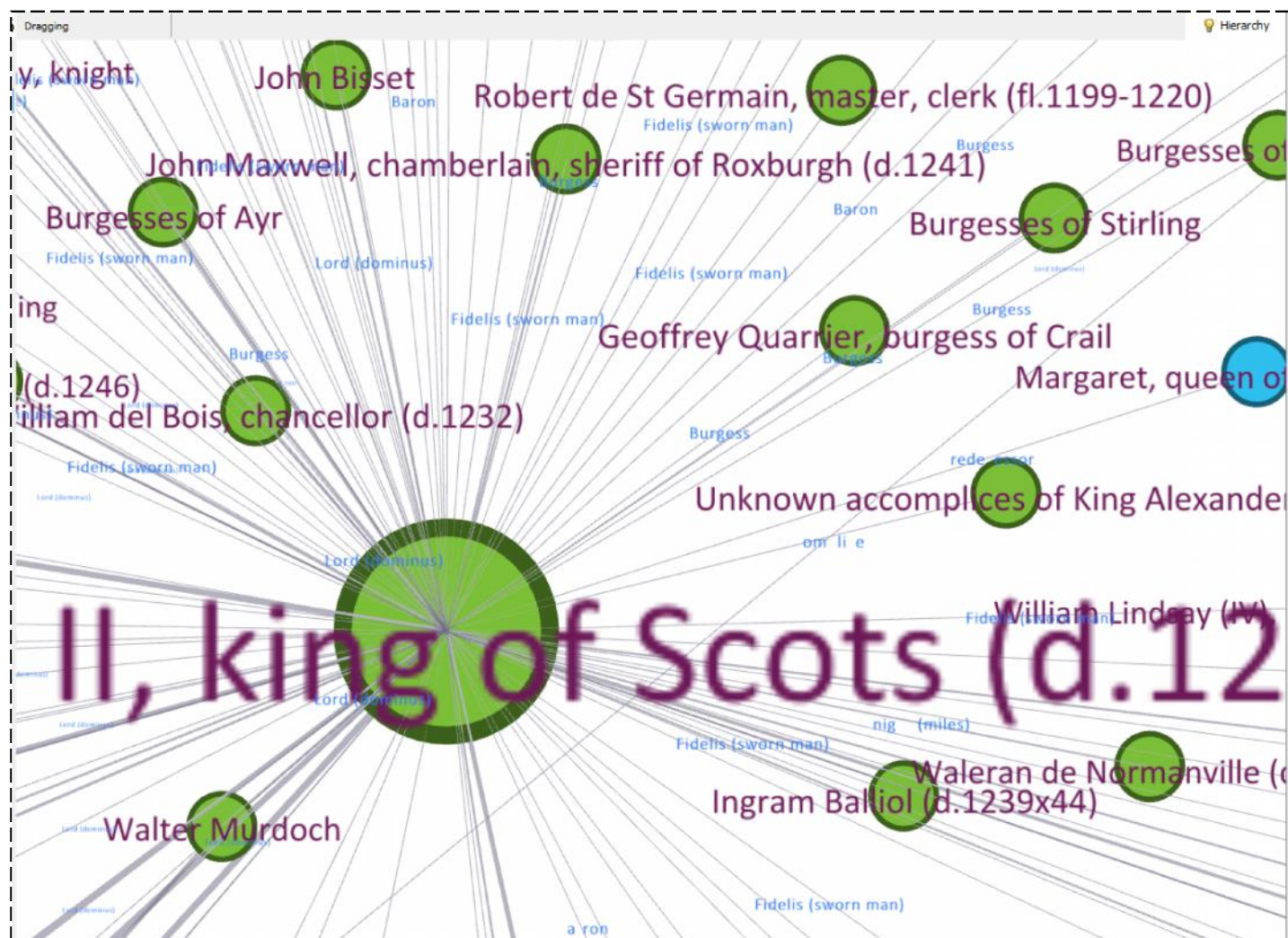
The following table lists the twenty individuals with the highest degree centrality in the Tenurial and Lordship Relationships network as calculated in Gephi.[4] Most of the individuals were active in the mid-to-late thirteenth century, and King Alexander III (1249-86) has the highest Eigenvector centrality in this study. Nevertheless, his predecessors King Alexander II (1214-49) and King William I (1165-1214) were linked to more individuals, with 123 and 120 such ties as compared to Alexander III's 83. Figures 2.35 and 2.36 show the whole structure of the sociogram in Gephi, as visible on the PoMS website (http://db.poms.ac.uk/sna/all/26/), where the nodes representing men are green, women are blue, and purple are institutions. Much as we have seen with the other relationship sociograms, there is a core segment distributed largely around the central figures of kings, with a number of smaller groupings, including dyads and triads, around the periphery.

Table 2.8. Centrality of individuals in Tenurial and Lordship Relationships sociogram

Id	Name	Gender	Degree	Eigenvector Centrality	Betweenness Centrality
58	Alexander II, king of Scots (d.1249)	M	123	0.190762158	141326.1875
1	William I, king of Scots (d.1214)	M	120	0.118732852	92373.73261
360	Alexander III, king of Scots (d.1286)	M	83	1	38878.98893
446	Patrick (III), earl of Dunbar (d.1289)	M	48	0.956759267	6607.446999
1981	Alexander Comyn, earl of Buchan (d.1289)	M	48	0.966728379	13514.92442
2110	William of Brechin, knight	M	48	0.924043923	6184.445831
2050	Malise (III), earl of Strathearn (d.in or a.1317)	M	47	0.954903238	8082.075771
2176	John Comyn, lord of Badenoch (d.1302)	M	45	0.953215672	913.0757706
1171	William Murray, son of Malcolm Murray, knight (TRA3)	M	44	0.952397331	187.0757706
1938	Robert Bruce V, lord of Annandale (d.1295)	M	44	0.922569043	11286.04668
1955	William Sinclair (d.1299x1303)	M	44	0.952397331	187.0757706
2138	William Soulis, knight, justiciar of Lothian (d.1292/3)	M	44	0.952397331	187.0757706
2209	Donald, earl of Mar (d.1297x1305)	M	44	0.952397331	187.0757706
2257	Alexander Balliol of Cavers (d.c.1311)	M	44	0.952397331	187.0757706
2310	Duncan (III), earl of Fife (d.1289)	M	44	0.952397331	187.0757706
6598	Robert Bruce VI, earl of Carrick (d.1304)	M	44	0.952397331	187.0757706
3428	Angus, son of Donald of the Isles, lord of Islay (d. ca 1293)	M	42	0.921274371	10479.73996
130	David I, king of Scots (d.1153)	M	41	0.056511232	21699.98134
1935	Alexander, son of King Alexander III (d.1284)	M	41	0.913221751	805.530355
2323	Alexander of Argyll	M	41	0.913666434	183.9958769

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[4] New dataset

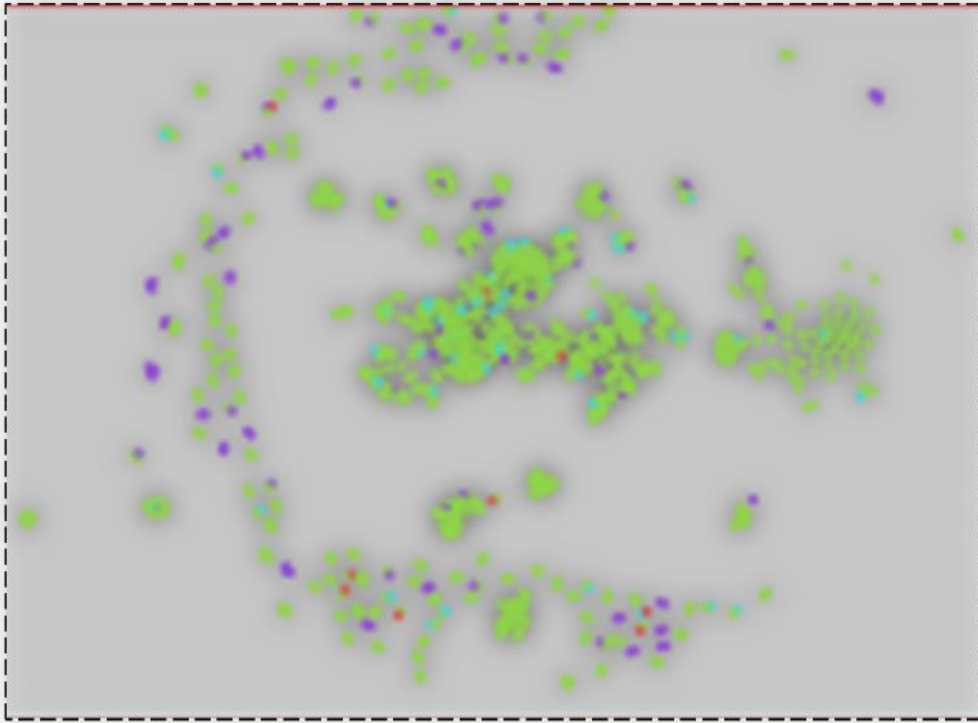Figure 2.35. Overview of sociogram in Gephi

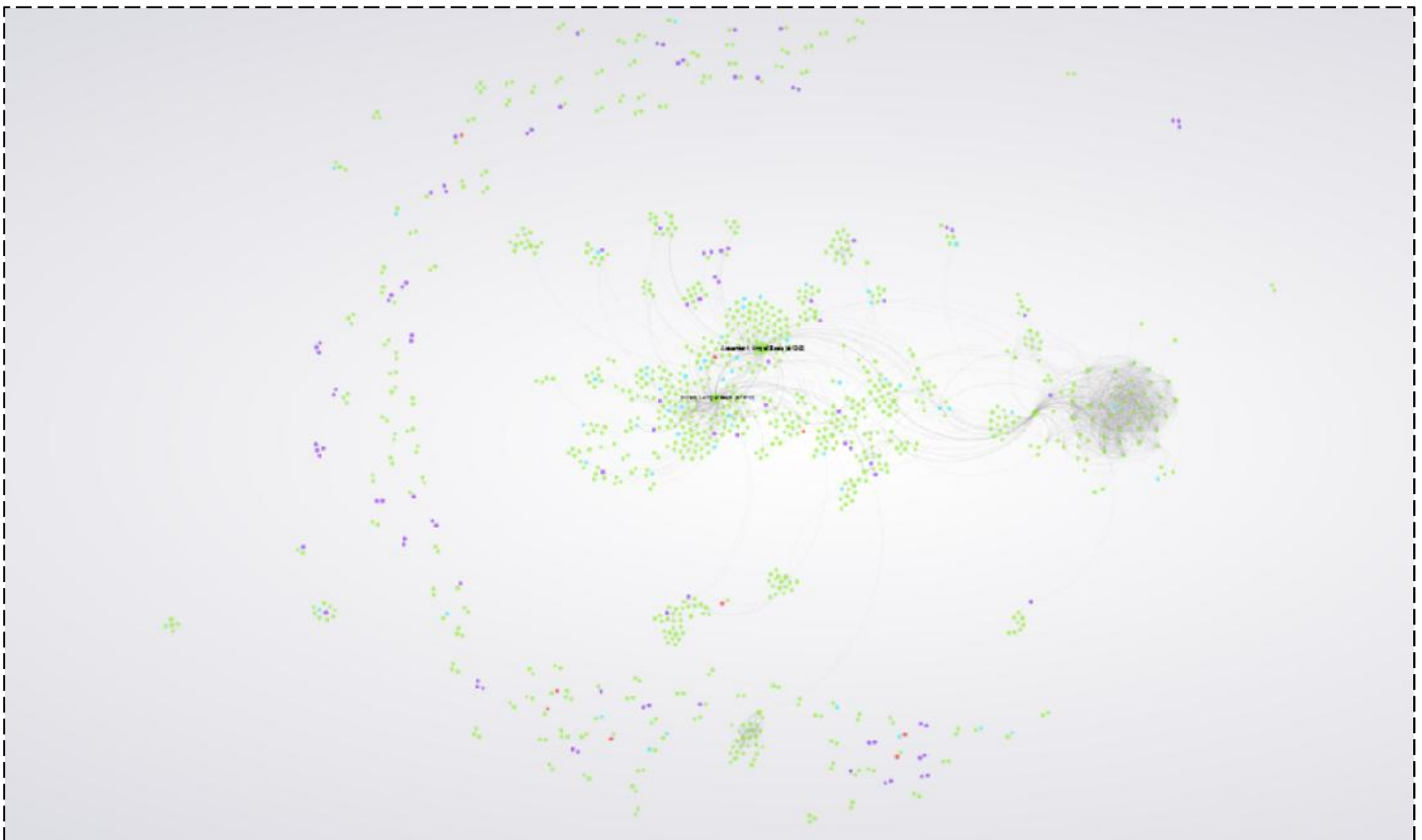Figure 2.35. Tenurial and Lordship Relationships sociogram, Gephi.

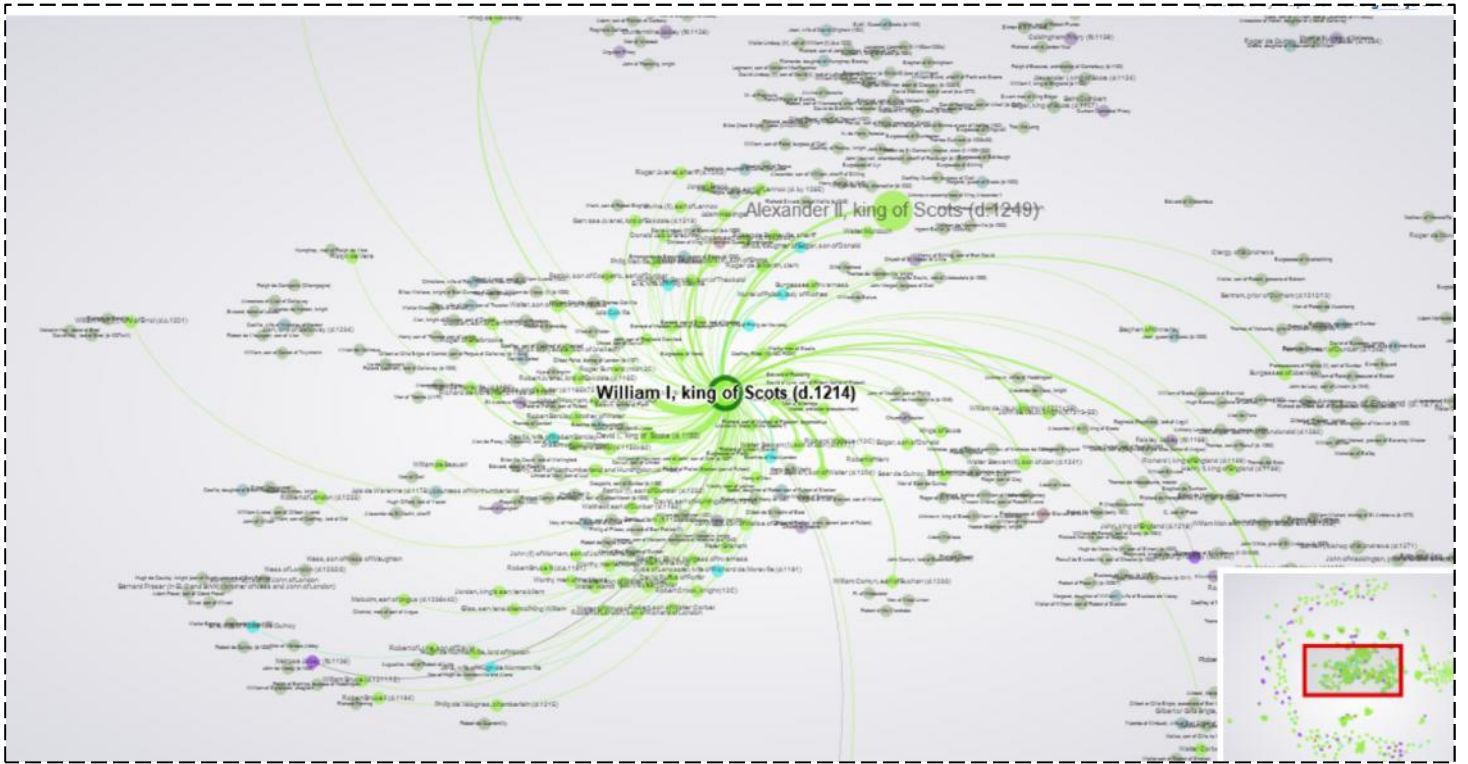Figure 2.36. Tenurial and lordship relationships of William I, king of Scots (d. 1214)

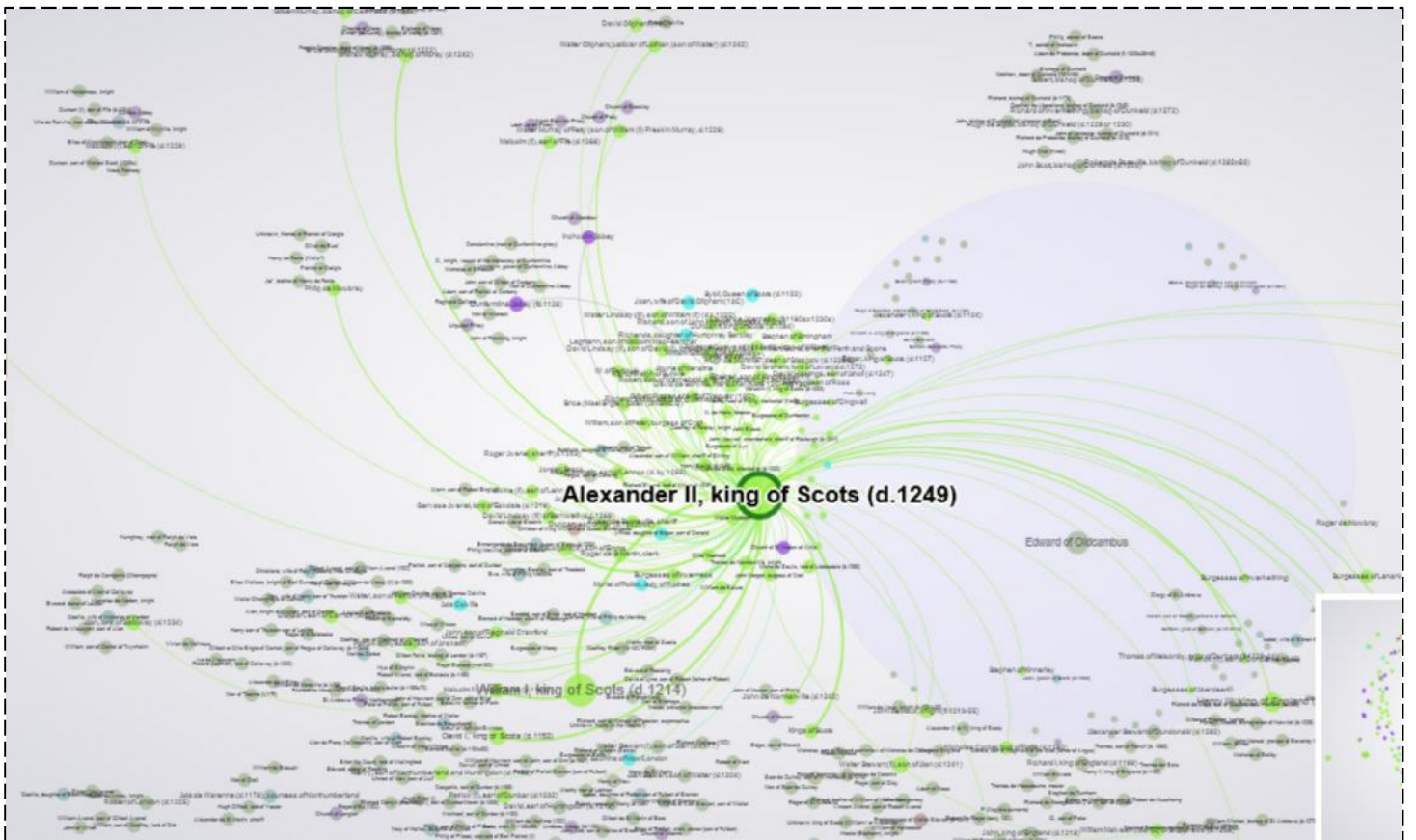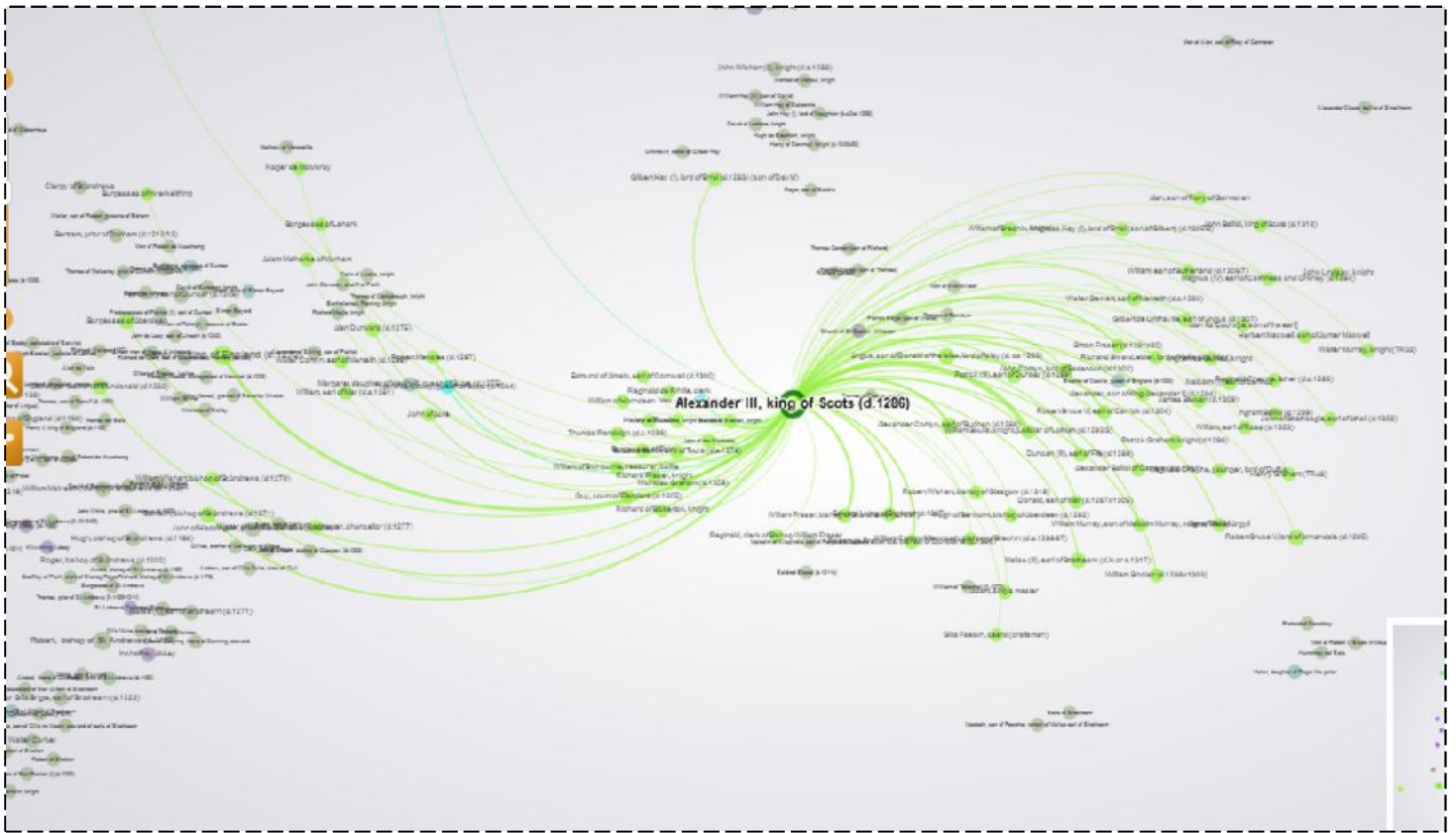Figure 2.37. Tenurial and lordship relationships of Alexander II, king of Scots (d. 1249)

Figure 2.38. Tenurial and lordship relationships of Alexander III, king of Scots (d. 1286)

Unfortunately, there is an error in this study which means that multiple lordship connections between King Alexander III and his barons represented in a single document, such as H4/42/5 (see Figure 2.39) show up in the social network analysis as not only links between these individual barons and the king, but also between all of the barons themselves. This seems to have skewed the centrality figures reported in Table 2.8, and with these documents removed it is possible that other persons from across the chronological period might appear as more central in the study. These barons are represented in the very densely interconnected constellation of nodes to the right of Alexander III in Figure 2.38, which is easily identifiable as a kind of 'swarm' in Figure 2.35. The ego-networks of two other central figures from this time period, Alexander Comyn, earl of Buchan, and Patrick (III), earl of Dunbar, are also given in Figures 2.40 and 2.41 below, respectively. The same group of barons is also easily identifiable in both of these. As there is no way of easily remedying this error, the results for individuals in the reign of Alexander III need to be taken with a big grain of salt, particularly any mathematical calculations of centrality. However, these problems do not exist for the earlier period, and most of the sociogram accurately reflects the lordship and tenurial relationships of the individuals.

Figure 2.39. Alexander III and his barons, 1284 (H4/42/5)

Relationship: Lords (dominus) of various named barons (Tenurial & lordship relationship)

RELATIONSHIP	Lord (dominus)
SUBJECT	Alexander, son of King Alexander III (d.1284)
SUBJECT	Alexander III, king of Scots (d.1286)
FROM SOURCE	4/42/5 (*Foedera*, I, II, 638)
FIRM DATE	5 February 1284
DATING NOTES	5th day of February, AD 1283, regnal year 35

Associated People (40):

Listing items 1 to 40, page 1 of 1

ROLE	NAME
subject (relationship)	Alexander, son of King Alexander III (d.1284)
subject (relationship)	Alexander III, king of Scots (d.1286)
object (relationship)	Alexander Comyn, earl of Buchan (d.1289)
object (relationship)	Patrick (III), earl of Dunbar (d.1289)
object (relationship)	Mailse (III), earl of Strathearn (d.in or a.1317)
object (relationship)	Malcolm (I), earl of Lennox
object (relationship)	Robert Bruce V, lord of Annandale (d.1295)
object (relationship)	Donald, earl of Mar (d.1297×1305)
object (relationship)	Gilbert de Umfraville, earl of Angus (d.1307)
object (relationship)	Walter Stewart, earl of Menteith (d.c.1293)
object (relationship)	William, earl of Ross (d.1323)
object (relationship)	William, earl of Sutherland (d.1306/7)
object (relationship)	Magnus (IV), earl of Caithness and Orkney (d.1284)
object (relationship)	Duncan (III), earl of Fife (d.1289)
object (relationship)	John of Strathbogie, earl of Atholl (d.1306)
object (relationship)	Robert Bruce VI, earl of Carrick (d.1304)
object (relationship)	James Stewart (d.1309)
object (relationship)	John Balliol, king of Scots (d.1314)
object (relationship)	John Comyn, lord of Badenoch (d.1302)
object (relationship)	William Soulis, knight, justiciar of Lothian (d.1292/3)
object (relationship)	Ingram de Guines, knight
object (relationship)	William Murray, son of Malcolm Murray, knight (TRA3)
object (relationship)	Walter Murray, knight (TRA3)
object (relationship)	Alexander Balliol of Cavers (d.c.1311)
object (relationship)	Reginald Cheyne, father (d.c.1293)
object (relationship)	William Sinclair (d.1299×1303)
object (relationship)	Richard Siward, elder, lord of Keillie (d.a.1311)
object (relationship)	William of Brechin, knight
object (relationship)	Nicholas Hay (I), lord of Errol (son of Gilbert) (d.1305/6)
object (relationship)	Henry Graham (TRA3)
object (relationship)	Ingram Balliol (d.1299)
object (relationship)	Alan fitz Count [i.e. son of the earl]
object (relationship)	Reginald Cheyne, younger, lord of Duffus
object (relationship)	John Lindsay, knight
object (relationship)	Patrick Graham, knight (d.1296)
object (relationship)	Herbert Maxwell, son of Aymer Maxwell
object (relationship)	Simon Fraser (d.1291×92)
object (relationship)	Alexander of Argyll
object (relationship)	Angus, son of Donald of the Isles, lord of Islay (d. ca 1293)
object (relationship)	Alan, son of Rory of Garmoran

Figure 2.40. Tenurial and lordship of Alexander Comyn, earl of Buchan (d. 1289)
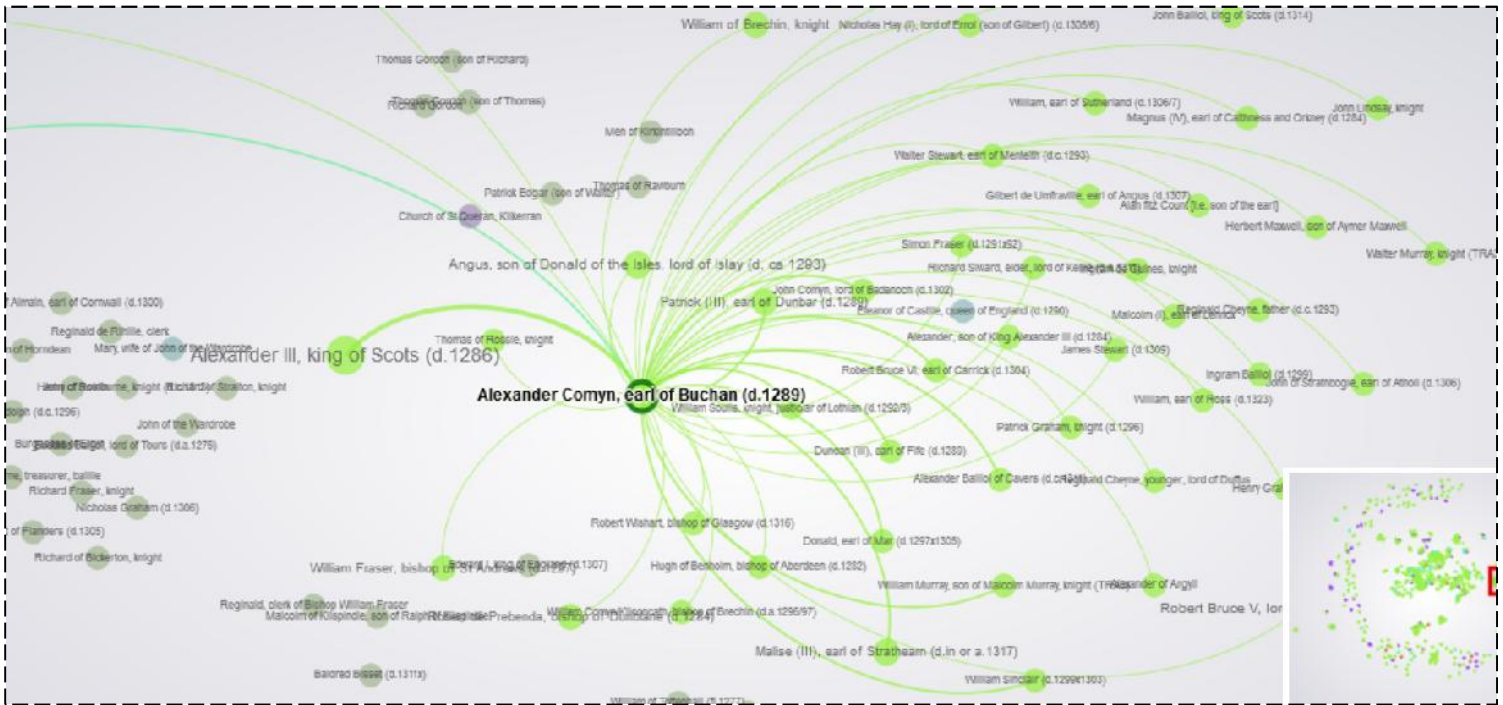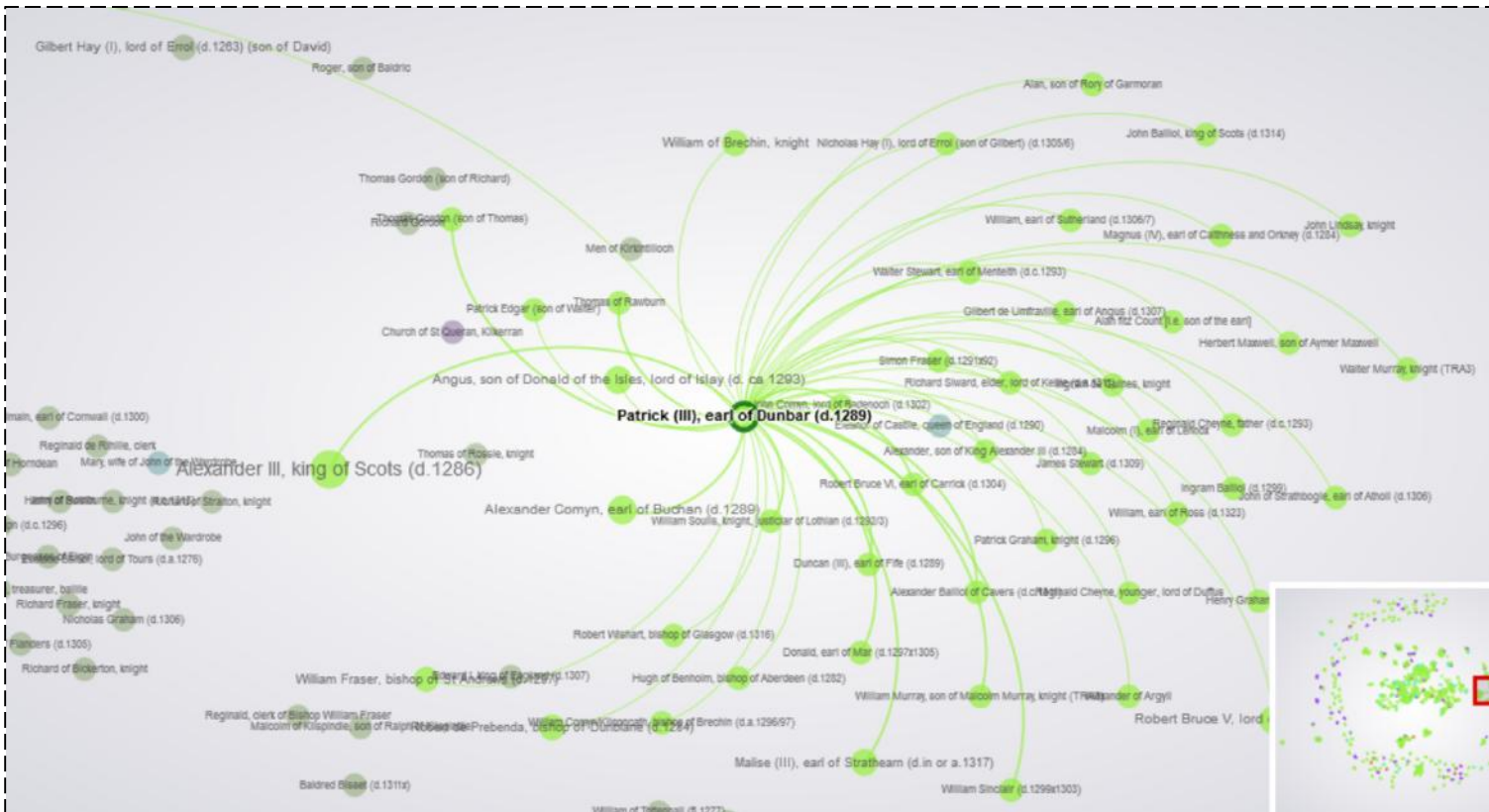

Figure 2.41. Tenurial and lordship of Patrick (III), earl of Dunbar

While our evidence of tenurial and lordship relationships explicitly mentioned is far from complete, Figures 2.42 through 2.45 are indicative of broader trends in the social relationships of the great landholders, including religious institutions. Figure 2.42 illustrates lordship relationships of Dunfermline Abbey, for example with a vassal knight with the first initial 'G', and various 'men of' the abbey, including one Constantine. We also see its mother-house relationship with its dependent priory, Urquhart, and tenurial links, especially on its lands in Lothian, Carberry and Smeaton. Similar relationships can be seen in Figure 2.43 for the bishops of Aberdeen. For the earls, we are more likely to see the relationships connecting them to their household officers. Figure 2.44 shows the tenurial and lordship ties of Gilbert or Gilla Brigte, earl of Strathearn, as patron of Inchaffray abbey, as husband (and lord) of Ysenda of Kinbuck, as well as ties to a local judge, thane, and others.

Figure 2.42. Tenurial and lordship relationships of Dunfermline Abbey
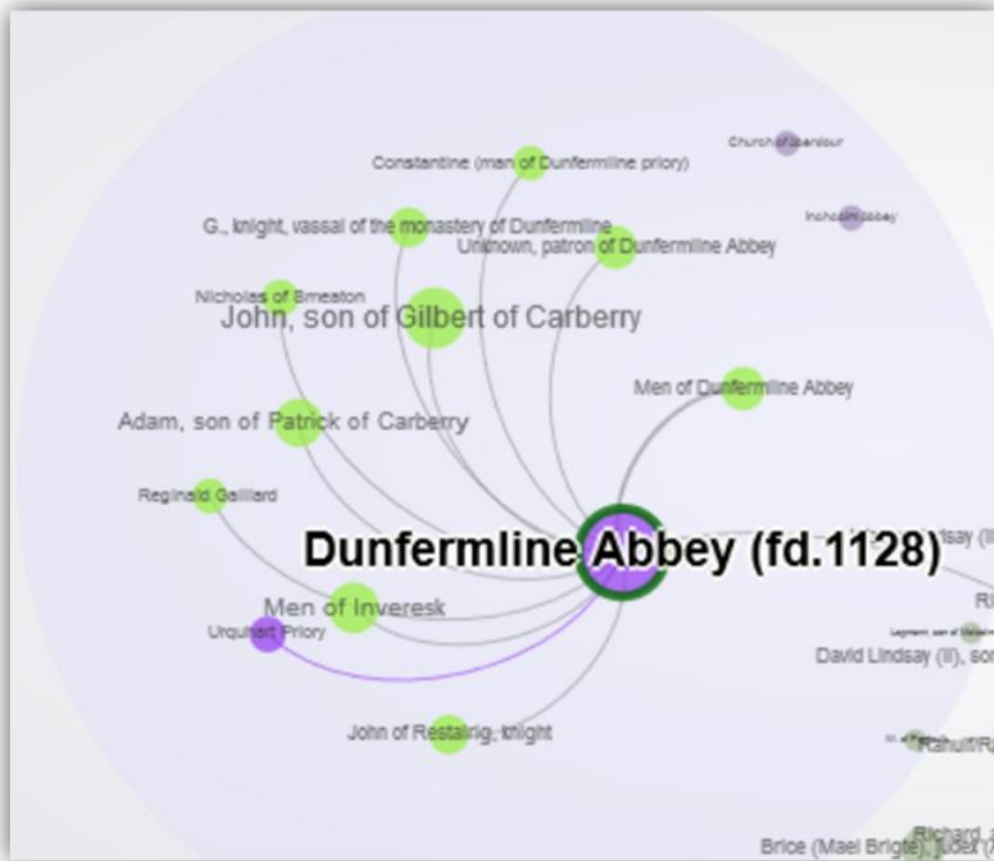
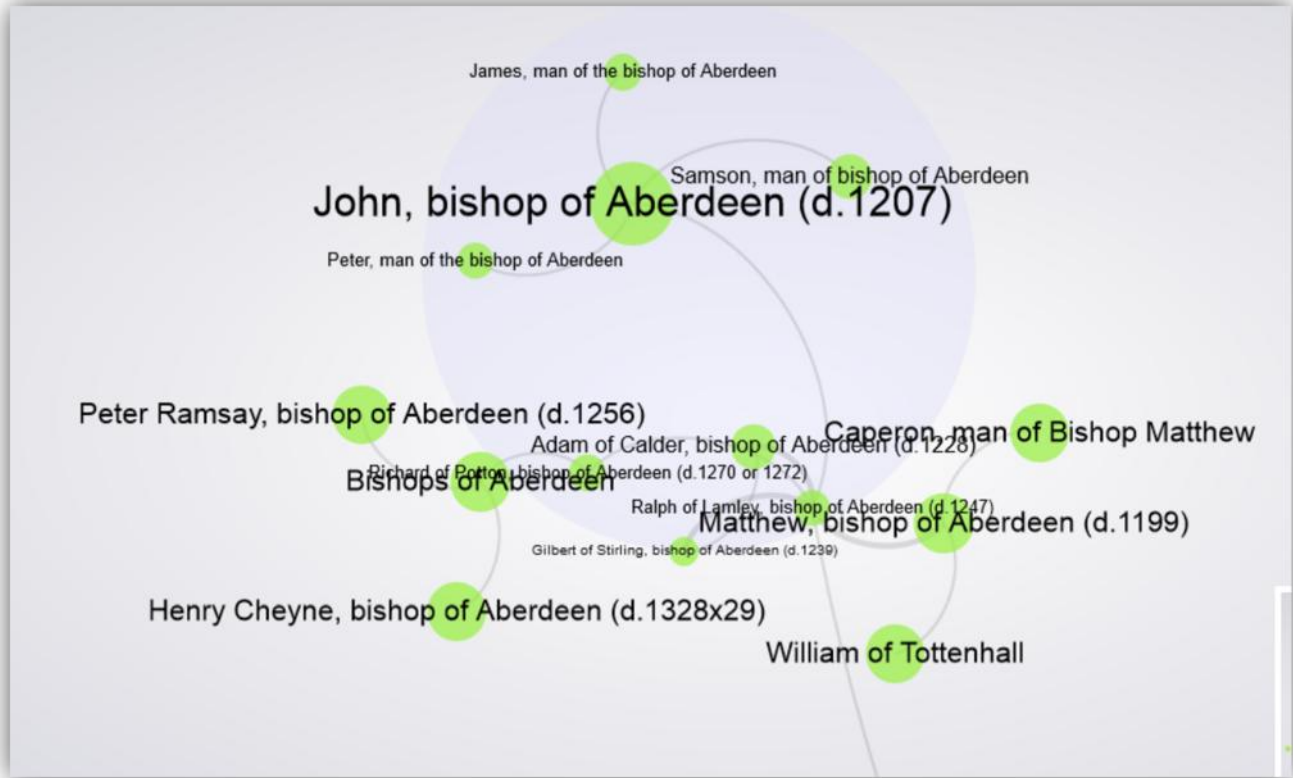Figure 2.43. Tenurial and lordship relationships of some bishops of Aberdeen
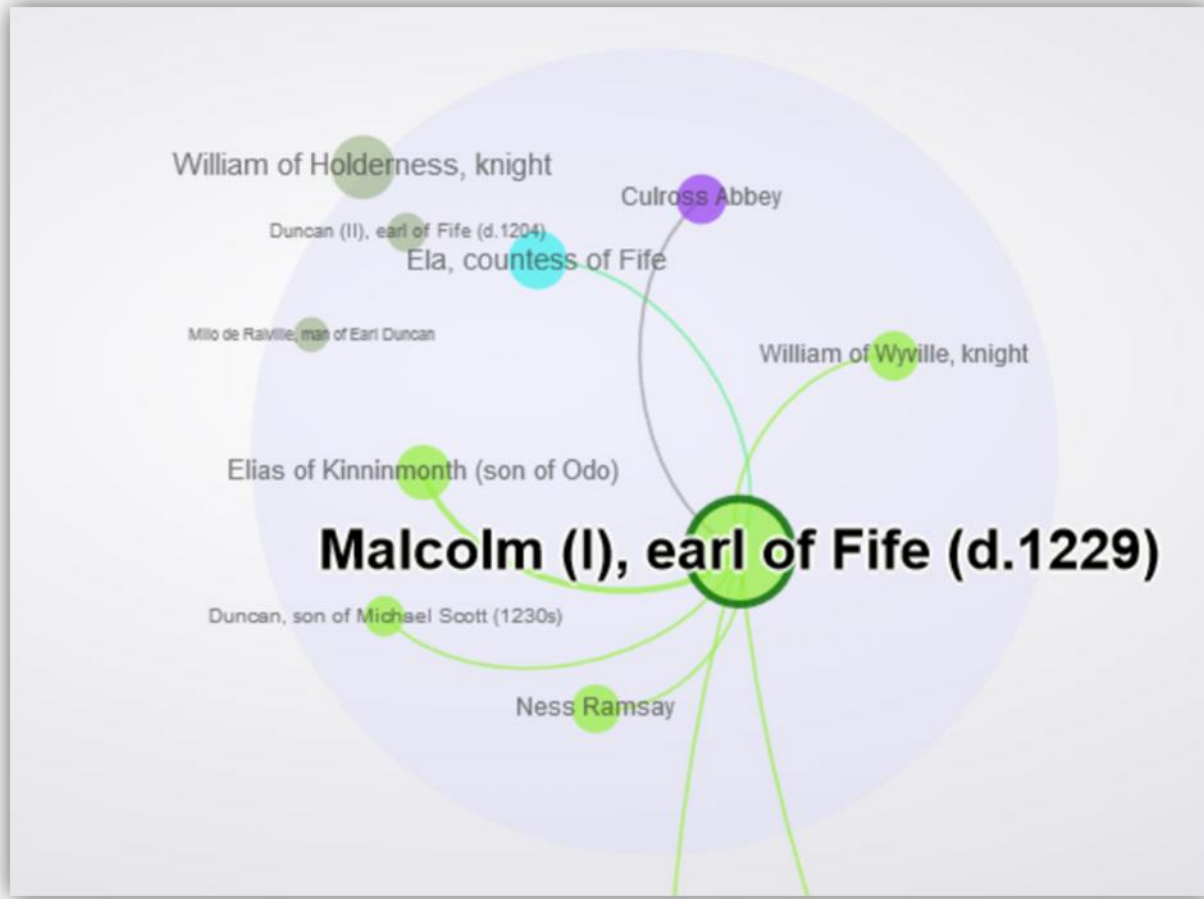

Figure 2.44. Tenurial and lordship relationships of Gilbert earl of Strathearn (d. 1223)

Figure 2.45. Tenurial and lordship relationships of Malcolm (I), earl of Fife (d. 1229)

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