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Fitting issues: The visual representation of time in family tree diagrams

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Abstract. Family tree diagrams are a specific type of visual representation of time that serve a range of purposes. This research considers their semiosic development across western cultures using cases from the earliest extant copies of the eighth century to current online versions. Cases are taken from the fields of religion, genealogy, history, anthropology, genetics, and popular culture. The paper begins with a general model of tree design based upon the linguistic representation of time, or tense, and then discusses in case study fashion, how each design was composed to support its use. Composition is discussed using the visual variables of the direction of time on the page, the key reference point, scale, alphanumeric and pictorial symbols, symbol positions, and the size, colour, tone, and texture of symbols and graphic elements. The paper argues that choices for the direction of time flow in a tree (e.g. left-to-right, right-to-left, top-down, etc.) depend upon many factors, which are the use of the diagram, the amount of information that needs to fit onto the page, patterns of reading and writing, aesthetic needs, the linguistic metaphor of descent, cultural values, and the "ideal-real" continuum that exists along the vertical axis for some types of graphics.

Keywords: family tree diagrams, genealogical diagrams, semiotic development

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Introduction

This paper discusses the semiosic development of family tree diagrams using cases from western cultures from the eighth century to the present, specifically focusing on the representation of time in the diagrams. For each case, the paper considers both the cultural use of a diagram and the choices made in creating it. In studying these diagrams, graphic production issues such as the direction of writing and the need to fit ever-increasing amounts of information into a tree require consideration as they affect the final design (e.g. in a pedigree chart, the number of parents doubles with each generation). Since the family tree is useful in many fields, cases from religion, genealogy, history, anthropology, genetics, and popular culture are used to describe how designers have adapted the design of the tree to meet their different needs.

Following Norbye (2008: 80), a family tree diagram is defined as "any arrangement of [family] … information which is not in straight text form". With the order of births or generations forming its primary structure, the family tree is a particular type of visual representation of time that is composed of the visual variables of the direction of time on the page, the key reference point, scale, alphanumeric and pictorial symbols, symbol positions, and the size, colour, tone, and texture of symbols and graphic elements. Family trees can visually represent group origins, member relationships, continuity, traits, and boundaries over time. This paper uses the representation of time in language through tense, as a basis upon which to describe the form of these diagrams. Although other researchers (Klapisch-Zuber 2000, 2003, 2007; Norbye 2008; Rosenberg, Grafton 2010; Watson 1934) have previously studied the designs of family trees, this paper is unique in describing them from a linguistic perspective and in considering designs up to the present.

The representation of time in language

The representation of tense in language is relevant to this research on visuals since similar meaning may be conveyed through different semiotic modes (Kress, Van Leeuwen 2001). As discussed by Mitchell (2006: 11), "a rich variety of temporal concepts present in language … are applicable to graphics". Thus, this discussion is useful for building a theoretical model for the visual representation of family relationships. Figure 1 presents a few examples of how temporal concepts in language can be explained using visual timelines.

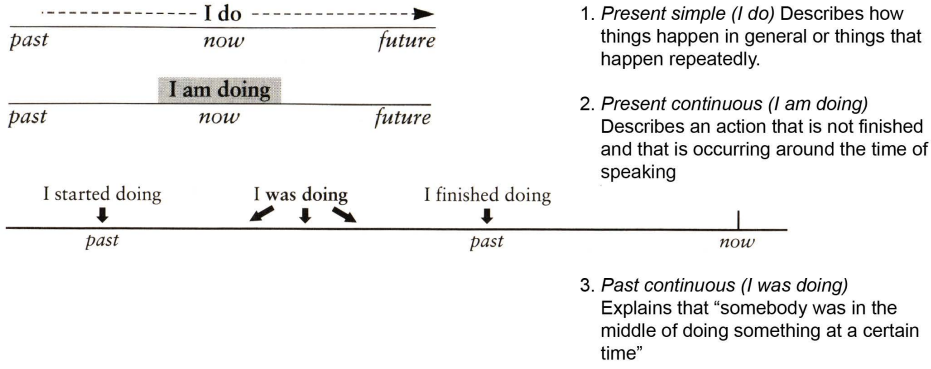


Figure 1. Examples of visual representations of linguistic time (Murphy 1994).

As discussed by many researchers (e.g. Traugott 1975; Mitchell 1980), the primary metaphor for the representation of time in many languages is that *time is space*. [Note that there are other metaphors of time that are more figurative and evaluative (e.g. *Time is a river*) but these are discussed only where relevant to a particular case.] As shown in Figure 1, this metaphor can be expressed both linguistically and diagrammatically. The illustrations in this figure take their shape from the structure of time as represented in language. In this figure, while the text on the right explicitly describes a temporal concept, the illustrations on the left are at once both "(1) directly interpretable and (2) dependent in their content, structure and order on the language-based statements on the right" (Mitchell 2006: 12).

According to Traugott (1975: 208), the primary linguistic structures for representing how events occur in time are *tense*, *temporal sequencing*, and *aspect*. Through *tense* we can relate whatever we are talking about (the topic) to the moment (the *now*) at which we are speaking. That is, tense is based upon "an imaginary timeline" along which "the speaker is the … reference-point" (Traugott 1975: 208). Using tense, the speaker can point to when events occurred or will occur in relation to the moment of speaking. Through *temporal sequencing*, a speaker can relate how two events, A and B, overlap, precede, or follow one another. It is through temporal sequencing that events are ordered in relation to one another, but not necessarily to the speaker. *Aspect* refers to how events occur in time, for example how long they endure or how they recur.

In language, the subsystems of tense, temporal sequencing and aspect provide the structures for speakers to locate events in time. According to Traugott (1975: 209), the three subsystems "are rarely, probably never, fully differentiated from each other

at the level of expression". As will be discussed, these structures are also applicable to the representation of time in family tree diagrams.

In addition to the triad of tense, temporal sequencing, and aspect, linguistic *modality* provides important information about a speaker's perception of how events occur in time. Palmer (1986: 16) defined modality as "grammaticalization of speakers' (subjective) attitudes and opinions". We place modal auxiliaries or modals (e.g. *shall/should, may/might, can/could,* and *will/would*) in front of verbs to express our level of confidence in the occurrence of events. A visual analogue of a modal in a family tree may be, for example, a dotted line that is drawn between a father and son to represent uncertainty over their relationship (e.g. "John may have been his father").

In developing a model of the visual representation of tense, it is also important to consider *temporal decentring*. When speakers use temporal decentring, they refer to events occurring in relation to a time other than the moment of speaking (Harner 1982). The following provides an example of temporal decentring: "When she was thirty, she had a daughter, and then three years later she had a son." The sentence requires the listener to change context from the time of hearing to the time "when she was thirty" and coordinate that with "three years later". In adult language, we coordinate speech time (*now*), event time, and reference time (Miller 1978).

Temporal decentring is also present in visual representations of time including family trees. In a visual representation of time, we coordinate four different times, which are reading (viewing) time, production (drawing) time, event time, and reference time. In more current family tree diagrams, the reference time is typically based upon the Gregorian calendar. For earlier family tree diagrams that contain no dates, we may need to estimate a reference time based upon the production style and represented events.

The representation of time in visuals

Given the above descriptions, visual representations of tense and modality may include at least the following features, with the first three being more obligatory than the last three. This model is developed from Mitchell (2006):

(1) something that points to the *main reference point* (which could be *now* – the time of viewing – or another, decentered time);
(2) something that points to *then* (the time of other represented events);
(3) something that differentiates the *past* from the *future* (or times *before* and *after* the main reference point);

(4) if a visual is to represent *temporal sequencing*, it needs to include at least two events;
(5) if a visual is to represent any *aspects* of an event's occurrence, it needs something to represent the event's duration, how the event is bounded or not, or whether the event recurs or not;
(6) if there is *less certainty* about whether an event is happening, has happened, or will happen, the visual needs something (a visual modal) that differentiates the event from those that are more certain.

Figure 2 illustrates how the above features can appear in a descent tree, which represents all descendants of a particular person or couple. In this example, the *main reference* point is the family patriarch, John Jacob Astor, with his wife, Sarah Todd, placed beneath him. Together, they occupy the leftmost position of the diagram, where they are centred alongside their offspring. In a descent tree, the main reference point is typically a decentred time. Also, a descent tree contains a hierarchy of events, which is formed at the first level by the creation of each new generation as a whole (marked as *Event 2* in the figure), and then by the births within each nuclear family. These events are visually pointed to by their horizontal and vertical positions relative to the main reference point. In the example, groups of offspring within each nuclear family are visually united by vertical lines.

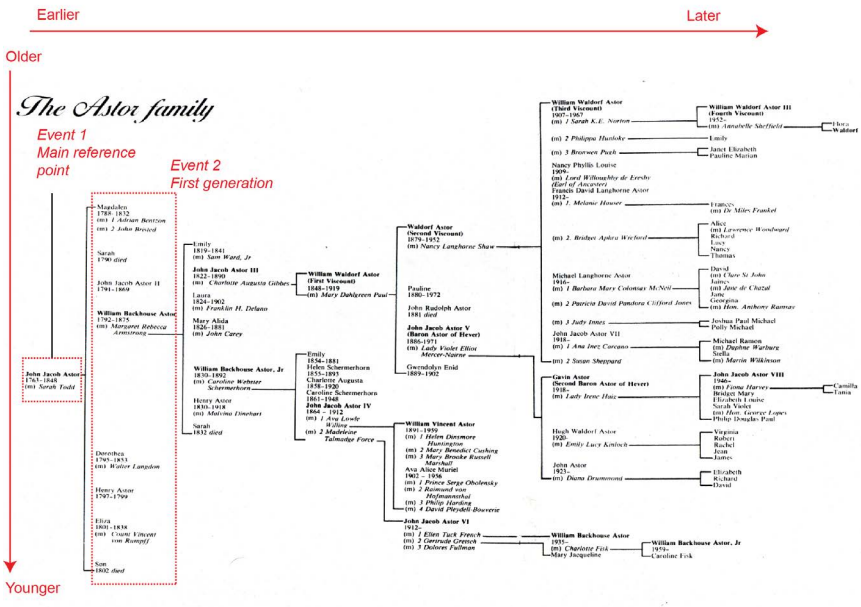


Figure 2. Horizontal family tree (Cowles 1979).

Temporal sequencing of the generations is marked by each generation's position from left to right. In contrast, the sequencing of births within each nuclear family is marked by the members' positions from top to bottom. The overall structure of events follows the pattern of western writing. *Aspect* in a family tree can represent years of a person's life, how members' lives overlapped, and boundaries of an extended family over generations. In this example, years of lives are represented with calendar years, not graphics. For some members, the years are not supplied. The boundary for the family as a whole is represented through the visualization of seven generations of sons carrying the Astor name. Each of these men is represented in bold text to highlight transmission of the name. Modality is not visually represented since nowhere in the tree is any information presented as being less than certain.

While the visual representation of members in family tree diagrams usually limits itself to issues of temporal sequencing and not aspect, there are rare cases in which aspect is visually represented, which may be useful for seeing how long relatives lived. An example is presented in Figure 3, which represents John Quincy Adams' pedigree. A pedigree differs from a descent chart in that it shows all ancestors of a person.

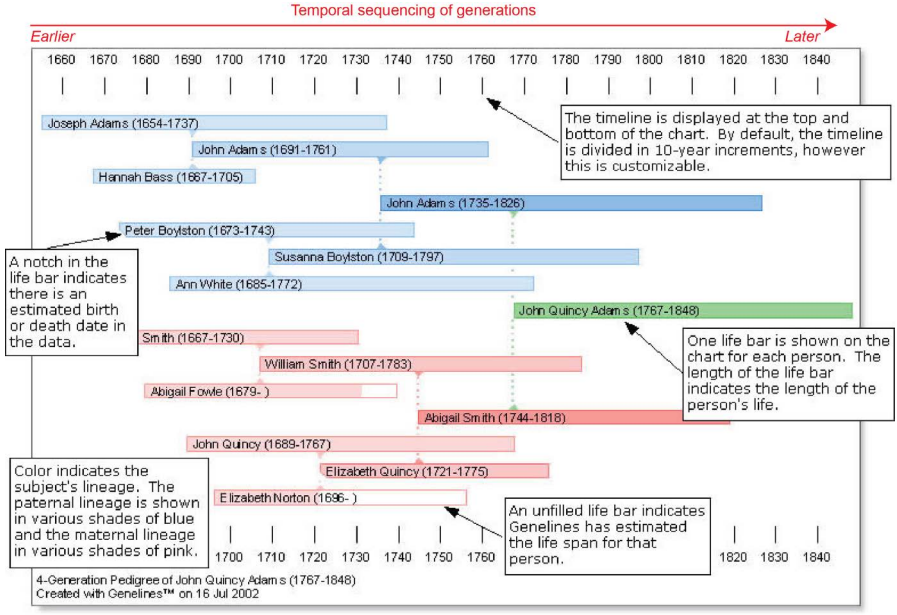


Figure 3. Genealogical tree with a time line (Pedigree of John Quincy Adams). (Progeny Software Inc. 1998–2002).[1]

[1] Progeny Software Inc. 1998–2002. Pedigree Chart. Retrieved from http://www.progenysoftware.com/genelines_samplecharts_pedigree_description.html on 10 May 2004.

Figure 3 also contains a visual representation of modality in that there is less certainty about the life spans of two ancestors: the certain times of their lives are represented with a solid bar while the estimated times are represented as hollow.

In a genealogical tree diagram, the expression of future action is unusual but could appear when a designer is making predictions (e.g. "Kate's firstborn, whatever its gender, will be the next monarch"). Figure 4 presents an example of a family tree diagram that is unusual in its visual emphasis on the future ("Charles *will rule* next and then the baby prince *will rule*"). In this diagram, the most likely future monarchs are visually separated from the other family members. The primary line of descent is highlighted with thicker lines, and the order of inheritance is represented with numeric values coloured red. In the diagram, the representation of time as space is emphasised through the use of perspective in which older relatives are illustrated as being physically further away from the present and future, and clearly out of the running for holding the throne.

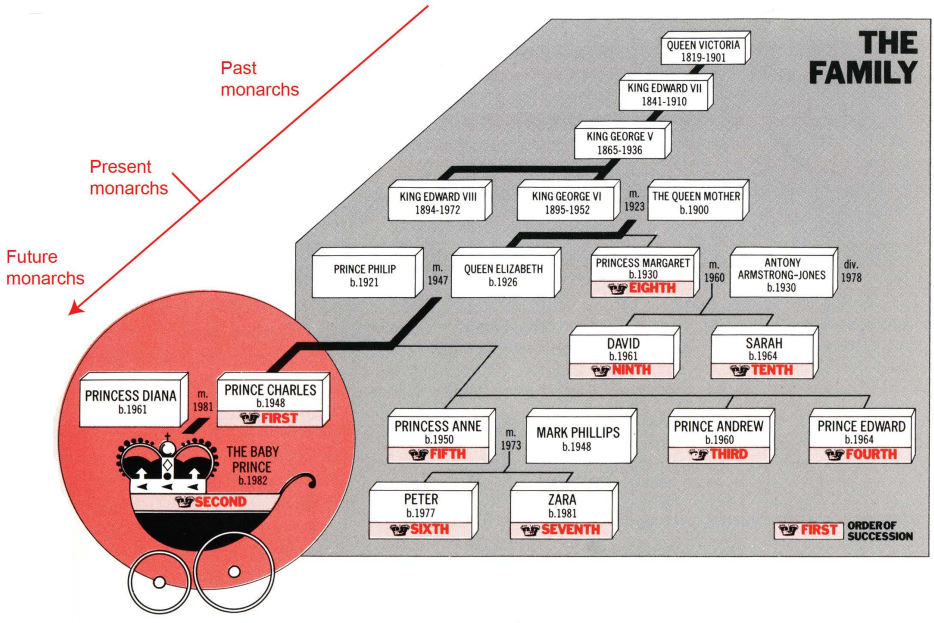


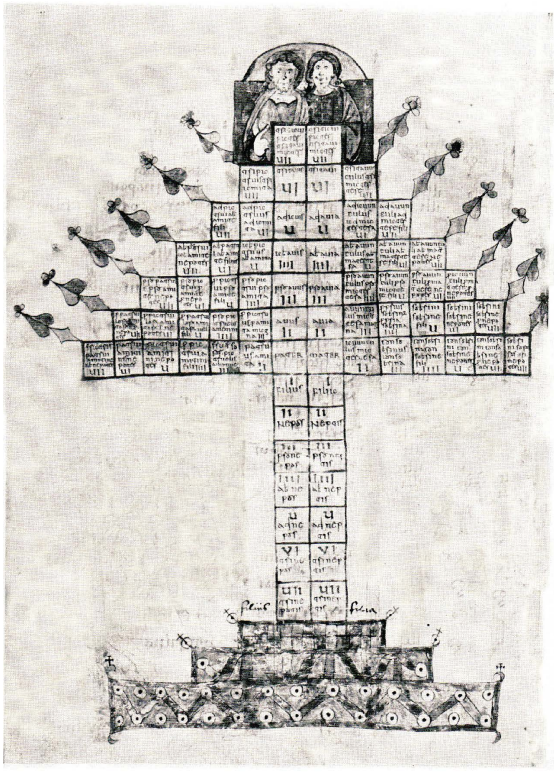
Figure 4. Example of the visual representation of future actions within a family tree (in Holmes 1984: 57).

Now that a model for the visual representation of time in family tree diagrams is presented, it is useful to see how the design varies with different uses. Discussion begins with a Roman tree of family relationships known as the *Arbor Juris*, and then

moves to a copy of the earliest known genealogical tree, a medieval illustration of Christ's ancestry.

The *Arbor Juris*

The *Arbor Juris* was a table of family relationships or consanguinity that suggested the contour of a tree (see Figure 5) (Watson 1934). It was available from at least the eighth century and was used when there were questions about inheritance or marriage. The *Arbor Juris* presented is from an eighth-century Brussels copy of the famous "*Etymologiae* (or *Origines*)" written by Isidore of Seville in the seventh century (Watson 1934).



The children are the reference point for moving back in time

5G grand-father	5G grand-mother
4G grand-father	4G grand-mother
3G grand-father	3G grand-mother
2G grand-father	2G grand-mother
Great grand-father	Great grand-mother
Father	Mother
Son	Daughter
Grand-son	Grand-daughter
Great grand-son	Great grand-daughter
2G grand-son	2G grand-daughter
3G grand-son	3G grand-daughter
4G grand-son	4G grand-daughter
5G grand-son	5G grand-daughter

The parents are the reference point for moving forward in time

Figure 5. The *Arbor Iuris* (*Juris*). Brussels, Bibliotheque Royale, MS. II. 4865, fol. 265v (in Watson 1934: Plate XXXV).

At the top of the *Arbor Juris* in Figure 5 are male and female torsos that rest over their respective halves of the tree. Watson (1934) described another example in which the word *Adam* appeared at the top, representing how all families begin with him.

The numbers in the *Arbor Juris* represent degrees, or a scale, of relatedness among kin. Along the vertical axis, these numbers also act as bidirectional timelines. There is one line that begins with the parents (*pater* and *mater*) then counts forward in Roman numerals through seven generations of offspring. The other line begins with the children (*filius* and *filia*) then counts back through seven generations of parents. The outer parts of the table represent progressively more distant relatives.

Since the central axis of the *Arbor Juris* is a type of scale, it is useful to discuss scales here. An understanding of scales helps to reveal some of the problems that early designers faced in creating tree diagrams. To begin, Stevens (1951: 22) defined a scale as "a rule for the assignment of numerals […] to aspects of objects or events". He defined four types of scales: nominal, ordinal, interval and ratio. In a nominal scale, numbers are used merely to label items, but not order them. Since nominal scales are not used in the *Arbor Juris* or in family tree diagrams generally, they will be discussed no further. In an ordinal scale, items are ranked from less to more (or vice versa) with no specific measurement interval between the items. Along an interval scale, items are arranged from less to more by equal measurements but have no true zero point. According to Stevens (1946: 679), "The zero point on an interval scale is a matter of convention or convenience […]". Finally, ratio scales are the same as interval scales except that they have a true zero point.

Family tree diagrams are irregular with respect to time in that human generations are of unequal length and members of earlier generations can be younger than those of later generations. Nonetheless, the trees can be created using quasi-interval or ordinal scales of generations, and can contain the notion of a ratio scale. The choice of scale will of course affect the overall design. If a designer follows an ordinal scale, then descendants can simply be represented as branching forever from their parents, and generations do not need to align. This strategy was followed by designers of early medieval family tree diagrams, which are discussed later. If a designer envisages the movement of generations along an interval scale, however, then all members of a particular generation must align with one another. This structure is followed along the central vertical axis of the *Arbor Juris* and in modern trees. The *Arbor Juris* that listed Adam as the first ancestor provided the idea of a ratio scale.

Since the *Arbor Juris* represented how relationships are structured within any family and not a particular family, the diagram can be said to represent *simple present tense*. This tense describes how things happen in general. It was probably not until the advent of the anthropological tree diagram, which will be discussed later, that simple present tense was used again to represent kinship.

Genealogy of Christ in the *Commentary on the Apocalypse*

According to Klapisch-Zuber 2003, the oldest extant western genealogical diagrams are found within copies of an illustrated codex called the *Commentary on the Apocalypse*, which was created in 776 by Beatus of Liébana, a monk. In the preface of the *Commentary*, Beatus states that it was made for "the edification of the brothers in their studies" (Williams, J. 1994: 19). Although containing the work of many writers, the *Commentary* was largely influenced by an earlier commentary, the North-African Tyconius, from about 380–385.

Famous for its illustrations of the apocalypse, the *Commentary* also contained genealogies of Christ and other Biblical figures such as Noah and Abraham. Thus, the first western genealogies began as illustrations of written text (Klapisch-Zuber 2003). In manuscript form, the genealogies covered 14 pages and included about 600 names. Twenty-six manuscripts or fragments are available (Williams, J. 1994).

Figure 6 presents Abraham's family tree in the Saint-Sever copy of the *Commentary*. As shown, the tree consisted of linked circles or medallions. It is likely that this design was used prior to the *Commentary* since Pliny (23–79 AD) described a similar system that Roman families used in their homes (Williams, J. 1994).

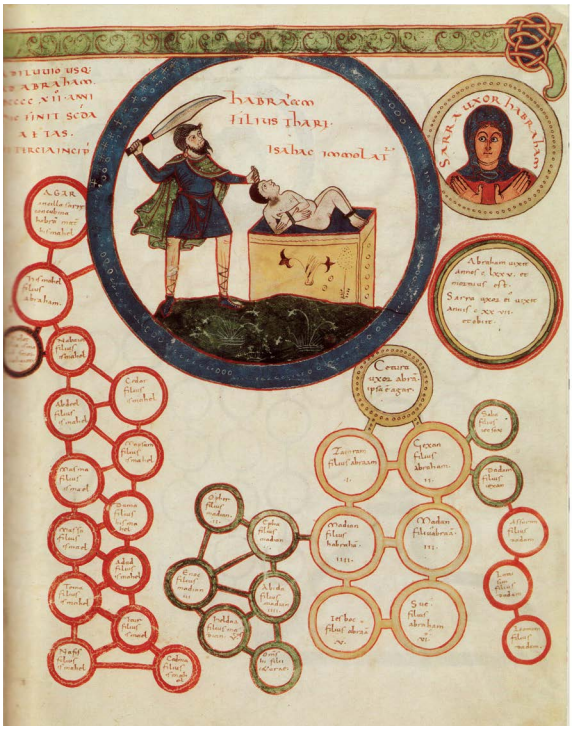


Figure 6. The family of Abraham from the Saint-Sever Beatus, 11th century (Paris, *Bibliothèque nationale de France*, lat. 8878, folio 8).

Before discussing the design of the genealogies in the *Commentary*, it is helpful to discuss why the Hebrew people kept genealogies at all. The genealogical lists in the Bible served to maintain the group's identity and regulate behaviour. Alvarez-Pereyre and Heymann (1996: 156) noted that although the Hebrew people have existed for at least forty centuries, they had their own state for little of this time (between 1033 and 586 BC, between 165 BC and 70 AD, and since 1948). Instead of keeping their group together through land ownership, they "dominate[d] the temporal dimension" through family identity with the history of the people. Jewish families kept their own genealogies, too:

> Genealogical lists, providing the necessary embodiments of family memory and of an individual's social status, were widely used for many centuries until early in the Christian era. Indeed, such memorial lists were still recited in the Middle Ages by the Jewish communities in the Middle East when a death was announced in the family, during the first month of mourning and at Yom Kippur. This type of genealogy extended over six generations on average, and formed an obligatory part of every juridical discussion relating to marriage or divorce, filiation or inheritance. (Alvarez-Pereyre; Heymann 1996: 157)

In their effort to emulate the style of the Old Testament, writers of the New Testament found it necessary to include a genealogy of Christ: the gospel of Matthew lists 41 ancestors while the gospel of Luke lists 76. In the *Commentary*, the visual combining of Christ's genealogy with the genealogies of the Old Testament created an important visual continuity between the texts.

Returning to Figure 6, the ancestors of Christ run across the top of the page while other descendants of those ancestors run vertically down the page. The design generally follows the structure of writing with Christ's ancestors moving from earlier on the left to later on the right. However, the design in this example used a variety of visual strategies to fit all of Abraham's descendants into the image and represent different relationships. Figure 7 provides a schematic of the strategies. As shown, position is the most important visual variable with Abraham's descendants organized along ordinal scales. At the top of the tree, Abraham's partners are placed so that their symbols touch those of his. Further, Abraham and his partners are placed in central positions above their offspring to represent their close relationships. This positioning has the added benefit of reducing eye movements when viewing a nuclear family. Brothers are placed in birth order vertically down the page following several strategies: if enough space is available, the brothers are placed in a vertical line from oldest at the top to youngest at the bottom; if less space is available, the brothers are placed in a zig-zag, left-to-right pattern down the page; if even less space is available or the designer believes that readers will have difficulty following a pattern, brothers' birth-orders are numbered. To further clarify relationships,

the designer has supplied visual redundancy through explicit labels (all offspring are labeled as sons or daughters of someone), colour (each group of offspring from a particular parent has its own colour), webs of lines (e.g. Ishmael's sons are connected by a lattice), pictorial symbols (Abraham and Sarah are highlighted with images), and unique borders (Abraham and his two wives are each highlighted with thicker, pattern-filled borders). The design also includes two sets of numerical information by which to place Abraham and Sarah in time. Firstly, on the right beneath Sarah's picture are the lengths of Abraham and Sarah's lives. Next, in the top left corner, Abraham is said to have lived 912 years after the flood, when the third age of the world began. Thus, the flood provides the key reference point for the image. In Medieval times, before the development of the *Anno Domini* (AD) system for dating years, Saint Augustine created a system known as the six ages of the world. The first age began with the creation of Adam and ended with the flood. The second age went from the flood until Abraham, whose birth marked the beginning of the third age. The fourth age began with King David and lasted through the Jewish people's time in Babylonian captivity. The fifth age marked the return of the people, and the sixth age began with Christ.

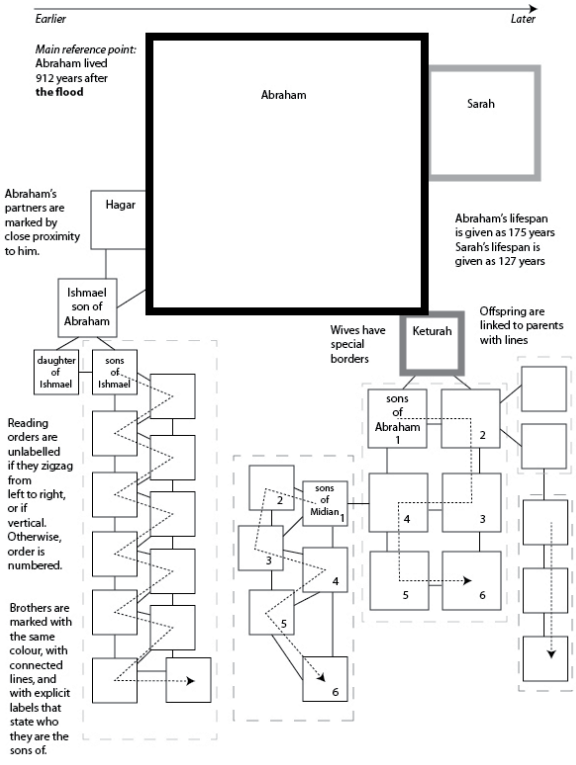


Figure 7. Schematic of Abraham's descendants in the Saint-Sever Beatus.

The Tree of Jesse

Another important style of family tree emerged in the medieval period with the Tree of Jesse. This design used the iconography of a living tree, placing ancestors along the trunk of the tree from earlier at the bottom to later at the top. Although its original purpose was to represent the coming of Christ as prophesized in Isaiah 11, Trees of Jesse sometimes included Christ's full ancestry.

Figure 8 presents an early example of a Tree of Jesse made of stained glass in about 1144 for the St-Denis monastery in Paris. Although much of this window has required reconstruction, art historians believe that it generally follows the original design (Watson 1934). This particular example is discussed here because it was perhaps the first to be made available to the public (Rudolph 2011). In addition, its monumental size, creation in stained glass, and symmetrical arrangement made it highly attractive and memorable. Interest here is focused not on finding the first representation of the Tree of Jesse, which is probably an impossible task, but on considering how its design came to serve as a visual model for many Medieval genealogies. Medieval Trees of Jesse were made in manuscripts, sculpture, painting, and stained glass.

At St-Denis, the Tree of Jesse window was just one of many monumental stained-glass windows created under Abbot Suger that visually represented scriptural concepts. The abbot rebuilt portions of this monastery from about 1125 to 1144 resulting in the first Gothic structure ever built. While Suger may have had the windows designed to enhance the fame and wealth of the monastery, they also served as educational vehicles for both the monks and parishioners. Rudolph (2011) noted that the windows were created at just the time when literacy was becoming more common. The new religious art, including the stained-glass Tree of Jesse, gave people a text to read.

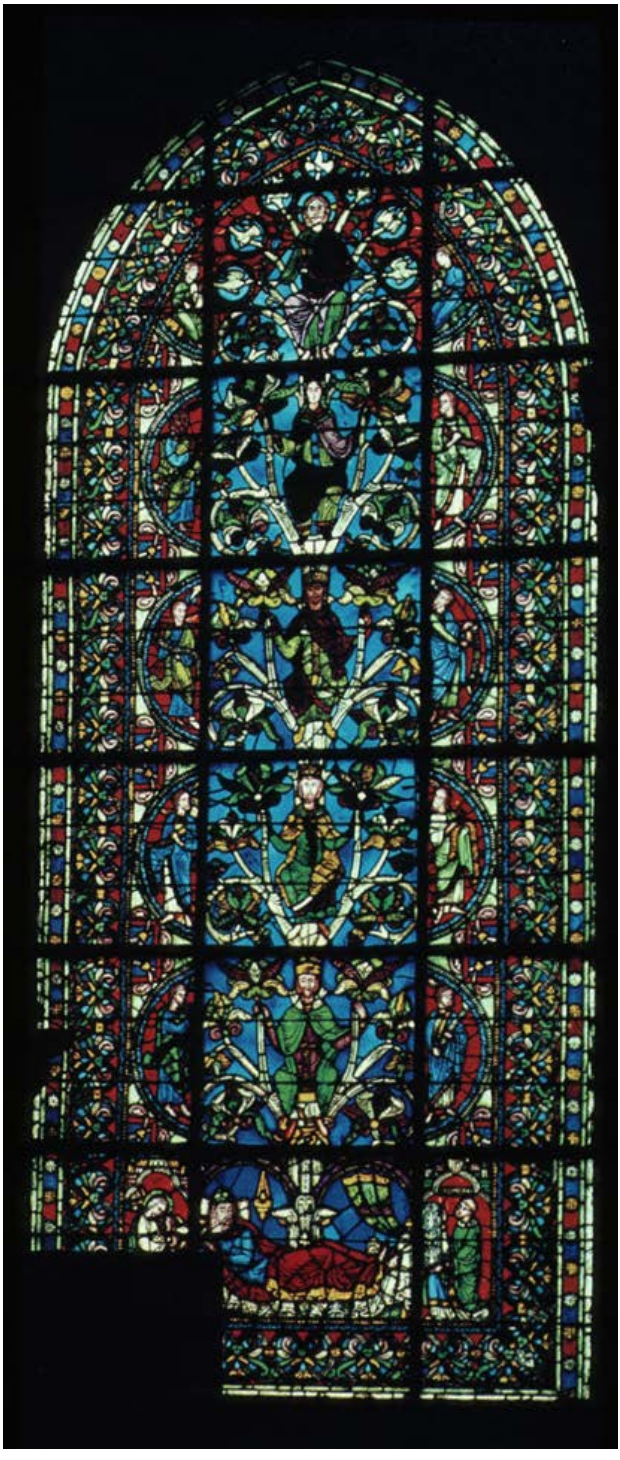


Figure 8. Tree of Jesse window (St-Denis, Chapel of the Virgin, ca. 1144).

As mentioned, the basis for the Tree of Jesse's design was Isaiah 11, but specifically as written in the Medieval Latin Bible (Watson 1934: 2):

> *Et egredietur uirga de radice Iesse, et flos de radice eius ascendet. Et requiescat super eum spiritus Domini: spiritus sapientiae et intellectus, spiritus consilii et fortitudinis, spiritus scientiae et pietatis; et replebit eum spiritus timoris Domini.*

The passage says that an *uirga* (branch) will come forth from the *radix* (root) of Jesse, and from it a *flos* (flower) will ascend. The spirit of the Lord will bestow upon this flower the seven gifts of "wisdom, understanding, counsel, fortitude, knowledge, piety, and fear of the Lord" (Rudolph 2011: 404). The *uirga* should be understood as the Virgin Mary, and the *flos* as Christ (Watson 1934).

As shown in Figure 8, at the base of the St-Denis tree is Jesse, the father of King David, who is reclining and has a tree trunk growing out of his body. Above him are three kings who are placed one above the other in equal amounts of space. Enclosing each king are mandorla-shaped branches that the kings hold in their hands. A mandorla (Italian for almond) is a marquee shape that was traditionally placed around the bodies of people of special dignity or holiness. Above the kings is the Virgin Mary, who is also holding branches, and above her is Christ, who is placed within a flower at the top of the tree. Christ is surrounded by seven doves that represent the seven gifts bestowed upon him by God as written in the prophecy. Prophets line each side of the tree. Together, the group of Jesse, the three kings, Mary and Christ form a lineage that is graphically linked by the branches of the tree.

To create the idea of a genealogy, the Tree of Jesse at St-Denis visually relied upon the rhetorical device of *synecdoche*, which is defined as the use of a part of something to stand for the whole thing. In this design, Christ's complete lineage is not shown but instead is represented through the six figures. While the original intent of the design was to represent the prophecy and not Christ's ancestry, clearly some designers saw the possibility of including more and sometimes all ancestors within it.

Just as maps cannot show everything about a particular city or landscape but instead include only that information which is needed for a particular purpose, the Tree of Jesse does not show everything about Christ and his ancestors. Instead, it includes only that information which is needed to prove Christ's identity as a royal person whose birth was prophesized in the Old Testament, and who was given special gifts from God. The tree represents the genealogical path along which the prophecy of Isaiah became a reality. Christ's literal placement within a tree represents his "blood" ties to the Virgin Mary and her royal ancestors going back to Jesse. The feature of "royalty" is thus flowing through the branches. Around Christ's body are placed seven doves that represent the seven gifts he received. Thus, Christ is

represented as having the personal characteristics of wisdom and so on. This same graphical mechanism of either placing symbols next to a person or highlighting the person in some way (e.g. with coloured text) is used in modern trees to represent the inheritance or acquisition of a particular talent or condition. In modern trees, typically more than one family member is represented as having particular attributes since the point is to show how the attribute is part of the family system. In the Tree of Jesse, however, only Christ is highlighted. Lastly, Christ's placement at the top puts him in a position of power, where all others can look up to him. This position would have been accentuated by the tall lancet window of the church.

Symmetry is another important design feature in the St-Denis Tree of Jesse as it helps to make the design aesthetically pleasing and allows each generation to appear along a continuous and equal portion of the tree. This alignment allowed the tree to appear highly structured.

Genealogy of Christ by Peter of Poitiers

In the late 12th century, another arrangement of Christ's genealogy emerged. Designed by Peter of Poitiers, a cleric in the cathedral school of Paris, it was most likely drawn on parchment roll, rather than in a codex (Norbye 2008), and was created for the education of poor and illiterate monks. Like Beatus's *Commentary* described earlier, it included Christ's genealogy as well as those of other key Biblical figures. A key improvement in the design was its use of an ordinal scale that placed members of a generation within the same horizontal space. Further, the design followed reading order, with the oldest ancestors, Adam and Eve, at the top and later ancestors moving progressively down the roll. According to Klapisch-Zuber 2003, this design marked the beginning of the modern genealogical diagram. Figure 9 presents Abraham's genealogy from an English copy of Poitiers' work in book form made in the early 13th century.

In this example, the ancestors are placed within circles, named, and represented with drawings of their faces and upper torsos. Detailed text accompanies many of the individuals presented. According to Klapisch-Zuber 2007: 294, this system of circles connected by lines came to dominate "scholastic teaching and genealogical presentations in the last two centuries of the Middle Ages … [and] came to be shared by all of Europe".

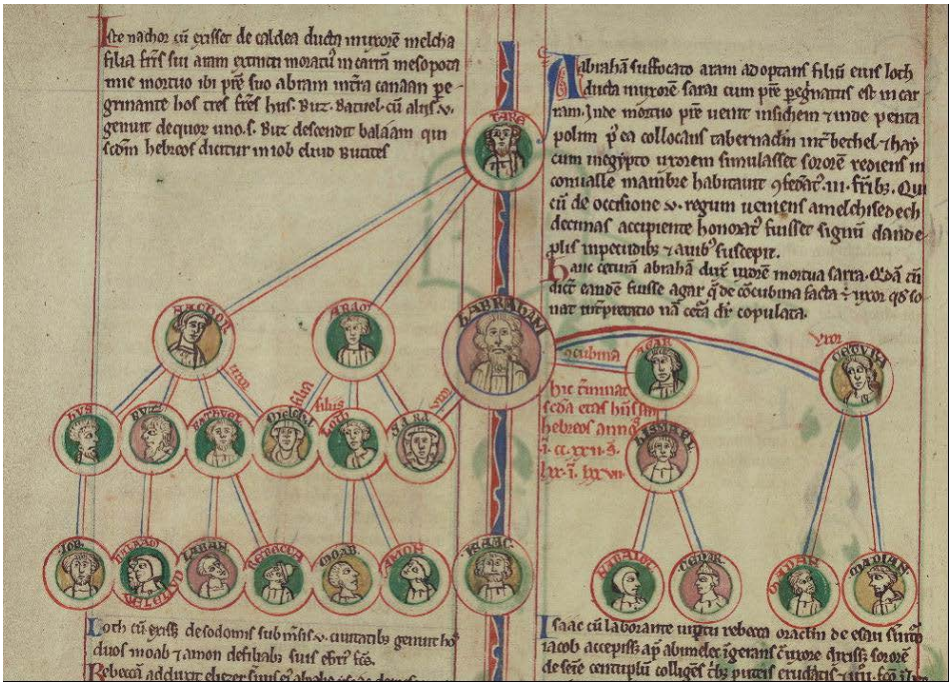


Figure 9. English copy of Peter of Poitiers' genealogy of Christ (Walters Ms. W.796, The Walters Art Museum 2013[2]).

In addition to the use of position to aid reading and represent family relationships, the designer used colour and changed the direction in which the ancestors faced. Along horizontal rows, the circles are alternately filled with different colours to visually distinguish between them. Many of the siblings are drawn so that they face one another and even look up towards their parent to represent their close ties. Other cultures have also used the direction of facing to indicate how to read a text. In Egyptian writing, for example, the facing of creature-based hieroglyphics (e.g birds, lions) determined the direction in which to read (the Egyptians usually wrote from right to left and so the creatures faced towards the right).

Writers came to add other historical information to Poitiers' roll such as successions of popes and Roman and Western emperors, creating universal chronicles (Norbye 2008). While a key benefit of rolls was their ability to represent continuity, a useful roll could only be so long. Universal chronicles were typically ten to fifteen

[2] Retrieved on 18 October 2013 from http://www.thedigitalwalters.org/Data/WaltersManuscripts/html/W796/.

metres long, and were more likely to be used for display than for easy referencing (Norbye 2008).

The lineage of Maximilian I, Holy Roman Emperor

The concept of a lineage as written in the Bible and its subsequent representation in the form of tree diagrams obviously resonated with Medieval people as genealogies came to structure European histories and people's social and political lives. In the absence of other structures upon which to describe and build history as well as explain their origins, people took hold of the genealogy (Klapisch-Zuber 2007).

Regarding these genealogies, Spiegel (2001: 47) wrote, "Written above all to exalt a line and legitimize its power, a medieval genealogy displays a family's intention to affirm and extend its place in political life". At the time, nobles hired "respectable scholars" to produce "genealogies that traced their ancestors back to ancient Rome or Egypt… Every dynasty put its lineage on show, from the Habsburgs to the rulers of Saxony" (Rosenberg, Grafton 2010: 48).

Figures 10a and 10b present an example of an extravagantly-designed medieval lineage, that of Maximilian I, King of the Romans from 1486 and Holy Roman Emperor from 1493 up to his death in 1519. Created by Albrecht Dürer in about 1515, the genealogy was the centrepiece of a three-meter high engraving known as the Triumphal Arch. For this genealogy, the researchers "At all costs … had to show that the Habsburgs descended from an independent line as venerable as that of the kings of France and the rulers of ancient Rome" (Rosenberg, Grafton 2010: 49). It was produced for display in city halls and palaces.

In an arrangement similar to that of the Tree of Jesse, Maximilian I sits at the top of his ancestors in a position where viewers would see him first and look up to him (Figure 10a). From the base of the design (Figure 10b), his ancestors move up in a boustrophedon (zigzag) pattern beginning with the matrons Francia, Sycambria, and Troia, who symbolize his mythical Frankish roots. His first "known" ancestor is presented as Clovis, founder of the Merovingian dynasty and Catholic (Madar 2003). Following the writing of Geoffrey of Monmouth, the Franks were believed to be "descendants of fugitives from Troy and founders of the Kingdom of Sicambria" (Klapisch-Zuber 2007: 302). The founding King of Britain was said to be Brutus of Troy. While the specific ancestors are visually represented with great certainty, the change to the females acts as a visual modal of uncertainty.

In addition to its goal of preserving Maximilian's memory, this image was designed to create the impression that Maximilian's rule was the fulfillment of a prophecy. Just as Christ appears in the Tree of Jesse as a fulfillment of Isaiah's

prophecy, Maximilian is represented as coming from the root of Troy and a line of Frankish kings. It appears that Maximilian was destined to take the roles of king and Holy Roman Emperor.

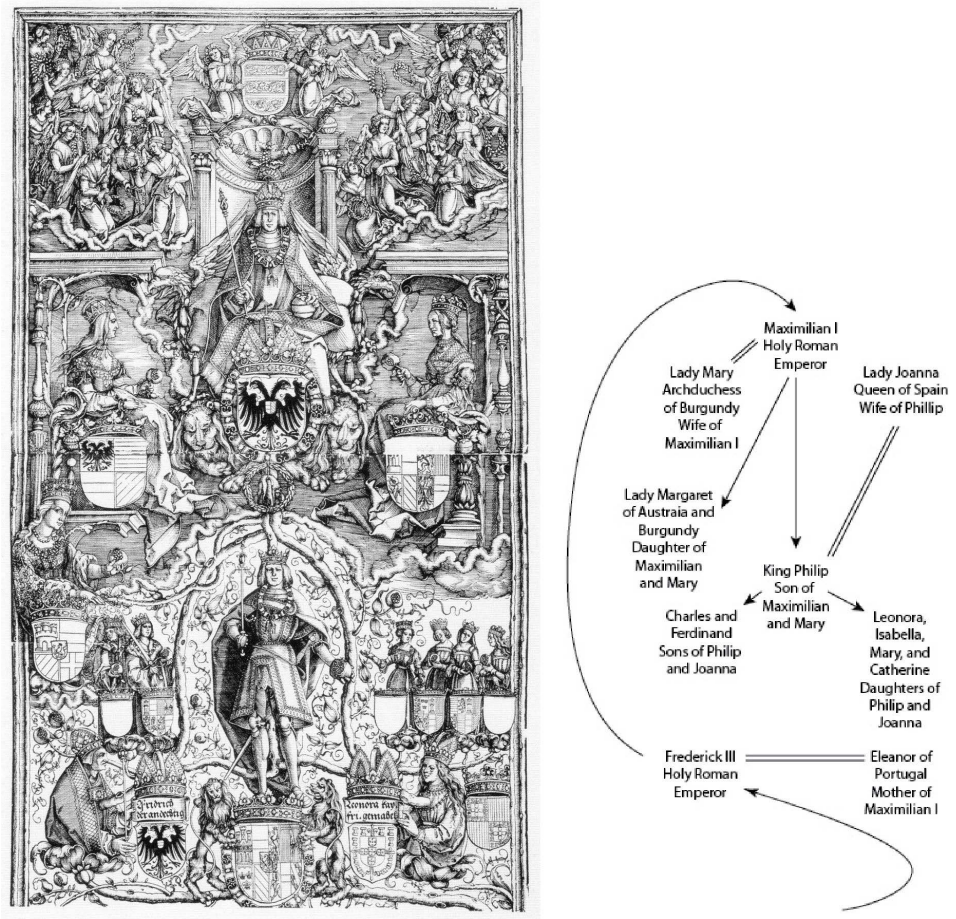


Figure 10a. Wall-sized print of "Triumphal Arch for Maximilian I" by Albrecht Dürer, ca. 1516 (in Rosenberg & Grafton 2010: 46–47).

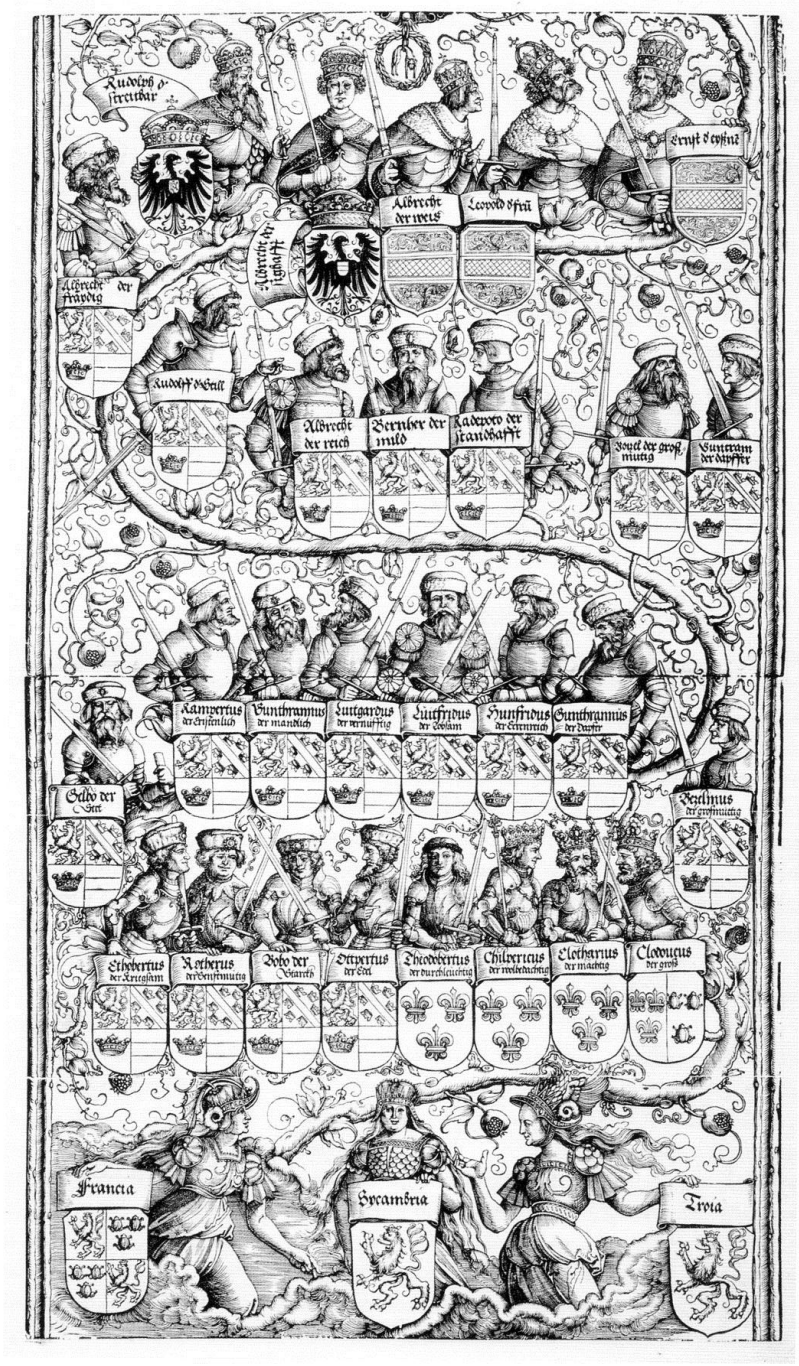


Figure 10b. Wall-sized print of "Triumphal Arch for Maximilian I" by Albrecht Dürer, ca. 1516 (in Rosenberg & Grafton 2010: 46–47).

Unlike the Tree of Jesse, Maximilian's genealogy is a combination of his ancestors and his descendants. Maximilian is the key reference point of the design, with his figure placed at its peak. His ancestors move up to him (Figure 10b) while his descendants come down from him (Figure 10a). The inclusion of Maximilian's wife and daughter, and his son's wife and daughters, reveals a difference in the kinship structure between Europeans and ancient Hebrews. Unlike the Hebrews who based kinship on the father-child bond (known as a patrilineage), European people trace their families through both their father and mother in a system known as standard double bilineal. In this system, while genealogy is based upon both parents, the woman traditionally takes her husband's family name upon marriage. The historian Akenson (2007) noted that people of the world follow four ideal types of kinship systems. In addition to the two mentioned, there are the variable double bilineal and the matrilineal systems. In a variable double bilineal system, children can choose to follow either their father's or mother's line depending upon which side they deem as offering greater assets. In a matrilineal system, genealogy is based upon the mother-child bond.

Power disrupts the visual ordering of Maximilian's descendants in time. Both his wife, Lady Mary, and his son's wife, Lady Joanna, appear in the same horizontal space, just to the sides of and below Maximilian. As Queen of Spain, Joanna is given an upper position in the tree to clearly show Maximilian's link with Spain and Joanna's powerful political position; Joanna is not placed alongside her husband. Maximilian's son, Philip the Fair, appears within mandorla-shaped vines beneath him.

As stated, Maximilian's ancestry of men bearing coats-of-arms is arranged in a boustrophedon pattern. The term boustrophedon, meaning "as the ox plows", comes from the Greeks who experimented with writing back and forth across and down the page (Diringer 1968). When the Greeks experimented with it, they turned the letters to read in the direction of the line. Since most of their letters were symmetrical, reading was not so difficult (Van Sommers 1991). The advantage of boustrophedon writing was in the continuity it created from one line to the next. With boustrophedon writing, neither the hand nor the eye had to be raised back to one side of the page to continue writing or reading. However, the change in *order* from right to left is very disrupting.

In the lineage of Maximilian I, although the writing itself and the ancestors' faces do not always face the direction of the line, the ancestors who are placed at the turning points have their faces or torsos turned into the page. This technique directs the reading order and creates a frame for the image. These ancestors literally follow the linguistic metaphor, "We face the future and the past is behind us".

The tree of the Medicis

According to Klapisch-Zuber 2003, genealogical diagrams did not take on their modern structure until the first decades of the 16th century. Klapisch-Zuber described the genealogical tree of the Medicis (Figure 11) as nearly modern since it places the family patriarch at the top and the descendants vertically down the tree. Like Biblical genealogies, it presents a patrilineage. It is obviously not modern in its use of the tree motif. The tree follows an ordinal scale, and although it is not easy to view each of the generations as a group, readers can nonetheless determine who descended from whom.

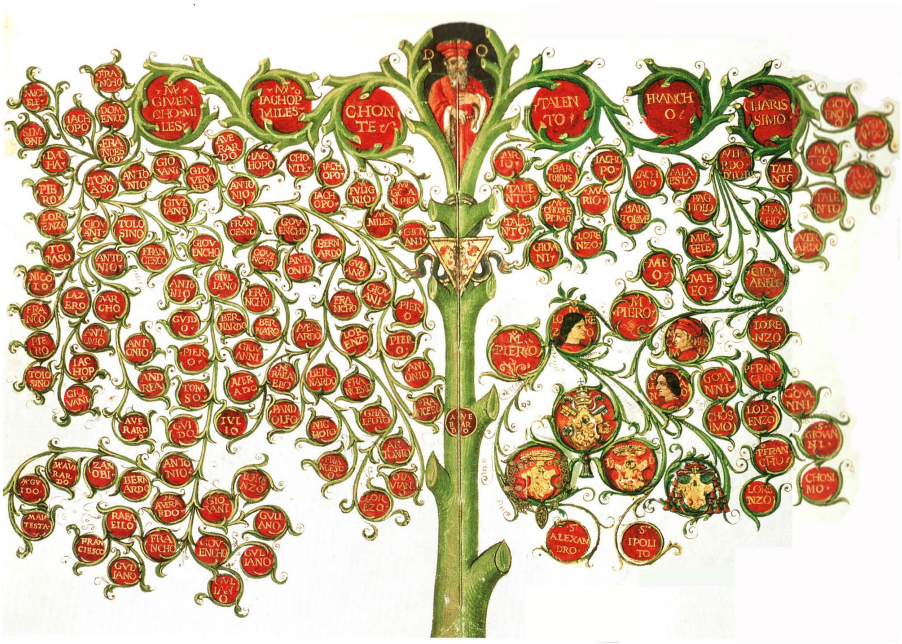


Figure 11. The genealogical tree of the Medicis, painting by Pier Cattacci, first quarter of the 16th century ("Florence, Biblioteca Medicea Laurentziana, Mediceo Palat. 225" in Klapisch-Zuber 2003: 170–171).

The tree of William Blethyn

In contrast to the tree of the Medicis, the tree of the Welshman William Blethyn (ca. 1575–1590; Figure 12), followed a modern graphical structure while still tracing Blethyn's lineage back to a legendary hero. It is the first example presented in this research that completely follows a standard double bilineal system, representing women alongside their partners. Marked with heraldic shields, the tree takes Blethyn's family back to Brutus of Troy. Like Peter of Poitiers' genealogy of Christ, this design represents relationships using circles and lines.

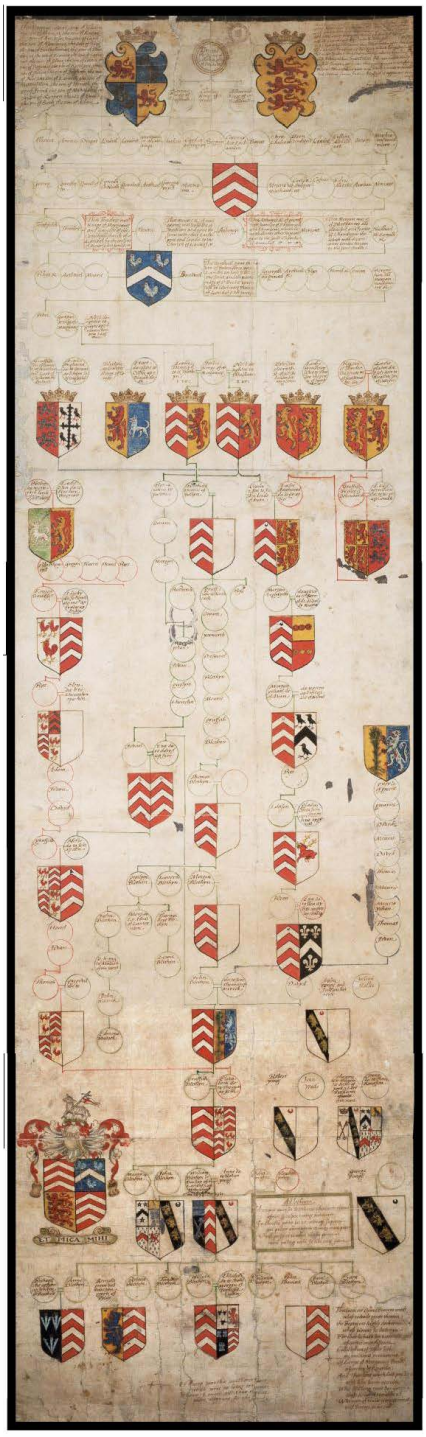


Figure 12. Pedigree roll of William Blethyn (ca. 1575–1590) (40x130cm) (The National Library of Wales 2004).

Eytzinger's Ahnentafel

In the 16th century, genealogists began to turn family trees along the horizontal, which made it easier to fit large amounts of information onto a page without resorting to a zigzag pattern. Both pedigree charts and descent trees were turned.

Figure 13 presents an example of a horizontal pedigree chart made in 1590 by the Austrian historian, cartographer, and author Michael Eytzinger. It is the first example in this paper of a tree produced on a printing press (invented in about 1439). This design illustrates Eytzinger's invention of the *Ahnentafel*, which is a numbering system for pedigrees that follow a standard bilineal system. Remaining useful today, the *Ahnentafel* allows a genealogist to represent a person's direct ancestors without the need for a diagram.

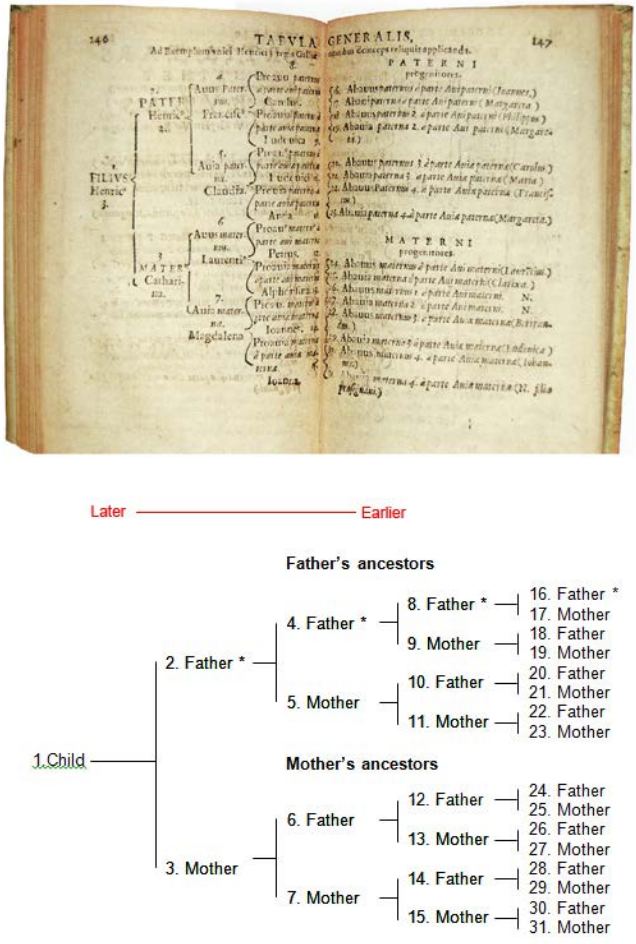


Figure 13. Eytzinger's original publication of the *Ahnentafel* system for numbering a person's ancestors (Eytzinger 1590: 146–147).

At the time Eytzinger created this chart, noble families were using the information to establish how many noble "bloodlines" a person had, which they found important for arranging marriages. As will be discussed, recent research shows that people today want this information for very different reasons.

An advantage of a horizontally-arranged pedigree or descent chart is that people who read along the horizontal strongly associate this dimension with the flow of time. Several studies (Zwaan cited in Winn 1994; Tversky 1995; Kugelmass, Lieblich 1970, 1979; Lieblich, Ninio, Kugelmass 1975) have found that people associate the idea of the 'past' or 'earlier' with the side of the page in which they begin reading, and the concepts of 'future' or 'later' with the side where writing ends.

While Eytzinger's pedigree chart reversed the perceived order of time along the horizontal, the design nonetheless took advantage of the page dimension that is most closely associated with time. The reverse arrangement created a new reading continuum of "known to unknown", which was most appropriate for pedigree charts in which people were searching for ancestors. As ancestors were found, people did not need to shift the data to the right to keep it in time order.

As mentioned, while the horizontal dimension of a page is strongly associated with the direction of time, the vertical dimension is not. In support of this assertion, Van Sommers (1984) asked subjects to imagine themselves moving in plan view along a vertical path. Some subjects placed themselves moving up the page, some moving down, and others drew arrows going in both directions. Van Sommers theorized that people made these differing choices because the vertical is not a natural way to view time. Other researchers have offered different theories for the perception of time along the vertical. Taking a metaphorical approach, Kress and Van Leeuwen (1996) said that people perceive *ideal* things as being *up* and *real* things as being *down*. Therefore, later time is perceived to be up only when it is viewed as better (more ideal) than the present or the past. The past is up only when it is viewed as better than the present. Research by O'Hara (1998) on beginning biology students' drawings of evolutionary trees supports this conclusion. O'Hara (1998: 327) found:

> While many contemporary systematists no longer draw diagrams that show humans as the pinnacle of life [that is, diagrams that place humans in the topmost position as the most ideal of all creatures], most of the general public and most of our students still do. A survey of beginning biology students' understanding of evolutionary history almost invariably produces images of the developmental type with a long main line reaching [up] to vertebrates, mammals, or humans.

Therefore, as shown through their misunderstanding of the evolutionary process, many people do view the upper part of a page as holding more ideal information. However, whether any vertically-oriented design can be conceived of in terms of the "ideal-real" structure depends very much upon the design's purpose. For example, geological timelines often move from earlier times at the bottom of the page to later times at the top following the direction in which layers of material accumulate on the surface of the earth. Clearly, the later (upper) times in these timelines are no more ideal than the earlier (lower) times.

The modern convention for vertical family trees is time-based, moving from earlier time at the top to later time at the bottom regardless of the "ideal" nature of any particular relative (e.g. a famous ancestor or descendant). However, following the "ideal-real" metaphor of the vertical axis, it could be argued that the oldest ancestors are always placed in the upper "ideal" position of the page because they are to be respected or because this arrangement effectively equalizes or brings down to earth all members of living generations. It is more likely, however, that the downward arrangement is based upon processes of reading and writing.

Returning to horizontal designs, the horizontal pedigree chart is now the default visualization of genealogies in the largest genealogical website, FamilySearch (2013)[3], and the largest genealogical wiki, WeRelate (2013) (see Figure 14). As interactive designs, these charts allow users to see more or less of a tree, or link to greater detail as desired. While FamilySearch provides an invaluable database of birth, death, and marriage records, and WeRelate offers users the opportunity to share their family stories, both sites visually represent families using the standard double bilineal system, which as mentioned earlier, is not appropriate for all cultures. Also, the sites do not allow for the visual representation of other forms of kinship including adoption and same-sex marriage, and would be more inclusive if they provided other visual structures, or indeed the option to create trees based upon other types of relationships.

[3] FamilySearch 2013 has been retrieved from https://familysearch.org/ on 30 October 2013, and WeRelate 2013 from http://www.werelate.org/wiki/Main_Page on 30 October 2013.

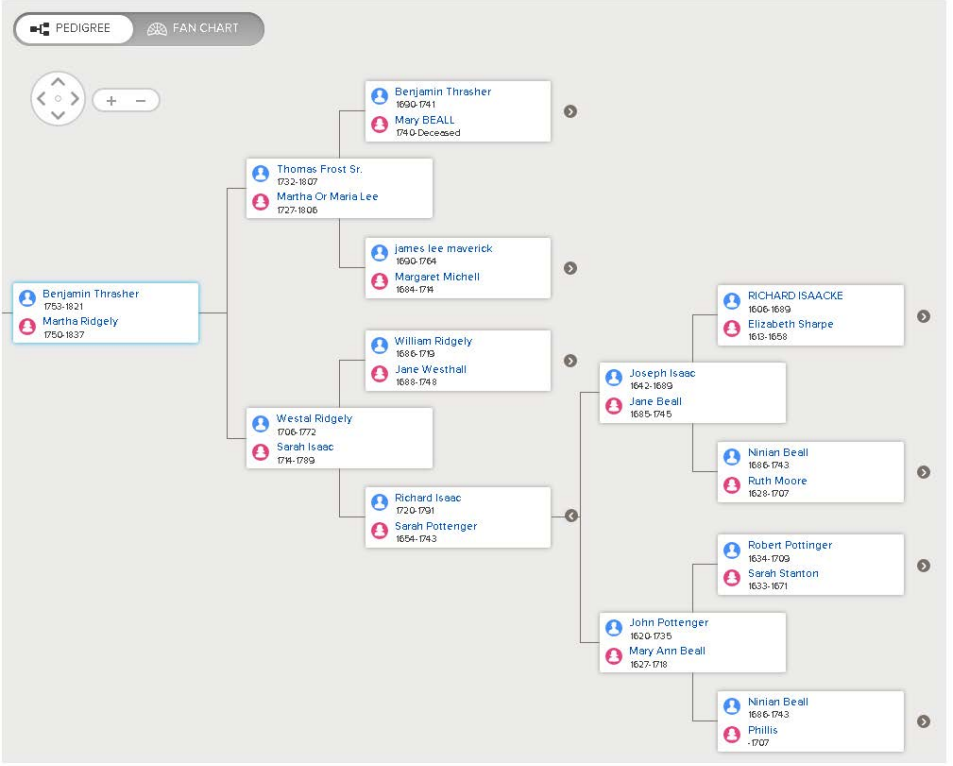


Figure 14. An interactive and continuous horizontal pedigree chart (Pedigree of Martha Ridgely in Family Search, 2013).

Anthropological trees

With the emergence of anthropology in the late 19th to early 20th centuries came the abstract family tree, reminiscent of the Roman *Arbor Juris*. At that time, Rivers (1914) encouraged researchers to use diagrams for illustrating the variety of ways in which cultures conceived of kinship.

The anthropological design of family trees typically orients the direction of time from the top to the bottom of a page. Symmetry remains an important design consideration, with parents centred directly above their offspring and each generation receiving an equal area of horizontal space.

For anthropology, the family tree diagram was transformed from the narrative of a particular family to a type of process diagram that represented how a cultural group typically recognized kinship. In addition to the symbols used to represent people (e.g. letters, circles, triangles), these trees added symbols from maps and

other process diagrams such as arrows and boundary lines to represent processes such as how marriages occurred (e.g. Figure 15 illustrates how daughters were given as wives to related families), how clans were organized (e.g. Figure 16 illustrates how members of two clans were allowed to marry), how children were adopted, and so on.

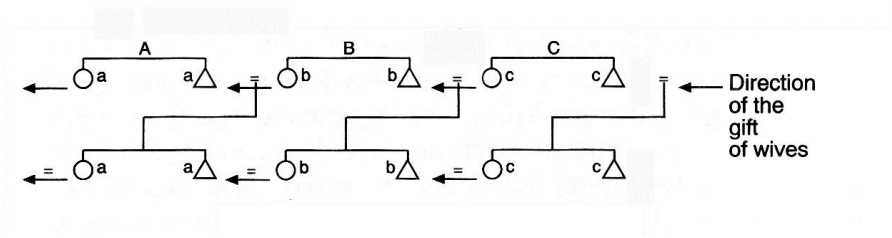


Figure 15. Generalized exchange (Zonabend 1996: 33).

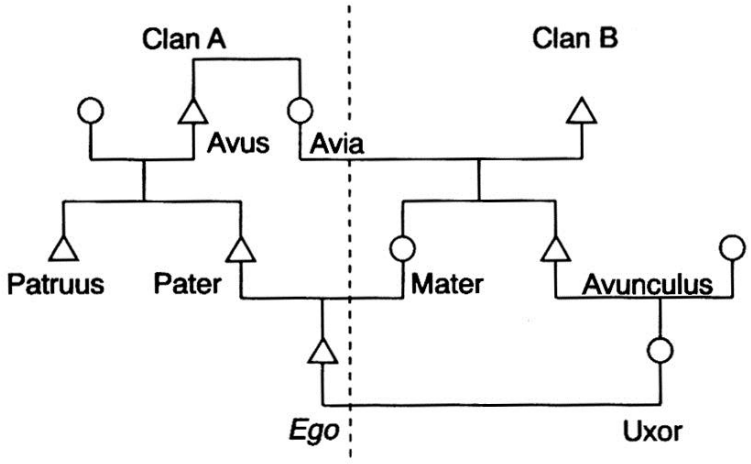


Figure 16. Kinship in Indo-European society (Benveniste in Masset 1996: 88).

Genetic trees

Family tree diagrams also became useful in the field of genetics, when researchers found that various physical characteristics were inheritable. These diagrams are commonly used today to educate and counsel about sex-linked inheritance of disease (e.g. Beery, Shooner 2004). The graphical model for including genetic inheritance in family tree diagrams begins with Thomas Hunt Morgan's (1919) work on sex chromosomes and inheritance. Figure 17 presents a diagram from his work

representing how the *Abraxas* moth passes on "germ cells" for wing color through three generations of males and females.

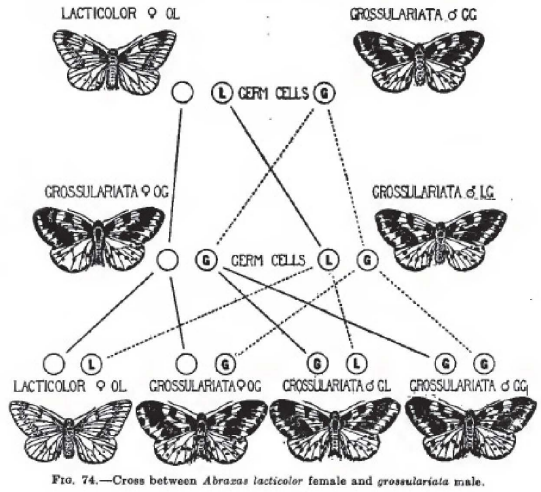


Fig. 74.—Cross between *Abraxas lacticolor* female and *grossulariata* male.

Key:
G=grossulariata (dark pigment in wings)
L=lacticolor (light pigment in wings)

In the first generation at the top of a diagram, a lacticolor (light-winged) female mates with a grossulariata (dark-winged) male. All of their sons and daughters will be grossulariata, but the sons will inherit the chromosomes for both lacticolor and grossulariata. If these sons and daughters are inbred, half of the females will be lacticolor and half will be grossulariata. All of the males will be grossulariata.

Figure 17. Cross between *Abraxas lacticolor* female and *grossulariata* male (Morgan 1919: 175).

The visual structure of Morgan's diagram is based upon the anthropological kinship tree, but the connecting lines now represent possibilities of biological inheritance. At the top level, two sets of lines emanate from each parent, solid from the mothers and dotted from the fathers, to indicate possibilities of chromosomal inheritance for male and female offspring. Since the diagram represents how inheritance occurs, it represents present simple tense.

A current representation of human genetic inheritance is provided in Figure 18. Here, two trees are useful to represent the inheritance of Cowden syndrome: one tree represents the chance of inheritance (present simple tense) while the other represents actual inheritance (past and present tenses). Similar to the first case study discussed, the Tree of Jesse, each person represented in the tree is visually coded to indicate what particular family characteristics they possess.

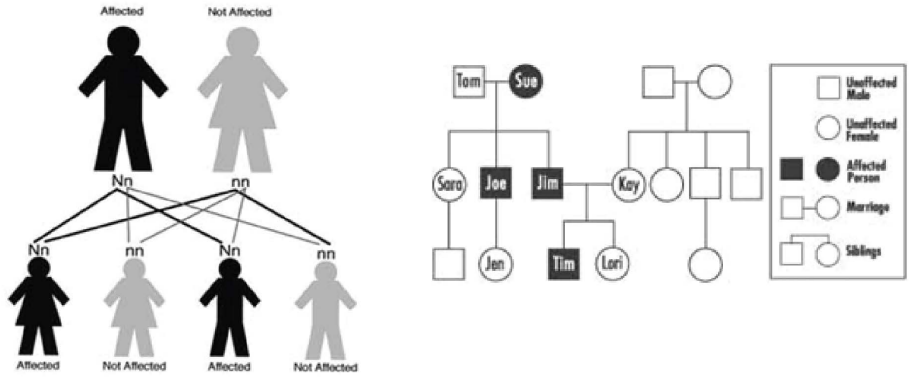


Figure 18. Inheritance of Cowden syndrome (The University of Iowa 2013).[4]

Genetic trees can also be used to represent "DNA genealogy", which uses DNA testing to clarify uncertain biological relationships (see Figure 19). Researchers (Davison 2009; Nelson 2011) have noted that this form of genealogy seems especially important to African Americans who typically have difficulty tracing their family past the time of enslavement. However, the testing has met with mixed reactions because it is often seen as not specific enough and it does not always match with people's oral histories (Nelson 2011). The example in Figure 20 represents a very public DNA experiment conducted for the Woodson family, who were trying "to determine whether Thomas Jefferson could have fathered any of his slave's, Sally Hemings, children" (Williams, S. 2005: 225). The family wanted proof of stories handed down over generations that Jefferson was the father of their ancestor, Thomas Woodson. Genealogical tree diagrams provided a useful tool for visualizing the research questions, method, and results. In this case, although the test results were negative, the Woodson family chose to continue following their family stories. Uncertainty about the family's male ancestry was represented with the visual modals of dotted lines and question marks between Hemmings and her possible partners. This diagram was turned horizontally simply to better fit the information onto the page.

[4] The University of Iowa (2013). How is Cowden Syndrome inherited? Retrieved from http://www.uihealthcare.org/2column.aspx?id=22930 on 30 October 2013.

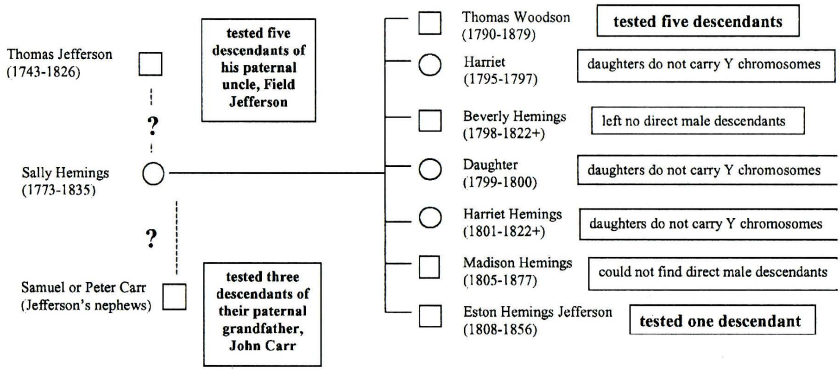


Figure 1. Diagram of Foster and colleagues' genetic analysis that tested whether Thomas Jefferson or one of his nephews, Samuel or Peter Carr, was more likely to be the father of Sally Hemings' children. They compared the Y chromosome haplotypes of descendants of Thomas Jefferson's family and descendants of Samuel and Peter Carr's family with descendants of two of Sally Hemings' sons.

Figure 19. Tree diagram used to describe genetic testing (Williams, S. 2005: 227).

Circular trees

Family trees are sometimes represented in circular designs. Pedigree charts move from later time at the centre to earlier time at the circumference (Figure 20). Circular trees make good use of space, but designers may also choose them for aesthetic reasons. As an aesthetic device, the people around the circumference serve as a frame for those in the middle.

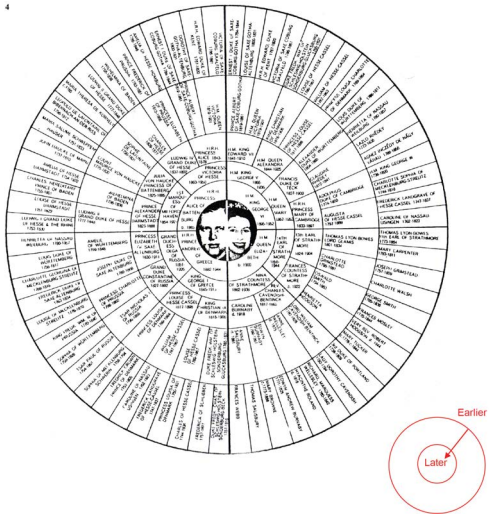


Figure 20. Example of a family tree that moves from the circumference to the centre (Family Tree of Queen Elizabeth II and Prince Philip).

Considering the needs of modern genealogists

While many genealogists of the past often conducted family research to socially elevate themselves, modern genealogists typically have other goals. Recent studies from the US, UK, and Australia (Basu 2005; Bishop 2005, 2008; Cannell 2011; Davison 2009; Hackstaff 2009; Kramer 2011; Mason 2008; Nelson 2011) indicate that people currently conduct genealogical research for the following reasons, all of which are meaningful to them:

- learn about family contributions to society;
- better understand oneself and one's family, both socially and biologically;
- pass on knowledge that could otherwise be lost;
- keep oneself and others "alive" forever, at least in memory;
- fulfill an obligation to one's family;
- find first immigrant ancestor;
- demonstrate love;
- honour ancestors;
- connect with family, both dead and alive;
- develop a cultural identity that may have been lost to a family or person through migration, enslavement, adoption, or other events;
- tell a story;
- place oneself and one's family in the big picture of life.

While people can still elect whom to include in their tree diagrams, many want to find everyone who is part of their family, regardless of how they lived their lives. In a description of the British and Australian television series *Who do you think you are?*, Davison (2009: 43.6) reported that the featured celebrities are looking for any of their relations, not "as traditional genealogists used to do, for noble ancestors and lost fortunes". Instead, the celebrities are finding ancestors who were lost to their family histories through "illegitimacy, crime, suicide, [and] racial or religious discrimination". As an example of an inclusive genealogical tree, consider that of President Ronald Reagan (Figure 21). One might almost suspect that humility of origin and station increased rather than decreased the chance of a person being included and described.

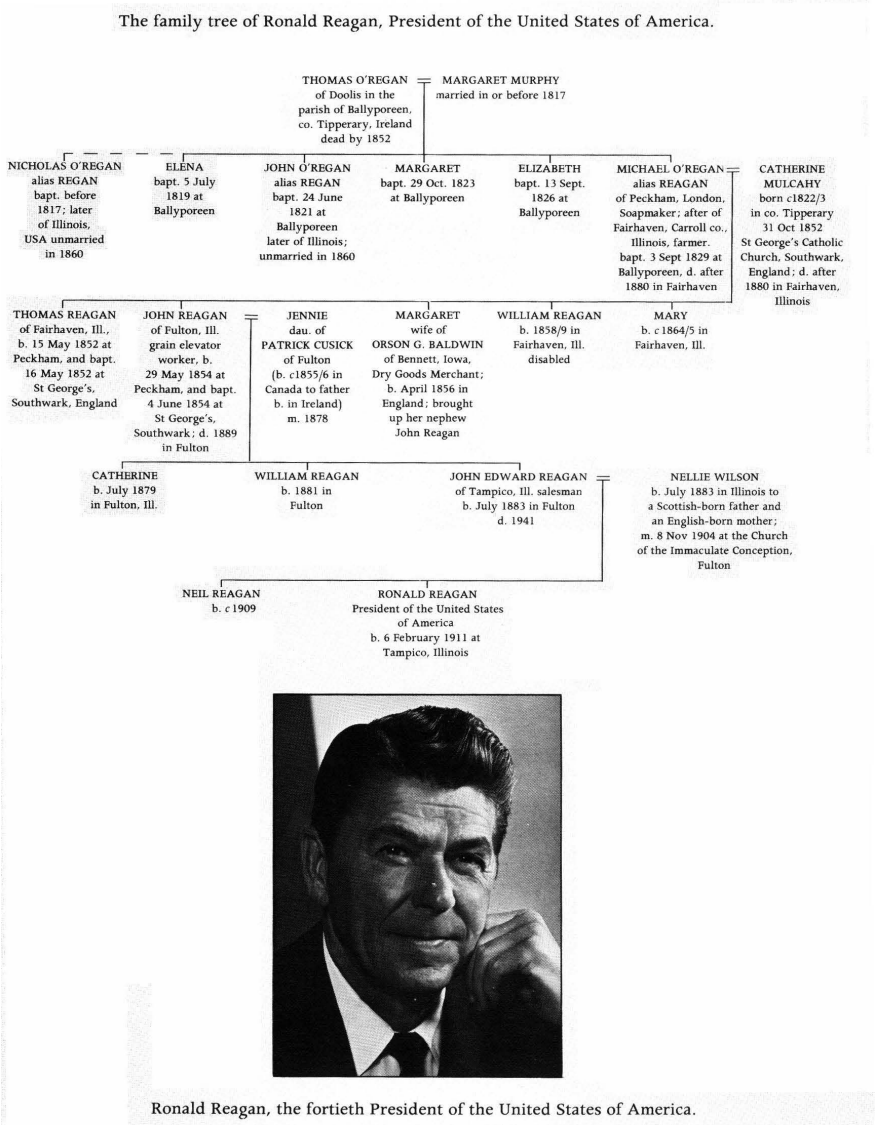


Figure 21. Ancestors of US President Ronald Reagan (Currer-Briggs, Gambier 1982: 191).

Figure 22 presents a modern family tree that contains a variety of affinitive and biological relationships including a same-sex couple and a child born through artificial insemination. Since the designer's goal was to emphasize the complexities of modern families, the design itself is deliberately busy with its crossing lines and text. While crossing-lines are used in genetic diagrams to show inheritance, this diagram uses them to call out particular relationships between people (e.g. stepmother, half

siblings). Given the complexities of many modern families, some researchers believe that many people need to represent their relationships in two separate trees, one that includes biological relationships and another that represents emotional ties.

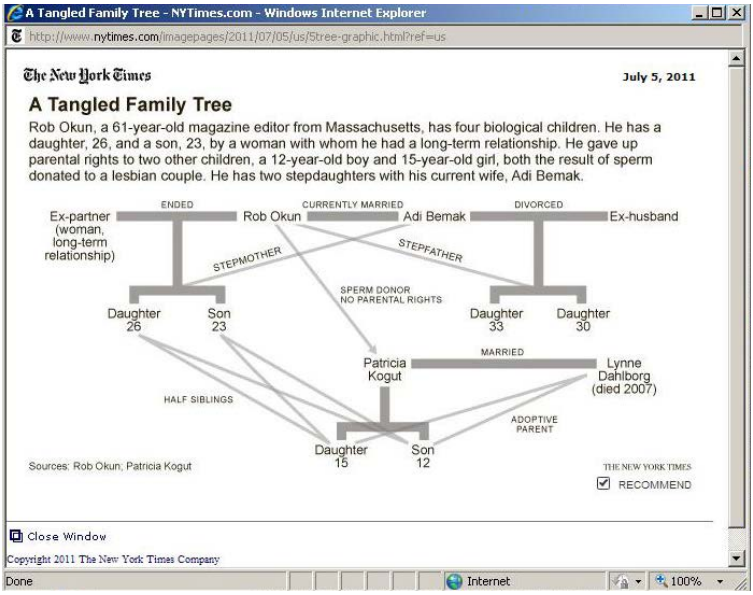


Figure 22. Example of a family tree containing a same-sex couple, children of a sperm donor, and other modern relationships (Holson 2011: A1).

Conclusion

Family tree diagrams appear to have developed along the path from oral history to written text to diagram, and have witnessed changes in form over time so as to meet different cultures' needs. Their forms have also been influenced by graphic production technologies and processes of reading and writing.

As discussed in this research, family tree diagrams have served as tools for answering legal questions (*Arbor Juris*), educating monks (Beatus' *Commentary*; Peter of Poitiers' genealogy of Christ), decorating cathedrals (St-Denis Tree of Jesse), demonstrating power through "blood" alliances (the lineage of Maximilian I; the tree of the Medicis), researching ancestors (Eytzinger's *Ahnentafel*), representing forms of kinship across cultures (anthropological trees); educating and counselling about sex-linked inheritance of disease (genetic trees); discovering biological family (DNA trees); honouring family (ancestors of Ronald Reagan); and representing a

diversity of biological and affinitive family relationships (tree of Rob Okun). The tree has thus shown that it can be easily adapted for different purposes.

Differences in the use of family trees have affected the choice of key reference point, what family members were to be included in the tree, what scale was to be used, and what relational characteristics were to be emphasized. Differences in a tree's graphical orientation in time were also affected by use but also by cultural values ("ideal is up"), technology (e.g. scrolls versus manuscripts; handwriting versus printed text), by aesthetics (e.g. circular trees are the most symmetrical), and by the need to maintain continuity while fitting ever-growing numbers of relatives into a given space. As discussed, the key reference point of a family tree can be a key ancestor or ancestors (e.g. Adam and Eve), a later-born person, or a person alive today. The tree diagram works by representing some culturally useful aspect of relatedness between the person who acts as the key reference point and other members of the group across generations.

The graphical position of the key reference point may vary with the culture, the purpose and the technology of the design. The position sets the direction of time through the generations. In horizontal trees, the key reference point may be on the left or the right of a tree, and time may flow in either direction. In the very early Beatus' *Commentary*, the main line of time flowed from left to right across the pages of the manuscript following the order of writing and reading. Adam and Eve appeared on the first page and Christ, the key reference point, appeared on the last. This arrangement is still followed today especially in larger trees that fit best across the pages of a book. From a cultural point of view, the horizontal dimension is time-based and therefore neutral. All family members who are placed along the horizontal are viewed as equal.

Although the very early tree from Beatus' *Commentary* was horizontal, the trees that immediately followed it were drawn along the vertical. Horizontal designs emerged again with pedigree chart and the *Ahnentafel*, although these designs reversed the order of time so that they could better serve as problem solving tools. In a horizontal pedigree chart, the key reference point is a later-born person who is placed on the left and whose direct ancestors are placed towards the right according to their generation. The horizontal arrangement moves from known to unknown. This design continues today in the largest online genealogical search websites.

While modern vertical family trees move from earlier time at the top to later time at the bottom regardless of which family member acts as the key reference point, earlier vertical trees could move in either direction. As discussed, Trees of Jesse moved up the page placing Christ, the key reference point, at the top. In contrast, Poitiers' genealogy of Christ moved down the page following the direction of reading and writing. Poitiers' design eventually became the convention for modern family trees.

Since Van Sommers' (1984) research showed that people do not associate a specific direction with the flow of time in the vertical dimension, the downward convention for family trees may have emerged through any or all of the following factors: (1) directions of reading and writing; (2) the linguistic metaphor of descent; or (3) cultural development of the "real-ideal" metaphor along the vertical, where ancestors are shown respect by placing them in an ideal position above the living. For many viewers, the vertical dimension is not neutral so the downward time direction of a family tree diagram provides a visual method for equalizing living family members.

Who is to be included in a family tree depends very much upon the culture and use of the tree. Historically, one strong point of difference in family trees was whether women were included. Early Biblical trees were based upon a patrilineage and therefore, only those women who served a special place in the Hebrew narrative received a place. European nobles such as Maximilian I who wished to express divine affiliation designed their family trees to match the Hebrew narrative, leaving out the majority of female members. However, since European kinship followed a standard double bilineal system, women eventually came to be entered into European trees.

While Medieval nobles used their trees to plan marriages and to prove their descent from mythical heroes, people in today's society use the trees for very different reasons and are more likely to include any people with whom they feel family affiliation and exclude those with whom they do not. They may want to know their ancestors and relatives for reasons of disease inheritance, as a basis for establishing identity, to develop a historical narrative, or simply just to know who their ancestors were. Recent changes in family arrangements leave many people with the desire to create different sorts of family trees which might show genetic relations (e.g. children of sperm-donors) and emotional relations (e.g. adopted children).

While the earliest genealogical tree (in the Beatus' *Commentary*) was based upon an ordinal scale, modern trees took on an easier-to-read structure with a quasi-interval scale that was based upon the generation. Symmetry appears to be important in all cases, with parents placed centrally over or alongside their offspring. The circular pedigree chart provides the greatest symmetry and aesthetically frames those at the centre. Also, in all tree diagrams the transmission of family characteristics is important. Trees can represent transmission of blood, name, royal position, genes, diseases, or anything. These characteristics can be represented through symbols, colour, text, or different types of connecting lines.

Early designers experimented with many design variables to both represent relationships and enhance readability. They made use of colour to show bands of brothers (Beatus' *Commentary*) or to help readers clearly distinguish between individuals

within a generation (Peter of Poitiers' genealogy of Christ). They also used facings to represent relationships in nuclear families (Peter of Poitiers' genealogy of Christ) or to indicate the order of reading (lineage of Maximilian I). To clarify the order of generations or the order of births, trees sometimes included numbers (*Arbor Juris*; Beatus' *Commentary*).

Trees generally aim to represent continuity among family members. When trees are placed along a roll (e.g. Peter of Poitiers' genealogy of Christ), family history appears uninterrupted. Online trees provide the sense of using a roll since users can scroll forward or backward to the boundaries of a tree.

While the online websites FamilySearch and WeRelate offer many helpful records and tools, they do not offer users enough choices in how to represent their families. As everyone knows, families come in many forms, and the purely biologically-based, standard double bilineal system does not work for all.

With modern people's desire to know, honour, identify with and remember family, the tree diagram will remain an essential visual form, and it is likely that other variations of it will continue to emerge.

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Проблемы совместимости: визуальная репрезентация времени в диаграммах генеалогического древа

Диаграммы генеалогического древа составляют конкретный тип визуальной репрезентации времени. Данное исследование рассматривает их возникновение и развитие в западной культуре начиная с самых ранних образцов 18 века до современных сетевых версий. Примеры приведены из областей религии, генеалогии, истории, антропологии, генетики и поп-культуры. Сначала рассматривается общая генеалогическая модель, основывающаяся на вербальном изображении времени или на грамматической категории времени, затем показывается, как, исходя из этой модели, составлены конкретные образцы. При описании выделяются следующие визуальные характеристики: направление времени на странице, главная точка отсчета, шкала, альфанумерические и изобразительные символы, расстановка символов и величина, цвет, тон и текстура символов и графических элементов. В статье утверждается, что выбор движения времени в генеалогическом древе (т.е. слева направо, справа налево, сверху вниз и т.п.) зависит от многих факторов: использования диаграмм, количества помещенной на одной странице информации, паттернов написания и чтения, эстетических потребностей, связанных с происхождением языковых метафор, культурных ценностей и континуума «идеально-реального».

Sobitamisprobleemid: aja visuaalne representeerimine sugupuudiagrammides

Sugupuudiagrammid moodustavad aja visuaalse representeerimise konkreetse tüübi, mis võib täita mitmesuguseid eesmärke. Käesolev uuring vaatleb nende semioosilist kujunemist lääne kultuurides, kasutades materjali alates 8. sajandist pärinevatest varaseimatest olemasolevatest eksemplaridest kuni tänapäeva võrguversioonideni. Näiteid tuuakse religiooni, suguvõsauuringute, ajaloo, antropoloogia, geneetika ja popkultuuri vallast. Artikkel algab sugupuukavandamise üldise mudeliga, mis põhineb aja või grammatilise ajakategooria keelelisel kujutamisel; seejärel vaadeldakse üksikjuhtumitele toetudes, kuidas iga kavand selle kasutust silmas pidades on koostatud. Koostamist arutatakse, kasutades selliseid visuaalseid muutujaid nagu aja suunatus leheküljel, peamine lähtepunkt, skaala, alfanumeerilised ja pildilised sümbolid, sümbolipaigutus ning sümbolite ja graafiliste elementide suurus, värv, toon ja tekstuur. Artiklis väidetakse, et aja liikumissuuna valik sugupuus (s.t vasakult paremale, paremalt vasakule, ülalt alla jne) sõltub paljudest teguritest, milleks on diagrammi kasutamine, leheküljele mahtuma pidava info kogus, kirjutamis- ja lugemismustrid, esteetilised vajadused, päritolu tähistav keeleline metafoor, kultuurilised väärtused ning “ideaalse-reaalse” kontiinuum, mis mõnda tüüpi graafika puhul esineb vertikaalteljel.