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# A NEW GENEALOGICAL ORDERING SYSTEM TO DENOTE CONSANGUINITY

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## Introduction

Classical models of denoting kinship relationships in genealogy often introduce two separated numbering systems: one to denote ancestors and one to denote descendants. For ancestors the most commonly used system is called the *Ahnentafel-system*, or the *Sosa-Stradonitz*<sup>1</sup>, or *Kekule-numbering*<sup>2</sup>. Sir Francis Galton has described it as the *sequential system*<sup>3</sup>. **Figure 1** illustrates this method, which is based on the *Ahnentafel* of Agnete von Ketelhodt: in it each number refers to a unique ancestor relationship.

For descendants there is the so-called *modified Henry system* which resembles the *Beichhold system*.<sup>4</sup> Here the children are numbered sequentially: 1, 2, 3, etc., and from the tenth child onwards these numerals are put into brackets: (10), (11), (12). Now for each new generation, the *modified Henry* numbers are simply linked together, as we see in **Figure 2** which takes as its example a pedigree of the Holy Roman Emperor Otto the Great (912–973).

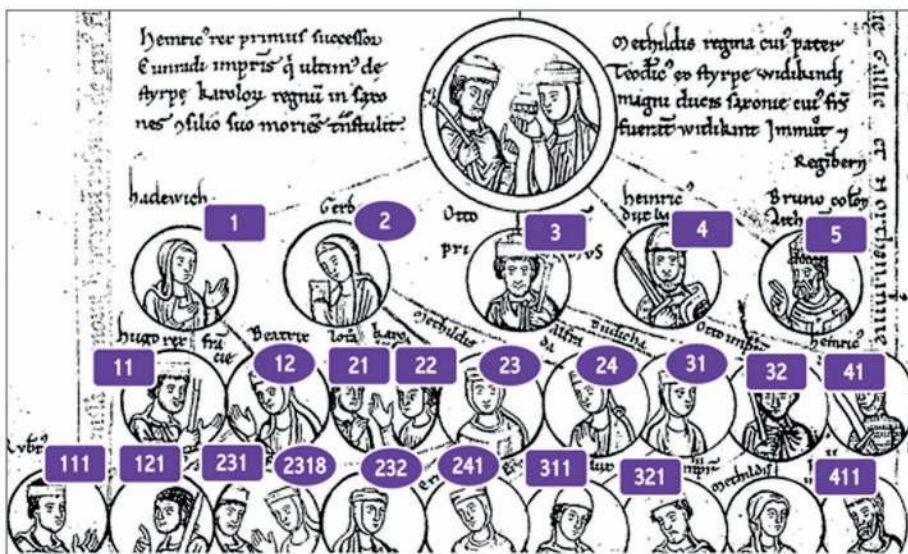
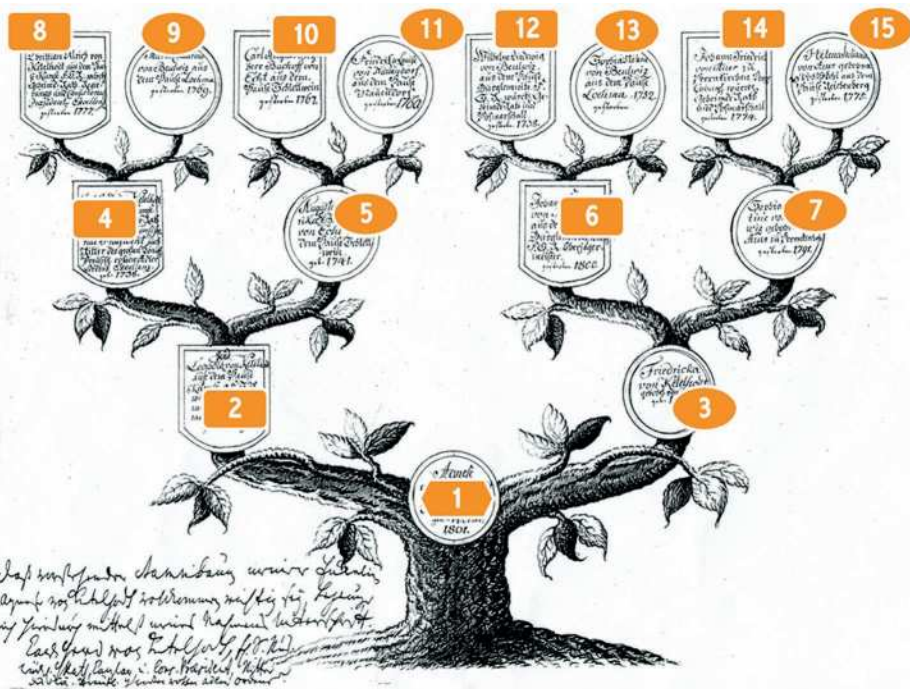
If we try to combine these numbering systems we face the challenge that the same numerals will occur in both systems independently, denoting different family relationships. A potential solution, the *Gesamtverwandschaft* (entire relationship) *system*, has been described by Rösch<sup>5</sup> and a further influential smart solution has been suggested by Knud Højrup with his *Knot System*.<sup>6</sup>

In this paper a new uniform genealogical ordering system is proposed that smoothly combines Galton's *Sequential system* for ancestors with the *modified Henry system* for descendants. It extends and modifies a journal paper that has been submitted to the local genealogical club Saarländische Familienkunde.<sup>7</sup>

## The new system

The key idea behind this approach is to show the shortest path between two related persons via their selected common ancestor. Since any blood-relationship is defined by the existence of a common ancestor, such a common ancestor must always exist. Technically, we denote the relationship of any two blood-related persons by combining both numbers (in respect to the 'EGO' person, whom we might also call the proband, subject or self): take the identifier of the common ancestor, attach a zero to the right, and then attach the number of the descendant to the right.<sup>8</sup>

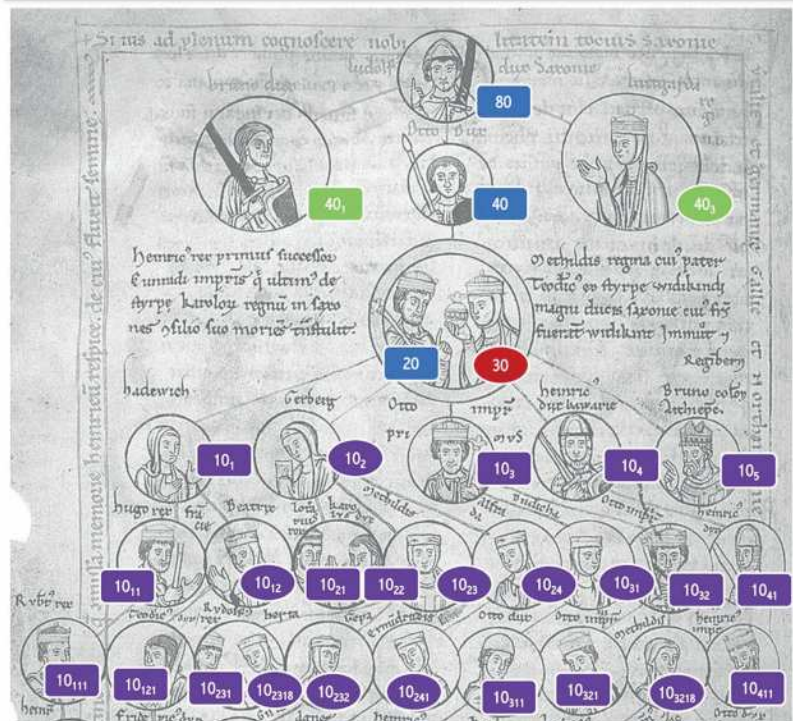
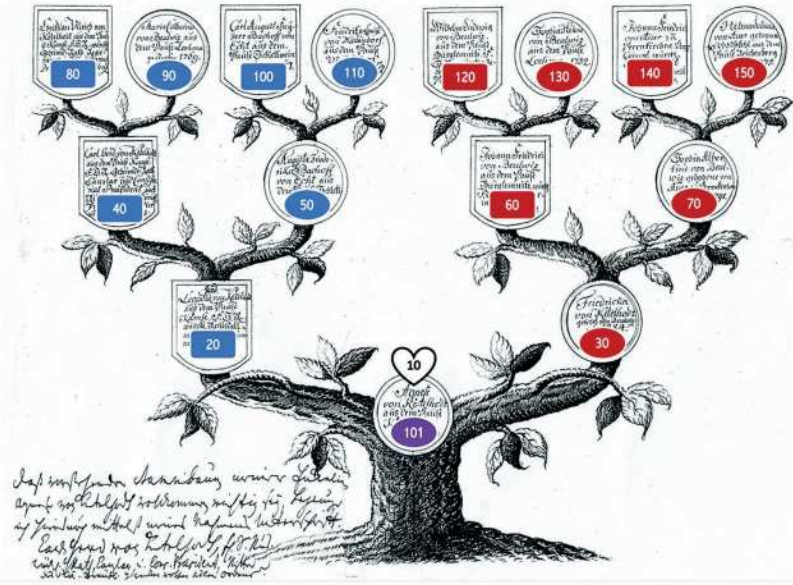
**Figure 3** is the renumbered version of the family chart of Figure 1. Here the EGO starts with the number **101**, where the "1" on the left-hand-side of the zero represents the former ancestor id, while the "1" on the right-hand-side of the zero represents the former descendants id. The heart with the number 10 could be interpreted as the "central family", the so called "we", connecting, the father "20", the mother "30" and the self "101".



Top: *Figure 1*: Pedigree of Agnete von Ketelhodt, annotated with a classical Ahnentafel numbering for ancestors and the “self” (Wikimedia Commons); bottom: *Figure 2*: cutout of a family tree of the Ottonians from the early thirteenth century *Chronica Sancti Pantaleonis*, Wolfenbüttel, Herzog August Bibliothek, Cod. Guelf. 74.3 Aug. 2°, p. 226), with an overlay of a classical numbering of descendants.

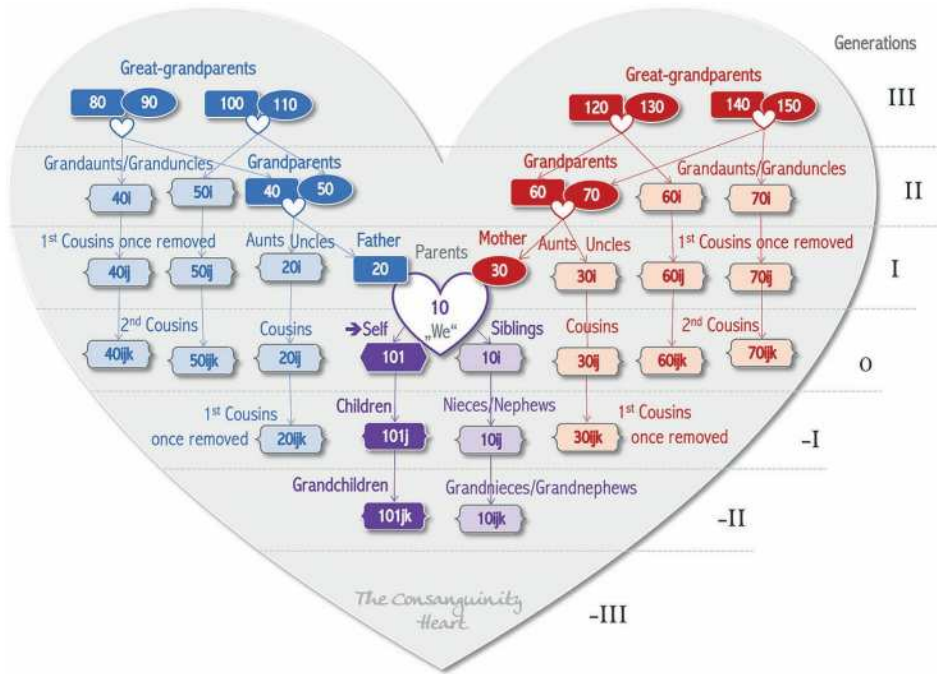


# A NEW GENEALOGICAL SYSTEM



Top: *Figure 3*: Pedigree of Agnete von Ketelhodt, annotated with the new suggested numbering for ancestors and the “self”(amended from Wikimedia Commons); bottom: *Figure 4*: family tree of the Ottonians with an overlay of the suggested new genealogical numbering system for both ancestors and descendants.

**Figure 4** presents a medieval German pedigree, annotated using the proposed new system to show how ancestors and descendants are numbered. **Figure 5** presents a new schematic view over six generations of how it is proposed that the numbers are ordered for consanguinity, while the variables i, j, k etc. represent the classes of possible children. It is based on and it extends a diagram of Johann Christoph B auerlein<sup>9</sup>.



*Figure 5:* “The Consanguinity Heart”, a schematic view of the classes of the new genealogical ordering numbers for consanguinity relations over six generations, including ancestors, descendants and collaterals, annotated with the corresponding family relations in English. The number “10”, denoting the “We”, can be understood as the “heart”, or the “center”, of the family tree, while the number “101”, denoting the “Self”, can be considered as “starting point” of the family relation chart.

Notice the adapted colour code:

- blue for paternal ancestors and red for maternal ancestors
- light-blue for paternal collaterals and light-red for maternal collaterals
- violet for self/descendants and light-violet for siblings and their descendants

Furthermore, notice the code of the abstract forms, carrying the numerals:

- a rectangle for a males and an oval for females
- a hexagon for a person of unspecified gender
- a form with “curly braces” to the left and to the right for a set of people
- finally, a “heart” to denote the centre of this consanguinity chart

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The presented family relationships in this “Consanguinity Heart” shown in **Figure 5** are annotated in English; for a systematic translation into German or Latin, we refer to Heiko Hungerige’s contributions in *Computergenealogie*.<sup>10</sup>

To summarize, this has been a brief diagrammatic presentation of a newly developed approach of an integrated numerical genealogical ordering system. It can be extended from the shown consanguinity types to include, for example, in-law kinship relationships or half-siblings etc. The overall aim of this new, uniform (not yet final) numbering approach, that combines well known numerical ancestor-numberings with descendant-systems, is to facilitate the deeper understanding and the structural analysis within the world of human relationships, especially for genealogical purposes.

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<sup>1</sup> Stephan Kekule von Stradonitz, ‘Über eine zweckmäßige Bezifferung der Ahnen’, in *Vierteljahrsschrift für Wappen-, Siegel- und Familienkunde*, no. 26 (Berlin, 1898), pp. 64–72.

<sup>2</sup> Arndt Richter, das ‘Gesicht der Genealogie’ Über listenmäßige Darstellung von Nachkommenschaften: Struktur und Bezifferung (2008), online at [www.gentalogie.de](http://www.gentalogie.de)

<sup>3</sup> Francis Galton, ‘Arithmetic Notation of Kinship’, in *Nature* 28 (Sept 6, 1883), p. 435.

<sup>4</sup> Robert Beichhold, ‘Ein Vorschlag zur Bezifferung von Nachfahrentafeln und Stammtafeln’, in *Familienge-schichtliche Blätter*, vol. 27, no. 9/10 (1929), p. 289.

<sup>5</sup> Siegfried Rösch: ‘Über Begriff und Theorie der Ge-samtverwandschaft’, in *Familie und Volk* 4 (1954), pp. 97–101.

<sup>6</sup> Knut Højrup: ‘The Knot System - A Numeric Notation of Relationship’, in *National Genealogical Society Quarterly USA*, vol. 84, no. 2 (June 1996).

<sup>7</sup> Dominikus Heckmann, ‘Ein Vorschlag zur Nummerierung der Verwandschaft mit natürlichen Zahlen’, in *Saarländische Familienkunde*, vol. 14/2, no. 54 (2021), pp. 312–321.

<sup>8</sup> In this paper the modified Henry numbers are used for denoting descendants, with round brackets if they have more than six children: 1, 2, 3, 4, 5, 6, (7), (8), (9), (10), (11), (12), ... in order to cope with the counting issue of families with a large number of children. In the earlier paper cited in note 7, a more mathematically complex and purely numeral enumeration was introduced and used for descendants.

<sup>9</sup> Johann Christoph Bäuerlein, *Manuductio Seu Explicatio Brevis Arboris Consanguinitatis, Et Facillimus Modus Indagandi gradus maximè quoad petendam dispensationem : tam ex Jure Canonico, quam Civili deducta, & in Schemate proposita* (Frankfurt am Main, 1725), p. 17.

<sup>10</sup> Heiko Hungerige: ‘Englische Verwandschaftsbezeichnungen: Was ist ein „second cousin twice removed“?’ in: *Computergenealogie – Magazin für Familienforschung*, vol. 35, no. 1 (2020), pp. 12–14.