

The collage is a complex visual composition. At the top, a horizontal strip shows a colorful, abstract pattern. Below this, a large, detailed illustration of a man in historical attire (a blue tunic, red hose, and a hat) is shown planting a tree. The tree is labeled with various names and dates, including 'William the Norman Robber', 'Richard the Lionheart', and 'Philip the Fair'. The man is holding a staff with a cross on it. The background of the illustration is a landscape with a castle and a body of water. Overlaid on the illustration is a modern flowchart with various boxes and arrows. The flowchart includes labels such as 'EXPLOITATIONS EUROPEENNES', 'SALAIRES 8', 'IMPOTS 11', 'MEN', 'CONSUMMATION DIVERS', 'PRODUCTION 15', 'EXTERIEUR 73,5', and 'PRODUCTIE'. There are also various numbers and letters scattered throughout, such as '45', '57', 'B', 'PR', 'D', 'E', 'TS 4', 'VERS 13', and 'New Dynasty'. The overall style is a mix of historical art and modern graphic design.

57

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SALAIRES 8

SOLDE DES ECHANGES INTERIEURS 7

CONSOMMATION DIVERS 9,5

ME

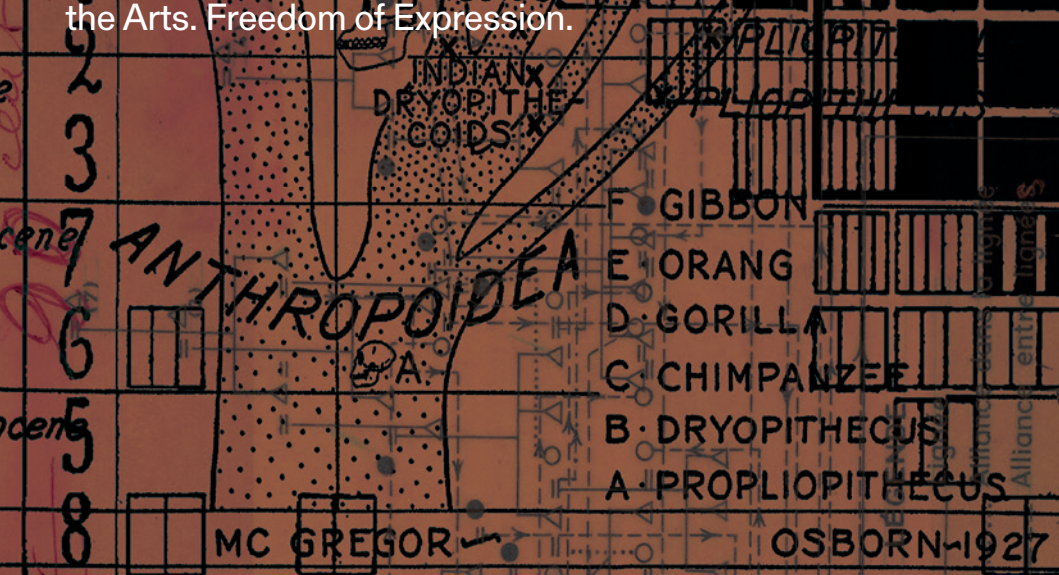
UNISIENS 24,5

EXTERIEUR 73,5

PRODUCTION

John Gardiner planting a Royal Pippin Tree. — All the
 PRODUCE of the Telegraph, of May 21st 1867 — Article — The Genealogy of the Royal A

Old Testament and New. Virgin Mary. Spiritual Kinship. Pedigrees Attacked. Polysemic Trees. Tree as Nation. Dynamics of the Regime. Revolving Disks. Denying Genealogical Linearity. Enigma. Two Theories. Genealogy and Geography. Wahlverwandtschaften. Cartesian Anthropology. (Un)cultural Anthropology. Triangular Anthropology. Bertin's Genealogical Networks. The Structuralist Tree. Representative Family Trees. Relating Living to Dead. Before the Patrilineal Turn. After the Patrilineal Turn. Blackboxing Mabuiag. Sticks and Stones. Genealogy of a Species. Race and Genealogies. Tracing the Original Type. Chords. Roots. Ramifications. Exploring the Diagrams. Legal Dispute. Colors and Cousins. Poverty and Prison. Persuasion and Criticism. Deaf-mute Family. Empirical Data or Theoretical Models? Brittle Branches. Solitude or Aloneness? Revenant Relationships. Forbidden Marriages. Diagrammatic Details. Arboreal Kinship. Kinship at a Glance. (In)visible Kinship and Evidence. Genealogy of Power. Peopling a Book. Hiding Mothers. Investigating Heredity. Ethno-linguistic Landscapes. Concepts and Measurements. Representing and Obscuring. Roots of a Method. A Method Redeployed. Avoidance of Incest. Figures of Presentation. Human Phylogeny. Speculative Encounter under a Tree. Quadrantennetz. Clustered Heat Map. Jungius's Decision Tree. Republic of Pictures. Relating the Arts. Freedom of Expression.



ENCE AS TO THE ASCENT OR PHYLOGENY OF MAN

Abb. 1. Graphische Darstellung der Ähnlichkeitsko-
 DOWN, HEIDELBERG, TRINIL, NEANDERTHAL AND RHODESIAN FOSSIL RACES

Eric Hounshell, Ruth Amstutz (eds.)

cache 03

SHADOW OF THE TREE

intercomverlag

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Authors' collective
Acknowledgements, Imprint

Editorial

Diagrams have long been used to describe, claim, and produce the relatedness of human individuals and groups, animals, and plants: medieval *arbores consanguinitatis* defining forbidden marriages; genealogies from across the centuries proving noble descent, relatedness of powerful lineages, or “purity of blood”; sixteenth-century bracket diagrams of plant affinities; Enlightenment genealogies of domesticated animal and plant breeds; family trees of the nineteenth-century high-bourgeois elite *Daig* of Basel; genealogical tables and trees in kinship anthropology, from W.H.R. Rivers to the French structuralists; didactic illustrations of Mendelian inheritance. The tree form seems to have attained particular dominance for representing relatedness, both within specific domains of practice and in historical scholarship. This pertains, moreover, to representations of non-organismic entities such as “the arts” or musical chords that nevertheless draw from and flow back into the broad cultural history of the tree. But in fact a wide variety of diagrams have been devised and redeployed since the medieval period, sometimes in connection with the tree, other times as an explicit alternative, or as an invention that appears entirely separate from the supposedly salient form. These include forms such as the scale, net, map, mosaic, or cluster – as well as improvised and idiosyncratic diagrammatic representations that do not fit into established genres: biological or cultural relatedness of human groups charted in clustered heat maps, geographical space, or ovular forms on a Cartesian plane; the mysterious and beautiful scrawlings of the Romantic poet Adalbert Chamisso. This volume wishes to bring the variety of diagrammatic forms out from under the “shadow of the tree” while also taking seriously the persistent ubiquity of the tree and its implications.

The conceptual framework and scholarly network for this publication come from the Swiss National Research Foundation Sinergia grant project *In the Shadow of the Tree: The Diagrammatics of Relatedness as Scientific, Scholarly, and Popular Practice* (2019–2024) formulated and led by principal investigators Marianne Sommer, Caroline Arni, Staffan Müller-Wille, and Simon Teuscher. Preliminary summaries of the project’s findings can be found in the introductions to two journal special issues.¹ The project consisted of four teams of doctoral and postdoctoral researchers, each led by one of the principal investigators, based at the universities of Lucerne, Basel, Lübeck/Cambridge, and Zurich respectively. We interacted through a series of workshops and conferences. One such workshop at Lucerne in November 2021 served as a kick-off and collective editorial session for this volume. There, we exchanged drafts of our contributions, contemplated in detail the best uses of the cache medium for our purposes, discussed the thematic arrangement of the publication, and suggested further commissions.

To examine the varied diagrammatics of relatedness – and the iconographic aspects that lend meaning to them and facilitate their circulation – this volume brings together a commensurately diverse mix of historians of the natural and human sciences, social historians, philosophers, and historians of art and media. All contributors interacted in one way or another through the Sinergia project as doctoral and postdoctoral researchers, guests, commentators, conference speakers, or as authors and long-time colleagues whose work has enriched our knowledge of the topic. The contributors were invited to compose an “exhibit” based on an image or a set of interrelated images of

their choice pertinent to the representation of relatedness in their area of research. We welcomed experimental approaches and interpretations, objects resistant (for whatever reason) to treatment in more conventional formats, images that lent themselves especially well to digital/print hybrid publication, and dispatches from ongoing research. Accordingly, *Shadow of the Tree* is not intended as an exhaustive or even necessarily representative selection of "canonical" diagrams of relatedness.

From the beginning, the publication was conceived as a "catalog for an exhibition that never took place" and each chapter as a vitrine with one or more objects on display. Perhaps fittingly, the publication is ultimately not only one final product of the Sinergia project but has also helped compensate for the inhibitions placed on typical scholarly life by the covid-19 pandemic. For scholars more in the habit of writing expository texts in conventional academic genres than of placing images at the center of an experimental medium, finding the means to communicate the visual content through the cache layout in print and digital formats was a collective process. This often facilitated a different sort of engagement, more collaborative than is typically the case. The arrangement of the contributions and the specific utilization of the cache medium have resulted from discussions among the editors, the leaders of the research group, and doctoral and postdoctoral researchers within the Sinergia project. Further, it was the spontaneous experimentation with the format by each contributor within the rough guidelines set by the editors that led to the diversity and richness of the pieces on offer.

The four parts to this volume reflect the project's points of departure laid out by its principal investigators and further discussed at our November 2021 workshop in Lucerne. First, as stated above, relatedness is not only conceived in the form of a tree. There are many other *Forms*, which is all the more reason to puzzle over the appeal of the tree, both its logic and its iconicity, and its consequences. Second, the particular fixation on *Descent* as a preeminent kind of relation is widespread across time, space, and subject matter or field of inquiry. Further, diagrams of relatedness are not merely abstract intellectual products but are bound up with concrete *Practices* and bear the traces of their uses in specific settings. And finally, the history of diagrams of relatedness is non-linear and is characterized by gaps, loops, redeployment, nesting, layering, or, to put it most generally, *Recurrence* of forms and practices.

Through the arrangement of these short but rich chapters into parts, we as editors engaged in something that we came to understand, playfully, as the construction of a diagram. Here we take our cue from Charles S. Peirce's functional conception of diagrams, which goes beyond the everyday notion of the diagram as a sensually perceptible figure and points out the semiotic work involved in constructing and reading diagrams. According to Peirce, the primary task of diagrams is not the representation of objects themselves but the representation of relations of similarity between objects. In order to construct a diagram – to establish those relations of similarity – one must determine which characteristics of the object should be represented as essential. This, in turn, introduces certain rules for reading. The arrangement of the contributions to this volume into four parts suggests such a rule: it is hoped

that the viewer can gain an impression of each conceptual point above through both sequential and non-linear reading. Many of the chapters could have been placed just as well in one part or another based on their content alone. Their fixed arrangement, however, gives particular weight to one aspect, while topical, formal, or chronological resonance with chapters in other parts may provoke a different reading. Here, too, we find Peirce relevant, as he described the way that diagrams facilitated the discovery of the unexpected through the examination of different configurations as a key feature of diagrammatic reasoning. And indeed, as viewers navigate the digital edition in particular, they may jump between disparate contexts and visual forms, allowing the analytical and inquisitive mind to fill its "cache" of objects and associations, luring the reader into unfamiliar terrain and fresh perspectives.

Eric Hounshell and Ruth Amstutz, Zurich, November 2023

Notes

- 1 Caroline Arni, Marianne Sommer, Simon Teuscher: "Diagrammatik der Verwandtschaft: Beiträge zu einer langen Geschichte", in: *Historische Anthropologie* 31/1 (2023), pp. 7–12; Marianne Sommer, Staffan Müller-Wille, Simon Teuscher, Caroline Arni: "In the Shadow of the Family Tree: The Diagrammatics of Relatedness in Genealogy, Biology, and Anthropology as Epistemic, Cultural and Political Practice", in: *History of the Human Sciences* (forthcoming 2024).

Further Readings

Caroline Arni, Marianne Sommer, Simon Teuscher: "Diagrammatik der Verwandtschaft: Beiträge zu einer langen Geschichte", in: *Historische Anthropologie* 31/1 (2023), pp. 7–12.

Matthias Bauer, Christoph Ernst: *Diagrammatik: Einführung in ein kultur- und medienwissenschaftliches Forschungsfeld*, Bielefeld: transcript (2010).

Charles S. Peirce: "On the Algebra of Logic: A Contribution to the Philosophy of Notation", in: *American Journal of Mathematics* 7/2 (1885), pp. 180–96.

Marianne Sommer, Staffan Müller-Wille, Simon Teuscher, Caroline Arni: "In the Shadow of the Family Tree: The Diagrammatics of Relatedness in Genealogy, Biology, and Anthropology as Epistemic, Cultural and Political Practice", in: *History of the Human Sciences* (forthcoming 2024).

Frederic Stjernfelt: "Diagrams as Centerpiece of a Peircian Epistemology", in: *Transactions of the Charles S. Pierce Society* 36/3 (2000), pp. 357–384.

FORM

INTRODUCTION

Many different forms appear to be thriving in the shadow of the tree: triangles, roundish contours drawn around adjacent dots, islands spread over an imaginary landscape with different distances between them, and revolving disks on the background of a starry sky. The part on form reminds us that diagrams of relatedness are not only native to science but also to devotional art, constitutional pomp, and political caricature. Forms include very abstract and minimalist shapes expressing relations or “logics” but have in some areas become elaborate iconographies or acquired iconic status. Some of them resulted from momentary thoughts that have long since been forgotten. Others outlasted centuries and were easily recognized even as they traveled from one domain to the next.

The diversity of forms is also related to the fact that attempts to bring order into biodiversity up to the late eighteenth century could still draw on notions of kinship and relatedness entirely different from genealogical ones. We are reminded of this when looking at Paul Dietrich Giseke’s “Genealogical-Geographical Table of Plant Affinities” from 1792 that Staffan Müller-Wille examines. ►FORM/PLANT AFFINITIES To approach the layers of meanings Giseke put into his notion of “affinity” and into his map of islands, Müller-Wille mobilizes contemporary meanings of affinity including Goethe’s *Wahlverwandtschaften*, the “rapports” between chemical substances, and republican ideas of sociality without hierarchy.

Does form follow function? Not if we assume that a diagram’s principal task is to manifest unequivocal relations. Some diagrammatic traditions evolved around a basic structure that could be represented in rapidly changing forms. Christiane Klapisch-Zuber and Herman Schadt have made this point about *arbores consanguinitatis*, the diagrams of consanguineous kinship in the Middle Ages.¹ These present a set of structural relations between kin that remained stable over centuries, while draftspersons brought them into many different iconographic shapes that include bodies, crosses, columns, buildings, and plants.

►RECURRENCE/TREE OF CONSANGUINITY

Someone who believed in optimizing the functionality of tree diagrams was Jacques Bertin. Charlotte Bigg examines his work at the Laboratoire de cartographie he had founded in 1954 at the Ecole Pratique des Hautes Etudes in Paris. ►FORM/DESIGNING BETTER TREES The *laboratoire*, where Bertin worked with authors such as Claude Lévi-Strauss and Fernand Braudel, was key to shaping the visual features of French structuralism in the social sciences and the Annales school in history. Bigg’s contribution lets us look over Bertin’s shoulders as he tries and rejects a series of similar forms in his quest to find the most efficient diagrammatic representation of kin relations and other structural relationships.

A similar formal variation characterized the medieval paintings of Divine Kinship discussed by Séverine Lepape. ►FORM/DIVINE KINSHIP All her “Trees of Jesse” are in principle built around a direct genealogical line connecting fathers and sons, beginning with King David’s father Jesse (*Isai*) and ending with Christ. Yet many of the paintings relativize the very linearity they are based on. They represent the principal line as split into two, as serpentine, or provide it with attributes of a tree even though the line does not bifurcate and hence lacks the defining feature of a tree diagram in current logic.

Forms are suggestive. They foster hopes and illusions. The Zurich *Regimentsspiegel* veils the linear and contingent character of successions to offices in the city-state of Zurich.

►FORM/CLOCKWORK KINSHIP The lines of successors to the same office were wound into spirals and squeezed onto rotating disks. This suggests a cyclical order, comparable to the revolu-

tion of clockwork or orbiting planets. The ponderous object that once stood in the city council's assembly hall conjured up mechanisms that had never been operative in the city's government.

Sometimes it is difficult to find any connection between a diagram's uses and its formal features. An example is the most enigmatic of the diagrams in this part: a drawing found in the papers of the botanist and Romantic poet Adelbert von Chamisso. Hans-Jörg Rheinberger and Hanns Zischler each have their theory about that drawing: ▶FORM/MONOGRAMMA Is it a representation of affinities between plant species before the domination of the tree diagrams and the phylogenetic assumptions they tend to carry? Or Chamisso's attempt at reiterating his travels in the Pacific Ocean? Each of the theories is convincing. But as the authors admit, neither explains the most striking formal feature of the drawing: its elaborate symmetry.

Forms can be clues to a diagram's role in contention or persuasion. They contribute to a diagram's "eloquence," as Andrea Ceccon puts it. ▶FORM/BLOOD GROUP RACE His example deals with the American anthropologist of the 1930s, Alfred Louis Kroeber. He rejected older theories of the division and evolution of races based on serological differences. Kroeber felt he also had to replace the diagram that had long been associated with such theories: Streng's *Rasse-dreick* mapping frequencies of blood groups in the shape of a triangle that resembled an inverted tree and suggested that racial groups evolved from one common origin, from where some would have advanced further than others. Instead, Kroeber plotted the same data on a Cartesian coordinate system. The new diagrammatic form made manifest that serological differences crisscrossed received ideas about races and their closeness and distance.

Diagrams of relatedness move to the center of feisty political polemics in the satires and caricatures of the nineteenth century that Stéphane Jettot investigates. Here family trees were used to epitomize the decline of dynasties in the face of an emerging consumer culture.

▶FORM/TREES FROM DYNASTIC TO NATIONAL EMBLEM The pedigrees that had formerly justified social precedence now stood for undeserved privilege, pretension, and greed at the expense of a broader public. The tree, the ascending branches of which are populated by officers who enrich themselves more ruthlessly the higher they have climbed, ridicules the aristocratic concern with old and older descent. At the same time, genealogical trees were remodeled to represent a time-honored political order that had to be preserved from attacks and "tiny gardeners" such as Napoleon, who entertained entire seed-plots of tiny dynastic seedlings.

When forms of diagrams are charged with temporality, they can be mobilized to build antagonisms between the old and the new. The representations of Divine Kinship that Séverine Lepape examines are paradigmatic. They attribute the linear succession along patriline with the Old Testament and its genealogical lists structured by indications of fathers who begot sons, who in turn became fathers who begot sons. This line culminates and ends when a woman, the Holy Virgin, appears at its height and marks the intervention of a new mode of procreation: the incarnation of God himself, the transition to the New Testament, and the time of salvation. In one of the paintings that Lepape examines, the new mode of reproduction is moreover represented in a separate image. Similar juxtapositions of the old and the new are at the core of the political caricatures Stéphane Jettot discusses. Here, tree diagrams and their many derivations were used as symbols of the old across the board. While progressives defamed the corrupted family trees of the nobility, conservatives used mighty trees to glorify the durability of the nation and the state. No wonder that also scientists dispose of iconic diagrammatic forms and recur to new ones to boost claims of their theories' novelty. In many cases, form follows politics.

Notes

- 1 Christiane Klapisch-Zuber: *L'ombre des ancêtres: essai sur l'imaginaire médiéval de la parenté*, Paris: Fayard (2000); Hermann Schadt: *Die Darstellungen der Arbores Consanguinitatis und der Arbores Affinitati. Bildschemata in juristischen Handschriften*, Tübingen: Wasmuth (1982).

DIVINE KINSHIP Old Testament and New



Tree of Jesse, *Bible des Capucins* (ca. 1150-1200), Paris: Biblio-
 thèque nationale de France, Département des Manuscrits, Latin

16746, 7v. Online: <https://gallica.bnf.fr/ark:/12148/btv1b85144288>.

Jesse lies sleeping. The stem, in the form of a solid trunk, extends from his crotch. On the main, vertical branch, King David, his son, King Solomon, the Virgin Mary and, at the very top, Christ, haloed by the seven gifts of the Holy Spirit are depicted. On the sides, in medallions, all the prophets of the Old Testament are represented. The winged man to the right of Jesse, symbol of Saint Matthew, turns towards him and declares "*sic deus ex Jesse voluit carnaliter esse*" (Thus, God wanted his existence in the flesh to originate from Jesse).

This image of the Tree of Jesse draws its textual sources from a prophecy in the Book of Isaiah, chapter XI. Jesse, at the origin of this stem, is the father of King David. From the fourth century onwards, Saint Jerome understood and glossed the prophecy as the Old Testament announcement of the coming of Christ (the flower) through Jesse (the root) and the Virgin (the stem).

"And there shall come forth a rod out of the stem of Jesse, and a Branch shall grow out of his roots."

Isaiah XI:1, *King James Bible* (1611).
Online: <https://www.kingjamesbibleonline.org/Isaiah-Chapter-11/>.

The prophecy in Isaiah XI served as textual source for the Tree of Jesse image.

In twelfth-century manuscripts, the Tree of Jesse became the image used to visually explain the beginning of the book of Saint Matthew, the *Liber Generationis*. This text begins with a genealogical list of Christ's ancestors from Abraham to Joseph. In the *Bible des Capuchins* (ca. 1150-1200), the Tree of Jesse image is contained within an illumination of the letter "L."

"The book of the generation of Jesus Christ, the son of David, the son of Abraham. Abraham begat Isaac; and Isaac begat Jacob; and Jacob begat Judas and his brethren; [...] And Jacob begat Joseph the husband of Mary, of whom was born Jesus, who is called Christ. So all the generations from Abraham to David are fourteen generations; and from David until the carrying away into Babylon are fourteen generations; and from the carrying away into Babylon unto Christ are fourteen generations."

Matthew I:1-17, *King James Bible* (1611).
Online: <https://www.kingjamesbibleonline.org/Matthew-Chapter-1/>.

The first chapter of the book of Saint Matthew, verses 1-17, gives the genealogy of Christ. The *Bible des Capuchins* illustrates the textual genealogy with a Tree of Jesse.

The notion of incarnation was essential for medieval theologians. Christ could only save mankind because he had become flesh. And how could he become flesh, if not by being born and becoming part of a biological lineage? This is what the Tree of Jesus shows: the kinship of Christ.

DIVINE KINSHIP Virgin Mary

Christ is incarnated in a lineage of the kings of Judah since Jesse, but the original sin transmitted by this lineage is broken thanks to Mary, who begets Christ by the Holy Spirit while remaining a virgin. A woman of the flesh but without sin, she constitutes the point of articulation of these two poles. She is the one who makes it possible to achieve divine spiritual kinship. The ascending plant offers the principle of hierarchization of the two notions, with Christ at the top and the ancestors at the bottom.¹

From a genealogical point of view, she is also the only one who can make the link between the Old and New Testaments because Joseph, a descendant of David and the kings of Judah, is not Christ's biological father. Christ's father is God. So that Christ could have a relationship with Jesse, theologians invented a story for Mary. In the eleventh century, she became a descendant of the kings of Judah. The Tree of Jesse can therefore also be understood as the Virgin's genealogy. Until the end of the fourteenth century, the Virgin Mary was depicted as an adult, separate from and subordinate to her son in the Tree of Jesse. But from the 1400s, in France, she gained a new position: she became the culmination of the Tree. Christ is depicted as a child in the arms of his mother. From *virga* (the stem), she became the *flos* (blossom), occupying the place once accorded to Christ in the Tree of Jesse.



Tree of Jesse from Jacques de Voragine: *Légende dorée* (late 13th c.), Paris: Bibliothèque nationale de France, Département des Manuscrits, French 245, 84r. Online: <https://gallica.bnf.fr/ark:/12148/btv1b8425999d>.

This illumination from the *Légende dorée* depicts the Virgin Mary as offspring of Anne and Joachim. Under it, two scenes show the kinship of the Virgin. The first illustrates

her birth from the elderly Anna, who was not supposed to be of reproductive age. On the right, Anna is represented with her three daughters. A legend of growing popularity in the eleventh century in Europe said that she was married three times and had from each union a girl: Mary, the mother of Christ, Mary Salome, who begets Saint John the Evangelist and Saint Jacques the Minor, and Mary Cleophas, mother of Joseph Barsabbas, Simon, Jude, and James the Great. All those apostles are believed, according to the legend, to be cousins of Jesus.

Jacques de Voragine's *Légende dorée* (late 13th c.) speaks of the history of the Virgin Mary: all the ancestors of the *Liber Generationis* are to be found there. But the stem bears at the very end her parents, Anne and Joachim, who are not present in the text of Saint Matthew. They embrace. Since the twelfth century, the Church and theologians had been engaged in a protracted debate over the Immaculate Conception of the Virgin. The idea that she was conceived without sexual intercourse gradually gained ground, supported by the story of the Meeting at the Golden Gate of her elderly parents. As they embraced or kissed, they conceived the Virgin. She emerges from a white flower, a symbol of her purity.

DIVINE KINSHIP Spiritual Kinship

The Tree of Jesse expresses Christ's kinship in a hierarchical way, idealized by the Church and its representatives. Since the Gregorian reform of the eleventh century, clerics believed themselves to be separated from the laity by their lifestyle: chaste and celibate, they renounced procreation. Yet they did not think of themselves outside the bonds of kinship. Their relationships are governed by spiritual rather than corporeal kinship.²

So it is not surprising that at the beginning of the sixteenth century religious orders represented their history and the ties that bind them according to the paradigm of the Jesse Tree,³ which can be understood as an "anti-genealogy."



Tree of Jesse and Tree of Dominicans from Hans Holbein, *High Altar of the Dominican Church in Frankfurt* (1501) [76.3 x 277.5cm], Frankfurt: Städel Museum, HM 6-20; LG 1. Online: <https://sammlung.staedelmuseum.de/en/work/high-altar-of-the-dominican-church-in-frankfurt-1>.

Child Jesus, symbolizing the Virgin's womb and their maternal link.

On the outer panels of the altarpiece, Hans Holbein created a dialogue between a Tree of Jesse and a Dominican tree. Saint Dominic is seated in a cathedra, surrounded by three Dominicans: Vincent Ferrier, Thomas Aquinas, and Peter of Verona. The stem starts from Saint Dominic's chest and develops into flowering tendrils, from which emerge ten illustrious Dominicans.

Opposite, the Tree of Jesse shows Jesse seated, surrounded by Abraham, Isaac and Jacob. Dominic spiritually begets the members of the order. This lineage is surmounted by the Virgin and Child, who offers a scapular to one of the Dominicans, whereas in the Tree of Jesse, she gives a fruit to the

The Dominican, renouncing the world and the system of carnal kinship that characterizes it, finds in the Virgin – more than a patron saint – a mother, in Saint Dominic a father, and in the other Dominicans brothers.

The Tree of Jesse is neither an appropriate image for Isaiah's prophecy, nor a perfect image of Christ's or Mary's genealogy: as an original and powerful creation of the medieval mentality, it is an image of ideal kinship in which the vegetal is uniting, ordering, and hierarchizing the lineage of god, between carnal and spiritual generation.

Notes

- 1 Anita Guerreau-Jalabert: "L'Arbre de Jessé et l'ordre chrétien de la parenté", in: Dominique Iogna Prat, Eric Palazzo, Daniel Russo (eds.), *Marie: le culte de la Vierge dans la société médiévale*, Paris: Beauchesne (1996) pp. 133-170.
- 2 Anita Guerreau-Jalabert: "Spiritus et Caritas: le baptême dans la société médiévale", in: Françoise Héritier-Augé, Elisabeth Copet-Rougier (eds.), *La Parenté spirituelle*, Paris: Archives Contemporaines (1996), pp. 133-203; Jérôme Baschet: *La Civilisation féodale: de l'an mil à la colonisation de l'Amérique*, Paris: Flammarion (2006), pp. 653-681.
- 3 Dominique Donadieu-Rigaut: *Penser en images les ordres religieux, XIe-XVe siècle*, Paris: Editions Arguments (2005).

Further Readings

Séverine Lepape: *Représenter la parenté du Christ et de la Vierge: l'iconographie de l'arbre de Jessé en France du Nord et en Angleterre, du XIIIe siècle au XVIe siècle* (Doctoral dissertation, EHESS Paris 2007), 11 vol. (506, 142, 132, 74, 59, 63, 95, 88, 54, 132 f.).

Séverine Lepape: "L'arbre de Jessé: une image de l'Immaculée Conception?", in: *Médiévales* 57 (2009), pp. 113-136.

TREES FROM DYNASTIC TO NATIONAL EMBLEM Pedigrees Attacked



William Hogarth, *The Marriage Settlement* (ca. 1743),
London: National Gallery, NG113.

In *The Birth of a Consumer Society*, Neil McKendrick reflected on the emulative role played by nobles and gentlemen in the growing market economy. Hence, they were the prime target of ingenious entrepreneurs – manufacturers, craftsmen, and booksellers – not only as wealthy customers but also as their most convincing influencers.¹ Simultaneously, from a bottom-up perspective, aristocratic values were modified by the constraints of a larger market of consumers. In private libraries, many ornamented and heavy folios were replaced by smaller dictionaries and pocket-books. Similarly, how then were early-modern family trees, which adorned so many country houses and were devised and crafted by painters, heralds, and glassmakers, reshaped by the social and political transformations of the eighteenth century? During the first Hanoverians, most genealogical compilations published in London replaced printed family trees by alphabetical listings and tabular charts. Many social commentators and artists, ridiculed the possession of family pedigrees. Once seen as coveted family treasure, this artifact appeared, as in William Hogarth's *The Marriage Settlement* (ca. 1743), out of place and derisory in a metropolitan context. From the fifteenth century onward, trees of Jesse were used to promote the glory of the living members in the higher branches while the prime ancestor lay asleep on the ground.² Hogarth in his painting turned this logic on its head, as the gouty and ailing noble was the degenerate descendant of a once glorious duke of Normandy. Hogarth's tree is one of the many caricatures that used family trees to lambast a declining dynastic culture. Later in the century, when political radicalism

was at its peak, family trees were even used to launch personal attacks, as in James Ridgway's *The Rolliad*.



Detail from William Hogarth, *The Marriage Settlement* (ca. 1743), London: National Gallery, NG113.

In the first painting of the famous *Marriage à la mode*, William Hogarth represented a gouty noble, Earl Squanderfield, who had lost his fortune and was therefore forced to marry his son into the mercantile class. Deprived of his son, unable to finish his country house which is seen in a state of semi-ruin in the background, he nonetheless proudly exhibited a decorated parchment of his pedigree.



Avito frondet honore, Publish'd for J. Ridgway (1785), London: British Museum, BM: J,2.40.

In *The Rolliad*, a collective satire against the government, the publisher James Ridgway inserted the burlesque pedigree of John Rolle, MP for Devon. Duke Rollo, the presumptive ancestor was depicted lying on the ground with his sword and Coronet while his latest descendants were introduced as "the most eminent of this great family": namely Walter Roll, a "very tall man," and Jeremiah, a "very fat man," and his mother Dorothy, whose main deed was to have died of dysentery.

TREES FROM DYNASTIC TO NATIONAL EMBLEM Polysemic Trees

These puns and caricatures did not mean that tree-shaped diagrams definitely lost their visual and naturalistic appeal. We can only provide a brief outlook of a plurisecular evolution from a dynastic tree to a more inclusive symbol. During the first British revolution in the 1640s, the oak came to represent both the Stuart dynasty – identified by its coat of arms – and the Constitution. Later, during the eighteenth century, trees were increasingly used as a metaphor for the state and ceased to be linked to the Stuarts.



Frontispiece to Clement Walker's *Anarchie Anglicana, or, The History of Independency, the Second Part* (1649), London: British Library, BL : E.1052.

In this caricature by Clement Walker (The Royal Oake of Brittain), Cromwell was accused of not only destroying the Stuart dynasty but also of unrooting the Bible, the Magna Carta, and the Statutes.



William Guthrie, *A Complete History of the English Peerage* (1763), Edinburgh: National Scottish Library, AB. 8.90.2.

In 1760, with the accession of George III and the promotion of a consensual British identity, Britannia came to be represented sitting under an oak.

Radical caricaturists were also inspired by the semantic richness of the state tree. In a 1783 caricature directed at the government, an apple tree simultaneously represented the state, its rewarding sinecures, the aspiring elite climbing up a social scale, and the tree of sin. Again, as in the case of John Rollo, those higher up in the tree were expected to be the more corrupted.



John Barrow, *The Golden-Pippin Boys, on the Branches of State* (1783), London: British Museum, BMSat 6248.

TREES FROM DYNASTIC TO NATIONAL EMBLEM Tree as Nation

In the tumultuous years of the American and French Revolutions, trees were remobilized to fulfill a more conservative and national agenda. As American and French revolutionaries successfully used the emblem of the liberty tree, British caricaturists came to use tree as a national and loyalist symbol.



James Gillray, *New Dynasty - or - The Little Corsican Gardiner Planting a Royal-Pippin-Tree* (1807).

In the war against Napoleon, James Gillray used the same oak tree, carrying the same emblems to create a startling contrast with the small trees planted by the dictators. While Napoleon was accused of planting a crop of illegitimate princes from his own family, the royal oak no longer represented a dynasty, or even the English kingdom but the whole British nation. It bears the following principles: "monarchy," "protestant faith," "integrity of the Lord," "independence of the Commons," and "liberty of the press."

Hence, the old dynastic tree came to be reinvented to suit a more inclusive and patriotic culture. These various examples provide only a snapshot of the remarkable creativity demonstrated by eighteenth-century London publishers and caricaturists in their reconfigurations of the early-modern dynastic trees.

Notes

- 1 Neil McKendrick, John Brewer, J. H. Plumb: *The Birth of a Consumer Society: The Commercialization of Eighteenth-Century England*, Bloomington: Indiana University Press (1984).
- 2 Christiane Klapisch Zuber: *L'arbre des familles*, Paris: Edition de la Martinière (2009); Susan L. Green: *Tree of Jesse Iconography in Northern Europe in the Fifteenth and Sixteenth Centuries*, Farnham: Ashgate (2020).

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Sarah Easterby-Smith, Emily Senior: "The Cultural Production of Natural Knowledge: Contexts, Terms, Themes", in: *Journal for Eighteenth-Century Studies* 36/4 (2013), pp. 471–476.

Marc-Edouard Gautier: *Mille ans d'histoire de l'arbre généalogique en France*, Rennes: Ouest-France (2007).

Kilian Heck, Bernhard Jahn (eds.): *Genealogie als Denkform in Mittelalter und Früher Neuzeit*, Tübingen: Max Niemeyer (2000).

Stéphane Jettot: *Selling Ancestry: Family Directories and the Commodification of Genealogy in Eighteenth Century Britain*, Oxford: Oxford University Press (2023).

CLOCKWORK KINSHIP Dynamics of the Regime



Regimentsspiegel of the City of Zürich (1657-1798), signed by painter Hans Heinrich Schwyzer (1618-1673), [244 x 225cm (closed)], oil on wood. Zurich: Swiss National Museum, LM3611.

This ponderous object is called the "*Regimentsspiegel* of the city of Zurich." It looks a little like a winged altarpiece with its central corpus that can be enclosed by moveable wings. An audience of the seventeenth century probably also associated the revolvable disks in the center with the astronomic clocks that were en vogue at the time. Their disks showed orbits of planets and hid underlying mechanics that drove the disks across successive planetary constellations.

Video of the *Regimentsspiegel* with details and human for scale.

Regimentsspiegel of the City of Zürich (1657-1798), signed by painter Hans Heinrich Schwyzer (1618-1673), [244 x 225cm (closed)], oil on wood. Zurich: Swiss National Museum, LM3611. Video filmed and edited by Lorenz Dändliker and Julian Miguez. VIDEO ► cache.ch/0405

The *Regimentsspiegel*, despite the painted stars on a deep blue background, represented neither divine nor profane celestial spheres but the dynamism of the city state's regime. It was placed in the assembly hall of the city council of Zurich in 1657. There it remained until the year 1798, when French troops invaded the city. They abolished Zurich's patrician constitution that the *Regimentsspiegel* had translated into a moveable diagram and stored the object itself away.¹ Today it stands in the Swiss National Museum.²

CLOCKWORK KINSHIP Revolving Disks



Detail from *Regimentsspiegel of the City of Zürich* (1657-1798), signed by painter Hans Heinrich Schwyzer (1618-1673), [244x225 cm (closed)], oil on wood. Zurich: Swiss National Museum, LM3611. Video filmed and edited by Lorenz Dändliker and Julian Miguez. VIDEO ► cache.ch/0407

Each office in the city's government is represented by one of the 162 revolving disks. While the large disks are reserved to the mayor and the council members, the smaller ones represent minor offices down to the guards of the city gates. On each disk we find the names and, far better visible, the coats of arms of all the office holders. The series starts with the individuals who held the respective office in the year 1498, placed at the center of the disk, and successively spiral outwards. The names and coats of arms of newly elected officers were added at regular intervals.

The revolving orbits suggest a political order that interlocks kinship and the distribution of the city's offices. The linearity of the dynastic kinship organization is implied but suppressed to the advantage of an emphasis of rotation. The coats of arms stand for *Geschlechter*, dynasties, defined by successions from fathers to sons. The revolving disks with their succession of coats of arms do not show such pedigrees but how members of the different dynasties recur in offices over the centuries. Accordingly, the hierarchy of offices can be read as alignments of the city's leading dynasties in constantly shifting constellations. And the whole apparatus stands for the similarities between the bureaucratic hierarchies of early states and the rigidly regulated inequalities within and between the dynasties of the period.

CLOCKWORK KINSHIP Denying Genealogical Linearity



Detail from *Regimentsspiegel* of the City of Zürich (1657-1798), signed by painter Hans Heinrich Schwyzer (1618-1673), [244x225 cm (closed)], oil on wood. Zurich: Swiss National Museum, LM3611.

The insistence on rotation was programmatic. The spiral order of the entries on each disk suggest a turning movement, even when the disks stand still. This stands in contrast to a succession of officeholders that in principle was linear. In a strict sense, neither the constitution nor the actual outcome of elections provided for a regular alternation between dynasties. Even though elections were manipulated now and then, their outcomes remained largely unpredictable. In a more general sense, however, it was true that members of a relatively small number of families shared the power in the city and that the same family names year after year kept recurring in lists of officeholders. The *Regimentsspiegel* intimates that this system operated like clockwork and elevates its regularity to celestial heights. Also part of this was the suggestion that the object's interior, like the one of an astronomical clock, hid a system of gears and wheels allowing for a coordinated movement of the different disks. In reality, however, each disk turns on its own and the interior is void.

As is often the case in politics, the fantasy of harmony rested on rigid mechanisms of exclusion. The *Regimentsspiegel* takes for granted that a narrow group of families monopolized the city's office. It is all the more striking that the object itself owes its existence to an outsider's attempt at being included. It was a gift of the Swabian craftsman Hans-Heinrich Schwyzer, an immigrant to Zurich. His gift to the council was an attempt at giving his application for citizenship in Zurich – quite literally – more weight.

Notes

- 1 With more references: Dario Gamboni, Georg Germann (eds.): *Zeichen der Freiheit: Das Bild der Republik in der Kunst des 16. bis 20. Jahrhunderts. Katalog zur Ausstellung im Bernischen Historischen Museum 1.6-15.9.1991*, Bern: Stämpfli (1991), pp. 193-194.
- 2 Sammlung Online des Schweizerischen Landesmuseum, <https://sammlung.nationalmuseum.ch/de/list?searchText=Regimentsspiegel&detailID=100100093>.

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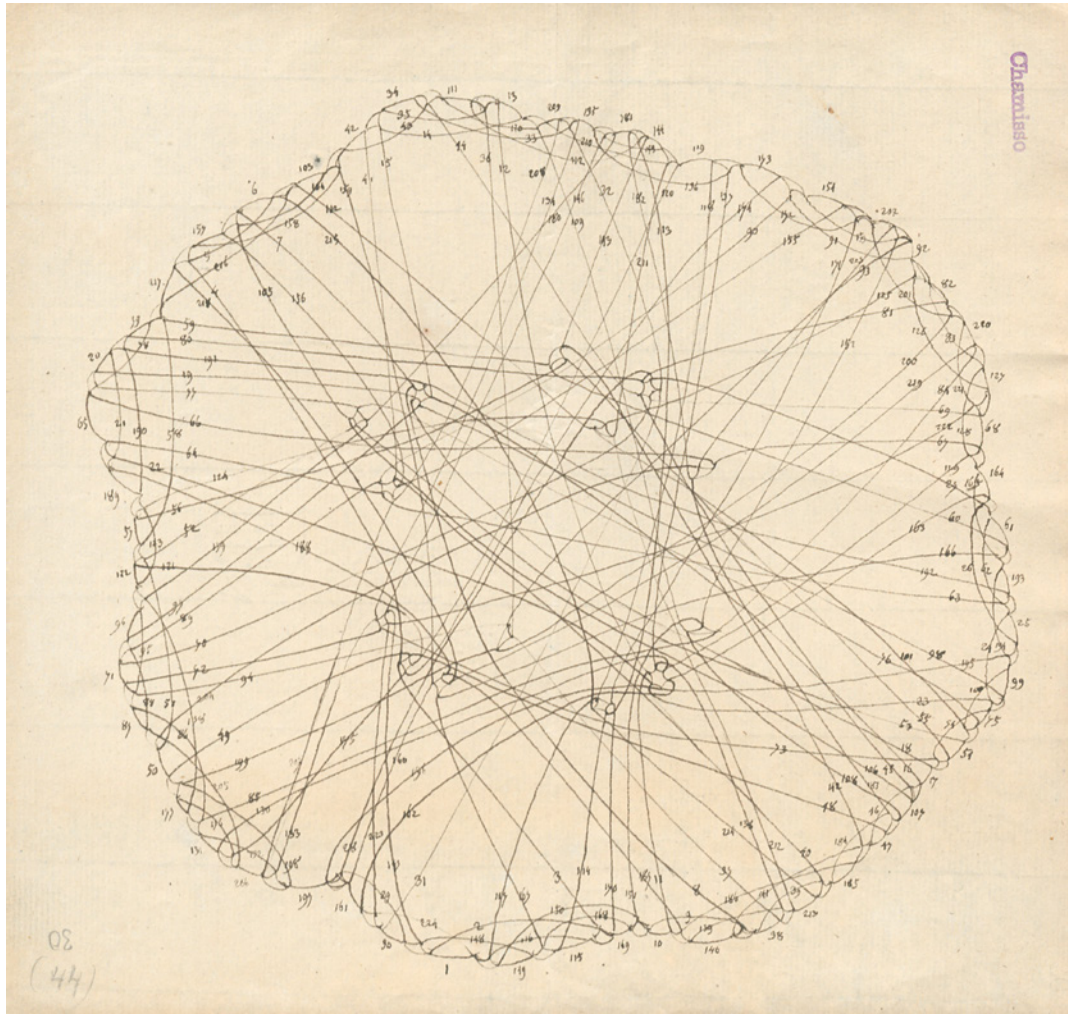
Hans-Jörg Gilomen: "Innere Verhältnisse der Stadt Zürich 1300-1500", in: Niklaus Flüeler, Marianne Flüeler-Grauwiler (eds.): *Geschichte des Kantons Zürich Band 1, Frühzeit bis Spätmittelalter*, Zürich: Werdverlag (1995), pp. 336-389.

David Warren Sabean, Simon Teuscher, Jon Mathieu (eds.): *Kinship in Europe: Approaches to Long-Term Development (1300-1900)*, New York: Berghahn Books (2007).

Simon Teuscher: "Verwandtschaft in der Vormoderne: Zur politischen Karriere eines Beziehungskonzepts", in: Elizabeth Harding und Michael Hecht (eds.): *Die Ahnenprobe in der Vormoderne*, Münster: Rhema (2011), pp. 85-106.

Thomas Weibel: "Der zürcherische Stadtstaat", in: Niklaus Flüeler, Marianne Flüeler-Grauwiler (eds.): *Geschichte des Kantons Zürich Band 2, Frühe Neuzeit – 16. bis 18. Jahrhundert*, Zürich: Werdverlag (1996), pp. 16-65.

MONOGRAMMA Enigma



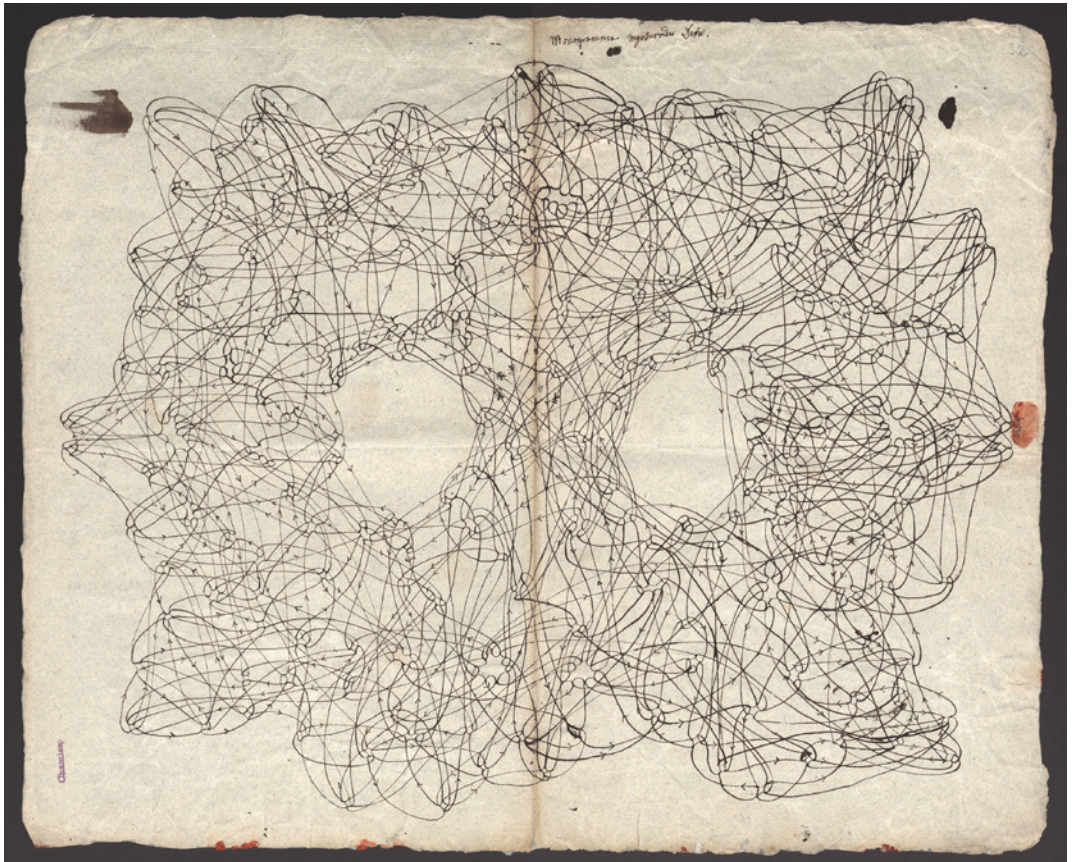
Adelbert von Chamisso, *Zahlen- und Linienschema* (n.d.), Berlin: Staatsbibliothek zu Berlin, Nachl. Adelbert von Chamisso, K. 3, Nr. 24, Bl. 30. Online: <http://resolver.staatsbibliothek-berlin.de/SBB0000C53000000000>.

This diagram found in the papers of Adelbert von Chamisso without explanation by its author has long vexed scholars. Is it a taxonomic system, or perhaps a Romantic reimagina-tion of his voyage?

The Staatsbibliothek in Berlin houses a good part of the posthumous papers of poet and naturalist Adelbert von Chamisso. Born in 1781 near Châlons-en-Champagne, his parents settled as emigrants in Berlin in 1796, where he frequented the Collège Français de Berlin and then served in the Prussian Army from 1798 to 1807. As a "titular savant," he participated in the Russian Rurik-Expedition around the World between 1815 and 1818 under Captain Otto von Kotzebue. Back from the voyage, Chamisso was named Second Custodian at the Royal Herbarium in Berlin-Schöneberg, where he remained until his death in 1838. One of us (H.Z.) had stumbled upon a number of enigmatic diagrams while delving into the papers of Chamisso in the late 2000s. Back then we were unable to achieve a satisfying

interpretation. A decade later, a workshop of the IKKM (Internationales Kolleg für Kulturtechnikforschung und Medienphilosophie) at the University of Weimar was again devoted to these diagrams. Together with a number of other interested colleagues, we once again pored over these mysterious diagrams. This time, too, we were not able to reach a conclusion. Recently, we came across a book-length report on Chamisso's travel around the world.¹ To our surprise it displays one of these drawings, accompanied by the following remarks: "The suspicion immediately suggests itself that the aims of such structure painting (*Strukturmalerei*) were simply concentration exercises, associative musings, or free digressive cogitations. It is, however, also conceivable that they served to describe, understand, and visualize anatomical or morphological structures in organisms for one's own comprehension."² The figure shown here is one of these diagrams. It contains altogether 224 numbered connection lines (actually a multiple of the prime number seven, relevant or not). Four relational nodes marking the four quadrants are identifiable, the whole diagram looking not unlike actual graphs of networks describing the relations between chemical molecules, citation clusters, or travel connections.

MONOGRAMMA Two Theories



Adelbert von Chamisso, *Linienchema* (n.d.), Berlin: Staatsbibliothek zu Berlin, Nachl. Adelbert von Chamisso, K. 3, Nr. 24, Bl. 32. Online: <http://resolver.staatsbibliothek-berlin.de/SBB0000C53500000000>.

The inscription at the top reads "Monogramma myosuroides Desv."

A possible interpretation of Chamisso's diagram is that it represents something like a taxonomic system. On the second drawing shown here, one reads the note: "Monogramma myosuroides Desv." Nicaise Auguste Desvaux (1784–1856), whose botanical author abbreviation is "Desv.," was a French contemporary of Chamisso and a specialist of grasses. Literary scholar Yvonne Maaß has interpreted this note as standing for (*Steno*)*Grammitis myosuroides* Schkuhr,³ a small fern species of the *Grammitis* genus, of the family of *Polypodiaceae* occurring in the Caribbean. The paper on which it is written would originally have served as an envelope for plant specimens. However, since it has the dimensions of ca. 40x50cm, it is unlikely to have served as an envelope for a fern shorter than a finger.

Monogramma, however, is another genus of ferns that contains slightly fewer than a dozen species. These ferns are geographically distributed between Madagaskar, Sri Lanka, and Malaysia. In contrast to the Caribbean, this area was part of Chamisso's world trip. But a species carrying the composite name of *Monogramma myosuroides* does not appear to exist in the botanical literature.

It is possible that the note and the drawing are not correlated but rather the result of an accidental juxtaposition. However, the inscription can also be interpreted in a different way (favored by H.R.). A monogram is traditionally seen as an artistic interlacement of initials. And "myosuroides" stands for the epithet "mouse-tail-like" in the botanical terminology. Quite a number of grasses carry this specification. "Monogramma" would then mean something like a condensed diagram of a number of related species, a sketch inserting itself in an ongoing effort of botanists and zoologists to visualize "natural systems" in the first part of the nineteenth century, before the tree diagram became prominent as a phylogenetic interpretation of organismic relationships.⁴



August Johann Georg Carl Batsch, *Tabula affinitatum regni vegetabilis*, Weimar: Landes-Industrie-Comptoir (1802), foldout page.

August Batsch was among those who attempted to visualize "natural systems" in the early nineteenth century, before the tree diagram became a common way to represent organismic relationships.

Perhaps it should be mentioned that Chamisso, while working for almost twenty years with Diederich von Schlechtendahl (1794–1866) at the Botanical Museum in Berlin-Schöneberg, was trying to conceal these drawings from his younger superior's eyes at all costs – and never to reveal, to anyone, the supposedly hidden "meaning" of those monograms. The very personal opinion of H.Z. today – after various presumptions – is that Chamisso, in his Romantic fervor of digression, was eerily dreaming *and drawing* himself back into the austere days of the circumnavigation. The envelope containing whatever plants that may have been was an ideal surface for the fantasizing seafarer. Good quality, ink-absorbent

paper was a rare material at the time. We cannot but admire the mastery of his terribly elegant, continuous stroke where the energy of the scientific explorer converges with the *désinvolture* of the Romantic poet. They are another symptom of the creative cleavage from which this German Frenchman suffered all his life.

What speaks for the latter view is that the graph shown here appears to constitute a continuous, uninterrupted line intersecting again and again on its trajectory. Both interpretations, however, fail to do justice to the obvious symmetry of these drawings. The last word about this riddle is thus not yet spoken.

Notes

- 1 Yvonne Maaß: *Leuchtkäfer & Orgelkoralle: Chamissos Reise um die Welt mit der Romanzoffischen Entdeckungs-Expedition (1815-1818) im Wechselspiel von Naturkunde und Literatur*, Würzburg: Königshausen & Neumann (2016).
- 2 Yvonne Maaß: *Leuchtkäfer & Orgelkoralle: Chamissos Reise um die Welt mit der Romanzoffischen Entdeckungs-Expedition (1815-1818) im Wechselspiel von Naturkunde und Literatur*, Würzburg: Königshausen & Neumann (2016), p. 78. Translation by the authors.
- 3 Christian Schkuhr (1741-1811) was a German botanist.
- 4 Among others, see Julia Voß: *Darwin's Pictures: Views of Evolutionary Theory, 1837-1874*, translated by Lori Latz, New Haven: Yale University Press (2010); Theodore W. Pietsch: *Trees of Life: A Visual History of Evolution*, Baltimore: The Johns Hopkins University Press (2012).

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Adelbert von Chamisso: *Tagebücher der Weltreise 1815-1818: Edition der handschriftlichen Bücher aus dem Nachlass*, Monika Sproll, Walter Erhart, Matthias Glaubrecht (eds.), Göttingen: Vandenhoeck & Ruprecht (2023).

Matthias Glaubrecht: *Dichter, Naturkundler, Welterforscher: Adelbert von Chamisso und die Suche nach der Nordostpassage*, Berlin: Galvani (2023).

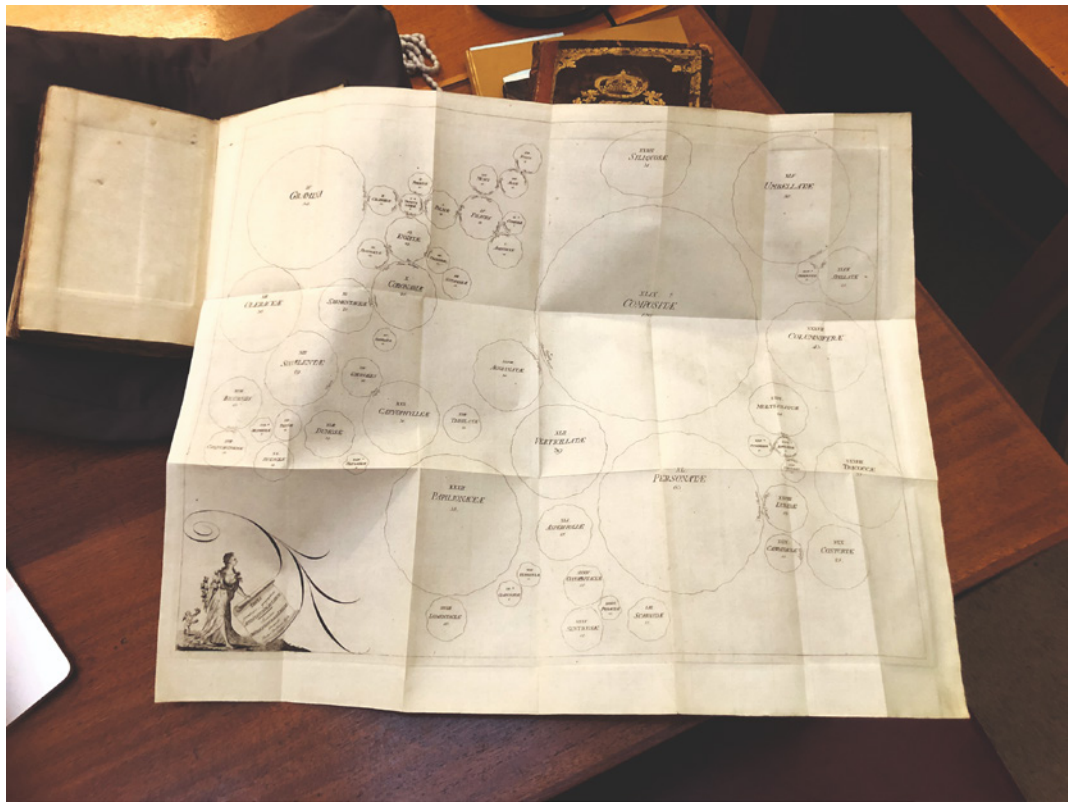
Yvonne Maaß: *Leuchtkäfer & Orgelkoralle: Chamissos Reise um die Welt mit der Romanzoffischen Entdeckungs-Expedition (1815-1818) im Wechselspiel von Naturkunde und Literatur*, Würzburg: Königshausen & Neumann (2016).

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Hanns Zischler: "Spuren, beginnlos: über einige abstrakte Skizzen und Zeichnungen aus dem Nachlass Adelbert von Chamissos", in: Jutta Müller-Tamm (ed.): *Labor der Phantasie: Texte zu Literatur- und Wissensgeschichte*, Berlin: Alpheus Verlag (2015).

PLANT AFFINITIES Genealogy and Geography



Paul Dietrich Giseke (ed.): *Caroli a Linne ... Praelectiones in ordines naturales plantarum. E proprio et Jo. Chr. Fabricii ... edidit Paulus Diet. Giseke*, Hamburg: Impensis Benj. Gottl. Hoffmanni (1792).
With kind permission by the Linnean Society of London,
www.linnean.org.

Paul Dietrich Giseke's "Tabula genealogico-geographica affinitatum plantarum," published in 1792 as a foldout table accompanying his edition of lectures by the Swedish botanist Carl Linnaeus. Copper engraving, 49 x 62 cm.

In 1792, Paul Dietrich Giseke (1741–1796) published an edition of lectures on the "natural orders" of plants given by Carl Linnaeus (1707–1778). The edition was based on notes that he himself and the naturalist Johan Christian Fabricius (1745–1808) had taken while attending Linnaeus's lectures during visits to Sweden in 1767 and 1771.¹ The volume contained a large foldout table, entitled "Genealogical-Geographical Table of Plant Affinities" (*Tabula genealogico-geographica affinitatum plantarum*) that today is remembered as a milestone in the history of graphical representations of biodiversity. Building on Linnaeus's famous aphorism that "all plants show mutual affinities, like a territory in a geographic map," it depicted plant diversity not in a linear series, as the ancient tradition of a *scala naturae* had it, but spread out in two dimensions.²

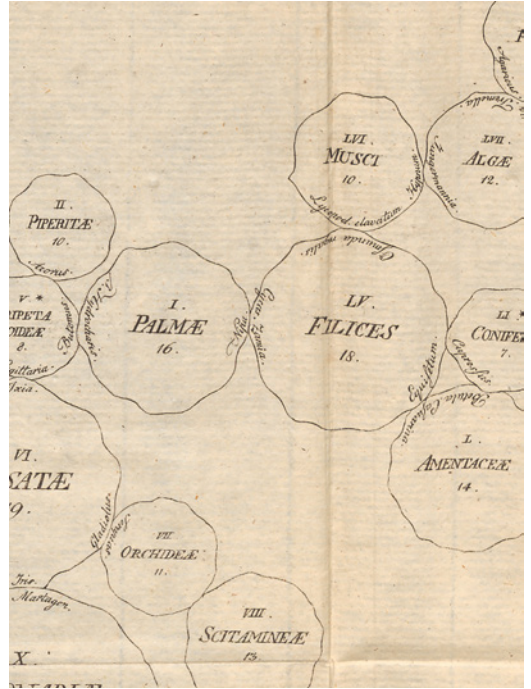
Helpfully, Giseke provided his readers with a detailed "commentary" that explained how to read his *tabula*. The circles represent natural orders as "provinces" (*provinciae*). Their "width" (*amplitudo*) represents the number of genera they contain. And their relative positions express "affinities" measured in terms morphological similarity. Thus some provinces are

"adjoined" (*finitimus*), others are "neighbouring" (*vicinus*), and some set apart as "islands" (*insulae*). The *Siliquosæ*, for example, are depicted at the top edge since "none of the islands is more distant from all the provinces and islands" than this one.³ With the help of Giseke's *tabula*, even the uninitiated reader can gain an intuitive grasp of plant affinities by literally reading it like a map.



Detail from "Tabula genealogico-geographica affinitatum plantarum", in: Paul Dietrich Giseke (ed.): *Caroli a Linne ... Praelectiones in ordines naturales plantarum. E proprio et Jo. Chr. Fabricii ... edit Paulus Diet. Giseke*, Hamburg: Impensis Benj. Gottl. Hoffmanni (1792). Online: <https://www.e-rara.ch/zut/content/zoom/5812789>.

Flora, chased by Cupid, both with roses in their hands, displays the title of the copper engraving.



Detail from "Tabula genealogico-geographica affinitatum plantarum", in: Paul Dietrich Giseke (ed.): *Caroli a Linne ... Praelectiones in ordines naturales plantarum. E proprio et Jo. Chr. Fabricii ... edit Paulus Diet. Giseke*, Hamburg: Impensis Benj. Gottl. Hoffmanni (1792). Online: <https://www.e-rara.ch/zut/content/zoom/5812789>.

Each circle symbolizes a "natural order" (*ordo naturalis*) of plants. At the center of each, the following information is displayed: a Roman numeral designating the position of the order in the linear succession of chapters of the book; the name of the order; and the number of genera it contains. Genera inscribed in their margins connect "neighboring" orders in terms of mutual "affinity." Thus, the two natural orders at the center of this image, i.e. the order of "palms" (*Palmae*, treated in the fifty-fifth chapter and containing sixteen genera) and the "ferns" (*Filices*, treated in the first chapter and containing eighteen genera), are connected by the mangrove palm (*Nipa*; today spelled *Nypa*) and two cycad or fern palm genera (*Cycas* and *Zamia*).

PLANT AFFINITIES Wahlverwandschaften

"[S]uch natures as, when they come in contact, at once lay hold of each other, and mutually affect each other, we speak of as having an affinity one for the other."

Johan Wolfgang von Goethe: *Die Wahlverwandschaften. Ein Roman*, Tübingen: J. B. Cotta (1809), vol. 1, p. 82. Translation quoted from Johan Wolfgang von Goethe: *Elective Affinities. A*

Novel, New York: Henry Holt (1872), p. 39.

"One can almost fancy, said Charlotte, that in these simple forms one sees people one is acquainted with; one has met with just such things in the societies amongst which one has lived."

Johan Wolfgang von Goethe: *Die Wahlverwandtschaften: Ein Roman*, Tübingen: J. B. Cotta (1809), vol. 1, p. 80. Translation quoted from Johan Wolfgang von Goethe: *Elective Affinities: A Novel*, New York: Henry Holt (1872), p. 39.

Historians of biology have been adamant that, prior to Darwin, genealogical metaphors in natural history cannot be taken literally. And indeed, Giseke stated explicitly that, by calling his table of plant affinities "genealogical," he did not want to imply that "one could trace [plant affinities] from grandfather to grandchildren." However, in a surprising *volte-face*, he added that the table might rather be read in the sense in which "cousins and in-laws are placed together so that the bonds by which they are connected are laid open."⁴ Diachronic descent was not what was captured by the table, but affinity in the sense of synchronic relations of kinship was.

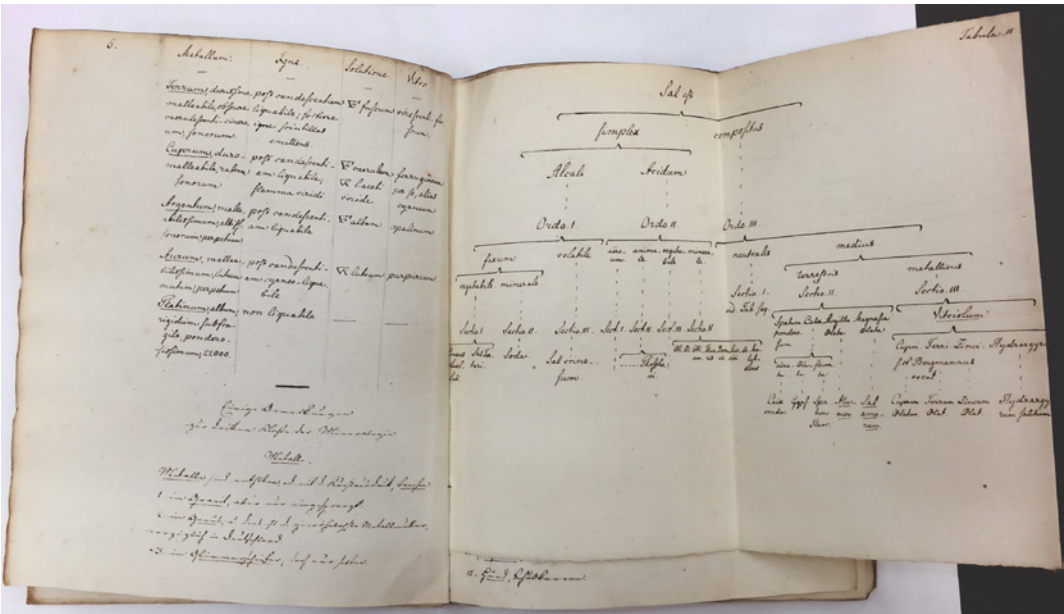
Affinity in this sense was a buzzword in eighteenth-century sciences, as reflected in the title by Johann Wolfgang Goethe's (1749–1832) novel *Elective Affinities* (*Die Wahlverwandtschaften*, 1809). Most prominently, it played a foundational role in chemistry. "Affinity tables" classified chemical substances according to their capacity to displace other substances from compounds. As a teacher in "physics and poetry" at the Academic Gymnasium in Hamburg from 1771 to 1784, Giseke was well versed in this literature. He taught on the subject and possessed the latest literature, including Torbern Bergman's (1735–1784) essay on "Elective Attractions."⁵

⤵	⤶	⤷	⤸	⤹	⤺	⤻	⤼	⤽	⤾
⤿	⤿	⤿	⤿	⤿	⤿	⤿	⤿	⤿	⤿
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⤿ Esprits acides. ⤿ Terre absorbante. ⤿ Cuivre. ⤿ Soufre minéral. (Principe.
⤿ Acide du sel marin. ⤿ Substances métalliques. ⤿ Fer. ⤿ Principe huileux ou Soudre
⤿ Acide nitreux. ⤿ Mercure. ⤿ Plomb. ⤿ Esprit de vinaigre.
⤿ Acide vitrique. ⤿ Règne d'Antimoine. ⤿ Zinc. ⤿ Esprit de vin et Esprit ac.
⤿ Sel alcali fixe. ⤿ Or. ⤿ Pierre Calaminaire. ⤿ Sel. ⤿ Sels.
⤿ Sel alcali volatil. ⤿ Argent.

Étienne François Geoffroy: "Table des different rapports observes en chimie entre differentes substances", in: *Histoire de l'Academie Royale des Sciences. Avec des Memoires de Mathematique & de Physique pour la même Année* (1718), pp. 202–12. Online: <https://commons.wikimedia.org/wiki/File:Affinity-table.jpg>.

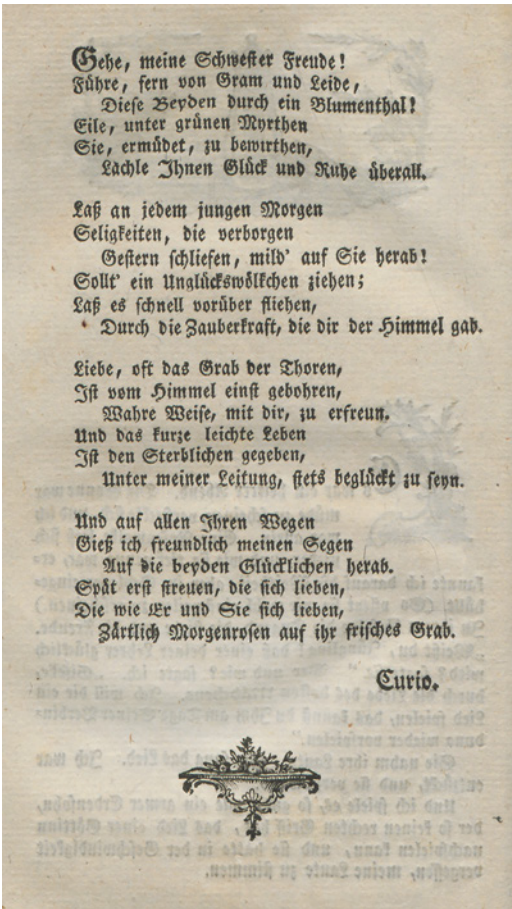
"Table of affinities" (*table de rapports*) published by Étienne François Geoffroy in 1718. Chemical substances are designated by symbols. The closer a substance is to the substance at the top of a column, the stronger its "affinity" to unite with this top substance and oust the substances below from such unions. At the beginning of his essay, Geoffroy declared: "These affinities have their degrees and their laws" (*Ces rapports ont leur degrés & leurs lois*).



Johann Wilhelm Schütze: "Tabulae et adnotationes ad mineralogiam pertinentes, ex dictatis viri experimentissimi doctissimi Paul Dieter. Giseke Phys. Pr. Publ. descriptae", in: Nachlass Paul Dietrich Giseke, 1 Bd, Staats- und Universitätsbibliothek Hamburg, call no. 18: NPDPG NL Giseke (Alte Signatur: Cod. hans.: IV: 43). With kind permission by the Staats- und Universitätsbibliothek Hamburg.

Johann Wilhelm Schütze's notes from lectures on mineralogy that Giseke gave at the Academic Gymnasium in Hamburg in 1791. The diagram follows the Ramist tradition of dividing up contents taught by applying a series of distinguishing criteria, but the reference to "Bergmannus [sic]" under "Cupri. Ferri. Zinci." on the right-hand side shows that Giseke was teaching mineralogy on the basis of the work of the Swedish chemist and mineralogist Tobern Bergman, known for his work on chemical "affinities."

Closer to home, one can note that Giseke's mercantile milieu has been identified as "kinship-hot," or obsessed with developing and tracing extensive networks of kindred.⁶ Giseke was a very active citizen as well, engaged in the foundation and leadership of Hamburg's Society of Physicians (*Ärztlicher Verein*) and other associations. The language of "affinities" may have appealed to Giseke for these reasons, and some of his students went on to become prominent proponents of republicanism in Hamburg.

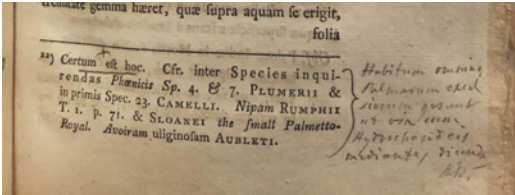


Johann Karl Daniel Curio: *Dem Herrn Doctor Giseke gewidmet*, Hamburg: Joh. Phil. Christ. Reuß (1774), p. 2. Staats- und Universitätsbibliothek Hamburg, Online: <https://resolver.sub.uni-hamburg.de/kitodo/PPN867661461>.

A poem published by Johann Carl Daniel Curio (1754–1815) on occasion of Giseke's marriage with Charlotta Wilhelmina Fixsen on September 20, 1774. Curio was a student of Giseke and would later found the first German teacher's association (*Gesellschaft der Freunde des vaterländischen Schul- und Erziehungswesen*, 1805). He is known for his republican views and allegedly stated: "We have no nobility, no patricians, no slaves, no, not even subjects. All real Hamburgers know and have only one class, the class of citizens. Citizens we are, nothing more and nothing less." (*Wir haben keinen Adel, keine Patrizier, keine Sklaven, ja nicht einmal Untertanen. Alle wirklichen Hamburger haben nur einen einzigen Stand, den Stand eines Bürgers. Bürger sind wir alle, nicht mehr und nicht weniger.*)

Quoted from Peter Rietbergen: *Europe: A Cultural History*, London: Routledge (1998), p. 333. Translation slightly altered.

While Giseke's *tabula* can thus be seen to resonate with some important elements of eighteenth-century science and culture, it did not immediately create a new visual genre. Alexander von Humboldt (1769–1859) reviewed the volume, and while appreciating that it gave access to Linnaeus's "philosophical ideas about affinity" (*philosophischen Ideen über Pflanzenverwandtschaft*), he did not even mention the *tabula*.⁷ Botanists promoting the so-called



Paul Dietrich Giseke (ed.): *Caroli a Linne ... Prælectiones in ordines naturales plantarum*, Hamburg: Benj. Gottl. Hoffmann (1792), Linnean Society of London, Library and Archives, call no. L XVI 792, p. 31. With kind permission by the Linnean Society of London, www.linnean.org.

Annotation by Robert Brown ("RB") in the copy of Giseke's *Prælectiones in ordines naturales plantarum* belonging to the Linnean Society of London. Brown is commenting on the "habitus" as a distinctive characteristic of palms. Giseke had sent this copy to James Edward Smith, the president of the Linnean Society, as is evident from a note he placed on the flyleaf (*Ex dono auctoris*). Brown was working as Smith's librarian for a while.

"natural system" in the early nineteenth century, such as Robert Brown in London, read it attentively, though, and in the long run, the peculiar structure of this system should become one of the chief phenomena evolutionary theories of the nineteenth century tried to explain.

Notes

- 1 Paul Dietrich Giseke (ed.): *Caroli a Linne ... Prælectiones in ordines naturales plantarum*, Hamburg: Benj. Gottl. Hoffmann (1792), p. xiv. (Translations, if not stated otherwise, are my own.)
- 2 Carl Linnaeus: *Philosophia botanica in qua explicantur fundamenta botanica cum definitionibus partium, exemplis terminorum, observationibus rariorum*, Stockholm: Kiesewetter (1751), aph. 77, p. 27. The aphorism is quoted in Fabricius's lecture notes; see Paul Dietrich Giseke (ed.): *Caroli a Linne ... Prælectiones in ordines naturales plantarum*, Hamburg: Benj. Gottl. Hoffmann (1792), p. 4, note a).
- 3 Paul Dietrich Giseke (ed.): *Caroli a Linne ... Prælectiones in ordines naturales plantarum*, Hamburg: Benj. Gottl. Hoffmann (1792), p. 625: "Sed nulla Insularum magis remota est ab omnibus tum provinciis tum aliis insulis, quam ordo XXXIX."
- 4 Paul Dietrich Giseke (ed.): *Caroli a Linne ... Prælectiones in ordines naturales plantarum*, Hamburg: Benj. Gottl. Hoffmann (1792), p. 623: "Dixi am genealogicam, quia vox Affinitatis de families adhiberi solet partier se utrumque Plantis, sed non ita, ut ab Avo ad nepotes deduci possit; potius eo sensu, quod patruales & affines collocentur ita, ut vincula, quibus inter se nectantur, pateant."
- 5 *Catalogus librorum viri celeberrimi Pauli Diderici Giseke M.D. Physices & Poëseos Prof. Bibliothecarii Primarii &c. : Quorum publica fiet auctio Hamburgi in æde vulgo dicta (Eimbeckische Haus) inde a die V Februar & seqq. DCCLXXXVIII*. Hamburg: Wörmner (1798), no. 2391. Online: <https://resolver.sub.uni-hamburg.de/kitodo/PPN857335502>.
- 6 David Warren Sabean, Simon Teuscher: "Kinship in Europe: A New Approach to Long Term Development", in: David Warren Sabean, Simon Teuscher, Jon Mathieu (eds.): *Kinship in Europe: Approaches to Long-Term Development (1300–1900)*, New York: Berghahn (2013), p. 3.
- 7 Alexander von Humboldt: "[Review of] Car. a. Linnaei ... Prælectiones in Ordines Naturales Plantarum 1791", in: *Annalen der Botanick* 1/1 (1791), pp. 172–74.

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Johannes Endres: "Evolution und Erbe: Zur Problemgeschichte der 'Wahlverwandschaften' bei Goethe und Darwin", in: *KulturPoetik* 9 (2009), pp. 45–66.

Ursula Klein: *Verbindung und Affinität: Die Grundlegung der neuzeitlichen Chemie an der Wende vom 17. zum 18. Jahrhundert*, Basel: Birkhäuser (1994).

Staffan Müller-Wille: "Names and Numbers: 'Data' in Classical Natural History, 1758–1859", in: *Osiris* 32 (2017), pp. 109–28.

Kees van Putten: "Three Eighteenth-Century Attempts to Map the Natural Order: Johann Herrmann – Georg Christoph Würtz – Paul Dietrich Giseke", in: *Early Science and Medicine* 24 (2019), pp. 33–89.

Hans-Jörg Rheinberger: "Aspekte des Bedeutungswandels im Begriff organismischer Ähnlichkeit vom 18. zum 19. Jahrhundert", in: *History and Philosophy of the Life Sciences* 8 (1986), pp. 237–50.

Olivier Rieppel: "The Series, the Network, and the Tree: Changing Metaphors of Order in Nature", in: *Biology and Philosophy* 25 (2010), pp. 475–96.

David Warren Sabean: "From Clan to Kindred: Kinship and the Circulation of Property in Premodern and Modern Europe", in: Staffan Müller-Wille, Hans-Jörg Rheinberger (eds.): *Heredity Produced: At the Crossroad of Biology, Politics and Culture, 1500–1870*, Cambridge, Mass.: MIT Press (2007), pp. 37–59.

David Warren Sabean, Simon Teuscher: "Kinship in Europe: A New Approach to Long Term Development", in: David Warren Sabean, Simon Teuscher, Jon Mathieu (eds.): *Kinship in Europe: Approaches to Long-Term Development (1300–1900)*, New York: Berghahn Books (2013), pp. 1–32.

Mary P. Winsor: "Considering Affinity: An Ethereal Conversation, Part I–III", in: *Endeavour* 39 (2015): pp. 69–79, 116–126, 179–187.

BLOOD GROUP RACE Cartesian Anthropology

After the discovery of human ABO blood groups by Viennese immunologist and serologist Karl Landsteiner in 1900,¹ German physician Emil von Dungern and Polish microbiologist and serologist Ludwik Hirszfeld confirmed the hypothesis of their heritability in 1910.² Building on these contributions, in 1919 Hirszfeld and his wife Hanka published the first, influential paper on the "Serological Differences Between the Blood of Different Races."³ This publication, which was long considered a classical paper in the field of anthropology, is often seen as signifying the rise of "sero-anthropology," a new, fast-growing discipline that aimed at establishing blood group determinations on different peoples and, ultimately, tried to prove blood groups as "racial" – if not even national – characteristics.

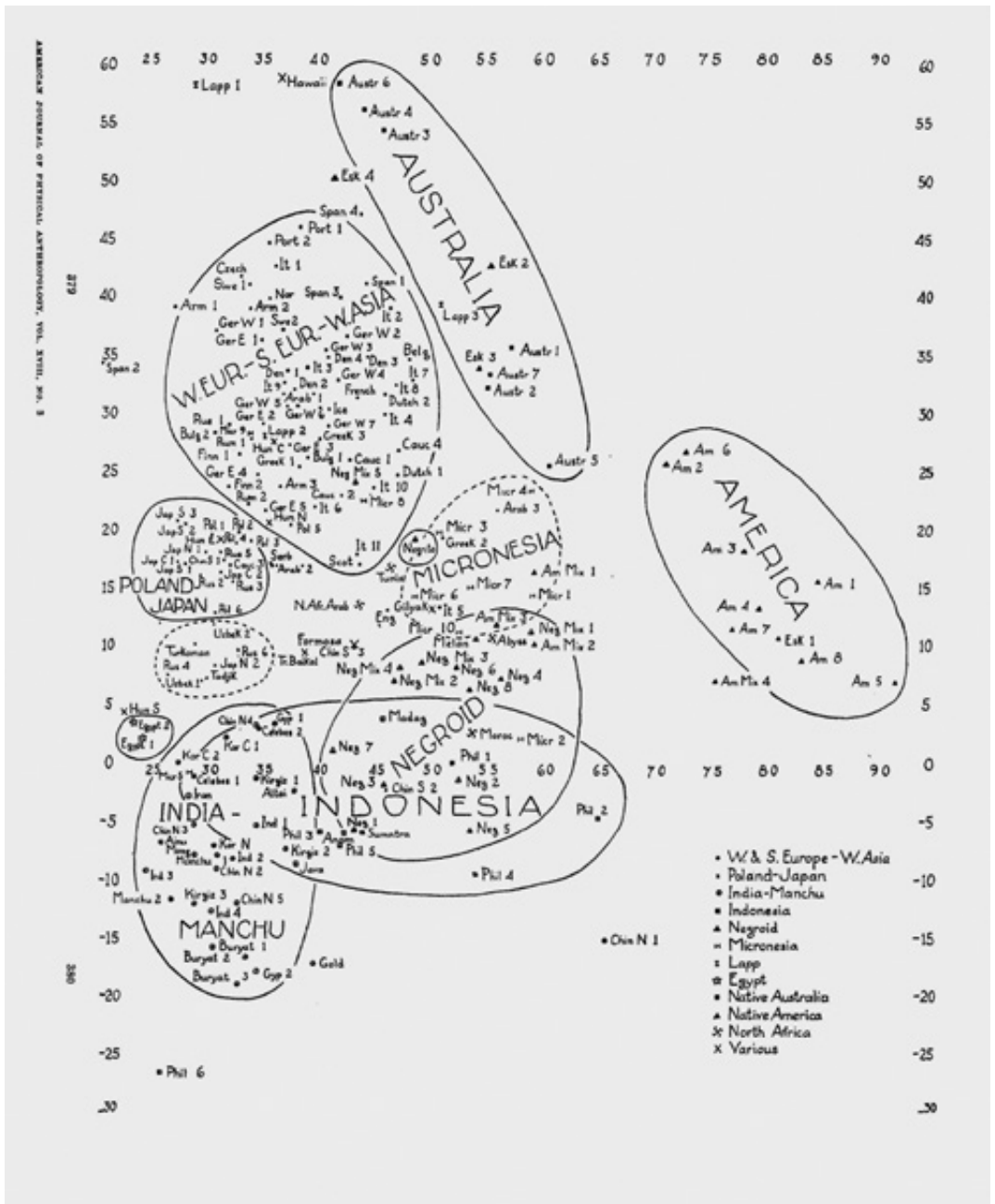
From the very outset of the enterprise, it was clear that synoptic tools such as eloquent graphical representations would have been very important in order to translate the set of investigations that were conducted under the banner of the new field of study into a meaningful and understandable message. As a result, different kinds of visualisations were proposed.

"One does not have to be visually predisposed to understand that pictorial representations can illustrate the results of large statistical surveys in a much more effective way than tables filled with numbers. Thus, it does not come as a surprise that we encounter attempts at an early stage [of the development of sero-anthropology] to graphically illustrate the blood group material, collected in form of numerical data, for the purposes of racial science."

Paul Steffan: "Die Bedeutung der Blutgruppen für die menschliche Rassenkunde", in: Paul Steffan (ed.): *Handbuch der Blutgruppenkunde*, München: J. F. Lehmann (1932), p. 434. Translation by the author.

Geographical and "racial" distribution of blood groups was conveyed into different kinds of graphical representations. Geographical maps plotting blood group gene frequencies by means of contours were probably the most obvious examples, but other more abstract diagrammatic conceptualizations were proposed.

The following diagram is an example of these efforts to express graphically the relation of populations in regard to blood-group frequencies. Published in 1934 by the American anthropologist Alfred Louis Kroeber, it makes use of ABO gene frequencies, which Kroeber extracted from data compiled by the German naval surgeon Paul Steffan and the Austrian engineer Siegmund Wellisch.⁴ Kroeber's choice was to chart gene frequency data in a Cartesian space.



Alfred Louis Kroeber: "Blood Group Classification", in: *American Journal of Physical Anthropology* 18 (1934), pp. 377-393, diagram on pp. 378-382.

into larger sets by drawing contours around those that are represented by the same symbol.

The scale of both x- and y-axis is the proportion of allelic frequency for the ABO blood group system. The horizontal axis expresses "the strength of the O factor" and the vertical axis expresses "the A to B relation" in terms of the ratio of A-B.⁵ This allowed Kroeber to pinpoint populations as three-parameter entities into a two-dimensional space. The diagram conceptualizes populations as points in the shape of symbols that are explained in a legend in the bottom right-hand corner. These points are then grouped

The choice of the x- and y-axes is particularly significant because Kroeber explicitly refused to use indexes such as the then-famous "biochemical race index" – a brainchild of the Hirszfelds – on the basis of which the couple proposed the notion of "biochemical race" or "serological race."

"Indeed, it is now possible to distinguish serological races within species. This can be obtained thanks to isoantibodies, and therefore a constitutional consideration of serological processes should be derived from the isoantibodies and the blood structures that can be determined by them."

Ludwik Hirszfeld: "Die Konstitutionslehre im Lichte serologischer Forschung", in: *Journal of molecular medicine* 3/26 (1 January 1924), pp. 1180–1184, p. 1180. Translation by the author.

In spite of the rejection of the Hirszfelds' "biochemical races," in the text accompanying the diagram Kroeber treats the groups that he drew in the chart as "blood-group races," a category that seems to closely resemble the one proposed by the couple. On the other hand, Kroeber also pointed out that the blood-type classification of his diagram crosscut what at that time was considered "the usually accepted race classification" and that the distributions were not even geographically consistent.⁶ Indeed, the blood-type assemblage thus defined cuts across "races" as they were then described through anthropometry, as is well exemplified by the Poland-Japan cluster or by the overlap of "types" that were generally considered quite different, such as what Kroeber defined as the "Negroid type" and the "Indonesian type."

BLOOD GROUP RACE (Un)cultural Anthropology

Kroeber's somewhat conflicting considerations – using his diagram to define "blood-group races" while at the same time pointing out the problems of the category just defined – reflect what seems to be Kroeber's main concern: to show that such diagrams do not in themselves allow to draw any clear conclusions about the relationships of the world's population. However, we should not be led to believe that Kroeber was questioning the very concept of "human race" – a questioning for which anthropology would need to wait a few more decades. Far from it.

"A race is a valid biologic concept. It is a group united by heredity: a breed or genetic strain or subspecies. It is not a valid sociocultural concept; the term 'race' is usually ambiguous and is best not used in sociocultural situations [...]. But physical anthropology being concerned with man's organic features, is properly and necessarily concerned with the human races."

Alfred Louis Kroeber: *Anthropology: Biology & Race*, New York: Harcourt, Brace & World (1963), p. 78.

Kroeber was Franz Boas's first doctoral student and the founder of the department of anthropology at Berkeley. More to the point, he is often considered one of the fathers of cultural anthropology. His short involvement with blood-group-based raciology seems to have been directed primarily at making sure that the discipline he was developing could operate on phenomena free from the grip of the biological sciences. Highlighting the problems of "race" as defined by sero-anthropology while adopting and officially approving the overall approach of the discipline was deemed apt to facilitate the establishment of disciplinary boundaries between physical and cultural anthropology and of major autonomy from biology for the latter. In particular, Kroeber aimed at undermining the theory for which blood groups could explain human history. In Kroeber's opinion, "race" was a category that worked very well in physical anthropology, but human history could only be explained through the lens of culture.

"When one has spoken a dozen times of 'the French race,' one tends inevitably to think of the inhabitants of France as a biological unit, which they are not. The basis of the error is confusion of organic traits and process with super organic or cultural ones, of hereditary or heredity with tradition or imitation [...]. The inherently great difficulties which beset the understanding and solution of what are generally called race problems [...] are considerably increased by a confusion between what is and what is not racial, organic, and hereditary."

Alfred Louis Kroeber: *Anthropology: Biology & Race*, New York: Harcourt, Brace & World (1963), p. 130.

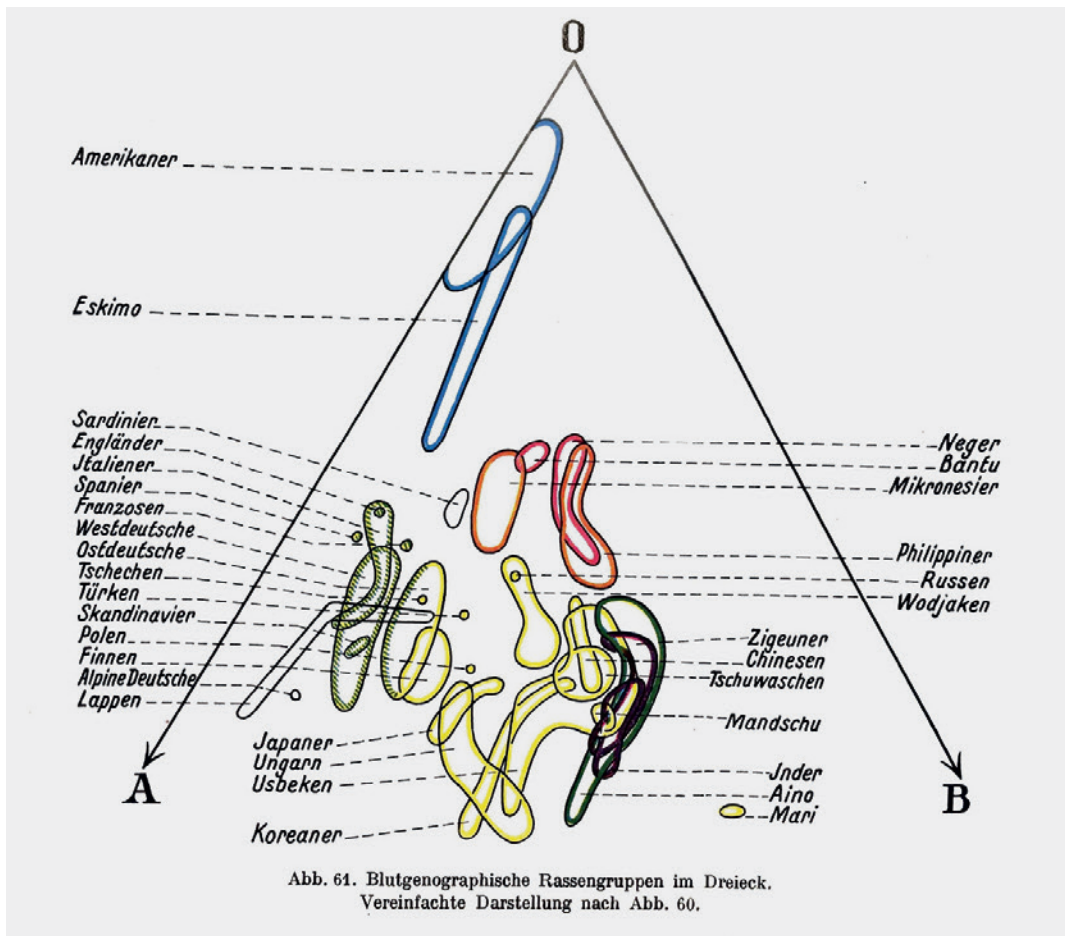
"If there is nothing beyond the organic, let us quit our false and vain business [(cultural) anthropology] and turn biologists."

Alfred Louis Kroeber, "Heredity without Magic", in: *American Anthropologist* 18 (1916), pp. 294–296, p. 296.

Kroeber – who had never dealt with serology before his 1934 foray – was an ardent advocate of the fundamental importance of culture and (non-biological) history in the formation of group differences as the basis for the establishment of cultural anthropology as an independent field of study with its own founding and disciplinary arsenal.

BLOOD GROUP RACE Triangular Anthropology

Since 1926, Finnish physician and blood researcher Oswald Steng tried to represent blood group data with a diagrammatic depiction that became known as "Steng's triangle" (*Steng'sches Dreieck* or *Rassedreieck*), the first of a long series of graphical devices that were immediately well-received, especially by German-speaking scientific communities. As mentioned, the data on which Kroeber's diagram was built is a selection from the data collected by Steffan and Wellisch, which is not accidental. In the 1930s, Steffan was the author of some of the most widely reproduced, Steng-inspired diagrams aiming at determining the history of human populations. As all sero-anthropologists, he believed that, thanks to blood group investigations, migratory movements and racial crossings could be reconstructed. This was the goal of those diagrams. Kroeber's own diagram made explicit reference to that tradition of research.



Paul Steffan: "Die Bedeutung der Blutgruppen für die menschliche Rassenkunde", in: Paul Steffan (ed.): *Handbuch der Blutgruppenkunde*, München: J. F. Lehmann (1932), pp. 382–452.

By the means of diagrams such as this – in addition to his famous "race maps" – Steffan aimed at showing Felix Bernstein's idea that the O blood group was the "original" blood type of the human species and the type A blood and type B blood occurred later as two distinct, independent mutations. Furthermore, following the Hirszfelds, Steffan claimed that the "cradle" of the A "factor" had to be found in north-western Europe, while the B "factor" was likely coming from East Asia. As a result, he asserted that it was possible to define two geographical "agglutination poles" – from which the two factors spread through migration and admixture – and two matching primeval races: the "Atlantic race" (the cradle of type A) and the "Gondwanic race" (the cradle of type B). Significantly, Steffan also maintained that the western and eastern elements met in correspondence of Germany's eastern frontier.

Steffan published the diagram reproduced here in his then-celebrated 1932 *Handbuch der Blutgruppenkunde* specifically as a way to suggest that type B was characteristic of the East and type A of the West. As the two arrows on the sides of the triangle show, the diagram is specifically conceived to illustrate the descent of two lines: from the original, unmutated type O blood on the top corner – represented by populations that "went into isolation" before the

two mutations – the "Atlantic race" descends down towards the "geographical" left side of the triangle and the "Gondwanic race" towards the right side.

When devising his own diagram, Kroeber seems to have aimed at employing the same data used by Steffan and Wellisch and a similar but different diagrammatic tool to show a different account, one that does not allow any grounded conclusion – thereby implicitly arguing that such grand claims as Steffan's incorporate "more interpolations than data" and could not have actual solid bases.⁷ He suggested instead an alternative and vaguer hypothesis assuming that the A and B "factors" arose independently several times in several places and populations. This could undermine the idea that the A and B "factors" could be traced back to a common ancestor, thereby making them unreliable as a means for reconstructing migratory movements.

Indeed, if diagrams are generally used to find coherence in the complexity of the data to make sense of a phenomenon, in this case Kroeber's goal seems rather to emphasize the intricacy of the picture.

Notes

- 1 Karl Landsteiner: "Zur Kenntnis der antifermentativen, lytischen und agglutinierenden Wirkung des Blutserums und der Lymphe", in: *Zentralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten* 27/10/11, (23 March 1900), pp. 357–362; Karl Landsteiner: "Über Agglutinationserscheinungen normalen menschlichen Blutes", in: *Wiener Klinische Wochenschrift* 14/46 (14 November 1901), pp. 1132–1134.
- 2 Emil von Dungern, Ludwik Hirschfeld: "Über Vererbung gruppenspezifischer Strukturen des Blutes", in: *Zeitschrift für Immunitätsforschung und Experimentelle Therapie* 6 (25 April 1910), pp. 284–292.
- 3 Ludwik, Hanka Hirschfeld [sic]: "Serological Differences Between the Blood of Different Races", in: *The Lancet* 194/5016 (18 October 1919), pp. 675–679.
- 4 Paul Steffan, Siegmund Wellisch: "Die geographische Verteilung der Blutgruppen", in: *Zeitschrift für Rassenphysiologie* Vol. I (1928), pp. 46–60, 80–81, 154–159; Vol. II (1929), pp. 114–145; Vol. III (1930), pp. 184–187; Vol V (1932), pp. 180–185; Vol. VI (1933), pp. 28–35 was not used by Kroeber; obviously, the same applies to the data that Steffan and Wellisch compiled in the same series after 1933.
- 5 Alfred Louis Kroeber: "Blood Group Classification", in: *American Journal of Physical Anthropology* 18 (1934), pp. 377–393, pp. 377–378.
- 6 Alfred Louis Kroeber: *Anthropology: Race, Language, Culture, Psychology, Prehistory*, New York: Harcourt, Brace (1948), p. 160.
- 7 Alfred Louis Kroeber: "Blood Group Classification", in: *American Journal of Physical Anthropology* 18 (1934), pp. 377–393, p. 377.

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Lisa Gannett, James R. Griesemer: "The ABO Blood Groups: Mapping the History and Geography of Genes in Homo Sapiens", in: Jean-Paul Gaudillière, Hans-Jörg Rheinberger (eds.): *Classical Genetic Research and its Legacy: The Mapping Cultures of Twentieth-Century Genetics*, London: Routledge (2004), pp. 57–84.

Evelyn Fox Keller: "Thinking about Biology and Culture: Can the Natural and Human Sciences Be Integrated?", in: *The Sociological Review Monographs* 64/1 (2016), pp. 26–41.

Maria E. Kronfeldner: "'If there is nothing beyond the organic...': Heredity and Culture at the Boundaries of Anthropology in the Work of Alfred L. Kroeber", in: *NTM Zeitschrift für Geschichte der Wissenschaften, Technik und Medizin* 17/2 (2009), pp. 107–133.

Pauline M. H. Mazumdar: "Blood and Soil: the Serology of the Aryan Racial State", in: *Bulletin of the History of Medicine* 64/2 (1990), pp. 187–219.

Claudio Pogliano: *L'ossessione della razza: antropologia e genetica nel XX° secolo*, Pisa: Edizioni della Normale (2005).

Marianne Sommer: "Population-Genetic Trees, Maps, and Narratives of the Great Human Diasporas", in: *History of the Human Sciences* 28/5 (2015), pp. 108–145.

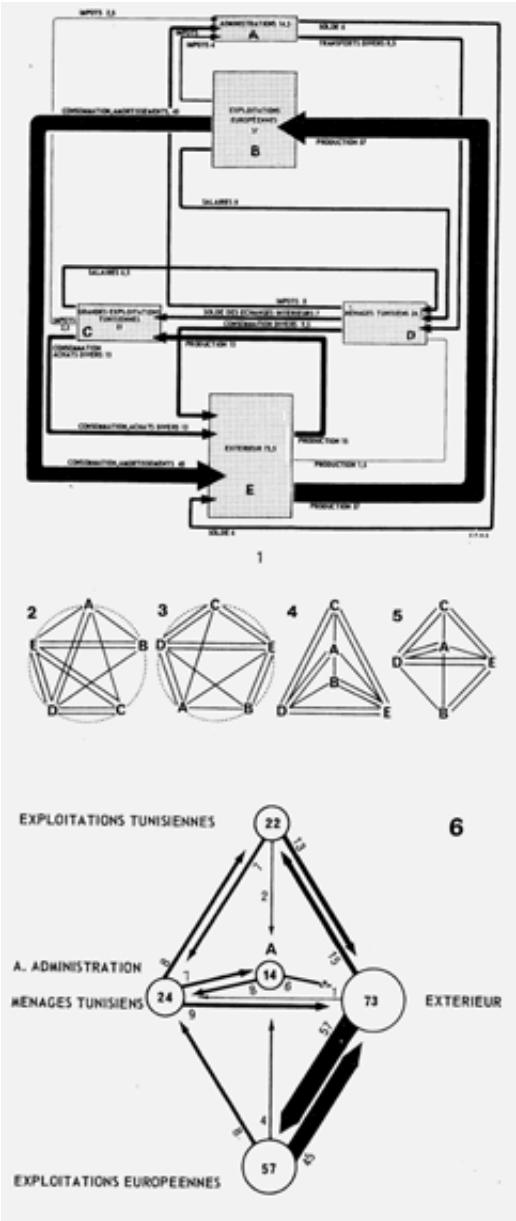
Myriam Spörri: *Reines und gemischtes Blut: Zur Kulturgeschichte der Blutgruppenforschung, 1900–1933*, Bielefeld: Transcript (2013).

DESIGNING BETTER TREES Bertin's Genealogical Networks

What connects Isidore of Seville (ca. 560–630), Lambert of Saint-Omer (ca. 1061–ca. 1125), Joachim of Fiore (ca. 1135–1202), Ramon Llull (1232–1315), Hartmann Schedel (1440–1514) and Athanasius Kircher (1602–1680)?¹ According to Manuel Lima, author of *The Book of Trees: Visualizing Branches of Knowledge*, they are all “visualizations pioneers.”² As the fields of data visualization and information design have developed over the past few years, powered by computer technologies and the desire to process increasingly large datasets, experts such as Lima have cast trees as forms of data visualization. In so doing they provide a pedigree to their field by linking the genealogical trees figuring on medieval illuminated manuscripts with their own practices.³ They also shine light on the often forgotten illustrators of historical books, underscoring their agency in creating visual forms. It should come as no surprise, then, that genealogical trees were some of the first objects systematically reflected and improved upon in the emerging field of “graphic information processing,” as it was initially called in the mid-twentieth century. One of the self-proclaimed pioneers of the field, French cartographer Jacques Bertin, worked on and discussed trees from the 1950s in working out his “Semiology of Graphics.”⁴ Bertin claimed that any homogenous series of observations can be subjected to three major kinds of “graphical transcriptions”: networks, diagrams, and maps. Alongside computer programs and road networks, genealogical trees were named as typical examples of networks.

“A family tree is the set of links (correspondences) that unite the members of a family, that is to say the elements A,B,C... of a single group of individuals. [...]. These elements belong to the same component. When these elements are transcribed on the plane, a network is constructed. A network can be constructed in various ways because the elements A,B,C... of the component can be transcribed by points and their links by lines, or the reverse, or both by lines, or by zones. Moreover, the arrangement of the elements can be rectilinear, or circular, or form a pattern. The choice depends both on the information itself and on the simplifying function of the graphic transcription. Graphic treatment [...] consists in discovering the simplest arrangement of elements and correspondences, that is, in reducing to a minimum the number of non-significant crossings. [...] It is then possible to deduce the image whose reading will be the most efficient according to the very nature of the concepts proposed by the information.”

Jacques Bertin: “La graphique”, in: *Communications* 15 (1970), pp. 169–185, p. 181.



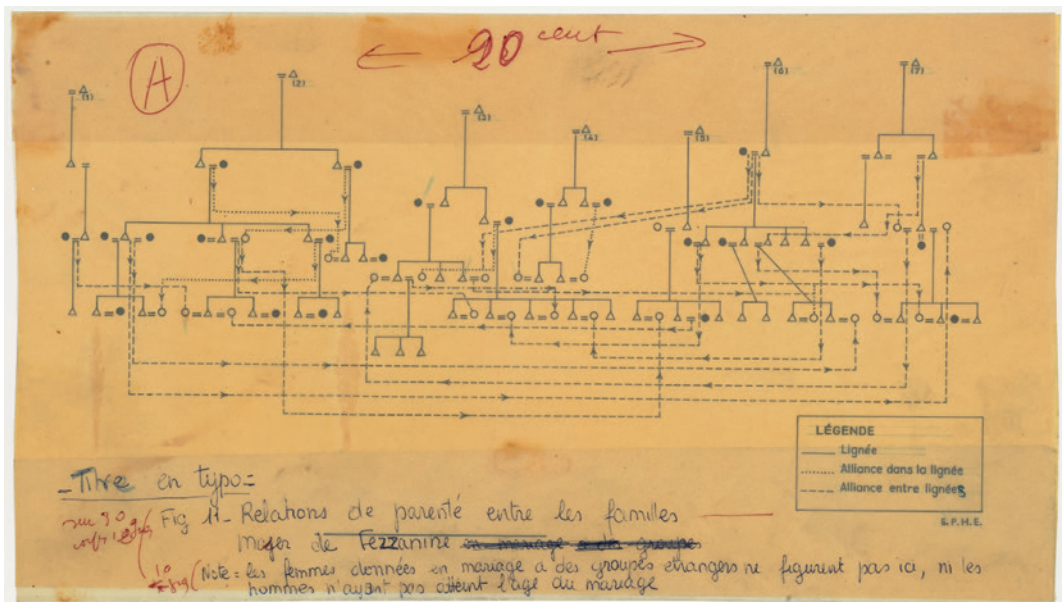
make diagrams more efficient, the information to be shown more readily graspable. The transformation aimed in particular at avoiding intersecting lines, achieved here by building a three-dimensional diagram (option 5). Bertin used as a starting point (1) a diagram his laboratory had prepared for the published version of Jean Cuisenier's PhD thesis, *L'Ansarine: Contribution à la sociologie du développement*, Paris: Presses universitaires de France (1962). This example shows that Bertin developed his method over time based on collaborations with and commissions from social and human scientists.

"Example of a transformation: Value of exchanges, between five large groups of economic agents in a market economy. After J. Cuisenier", in: Jacques Bertin: *Sémiologie graphique: Les diagrammes, les réseaux, les cartes*, Paris: Gauthiers-Villars (2005 [1967]), p. 274.

These diagrams depict economic flows in the year 1950 in Tunisia's Ansarin region. They provide a snapshot of the region's economic makeup by depicting flows between households, the administration, European exploitations, Tunisian exploitations, and the outside world. The thickness of the arrows is proportional to the strength of the flow, indicated in millions of Francs. The bottom figure (6) contains the same information as the figure above (1), the series in the middle (2–5) showing the different possibilities of spatially arranging five points and their connections. Through this series Bertin showed how his method could

DESIGNING BETTER TREES The Structuralist Tree

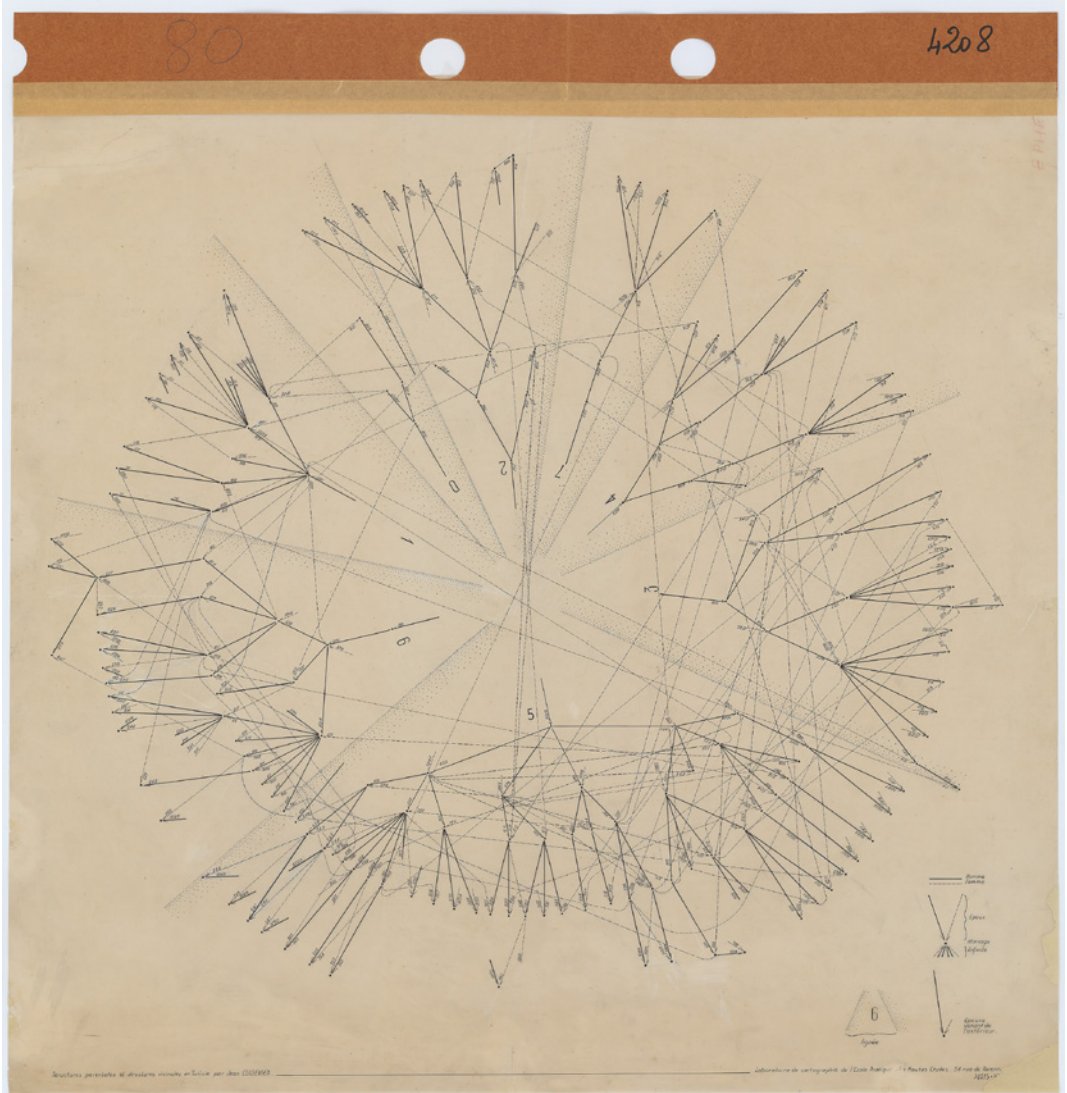
Bertin was based at the Laboratoire de cartographie he had founded in 1954 within the Ecole Pratique des Hautes Etudes in Paris (renamed Laboratoire de graphique in 1975 when it joined the Ecole des Hautes Etudes en Sciences Sociales). There he worked closely with geographers, historians, and anthropologists on the production of maps and graphs for their scientific publications. Bertin worked in the context of an exciting, experimental transformation of the social and human sciences at the time, marked in particular by the structuralist movement whose "visual identity" he helped create. He illustrated anthropologist Claude Lévi-Strauss's books and contributed to shape the structuralism-inspired Annales school of historians, especially through his intense collaboration with Fernand Braudel, and his work was admired by Roland Barthes.



"Kinship relations between the major families of Fezzanine."
Advanced version of the diagram prepared by the Laboratory of cartography for publication in Jean Cuisenier's book, *L'Anzarine: Contribution à la sociologie du développement*, Paris: Presses Universitaires de France (1962). Archives Nationales (France), file 20010291/70.

This is a classic genealogical tree, with individuals (represented as triangles and circles) embodying the units and their kinship (represented as lines) embodying relations between the units. This kind of representation works for small data sets such as one or a few families, albeit at the price of leaving out some information and of featuring many intersections, which Bertin thought hampered understanding and should be avoided.

Several of these scholars worked on kinship, commissioning Bertin to produce genealogical trees. This fed his research into more efficient, systematic ways of visualizing information. Bertin developed new ways of visualizing genealogical trees, notably in the course of his yearlong collaboration with Jean Cuisenier, in connection with the latter's research into endogamy and exogamy in Arab marriage practices.



Representation of the entirety of kinship relations among the Ouled Arfa people from the Ansarin region in Tunisia, prepared by the Laboratory of cartography for publication in Jean Cuisenier: "Endogamie et exogamie dans le mariage arabe", in: *L'homme 2/2* (1962), pp. 80-105. Archives nationales (France), file 20150572/1/1.

This diagram follows Bertin's structuralism-inspired precept in that it showcases relations rather than units/individuals, compared to the classic trees, and thereby helps make visible otherwise invisible structures. Women are represented as dotted lines, men as lines, shading as the boundaries of lineage. A line and a dotted line converge into a dot (marriage), from which lines emerge (children). Short dotted lines denote female spouses originating outside the community.

"[T]his network of alliances and filiation between agnates brings to light, in two different ways, the architectonic role played by marriage with the daughter of the paternal uncle in the Arab kinship system. The path will thereby be laid for a sketch of a very simple model aimed at explaining the frequency of endogamy at the different levels of the parent group."

"Marriage, figured as points, constitute the units, while individuals (a man or a woman) figured as lines, constitute the relations. The entirety of kinship relations can be transcribed as a network or rather more exactly as a tree, whose marriages are knots."

Jean Cuisenier: "Endogamie et exogamie dans le mariage arabe", in: *L'homme 2/2* (1962), pp. 80-105, p. 82, p. 95.

In the wake of Lévi-Strauss's search for underlying structures in kinship systems, Cuisenier sought to show that the typical Arabic practice of marriage between parallel cousins was independent of external determinants. He considered that

"in order to understand this structure, the complete system of alliances must be reconstituted over several generations. However, as soon as the group reaches a given size, and the investigation goes back several generations, it becomes practically impossible to capture the play of alliances between agnates using Morgan's diagrams: the lines crisscross each other in an inextricable tangle."

Jean Cuisenier: "Endogamie et exogamie dans le mariage arabe", in: *L'homme* 2/2 (1962), pp. 80–105, p. 82.

Cuisenier claimed that good accountancy and Bertin's graphic method yielded a solution to the challenge of extracting a recognizable structure from such a large data set. Bertin provided suitably structuralism-inspired graphics for the structuralist overhaul of anthropology of the time. He both extended and transformed the history of genealogical tree production, with a lasting impact in French history and anthropology, while putting trees at the heart of the new era of data visualization and information design.⁵

Notes

- 1 This contribution is based on research carried out within the collective project DESIGNSHS <https://laboratoire-graphique.fr/> funded by Agence Nationale pour la Recherche, ANR-20-CE27-0023. Special thanks to the French national archives for their kind supply of the digital versions of images from the Laboratoire de graphique held in their custody and to Anne-Lyse Renon for her suggestions and comments.
- 2 Manuel Lima: *The Book of Trees: Visualizing Branches of Knowledge*, Princeton: Princeton Architectural Press (2014), pp. 9–10.
- 3 Michael Friendly: "A Brief History of Data Visualization", in: Chun-Hou Chen, Wolfgang Härdle, Antony Unwin (eds.): *Handbook of Data Visualization*, Berlin/Heidelberg: Springer (2008), pp. 15–56.
- 4 Jacques Bertin: *Sémiologie graphique: Les diagrammes, les réseaux, les cartes*, Paris: Gauthiers-Villars (1967).
- 5 See, e.g. Hérán (further readings) or Elie Haddad: "Deux modèles récents de la parenté à l'épreuve de la noblesse française d'Ancien Régime", in: *L'Atelier du Centre de recherches historiques* 9 (2012).

Further Readings

Jacques Bertin: *Graphics and Graphic Information Processing*, trans. by William J. Berg, Paul Scott, Berlin: De Gruyter (1981).

Alexander Campolo: "Sights and Sight: Jacques Bertin and the Visual Language of Structuralism", in: *Grey Room* 78 (2020), pp. 34–65.

François Hérán: *Figures de la parenté: Une histoire critique de la raison structurale*, Paris: Presses universitaires de France (2009).

Manuel Lima: *The Book of Trees: Visualizing Branches of Knowledge*, Princeton: Princeton Architectural Press (2014).

DESCENT

INTRODUCTION

The humanities and social sciences have proclaimed a diagrammatic turn, with diagrammatics as a new approach bridging the disciplines.¹ Diagrams might lend themselves to such an integrative approach because they seem to transgress societal and disciplinary domains and are characterized by open-ended variation. Diagrams (re-)present relations and proportions that characterize a phenomenon; they show structural analogy to it. Processes of manipulation and experimentation are intrinsic to diagrams, such that they allow new insights into the objects of representation (beyond their production). They are also constructive – they may bring relations newly into being – and they may be informed by and inform ideological conceptions.²

In the Swiss National Science Foundation Sinergia project *In the Shadow of the Tree: The Diagrammatics of Relatedness as Scientific, Scholarly, and Popular Practice*, out of which this cache volume arose, we work with the fact that diagrams are about relations. And we are specifically interested in organismic relatedness. While this narrows the scope of the diagrams of interest down to those that are about genealogy, pedigree, kinship, descent, affinity, etc., diagrams of relatedness in this sense still connect a wide variety of fields, including theology, law, genealogy, natural history, biology, anthropology, ethnography, genetics, and eugenics. We are interested in how diagrams constitute relatedness, for example between human individuals, biological groups, or medical pathologies. We focus on historical specificity, engaging with the particular situation and ways in which diagrams were produced and used, rather than abstracting transhistorical core principles. We understand diagrams as part of socio-political as well as epistemic practices. At the same time, we hope to uncover circulations between fields, similarities as well as differences between traditions. This cache volume, and maybe particularly its dynamic online version, might lend themselves especially to the task.

With respect to a diagrammatics of relatedness, it is the tree diagram that has not only been identified as a canonical icon in modern biology; tree thinking has also been made out as a general modern Western rationale that reduces relatedness to descent. However, as made beautifully obvious in this cache volume, there are a great number of alternative diagrams lurking in the shadow of the tree, and even what is called a tree might not always come in a strictly bifurcating shape. Finally, by far not all trees conceptualize relations of descent. Therefore, although the tree does appear as a structuring device for organismic relatedness in religion, law, genealogy, natural history, biology, anthropology, psychiatry, eugenics, genetics, etc., from the Middle Ages to the present, the history of conceptualizing and visualizing relatedness both in terms of descent and otherwise seems to be more dynamic. Even within this section on "Descent," the editors included the contribution by Petter Hellström on a genealogical tree of chords from 1815. ►DESCENT / TREE OF HARMONY Although working with the tree structure and drawing on metaphors like birth, growth, ascent, descent, roots, and branches, this "genealogical tree" by the composer Henri Montan Berton was not about genealogy, or a temporal development, but about natural principles supposed to underlie musical harmony.

Also in natural history, the tree was not the dominant image, and once trees appeared as a device to relate organisms, they did not refer to descent. Naturalists around 1800 preferred the network to explore "natural affinities" among organisms rather than descent – as one might glean from Rheinberger and Zischler. ►FORM / MONOGRAMMA Up until Charles Darwin's influence, in botany and zoology relatedness was mainly represented not by means of tree-like, but by map-like or reticulate diagrams. This diagrammatic imagery, with its crisscrossing

lines interconnecting organisms in all directions, or with its blobs, circles, or polygons representing nested groups of "affiliated" organisms, some of which can be found in Müller-Wille's contribution, is strikingly different from post-Darwinian phylogenetic diagrams.

►FORM/PLANT AFFINITIES Hardly any of these were created with the ambition to introduce a temporal dimension or speculate about common descent, and this is true even for the few diagrams that did resemble trees.³ Olivier Doron engages in his contribution with what seems to have been the only exception: diagrams that illustrated relations of hybridization and geographic variation among races within one species. ►DESCENT / THE GEOGRAPHIC-GENEALOGICAL MAP While being network-structures, Buffon's *Table de l'ordre des chiens* (1755) and the French naturalist A. N. Duchesne's *Généalogie des fraisières* (1766) were actually also about genealogy, about descent. Furthermore, like so many of the images in this volume, they point at the communication between diverse cultural realms in that Buffon and Duchesne drew on imagery from genealogical and breeding practices. Doron shows that Buffon's table stood for the new kind of genealogical reasoning in natural history that was in fact inherently intertwined with the modern notion of races as a group of organisms sharing certain characteristics due to common descent.

Practices within the realm of human kinship were certainly powerful inspirations for diagrams of relatedness in other fields than natural history. Lea Pfäffli's contribution evidences the European interest in genealogy as a driving force behind the implementation of the tool of the family tree in kinship anthropology. However, even within the field of genealogy, trees are by no means the only way of structuring kinship. Many medieval and early modern "forerunners" of tree diagrams actually depict linear relations of descent, while modern family trees may be pervaded by a reticulate logic derived from understandings of kinship laid down in canon law. Fiona Vicent's contribution gives testimony to the very "strong genealogical consciousness" that drove European patrician families in the nineteenth century to (obsessively) collect genealogical material. ►DESCENT / BOURGEOIS GENEALOGICAL DIAGRAMS But even in this context, other diagrams than trees were employed to connect the living to the dead, such as the ascending and descending side of a triangle. Contributions to this section also look at non-European genealogical practices. Sun Joo Kim's Korean genealogies differ from early-modern European ones that were actually dominated by the tree, and Julián Míguez introduces a South American diagrammatics that is rather zigzaggy.

What becomes particularly evident in these contributions is the politics of diagrams of relatedness. The Korean elite's increased interest in family genealogies and eventually their ubiquitous production in the eighteenth century was part of the shift to Neo-Confucianism and signified a turn to a patrilineal kinship structure. ►DESCENT / GENDER SHIFT IN GENEALOGY Entangled with the move from bilateral to patrilineal genealogical diagrams was the exclusion of women from inheritance and the performance of ancestral rituals. The South American diagrams discussed by Julián Míguez, in turn, fight a legal battle over succession regarding the territory of an indigenous ruler. ►DESCENT / OPPOSING DIAGRAMS As part of hundreds of pages of documents, two kinship diagrams oppose each other on one page, juxtaposing noble and common descent in every sense of the adjectives. Colors and substance code for leaders and the entitled among one's ancestors, while gray schematics communicate the poverty and criminality associated with those of others. Lea Pfäffli looks at a kind of diagrammatics that developed in the colonial contact zone. ►DESCENT / INDIGENOUS DIAGRAMS Ethnologists on expeditions tried to get at indigenous pedigrees because they believed them to store information on past social structures and social evolution. In the process, people of different cultural backgrounds (and in unequal power relations) developed diagrammatic means of communication.

Thus, Lea Pfäffli's contribution also highlights that diagrams are not only an issue of lines on

paper but may travel as metaphors in speech or writing – or are enacted with the use of sticks and stones or other objects. Finally, Fiona Vicent's contribution reminds us that diagrams of relatedness can be one more thing: incredibly beautiful images.

Notes

- 1 See, for example, Steffen Bogen and Felix Thürlemann: "Jenseits der Opposition von Text und Bild: Überlegungen zu einer Theorie des Diagrammatischen", in: Alexander Patschovsky (ed.): *Die Bildwelt der Diagramme Joachims von Fiore: Zur Medialität religiös-politischer Programme im Mittelalter*, Stuttgart: Thorbecke (2003), pp. 1–22; Matthias Bauer and Christoph Ernst: *Diagrammatik: Einführung in ein kultur- und medienwissenschaftliches Forschungsfeld*, Bielefeld: transcript (2010).
- 2 Among others, see Frederik Stjernfelt: "Diagrams as Centerpiece of Peircean Epistemology", in: *Transactions of the Charles S. Peirce Society* 36/3 (2000), pp. 357–384.
- 3 See, for example, Giulio Barsanti: *La scala, la mappa, l'albero: Immagini e classificazioni della natura fra sei e ottocento*, Firenze: Sansoni (1992); Mark A. Ragan: "Trees and Networks before and after Darwin", *Biology Direct* 4/43 (2009), n.p.

BOURGEOIS GENEALOGICAL DIAGRAMS

Representative Family Trees

Out of a green grassy patch grows the trunk of a tree, surrounded by three coats of arms which, according to small stone inscriptions next to them, have been given by three emperors to Andreas, Eusebius, and Nicolaus Bischoff, the designated progenitor of the Bischoff family who was born in 1501. Leaves are placed along the trunk, mentioning the names and life dates of Bischoff family members, from the generation of Nicolaus and his siblings up to his descendants born in the first half of the nineteenth century. A close look at the leaves reveals that to some of them, certain capital letters were added. These refer to certain professions, as the legend beneath the tree explains. For example, the letter A refers to doctors, surgeons, or professors, while the letter B refers to printers and book sellers, while the other letters stand for theologians, military men, salesmen, administrators, and politicians. The diagram illustrates the growing of the Bischoff family, and it also provides information about the high ranks and important professions held by Bischoff family members, indicating the family's significance in domains like medicine, religion, warfare, economics, and politics. The Bischoff family tree is not the only genealogical diagram by Basel's bourgeois elite families (the so-called *Daig*) that tries to convey information about status; we can find similar illustrations for other families as well. In general, many of these families produced vast amounts of genealogical material, pointing towards a strong genealogical consciousness.



Hieronymus Bischoff-Bischoff: *Family Tree of the Bischoff Family* (19th c.), after a manuscript of his father Hieronymus Bischoff-Buxtorf [79.5 x 98.5cm], Basel: Staatsarchiv Basel-Stadt PA 818a D 7.



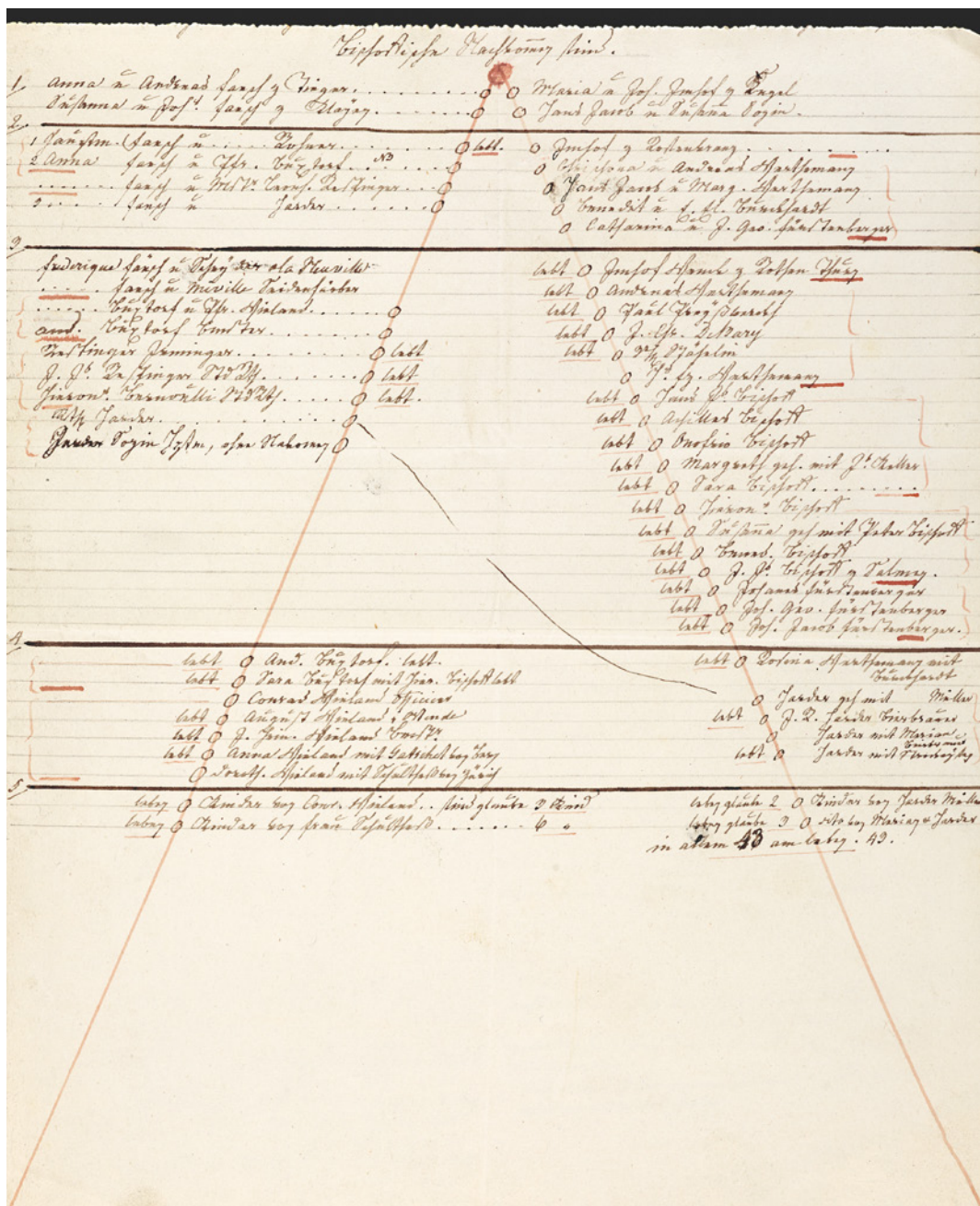
Detail from Hieronymus Bischoff-Bischoff: *Family Tree of the Bischoff Family* (19th c.), after a manuscript of his father Hieronymus Bischoff-Buxtorf [79.5 x 98.5cm], Basel: Staatsarchiv Basel-Stadt PA 818a D 7.

The tree's leaves mention the names and life dates of the descendants of Nicolaus Bischoff, the designated "*Stammvater*" of the Bischoff family. Some leaves bear the inscription of capital letters – these refer to certain professions. A different hand added lines (mostly with red colored pencil) to separate the generations from each other.

BOURGEOIS GENEALOGICAL DIAGRAMS

Relating Living to Dead

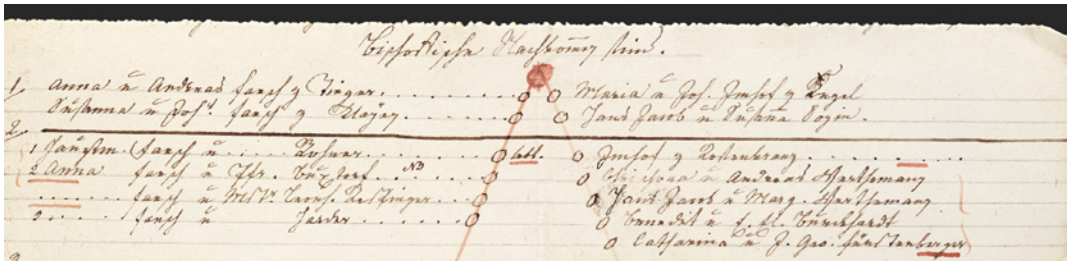
While the Bischoff family tree with its trunk, branches, and leaves looked rather arborescent, imitating the appearance of a biological tree, another diagram concerning the Bischoff family stands in stark contrast to it. This other diagram is reminiscent of the shape of a triangle; its composition does not resemble the graphics we would most often associate with genealogy, such as family trees or pedigrees. Like those genealogical diagrams, it tries to convey information about who relates to whom with lines that connect descendants with their ancestors, but besides that, this diagram here remarks who was still alive when the diagram was composed – its lines relate the living to the dead.



Hieronymus Bischoff-Buxtorf: *Bischoffische Nachkommen sind*
 [Bischoff Descendants are] (ca. 1810s) [22 x 27cm], Basel: Staats-
 archiv Basel-Stadt PA 818a D5.

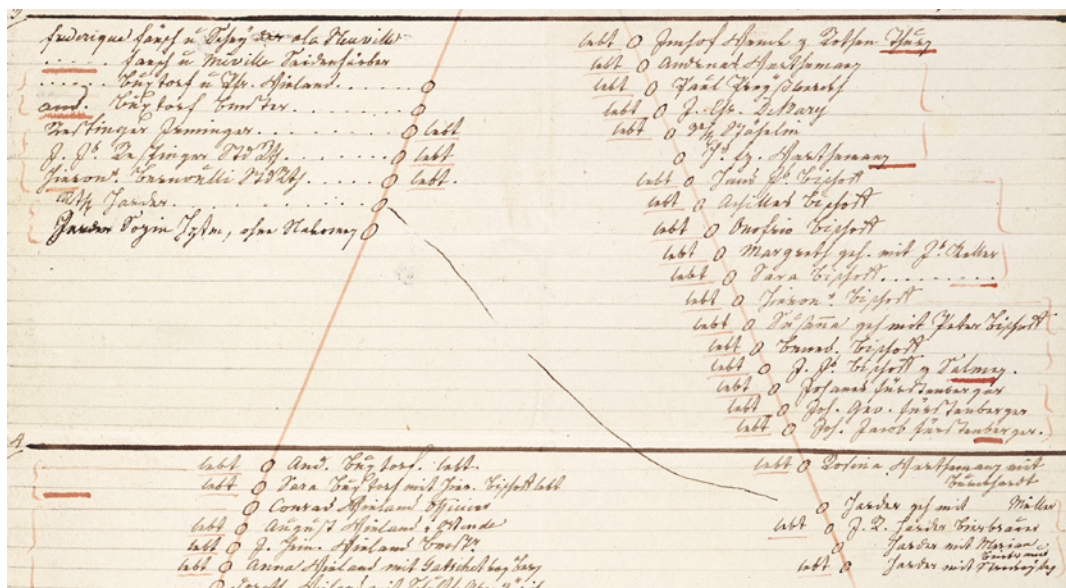
The author of the diagram was Hieronymus Bischoff-Buxtorf (1762–1828). In his younger years, he was trained in commerce and later became an active member of Basel's city council. He was married to Sara Buxtorf, the major's daughter. Hieronymus had a keen interest in genealogy: he engaged in genealogical research and wrote a "Stamm Register der Familie Bischoff in Basel," a textual narrative that explained the lineage of the Bischoff family in Basel.¹ He collected genealogical information from various sources and produced many

notes that must have inspired the conceptualization of the Bischoff family tree and which are still preserved today. Among them we find this triangular-shaped diagram.² Entitled *Bischoff'sche Nachkommen sind* (Bischoff Descendants are), it lists the descendants of Hans Jacob Bischoff (1646–1719) and Maria Socin (1654–1695), but this fact is not explicitly mentioned. Only the notes on the backside of the document reveal this information. Hans Jacob and Maria were the great-grand parents of Hieronymus Bischoff-Buxtorf. They are represented by the big red dot at the tip of the graphic, and the four names beneath this dot represent their children: Anna and Susanna Bischoff with their husbands on the left, Maria and Hans Jacob Bischoff with their spouses on the right. They constitute the first generation, as indicated by the number one on the left margin. In the second generation follow the children of these four siblings with their spouses, in the third generation their grandchildren, and so forth. The diagram is basically a register of the generations descending from Hans Jacob Bischoff and Maria Socin. However, the composition of the diagram does not clearly illustrate who descends from whom, at least not at first sight. Only the red braces that group together siblings, paired with a close look at the surnames provide hints to discern the lines of descent.



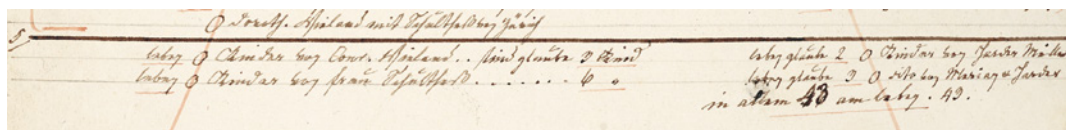
Detail from Hieronymus Bischoff-Buxtorf: *Bischoff'sche Nachkommen sind* [Bischoff Descendants are] (ca. 1810s) [22 x 27cm], Basel: Staatsarchiv Basel-Stadt PA 818a D5.

Usually, the children follow on the same side of the triangular shape as their parents, but the children born to a certain "Rath[sherr] Harder" were inconsistently included at the wrong side, which is why a shaky, diagonal line cuts across the diagram to connect the children on the right to their father on the left. We might assume that Hieronymus Bischoff did not always include all the parents' children: the ratio between the people included in the third and the fourth generation on the right side seems to be out of proportion. It might be that only a few people of the fourth generation were already married and having children at the time when Hieronymus Bischoff-Buxtorf drew the diagram, so that he decided to exclude those without offspring. Or he might simply not have had any more information about additional descendants. Hieronymus Bischoff-Buxtorf himself is also included in the graphic: he can be found at the right side in the third generation. His wife Sara is mentioned in the fourth generation on the left side. In a way, the diagram shows that he and his wife descended from the same shared ancestors, Hans Jacob Bischoff and Maria Socin.



Detail from Hieronymus Bischoff-Buxtorf: *Bischoffische Nachkommen sind* [Bischoff Descendants are] (ca. 1810s) [22 x 27cm], Basel: Staatsarchiv Basel-Stadt PA 818a D5.

One of the most prominent features of the diagram is the remark "lebt": It seems that Hieronymus Bischoff-Buxtorf explicitly marked those people who were still living at the time when he composed the diagram, probably in the 1810s. At the bottom, he concluded that 43 descendants of Hans Jacob Bischoff and Maria Socin were still alive at that point. Thus, the diagram registers the living (and therefore the people who might be able to provide more genealogical information for him) and relates them via the two lines to their dead ancestors. Apparently, Hieronymus Bischoff-Buxtorf needed more genealogical information, as the data he provided for the last generation, the fifth one at the bottom of the triangular shape, was rather unspecific. Here, Hieronymus Bischoff-Buxtorf did not (or was not able to) provide any names. For example, he only noted "children of Conrad Wieland, there are, I think, three of them."



Detail from Hieronymus Bischoff-Buxtorf: *Bischoffische Nachkommen sind* [Bischoff Descendants are] (ca. 1810s) [22 x 27cm], Basel: Staatsarchiv Basel-Stadt PA 818a D5.

Why Hieronymus Bischoff-Buxtorf drew the diagram in the first place is hard to tell. As there is no text available that would provide any information on how to read and interpret the diagram, we might assume that it was not intended to be read by a larger audience. Besides illustrating the descendants of Hans Jacob Bischoff and Maria Socin, a key feature of this diagram is its emphasis on those people that were still alive in contrast to those that were not anymore and to relate them to each other. Following Fenella Cannell, we can observe how genealogy "reconnects the living to their dead as kin,"³ as they are placed along the same line that also connects them to each other. The dead may be gone, but they are nonetheless the ancestors of those still living. Another important feature of the diagram is its snapshot character: Hieronymus Bischoff counted 43 living descendants, presumably back in the

1810s. We can only speculate why this was an important observation for him. Maybe he planned a family reunion, or he needed the names of those living people for his further genealogical writings. The definitive motivation for drawing and using the diagram thus remains unknown.

Notes

- 1 Hieronymus Bischoff-Buxtorf: "Stamm Register der Familie Bischoff in Basel (Episcopus). Mit historischen & biographischen Notizen. Von uralter, vormalis verschiedener Abkunft", manuscript, early 19th. c., Staatsarchiv Basel-Stadt, PA 818a D9.
- 2 Hieronymus Bischoff-Buxtorf: *Bischoffische Nachkommen sind* [Bischoff Descendants are] (ca. 1810s), Basel: Staatsarchiv Basel-Stadt PA 818a D5.
- 3 Fenella Cannell: "English Ancestors: The Moral Possibilities of Popular Genealogy", in: *Journal of the Royal Anthropological Institute* 17 (2011), pp. 462–480, p. 465.

Further Readings

Volker Bauer: "Baum und Zeit Datenorganisation, Zeitstrukturen und Darstellungsmodi in frühneuzeitlichen Universalgenealogien", in: Achim Landwehr (eds.): *Frühe Neue Zeiten. Zeitwissen zwischen Reformation und Revolution*, Bielefeld: Transcript (2012), pp. 41–82.

Mary Bouquet: "Family Trees and their Affinities: The Visual Imperative of the Genealogical Diagram", in: *Journal of the Royal Anthropological Institute* 1/2 (1996), pp. 43–66.

Leonardo Broillet, Claire Gantet: "A Ridiculous Science? Genealogical Practices and Techniques in a Society without its own Nobility in the Seventeenth and Eighteenth Centuries", in: Jost Eickmeyer, Markus Friedrich, Volker Bauer (eds.): *Genealogical Knowledge in the Making*, Berlin: De Gruyter (2019), pp. 23–46.

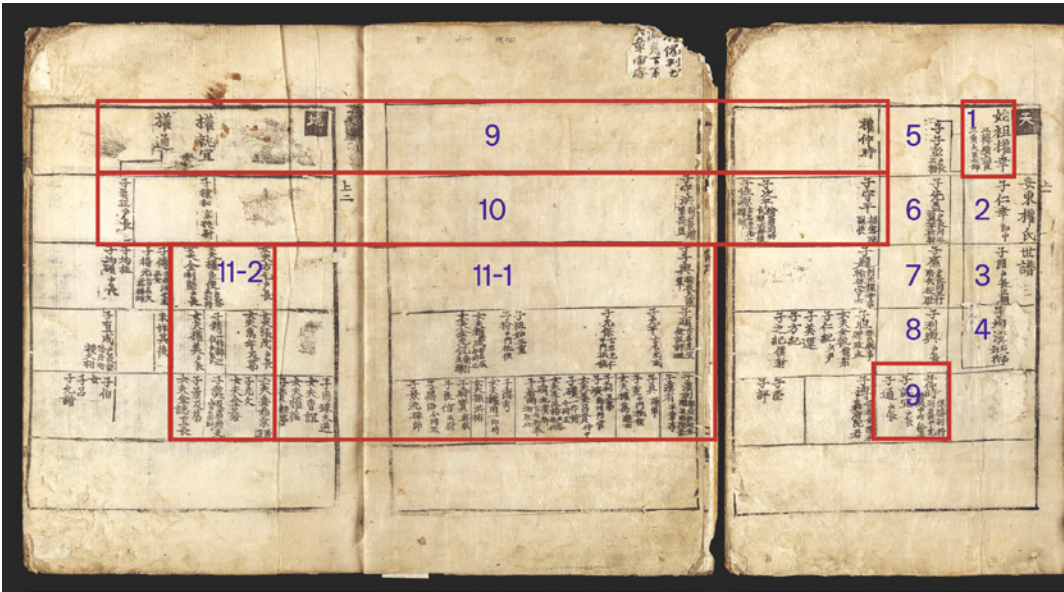
Christiane Klapisch-Zuber: "The Genesis of the Family Tree", in: *I Tatti Studies in the Italian Renaissance* 4 (1991), pp. 105–129.

Philipp Sarasin: *Stadt der Bürger: Bürgerliche Macht und städtische Gesellschaft*, Göttingen: Vandenhoeck & Ruprecht (1997).

Fiona Vicent: "Abstammung zelebrieren: Das 'Erinnerungsfest' zum 400-jährigen Geburtstag des Stammvaters der Familie Burckhardt am 14. September 1890", in Michael Hecht, Elisabeth Timm (eds.): *Genealogie in der Moderne: Akteure - Praktiken - Perspektiven*, Berlin: De Gruyter Oldenbourg (2022), pp. 129–156.

GENDER SHIFT IN GENEALOGY Before the Patrilineal Turn

Though Koreans kept family records from early in the country's history, they began to compile and publish genealogies starting in the fifteenth century. Since that time, elite descent groups devoted increasing resources to compiling and publishing their genealogical records, and from the eighteenth century on almost all elite descent groups participated in producing them. The popularity of genealogy coincided with the patrilineal turn in kinship organization, as prescribed in Neo-Confucianism. Scholars indicate that the Confucianization of Chosŏn Korea (1392–1910), a slow and uneven process which took place over centuries, had a debilitating impact on women as they lost their equal inheritance right along with full participation in ancestral rituals. Genealogies reflect this monumental transformation of society. Genealogies produced before the eighteenth century were compiled following the principle of bilaterality, whereas those compiled afterward adopted a patrilineal principle instead. The *Andong Kwŏn Genealogy* of 1476, the earliest extant genealogy, thus traces matriline and patriline in equal detail. In addition, daughters and sons were recorded in order of birth. The genealogy also recorded a woman's remarriage, signifying that remarriage of women was not stigmatized, unlike in late Chosŏn when an elite woman was supposed to maintain her chastity when widowed; together with loyalty and filial piety, chastity was one of three cardinal values among Chosŏn elites.¹

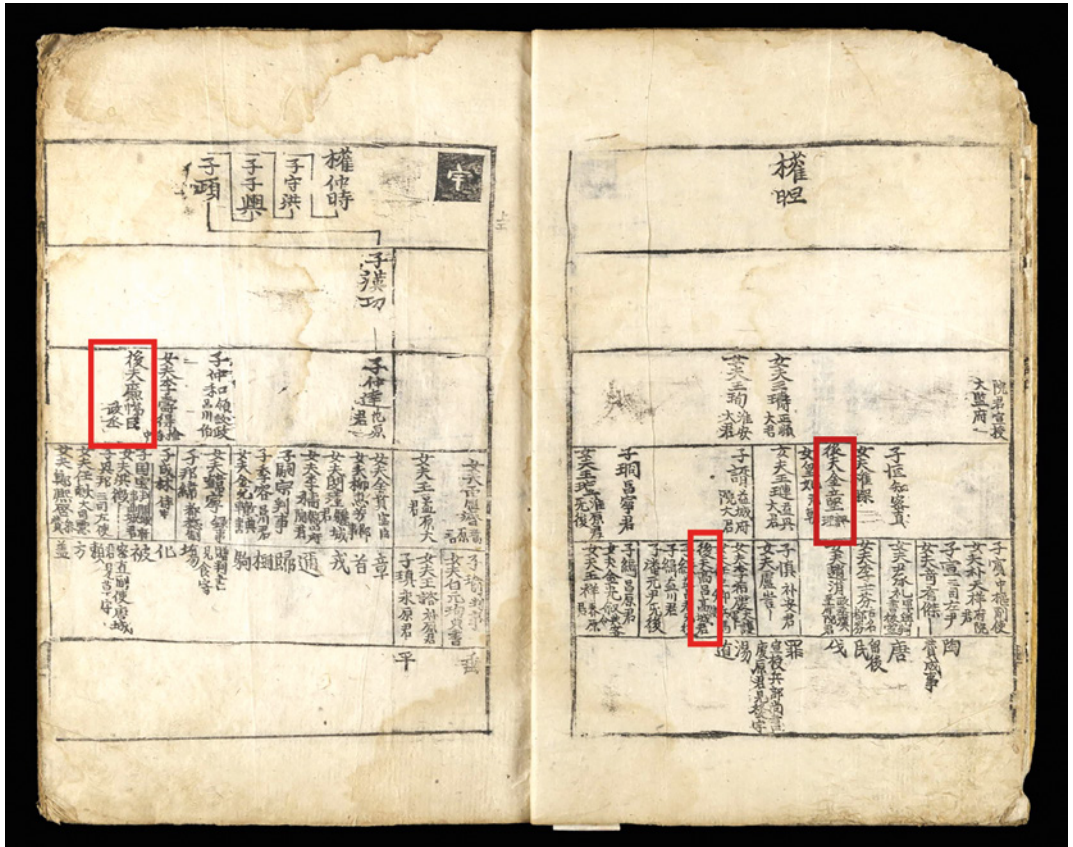


Sŏ Kŏ-jŏng: *Andong Kwŏn ssi chokpo* [*Andong Kwŏn Genealogy*], Andong (1476), 1: 1a–2a, https://kyudb.snu.ac.kr/book/view.do?book_cd=GR36020_00. Courtesy of Kyujanggak Institute for Korean Studies, Seoul National University.

Andong Kwŏn Genealogy of 1476: The basic format of this oldest extant genealogy, probably modelled after Chinese precedents and distinct from the tree form popular in early modern Europe, became typical of subsequent genealogies. Each page is divided into several horizontal segments. The oldest generation occupies the top row followed by the next generation in the second row, and so on. The first child is written on the right immediately below his or her parent, with the next child to the left of the older sibling. Descen-

dants of the people recorded at the bottom row appear in subsequent pages or in another volume not shown here. This form enables recording many dozens of generations in multiple volumes. The Sinograph “*cha* 子” on top of a name written vertically in the genealogy means “son” and “*yŏbu* 女夫” means son-in-law. Although women in premodern Korea had their own name, they were referred to by their husband’s name in genealogical records. The *Andong Kwŏn Genealogy* provides only one son’s name in each of the first seven generations after the apical ancestor Kwŏn Haeng 權幸 (a vertical box on top right), already showing patrilineal bias. It lists three sons for the ninth generation and six sons for the tenth generation. Daughters appear only from the eleventh gen-

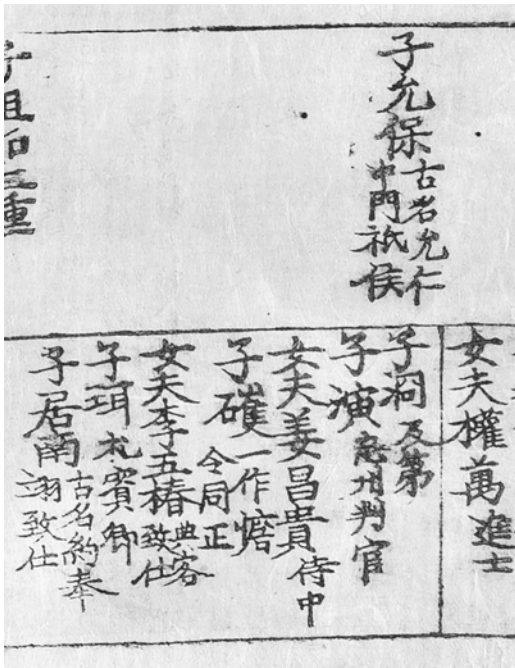
eration (11-2). From then on, both daughter's and son's descents are recorded equally. For example, [Kwŏn] Su-hong [權]守洪, the fourth son in the tenth generation, had one son and three daughters (11-1 and 11-2). [Kwŏn] Cha-yŏ [權]子興, Su-hong's only son, had many children and grandchildren and thus takes up more space in these pages. But the boxes 11-1 and 11-2 trace both son's and three daughters' descendants equally. This genealogy, which offers 21 generations of records bilaterally, is in fact a multi-descent group genealogy, as only 380 people out of a total of around 9'000 belonged to the Andong Kwŏn descent group.



Sŏ Kŏ-jŏng: *Andong Kwŏn ssi chokpo* (1476), 1: 4b-5a. Courtesy of Kyujanggak Institute for Korean Studies, Seoul National University.

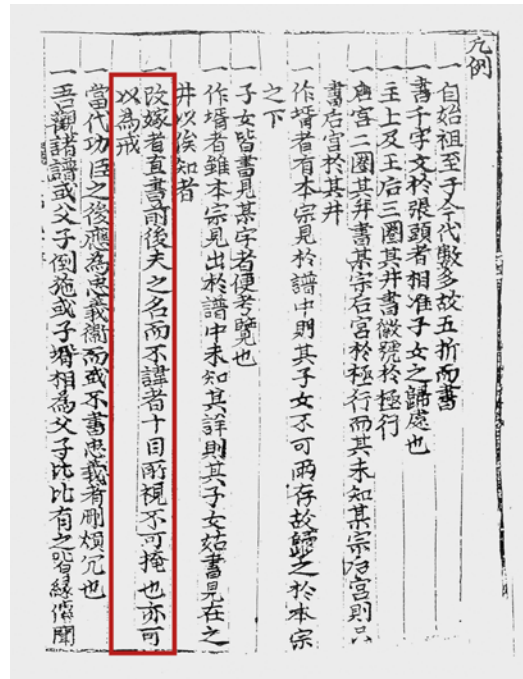
Remarriage of women in the *Andong Kwŏn Genealogy*: Remarriage of elite women before the sixteenth century was common and not stigmatized, as the *Andong Kwŏn Genealogy* records a total of seventeen women's remarriage out of about 9'000 people. These two pages alone reveal three cases of remarriage, marked by "*hubu* 後夫" meaning "later husband." In comparison, the *Munhwa Yu Genealogy* of 1565 records eighteen cases of women's remarriages out of about 42'000 women and men. Of those eighteen, fourteen appear in the *Andong Kwŏn Genealogy*, demonstrating that women's remarriage decreased rapidly after the late fifteenth century.² There was no legal prohibition on remarriage. However, the prospects for elite women's remarriage were effectively blocked by the articles in the *Great Code of Administration* (1485), which prohibited sons of remarried women from taking the civil service examination,

the primary avenue to enter bureaucracy, and also from holding both civil and military positions.³ Increasing emphasis on moral values, most notably chastity, further discouraged elite women from remarriage.



Detail from Andong Kwŏn Genealogy (1476).

Daughters and Sons by Birth Order in the Andong Kwŏn Genealogy: In the early Chosŏn genealogical records, children are recorded in order of birth as shown here, with the first born on the right followed by the next born to the left. The birth order of [Kwŏn] Yun-bo's [權]允保 seven children is thus son, son, daughter, son, daughter, son, son.



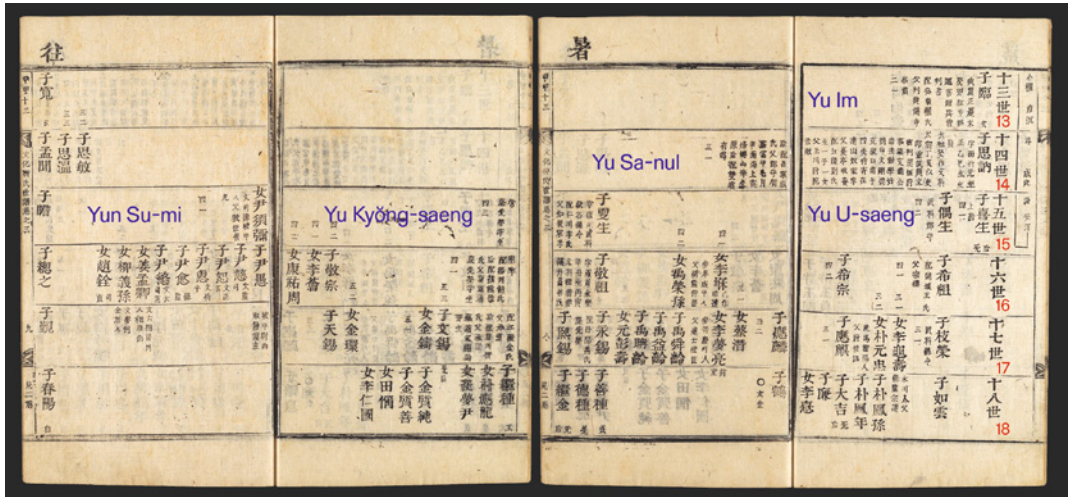
Yu Hŭi-jam: *Munhwa Yu ssi sebo* [*Munhwa Yu Genealogy*] (1565), pŏmnye [compilation principles]: 1a, reprint edition, Munhwa Yu ssi sebosŏ (1979). The 1565 edition is available at http://yoksa.aks.ac.kr/jsp/aa/ImageView.jsp?aa10no=kh2_je_a_vsu_55021_001&pageid=.

Compilation Principles for the Munhwa Yu Genealogy of 1565: The *Munhwa Yu Genealogy* spells out the following compilation principle concerning women's remarriage (red box), illuminating the changing elite ethos: "For those women who remarried, the names of both the first and second husbands shall be straightforwardly written with no attempt to conceal their remarriages because everyone knows these cases. In addition, such records would serve as an admonition to others."

GENDER SHIFT IN GENEALOGY After the Patrilineal Turn

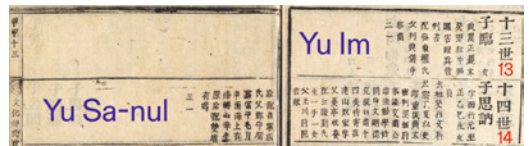
The compilation and publication of genealogies became popular from the latter part of the seventeenth century. Once a genealogy was compiled, the ideal among elites was to update it every thirty years, or once a generation, though in reality the gap between updates was often much longer. The ways in which women were recorded in genealogies after the eighteenth century reflected the patrilineal principle that elites adopted over the centuries. Sons were recorded first regardless of birth order. Daughters were recorded with a gender marker "yŏ 女" but in her husband's name following the previous Chosŏn practice. Records concerning the daughter's descendants were limited to one or two generations, usually with only names but sometimes with brief notes on their paternal ancestry, exam degrees, and bureaucratic positions. This brevity contrasts with more comprehensive entries for some male members, which could include style name, penname, birth and death years, grave location, exam degrees, positions, and information concerning the wife such as her ancestry and her birth and death years. Some entries are laden with more elaborate information such as the member's bureaucratic and literary career while many

other entries remain blank. A new feature in late Chosŏn patrilineal genealogy was the inclusion of wives, though the information concerning them is appended to the husband's entry. Mark Peterson captures this formatting nicely in noting that a woman became "an associate member of her husband's patrilineage in the Confucianized society."⁴ Not surprisingly, perhaps, late Chosŏn genealogies recorded remarriage of men, but not of women.



Yu Pyŏng-gyun: *Munhwa Yu ssi sebo* [Munhwa Yu Genealogy] (1803), 3: 7b-9a, [https://iif.harvard.edu/manifests/view/drs:459590910\\$34i](https://iif.harvard.edu/manifests/view/drs:459590910$34i). Courtesy of Harvard-Yenching Library of Harvard College Library, Harvard University.

These pages from the 1803 edition of the *Munhwa Yu Genealogy* show some members of Munhwa Yu descent group from the thirteenth to eighteenth generations (noted on the far right), descending from [Yu] Im [柳臨], the entry on the top right next to generation marker "13 十三." He had three sons listed in the second row. His first son [Yu] Sa-nul [柳思訥] (1365-1440) had three sons and one daughter while the other two had no descendants.



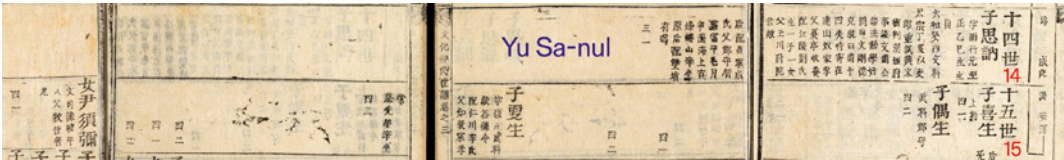
Detail from *Munhwa Yu Genealogy* (1803).

Yu Im and Yu Sa-nul in the *Munhwa Yu Genealogy* of 1803: The information provided for certain entries is multidimensional, going beyond simple biographical data. The gap between the man and woman is also notable.

Son, Im: He held a junior third rank position in the Agricultural Bureau (Chŏnnong Chŏng). / He was killed during the Red Turban invasion in 1363. / The court awarded him a posthumous position of minister of the Military Affairs (Pyŏngjo P'ansŏ). / Wife was Madam Kwŏn of Andong Kwŏn and her father was Kwŏn Suk 權肅, who held a senior third rank position in the Medical Bureau (P'an Chŏnŭisisa).

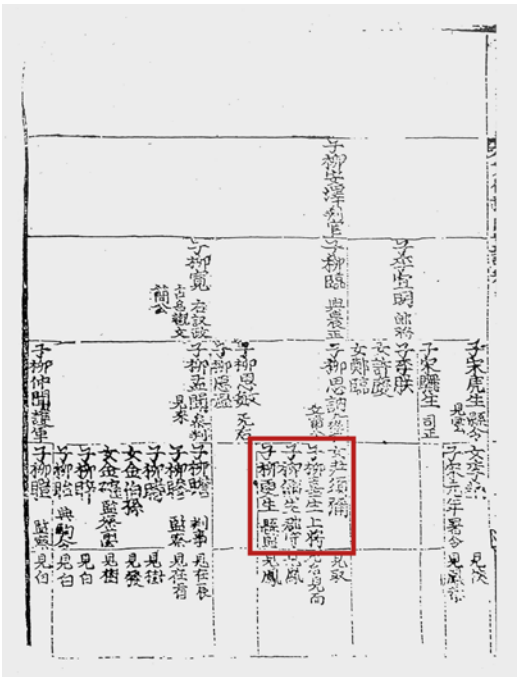
Son, Sa-nul: Style name is I-haeng. / He was born in 1365. / He held a classics licentiate degree. / He passed the higher civil service examination in 1393. / In 1407, he passed the special examination for officials and was director of the Office of Royal Decrees (*munhyŏng*, Sr. 2). / He served as magistrate of Hansŏng Capital Magistracy (Sr. 2). / His posthumous title is Lord Munsuk. According to the principles of creating a posthumous title, the letter "mun 文" is used for a person who loves scholarship and "suk 肅" is used for a person who is upright and benevolent, and who surmounts difficulties and attains great accomplishment. / He lost his parents at the age of 14 and entrusted himself at the house of a slave in Yŏnsan County. Then his uncle Yu Kwan 柳寬 (1346-1433) took him under his care and raised him. / Wife is Madam Yu of Kangnŭng Yu descent group.

She bore one son and one daughter. Her father is Yu Ch'ang 劉敞 (?-1421), Lord Okch'ŏn. / Second wife is Madam Sŏng of Ch'angnyŏng Sŏng descent group. Her father is Sŏng Sŭp 成習, who was a county magistrate. / His grave is located in "sin 辛" position on the Old Beacon Fire Mountain in Mowŏl Cape, Pup'yŏng County and both first and second wives are buried together in a twin mound. There is a stela.



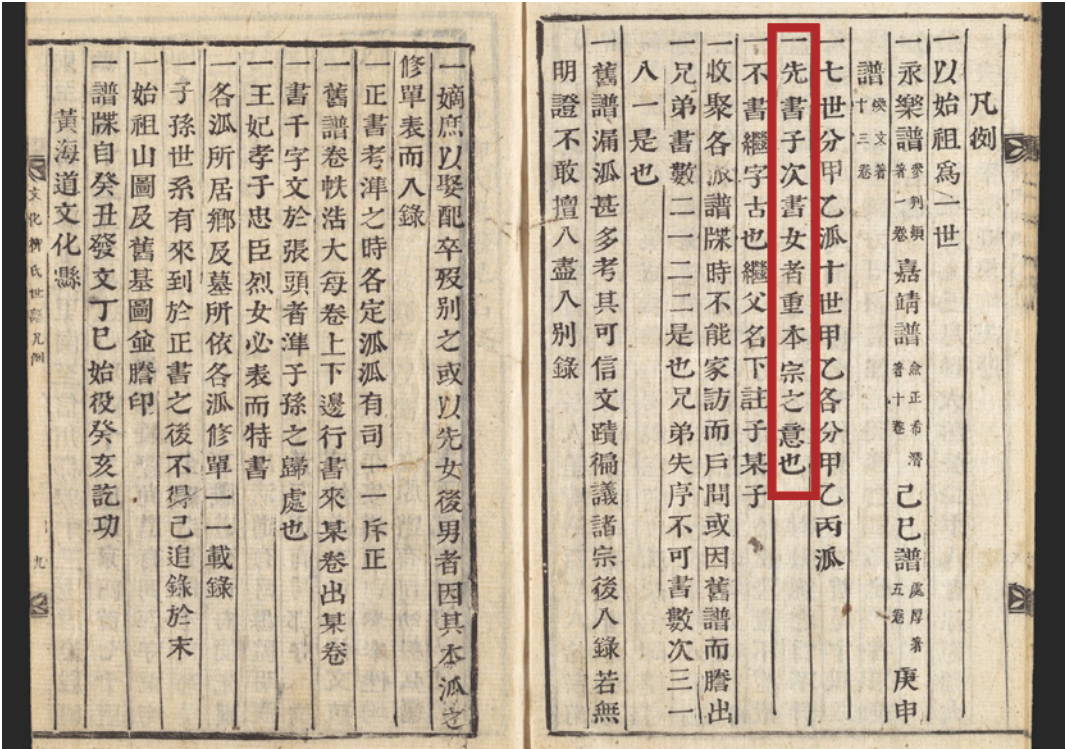
Detail from *Munhwa Yu Genealogy* (1803).

Yu Sa-nul's Descendants in the *Munhwa Yu Genealogy* of 1803: In the 1803 genealogy, the four children of Yu Sa-nul in the fifteenth generation are listed as follows: [first] son Hŭi-saeng 喜生; [second] son U-saeng 偶生; [third] son Kyŏng-saeng 嬰生; and a daughter [who married] Yun Su-mi 尹須彌.



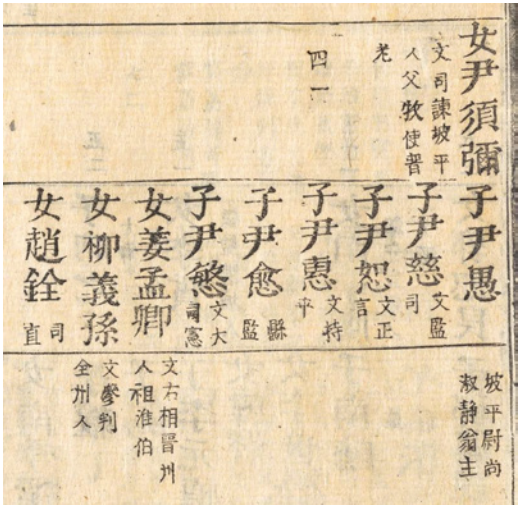
Yu Hŭi-jam: *Munhwa Yu ssi sebo* (1565) 1: 10b.

Yu Sa-nul's Descendants in the *Munhwa Yu Genealogy* of 1565: The 1565 edition of the *Munhwa Yu Genealogy*, however, informs us that the daughter was the first-born child, as she is listed first on the right followed by three sons to her left (see the boxed area).



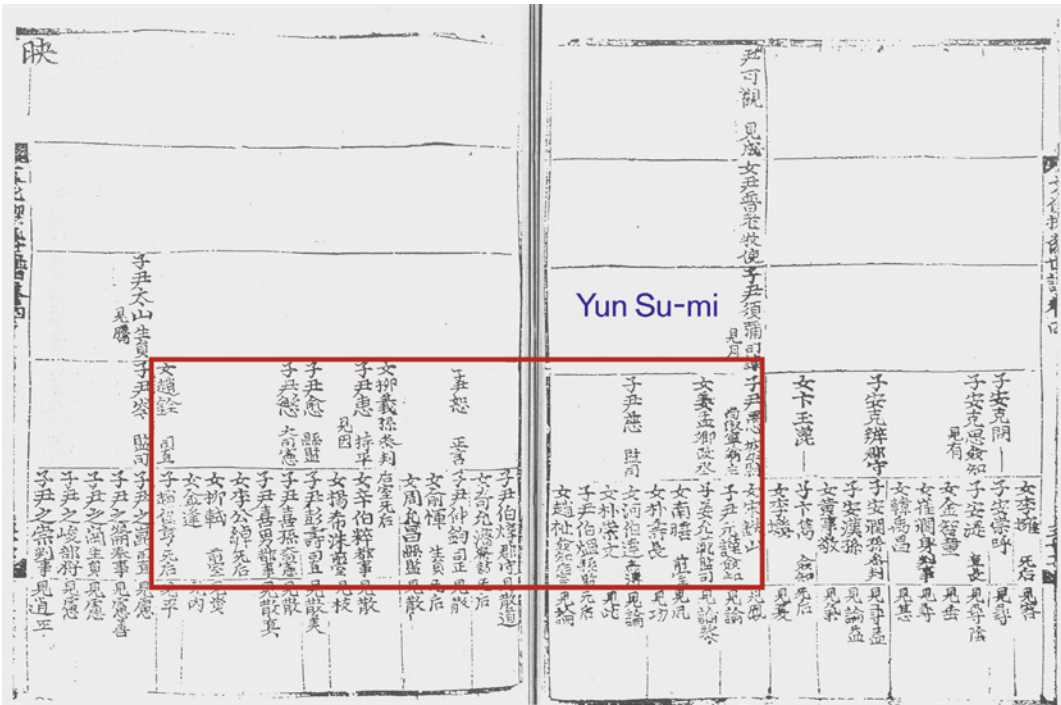
Yu Pyŏng-gyun: *Munhwa Yu ssi sebo* (1803), sŏ: 8b.

Compilation Principles of the *Munhwa Yu Genealogy* of 1803: Guided by Neo-Confucianism, elite society developed the idea that the patriline outweighs the matriline. Reflecting this shift, compilation principles guiding late Chosŏn genealogies discriminated against women, as this sample clearly spells out: “Sons shall be written before daughters in order to stress the importance of the primary line of descent (*ponjong* 本宗).” The primary line no doubt refers to the patrilineal descendants.



Detail from *Munhwa Yu Genealogy* (1803).

A Daughter's Descendants in the *Munhwa Yu Genealogy* of 1803: In the 1803 edition, Sa-nul's daughter's line (i.e. son-in-law Yun Su-mi's line) records only one more generation of six sons and three daughters – sons first, followed by daughters.



Yu Hŭi-jam: *Munhwa Yu ssi sebo* (1565) 4: 32b–33a.

A Daughter's Descendants in the *Munhwa Yu Genealogy* of 1565: In contrast, the 1565 edition lists the nine children in birth order and both daughter's and son's descents were equally recorded. Although the images here show only two generations of Yun Su-mi's descendants by his daughters and sons, more information concerning descendants of Su-mi's grandchildren at the second bottom row are provided in other volumes of the genealogy. Notations on the bottom row indicate which volume and page to look up.

Another significant element of the patrilineal turn was agnatic adoption (*iphu* 立後). In the *Andong Kwŏn Genealogy* of 1476, no single example of adoption among about 9'000 people is recorded. The *Munhwa Yu Genealogy* of 1565 shows 126 adoption cases among about 45'000 recorded people.⁵ An analysis of those cases illustrates that although agnatic adoption began in the early part of the sixteenth century, it remained unpopular throughout the century. By the eighteenth century, however, about fifteen percent of the successful graduates of the civil service examination were adopted sons.⁶ One mechanism behind this change was that elite families began excluding daughters from inheritance and ritual roles, instead preferring male adopted heirs to succeed the family line and perform ancestral rituals.⁷ Genealogies, despite their shortcomings derived from inaccuracies and incompleteness, provide key insights into the social and cultural conditions of the time when they were compiled and published. By comparing various editions, we can discern the transformation of elite understandings of kinship structure and gender relations as well as the place of women in early modern Korea.

Notes

¹ Terms and names in Korean are rendered using the McCune-Reischauer romanization system. Korean names are given surname first without a comma except for authors of works in English. When I use two words to designate a family or a descent group, the first word refers to the ancestral seat (usually a county or subcounty) and the second refers to the surname. Therefore, Andong in Andong Kwŏn refers to the ancestral seat of this descent group having Kwŏn as the apical ancestor's surname.

- 2 Edward W. Wagner: "Two Early Genealogies and Women's Status in Early Yi Dynasty Korea", in: Laurel Kendall, Mark Peterson (eds.): *Korean Women: View from the Inner Room*, New Haven, CT: East Rock Press, Inc. (1983), p. 28; Mark Peterson: "Women without Sons: A Measure of Social Change in Yi Dynasty Korea", in: Laurel Kendall, Mark Peterson (eds.): *Korean Women: View from the Inner Room*, New Haven, CT: East Rock Press, Inc. (1983), p. 38.
- 3 Ch'oe Hang et al.: *Kyŏngguk taejŏn* [Great Code of Administration] (1485), Yejŏn [Code of Rites], Chegwa [State Examinations], 3: 1b, https://db.history.go.kr:443/id/jlaw_103_0020_0010 and Ijŏn [Code of Personnel], Kyŏnggwangjŏk [Central Government Positions], 1:4b-5a, https://db.history.go.kr:443/id/jlaw_101_0040_0070.
- 4 Mark Peterson: "Women without Sons: A Measure of Social Change in Yi Dynasty Korea", in: Laurel Kendall, Mark Peterson (eds.): *Korean Women: View from the Inner Room*, New Haven, CT: East Rock Press, Inc. (1983), pp. 33-44, p. 35.
- 5 Edward W. Wagner: "Two Early Genealogies and Women's Status in Early Yi Dynasty Korea", in: Laurel Kendall, Mark Peterson (eds.): *Korean Women: View from the Inner Room*, New Haven, CT: East Rock Press, Inc. (1983), pp. 23-32, pp. 26-27.
- 6 Mark Peterson: "Women without Sons: A Measure of Social Change in Yi Dynasty Korea", in: Laurel Kendall, Mark Peterson (eds.): *Korean Women: View from the Inner Room*, New Haven, CT: East Rock Press, Inc. (1983), pp. 33-44, p. 34.
- 7 Although the patrilineal and patriarchal model of genealogy had become dominant in late Chosŏn, elites also produced bilateral alternatives in which bilateral ancestors were equally represented.

Further Readings

Mark A. Peterson: *Korean Adoption and Inheritance: Case Studies in the Creation of a Classic Confucian Society*, Ithaca: East Asia Program, Cornell University (1996).

Martina Deuchler: *The Confucian Transformation of Korea: A Study of Society and Ideology*, Cambridge and London: Council on East Asian Studies, Harvard University (1992).

Sun Joo Kim: "Adoption in Chosŏn Korea and in the Yu Taech'ŭng Family", in *Acta Koreana* 23/1 (2020), pp. 115-134.

Sun Joo Kim: "Inheritance Document and Mutual Agreement on the Division of Property (*hwahoe sŏngmun* 和會成文)", in *Acta Koreana* 23/1 (2020), pp. 97-114.

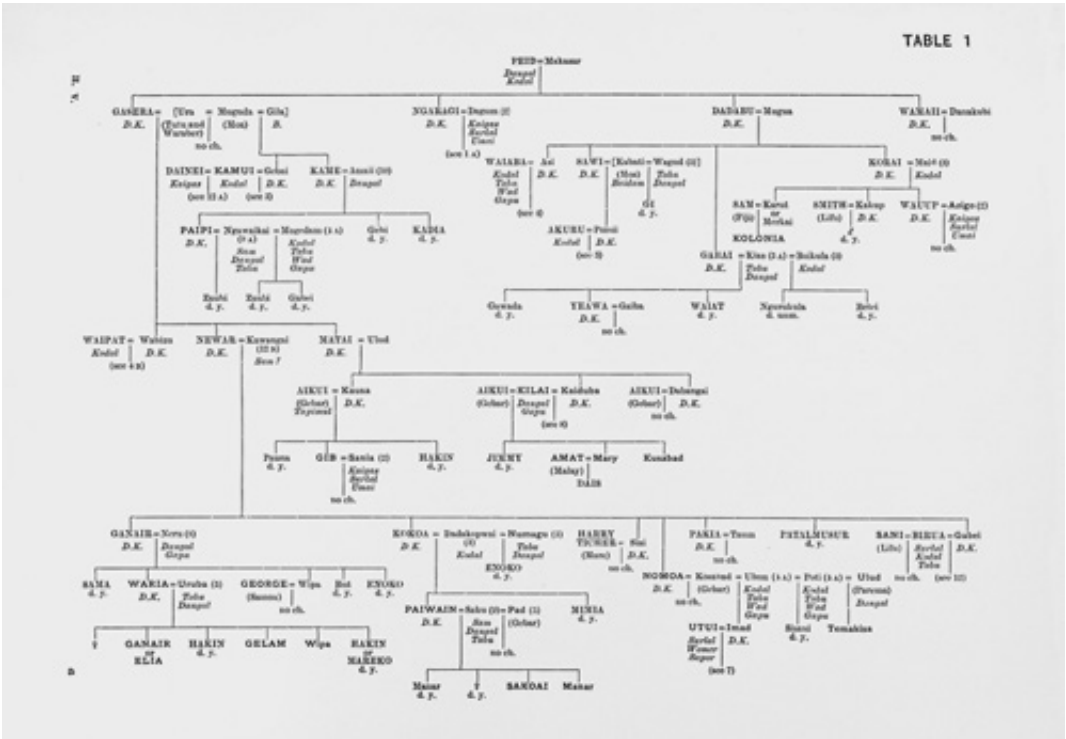
Sun Joo Kim: "Yu Taech'ŭng Family Documents and the Kigye Yu of Puyŏ", in *Acta Koreana* 23/1 (2020), pp. 65-96.

Sun Joo Kim: "Diversity and Innovation in the Genealogical Records of Chosŏn Korea", in *Historische Anthropologie* 31/1 (2023), pp. 34-61.

INDIGENOUS DIAGRAMS Blackboxing Mabuiag

Mabuiag, a remote island in the Torres Straits, 1898. Waria recorded the words of an elder of his tribe, chief authority in genealogical lore. They sat at the camp of W.H.R. Rivers, member of the Cambridge Anthropological Expedition to Torres Straits. What were the names of the children of your father? The names of their children, their wives, and husbands? And of the father and mother of your father? Surrounded by a large crowd listening and correcting, if necessary, Waria collected name after name of his ancestors and reported them to the ethnologist.¹

Six years later, Rivers published the collected genealogies in a volume of *The Reports of the Cambridge Anthropological Expedition to Torres Straits*. The ethnologist arranged them as schematic pedigrees, developing a specific style of notation: capital letters for men, Clarendon type for people living, the names of men always to the left of those of their wives, "d.y." for "died young," "n.ch." for "no children," the name of the totem in italics and the name of the island in parentheses. (Later this inscription style became influential in the formation of the Cambridge Anthropological School.)² In the pedigree in Table 1 of the volume, Rivers put the name of Waria in Clarendon type and to the left of his wife Uruba. In italics, he annotated that Waria was a member of the Dangal Kodal ("D. K."), while his wife originally belonged to the totem of the Tabu Dangal.³



William H.R. Rivers: *Genealogical Tables*, Cambridge: Cambridge University Press (1904), Table I, n.p.

From *go-between to inscription*: Waria in Rivers's *Genealogical Tables*.

With the genealogies from Mabuia translated into abstract diagrams, Rivers studied, as he called it, "social institutions" – not only from his time but also from the early history of mankind. The pedigrees tended to reflect, in his view, ancient, and often extinct, social facts. They could be used as a kind of "linguistic archaeology" in order to understand historical changes in social organization:⁴ based on the diagrams, Rivers reasoned about marriage rules and interpreted them as relics of an evolution from the system of maternal descent to that of paternal descent. It could be of "little doubt that the Mabuia custom is also the survival of a condition of maternal descent from which the islanders have emerged at a comparatively recent date," the ethnologist argued.⁵

While Rivers speculated about primeval times in Mabuia, black boxing Waria's report, he was surrounded by trans-imperial entanglements at the Torres Straits – and its effects on nature: British and French Colonials lodging at thriving two- or three-storied hotels. Islanders patrolling as policemen, selling pearl shell, *bêche-de-mer*, and sometimes a little garden produce. German, Scandinavian, and Greek day laborers waiting for a job as divers. Japanese competing with the British in the pearl industry. Boiled and smoke-dried sea slugs ready for the export to China. Mountains of eviscerated tins, kerosine cases, and empty bottles cast into the sea. Overfished waters, and a harvest that became scantier – after years of rapid fortune.⁶

INDIGENOUS DIAGRAMS Sticks and Stones

"I should perhaps add that although we communicated with one another in jargon, or pidgin-English, we used native words whenever there was a possibility of a misunderstanding arising, and by the context we could usually make certain as to the significance of new or obscure native terms. [...] It is a quaint, though not an ideal mode of communication of ideas, but with practice and the employment of suitable illustrations and similes, one can get along fairly well. I found, too, one could often elucidate a statement by acting it, or by using sticks and stones as dummies; it is remarkable what can be done in that way, and the natives quite enter into the spirit of the thing."

Alfred C. Haddon: *Headhunters: Black, White*, London: Methuen & Co. (1901), p. 33.

"On two separate occasions I was given a diagrammatic representation of the working of the system. (I). My informant placed three large white stones to form the apices of an equilateral triangle. Each stone he said represented [...] (II). A second diagrammatic illustration of the working of the system was given to me as follows: My informant drew three very long lines (D, E, F), each representing a man [...]"

Arthur Bernard Deacon: "The Regulation of Marriage in Ambrym", in: *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 57 (1927), pp. 325–342, pp. 329–330.

"It is perfectly clear that the natives (the intelligent ones) do conceive of the system as a connected mechanism which they can represent by diagrams [...] The way they could reason about relationships from their diagrams was absolutely on a par with a good scientific exposition in a lecture-room."

Arthur Bernard Deacon: "The Regulation of Marriage in Ambrym", in: *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 57 (1927), pp. 325–342, p. 329.

In his travel report, Alfred Court Haddon, ethnologist and leader of the Cambridge Anthropological Expedition to Torres Straits, described the communication between ethnologists and indigenous experts: Pidgin-English laid the foundation of the exchange. Additionally, Haddon mentioned the use of "illustrations and similes" and of "sticks and stones as dummies." What about diagrammatic representations? Did Rivers show an illustration of a family tree to collect the pedigrees? Did Waria use sticks and stones to draw family relations on the ground reporting the genealogies? Haddon did not specify their communication techniques any further.

Some decades later, the ethnologist Arthur Bernard Deacon stressed the role of diagrams in the exchange with local experts at the Pacific island of Ambrym. Not only did indigenous peoples understand complicated diagrammatic representations, they also used them in order to transfer their knowledge to the ethnologists. According to Deacon, the locals in Ambrym drew diagrammatic illustrations of the working of kinship systems – using lines, letters, and

stones. It shows that diagrams played a crucial role for local brokers of knowledge. That said, with Deacon's expressions of astonishment about the informants ("the intelligent ones") understanding advanced diagrammatic representations "on a par with a good scientific exposition in a lecture-room," the ethnologist deployed colonial discourses of othering.

Notes

- 1 William H.R. Rivers: "Genealogies", in: Alfred C. Haddon (ed.): *Reports of the Cambridge Anthropological Expedition to Torres Straights: Sociology, Magic and the Religion of the Western Islanders*, vol. 5, Cambridge: Cambridge University Press (1904), pp. 122–129, p. 123.
- 2 William H.R. Rivers: "Genealogies", in: Alfred C. Haddon (ed.): *Reports of the Cambridge Anthropological Expedition to Torres Straights: Sociology, Magic and the Religion of the Western Islanders*, vol. 5, Cambridge: Cambridge University Press (1904), pp. 122–129, p. 123.
- 3 William H.R. Rivers: "Genealogical Tables", in: Alfred C. Haddon (ed.): *Reports of the Cambridge Anthropological Expedition to Torres Straights: Sociology, Magic and the Religion of the Western Islanders*, vol. 5, Cambridge: Cambridge University Press (1904), pp. 9–122, Table I.
- 4 Alan Barnard: *History and Theory in Anthropology*, Cambridge: Cambridge University Press (2000), p. 74.
- 5 William H. R. Rivers: "Kinship", in: Alfred C. Haddon (Ed.): *Reports of the Cambridge Anthropological Expedition to Torres Straights: Sociology, Magic and the Religion of the Western Islanders*, vol. 5, Cambridge: Cambridge University Press (1904), pp. 129–153, p. 151.
- 6 Alfred C. Haddon: *Headhunters: Black, White*, London: Methuen & Co. (1901), pp. 2–4.

Further Readings

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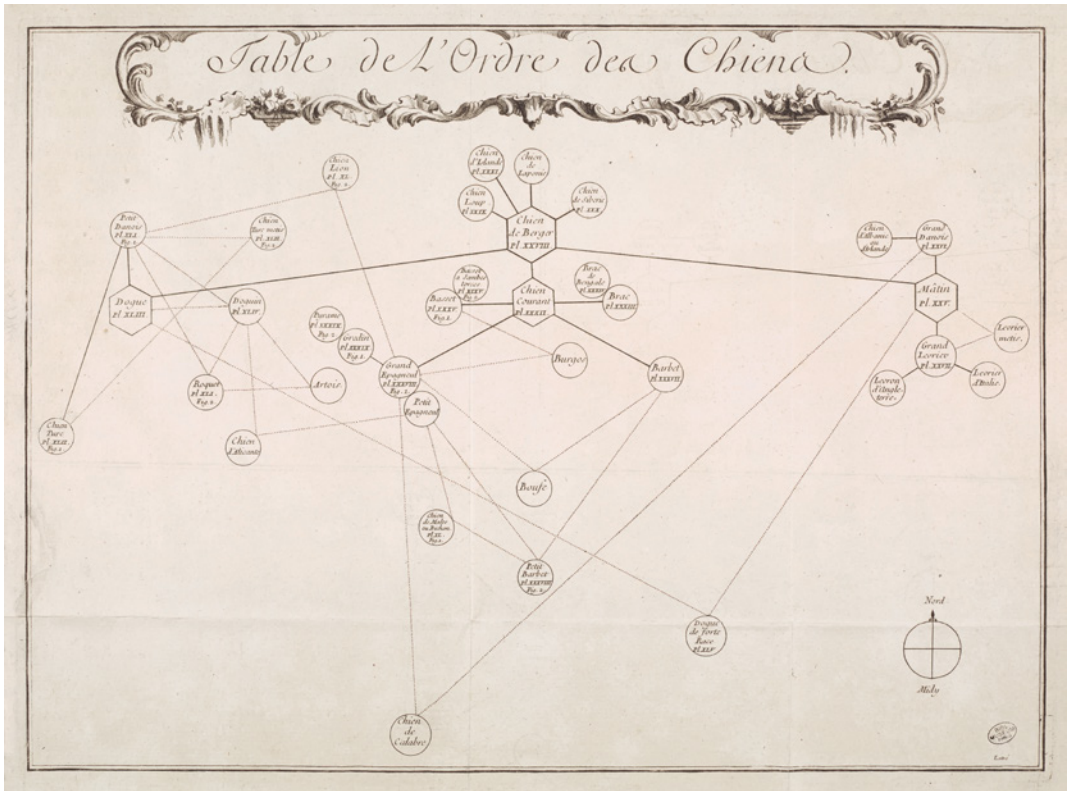
Daniel Hedinger, Nadin Hée: "Transimperial History: Connectivity, Cooperation and Competition", in: *Journal of Modern European History* 16/4 (2018), pp. 429–452.

Bruno Latour: *Science in Action: How to Follow Scientists and Engineers Through Society*, Cambridge, Mass.: Harvard University Press (1987).

Simon Schaffer, Lissa Roberts, Kapil Raj (eds.): *The Brokered World: Go-Betweens and Global Intelligence, 1770–1820*, Sagamore Beach, MA: Watson Publishing International (2009).

THE GEOGRAPHIC-GENEALOGICAL MAP

Genealogy of a Species



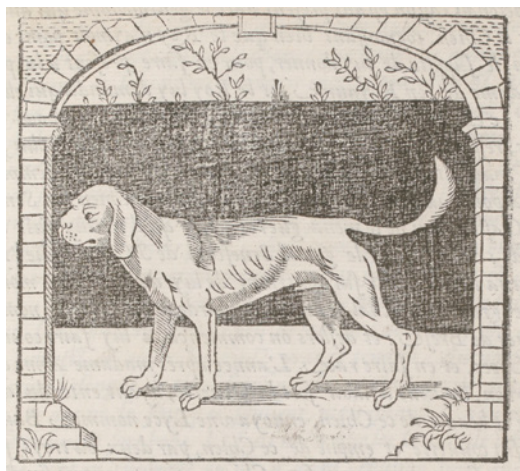
Georges-Louis Leclerc de Buffon: "Table de l'ordre des chiens", in: *Histoire naturelle, générale et particulière, avec la description du cabinet du roi*: Tome V, Paris: Imprimerie Royale (1755), pp. 228-229. Reproduction from 2010 facsimile edition from H. Champion, Paris by Muséum national d'Histoire naturelle, Paris.

In 1755, the French naturalist Buffon illustrated his article on Dog with a graphic innovation that was widely noticed by his contemporaries (one of whom called it a "geographic-genealogical map").¹ It was a "kind of family tree" that allowed the beholder to embrace "at a single glance" the whole history of the dog species and its different races by showing their relatedness and ancestry. To this genealogical dimension, Buffon added a geographical axis: the table is "oriented like geographical maps" so that the distribution of the races on the map reflects their dispersion in different climates.²

THE GEOGRAPHIC-GENEALOGICAL MAP

Race and Genealogies

Buffon's graphic innovation captured a new genealogical style of reasoning in natural history in order to analyze the relationships between groups defined by the relatively constant transmission of their characteristics along generations, which Buffon called "races."³ If Buffon's work inherited an older genealogical knowledge on dog breeds, one difference should be noted: breeders built familial genealogies, the most famous of which are those proposed by Fouilloux, tracing especially "noble" dogs back to their mythical ancestors.⁴



"Chien blanc", in: Jacques de Fouilloux: *La Venerie*, Poitiers: Marnes et Bouchetz Frères (1561), p. 5. Online: <https://gallica.bnf.fr/ark:/12148/bpt6k15131176>.

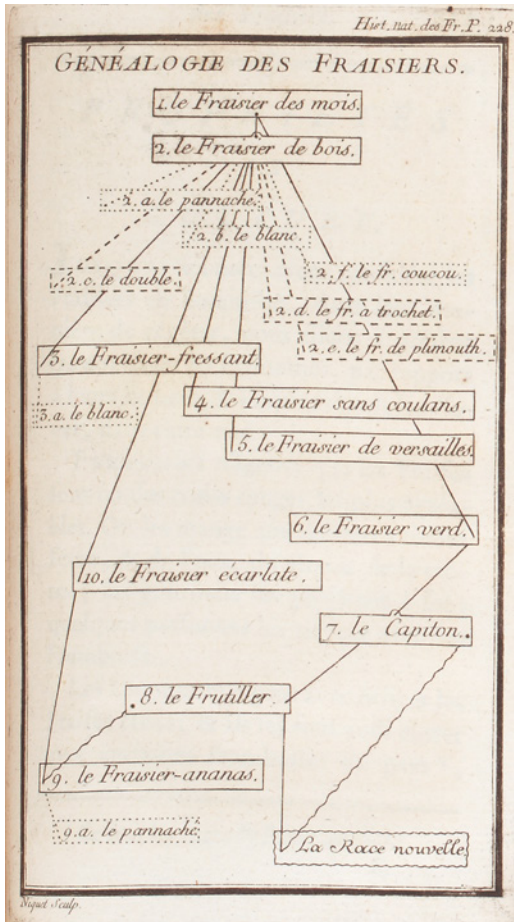
For Buffon, genealogy applies to races understood as broad lineages that share some hereditary physical characteristics. These races form, within a species, varieties of a particular kind – "permanent varieties" based on hereditary transmission. In the case of dogs, these races are so marked that they are, according to Buffon's collaborator Daubenton, "acknowledged by nature" itself: there is a tendency to return to the main races after a few generations when they have admixed.⁵ Buffon's table aims precisely at tracing these admixtures. It distinguishes between "pure races" and "mongrel (*métives*) races" (and even "double mongrel races"), i.e. races formed by the mixing of pure races.⁶ These relationships between admixed races and parent races are shown in his table by dotted lines. This table thus provides a cartography of what used to be a grey area in natural history, i.e. the domain of "varieties," by organizing it according to genealogical criteria and making race a central concept in natural history. It participates in a larger debate opposing an "artificial," catalog-like mode of classification and a system based on the "real" affinities between natural beings, which were linked to kinship and ancestry. As Duchesne noted in 1766 (in a work inspired precisely by Buffon's table) "the genealogical order [...] is the only one that nature indicates [...] any other is arbitrary and devoid of meaning."⁷ Kant, who systematically contrasted two ways of doing natural history – the genealogical history of nature and the mere description of nature – also had Buffon's picture in mind while building his opposition.⁸

THE GEOGRAPHIC-GENEALOGICAL MAP

Tracing the Original Type

For Buffon, a diagram such as his "Table de l'ordre des chiens" was actually part of a broader investigation aimed at reducing the diversity of races to their original unity and discovering, under the differences imposed by climates, food, domesticity, and crossbreeding, "the character of the primitive race, of the original race, of the mother race of all races," that is "the true dog of nature."⁹ Among all animals, the dog is the one whose original type has been the most altered, but it is nevertheless possible, by cross-referencing clues, to go back to the original race. To do this, Buffon compared the various races of dogs in order to retain their common characteristics, examined their instincts, and related them to close species (wolf or fox). This led him to retain "the shepherd's dog" (*chien du berger*), placed here in the center of the picture, as "the root (*souche*) of the tree" from which the main races (mastiff,

foxhound...) are directly derived.¹⁰ We find here a pattern typical of Buffon, who explains the formation of these main races by a degeneration, linked to a change of climate and living conditions (domesticity, food) which produced alterations that are incorporated into the lineage. Hence the importance of geographical coordinates. This scheme goes hand in hand with a hierarchy, which takes the original stock as reference, the various races being described as deviations from the "true dog of nature." On this point, it is useful to contrast Buffon's diagram with the one proposed by Duchesne in 1766 in his *Histoire des fraisiers*.



Antoine Nicolas Duchesne: "Généalogie des fraisières", in: *Histoire naturelle des fraisières*, Paris: Didot (1766), p. 228. Online: <https://gallica.bnf.fr/ark:/12148/bpt6k10417853>.

Like Buffon, Duchesne strived to identify "the primitive race" and the "root of the tree," which is also "the most perfect" race (the *fraisier des mois*).¹¹ However, his approach was more dynamic, performative, and future-oriented. He tried to illustrate the production of new constant varieties, or races, while inscribing them in a genealogical continuity. This point is illustrated by the phrase "the new race" (a new constant variety he has produced) that concluded his genealogy.

Notes

- 1 Joseph Le Large de Lignac: *Suite des lettres à un américain sur l'histoire naturelle*, IX, Hamburg (1756), p. 249.
- 2 Georges-Louis Leclerc de Buffon: "Table de l'ordre des chiens", in: *Histoire naturelle, générale et particulière, avec la description du cabinet du roi: Tome V*, Paris: Imprimerie Royale (1755), p. 225.

- 3 For a detailed discussion, see Claude-Olivier Doron: *L'homme altéré: Races et dégénérescence*, Cézeyrieu: Champ Vallon (2016); Claude-Olivier Doron: "The Genealogical Order and the Emergence of the Concept of 'Race' in Natural History", in: Stéphane Jettot, Jean-Paul Zuñiga (eds.): *Genealogy and Social Status in the Enlightenment*, Oxford: Oxford University Press (2021), pp. 185–205; Staffan Müller-Wille: "Reproducing Difference: Race and Heredity from a *longue durée* Perspective", in: Susan Lettow (ed.): *Reproduction, Race, and Gender in Philosophy and the Early Life Sciences*, Albany: SUNY Press (2015), pp. 217–235; Philip Sloan: "Buffon, German Biology and the Historical Interpretation of the Biological Species", in: *The British Journal for the History of Science* 12/2 (1979), pp. 109–153.
- 4 Jacques de Fouilloux: *La venerie*, Poitiers: Marnes et Bouchetz Frères (1561).
- 5 Louis Jean-Marie Daubenton: "Description du chien", in: Georges-Louis Leclerc de Buffon: "Table de l'ordre des chiens", in: *Histoire naturelle, générale et particulière, avec la description du cabinet du roi. Tome V*, Paris: Imprimerie Royale (1755), p. 232.
- 6 Georges-Louis Leclerc de Buffon: "Table de l'ordre des chiens", in: *Histoire naturelle, générale et particulière, avec la description du cabinet du roi. Tome V*, Paris: Imprimerie Royale (1755), p. 227–228.
- 7 Antoine Nicolas Duchesne: *Histoire naturelle des fraisières*, Paris: Didot (1766), p. 220.
- 8 See Jon Mikkelsen: *Kant and the Concept of Race*, Albany: SUNY Press (2013).
- 9 Georges-Louis Leclerc de Buffon: "Table de l'ordre des chiens", in: *Histoire naturelle, générale et particulière, avec la description du cabinet du roi. Tome V*, Paris: Imprimerie Royale (1755), pp. 193 and 202.
- 10 Georges-Louis Leclerc de Buffon: "Table de l'ordre des chiens", in: *Histoire naturelle, générale et particulière, avec la description du cabinet du roi. Tome V*, Paris: Imprimerie Royale (1755), p. 225.
- 11 Antoine Nicolas Duchesne: "Généalogie des fraisières", in: *Histoire naturelle des fraisières*, Paris: Didot (1766), pp. 7–8.

Further Readings

Claude-Olivier Doron: *L'homme altéré: Races et dégénérescence*, Cézeyrieu: Champ Vallon (2016).

Claude-Olivier Doron: "The Genealogical Order and the Emergence of the Concept of 'Race' in Natural History", in: Stéphane Jettot, Jean-Paul Zuñiga (eds.), *Genealogy and Social Status in the Enlightenment*, Oxford: Oxford University Press (2021), pp. 185–205.

John M. Mikkelsen: *Kant and the Concept of Race*, Albany: SUNY Press (2013).

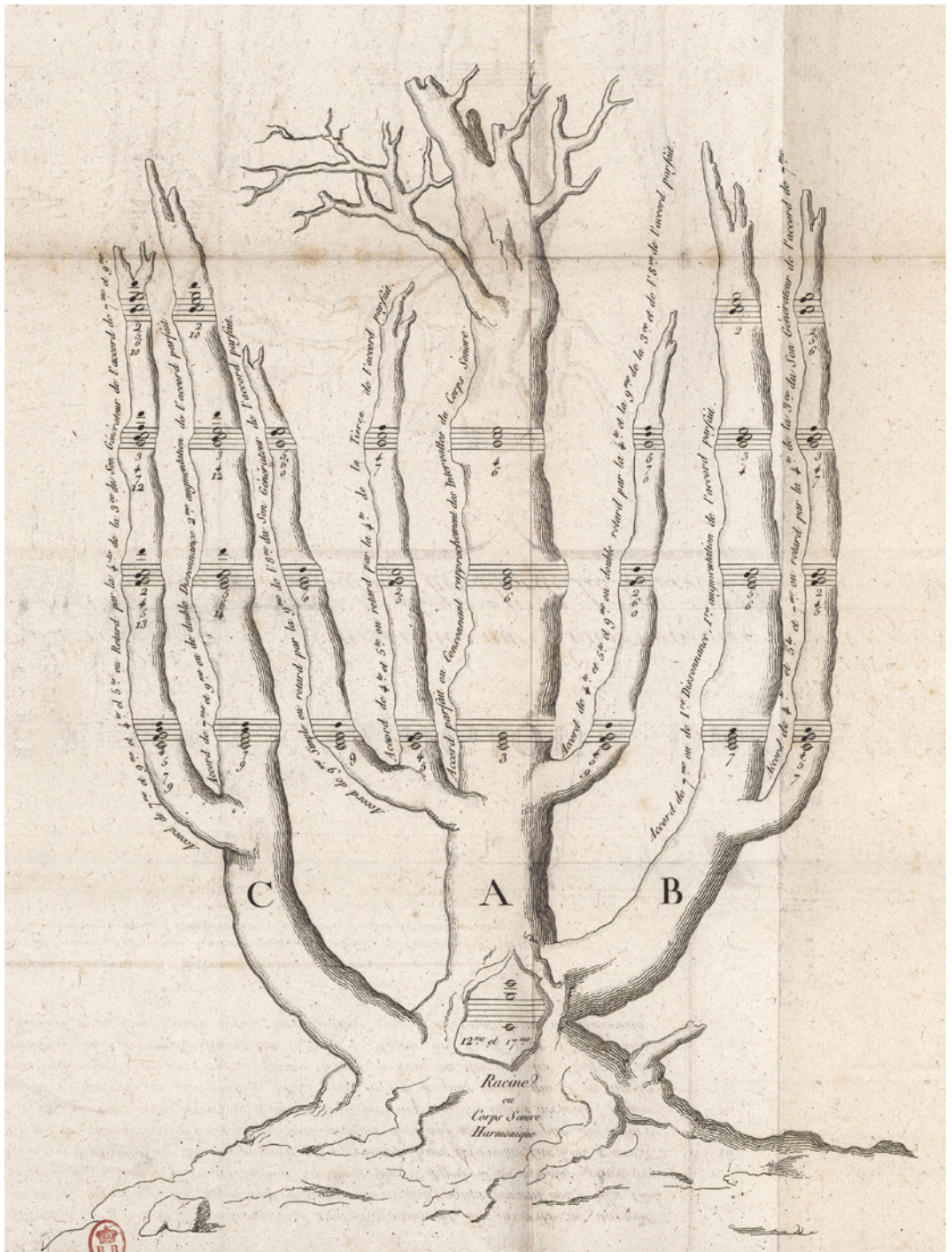
Staffan Müller-Wille: "Figures of Inheritance, 1650–1850", in: Staffan Müller-Wille, Hans-Jörg Rheinberger (eds.), *Heredity Produced: At the Crossroads of Biology, Politics and Culture*, Cambridge, Mass.: MIT Press (2007), pp. 177–204.

Staffan Müller-Wille: "Reproducing Difference: Race and Heredity from a *longue durée* Perspective", in: Susan Lettow (ed.): *Reproduction, Race, and Gender in Philosophy and the Early Life Sciences*, Albany: SUNY Press (2015), pp. 217–235.

Marc J. Ratcliff: "Duchesne's Strawberries: Between Growers' Practice and Academic Knowledge", in: Staffan Müller-Wille, Hans-Jörg Rheinberger (eds.): *Heredity Produced: At the Crossroads of Biology, Politics and Culture*, Cambridge, Mass.: MIT Press (2007), pp. 205–228.

Phillip R. Sloan: "Buffon, German Biology and the Historical Interpretation of the Biological Species", in: *The British Journal for the History of Science* 12/2 (1979), pp. 109–153.

TREE OF HARMONY Chords



Detail from Henri Montan Berton: *Arbre généalogique des accords*, second edition, Paris: Duhan (1815). Paris: Bibliothèque nationale de France.

Berton's *Arbre généalogique des accords* (Genealogical Tree of Chords) was drawn to represent "the great family of Chords."

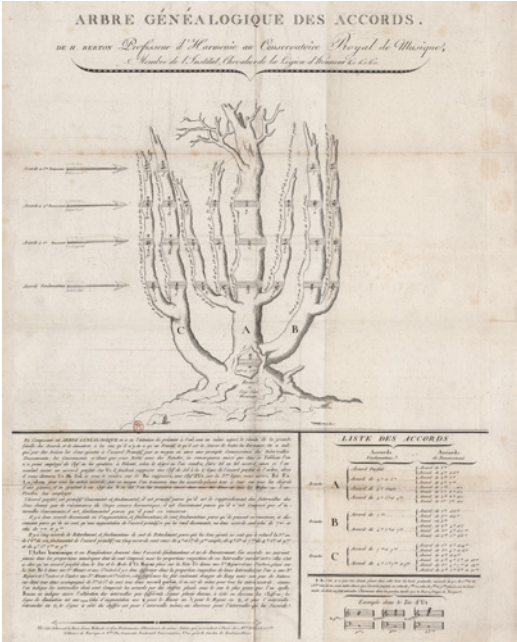
In 1807 or shortly thereafter, the celebrated composer and professor of musical harmony Henri Montan Berton (1767–1844) published an engraved broadsheet entitled *Arbre généalogique des accords* (Genealogical Tree of Chords).¹ A second edition appeared in 1815.² While in the modern sciences, we have come to associate tree diagrams – especially family tree diagrams – with evolutionary biology and linguistics, Berton’s “genealogical tree” was drawn to represent “the great family of Chords.”

In light of the profusion of historical studies concerned with tree diagrams in natural history and language studies, it is intriguing that trees produced in other fields of learning have barely been noted or are otherwise completely absent in the historical literature.³ In the case of Berton’s tree at least, this cannot be because the author is forbiddingly obscure. A celebrated instrumentalist as well as a prolific composer and a well-placed opera director, Berton was born into a family of distinguished musicians and grew up to assert his place in the contemporary musical establishment. He was a member of the prestigious National Institute as well as an Officer of the Legion of Honor. As a professor of musical harmony, he taught at Europe’s leading institution for music education – the Paris Conservatory – from its foundation in 1795 and until his death in 1844.⁴



Henri Montan Berton: *Arbre généalogique des accords*, first edition, Paris: Duhan (ca. 1807). Paris: Bibliothèque nationale de France.

The only known, surviving copy of the first edition is in poor condition. The editions of 1807 and 1815 are, however, almost identical. Berton apparently remained loyal to his idea over a longer period.

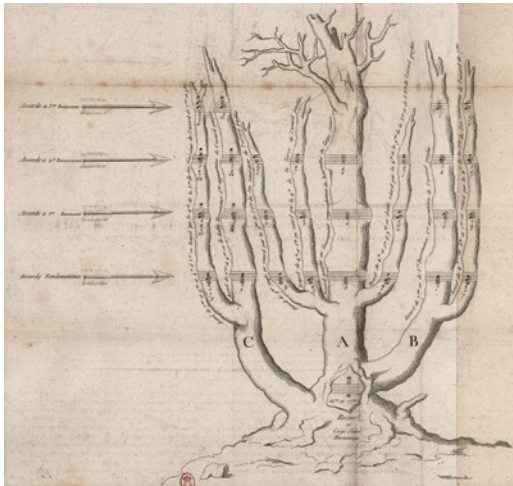


Henri Montan Berton: *Arbre généalogique des accords*, second edition, Paris: Duhan (1815). Paris: Bibliothèque nationale de France.

The only apparent difference between the first and the second edition of Berton’s tree is the description of its author. In the earlier edition, Berton is presented as a professor at the Imperial Conservatory of Music. The later edition, published after the Restoration, presents him as a professor at the Royal Conservatory, a member of the National Institute, and a Knight of the Legion of Honor.

TREE OF HARMONY Roots

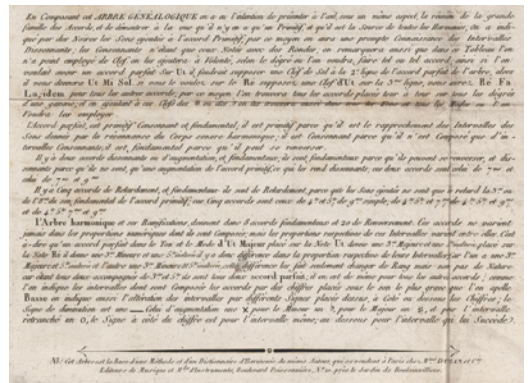
Why did a celebrated musician and experienced pedagogue like Berton produce a "genealogical tree of chords"? In what sense was it "genealogical"? And what was it meant to do? In an explanatory note, printed onto the poster below the tree, Berton clarified that "In Composing this GENEALOGICAL TREE, one has had the intention to present to the eye, at a single glance, the reunion of the great family of Chords, and to demonstrate to the eye [à la vue] that there is only one Primordial [Chord], and that it is the Source of all Harmonies [...]"⁵ The tree was at the center of Berton's design. Gnarled and leafless, it grew out of a sturdy root, labelled "Root or Harmonic Sonorous Body." The tree had three principal stems or "branches," and an additional five branches or "ramifications." The main issue of branch "A" – the central stem of the tree – represented the "Perfect or Consonant Chord." In the explanatory note, Berton clarified that this chord issued directly from "the Intervals of the Sounds provided by the resonance of the Harmonic Sonorous Body."



Detail from Henri Montan Berton: *Arbre généalogique des accords*, second edition, Paris: Duhan (1815). Paris: Bibliothèque nationale de France.

The central "branch" of Berton's tree, labelled "A," had three lateral arms apart from the principal stem, while "B" and "C" had one lateral arm each, which meant there were eight "ramifications" in total. A set of arrows pointed to the chords, which were distributed across the ramifications on four distinct levels. Each ramification had a "fundamental" chord at the bottom level and "inverted" chords on the second and third levels. Four of the ramifications had an additional inverted chord.

Berton's design was unconventional. The concepts and theories that informed his tree were, by contrast, perfectly standard. What Berton taught about the "sonorous body" and the "perfect chord," as about harmony and composition more generally, was largely on loan from Jean-Philippe Rameau (1683–1764). The most influential music theorist of the French Enlightenment, Rameau applied "scientific" methods to uncover the "laws" of music. The "source" of all harmony, he argued, was the "sonorous body," as Rameau believed that any vibrating, resonating body would generate a bass tone and harmonically aligned overtones, which were there even when they were not audible.⁶

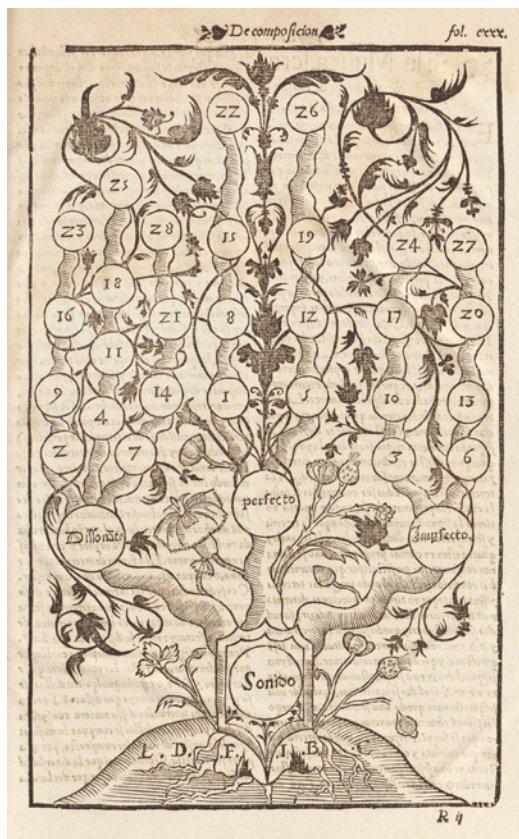


Detail from Henri Montan Berton: *Arbre généalogique des accords*, second edition, Paris: Duhan (1815). Paris: Bibliothèque nationale de France.

Berton apparently felt his readers would not know how to make sense of his diagram, as in an explanatory note printed onto the poster below the tree he gave detailed instructions for how to interpret and make use of it.

TREE OF HARMONY Ramifications

In making the sonorous body the root of his tree, Berton not only followed Rameau in theory, but he also followed him in his use of metaphors. Consistently throughout his career, Rameau deployed genealogical and arboreal images in writing. Time and again, he compared the "sonorous body" to the hidden "roots" of a tree, while comparing musical harmony to the tree's visible parts. As the sonorous body "begins to resonate," Rameau declared at one point, "one sees how it gives birth to the trunk of the tree [...] which in turn produces an infinity of branches [...] and then, above each branch twigs rise up [...] from which the flowers and the fruit are born."⁷



Juan Bermudo: *Declaracion de instrumentos musicales*, Osuna: Leon (1555). Paris: Bibliothèque nationale de France, fol. cxxx r.

Tree diagrams were used in music theory long before they were brought into natural history and language studies. Inspired by Boethius, the Franciscan friar Juan Bermudo (ca. 1510–ca. 1565) made sound the "root" of his "consonance tree."

Like early tree makers in natural history and language studies, Berton did not dream up the image of a tree. He teased out already established metaphors – family relations, generation, birth and growth, ascent and descent, roots and branches – and made them visible on paper. While the outcome may seem strange to a modern reader – a "genealogical tree" that did not chart history – it should be remembered that we still today speak of chord "families" and "roots." Tree diagrams and metaphors of generation have, in fact, been at play in music studies for centuries, without this implying any temporal dimension. For Berton as



François Guillaume Vial: *Arbre généalogique de l'harmonie*, Paris: chés l'Auteur (1766). Paris: Bibliothèque nationale de France.

Berton was not first in exploiting Rameau's metaphors for didactic purposes. In 1766, François Guillaume Vial (born ca. 1725) published an *Arbre généalogique de l'harmonie* (Genealogical Tree of Harmony), meant to facilitate modulation.

for Rameau, it appears that the ontological claim embedded in the image of the tree was one of natural principles, not one of historical development.

Rameau helped revolutionize music theory. Berton, for his part, partook in a didactic revolution. For centuries, music education had revolved around private tuition and the relationship between master and apprentice. Established in 1795, the Paris Conservatory was a revolutionary creation and the first of its kind: a state-sponsored music school where students were taught in cohorts. To facilitate this aim, Berton and his colleagues set out to develop new teaching methods. A pedagogue first and foremost, he did not draw a family tree to argue for any new theory but to help his students get chord composition right.

Notes

- 1 Henri Montan Berton: *Arbre généalogique des accords*, first edition, Paris: Duhan (ca. 1807).
- 2 Henri Montan Berton: *Arbre généalogique des accords*, second edition, Paris: Duhan (1815).
- 3 The only reference I have seen to Berton's tree is a short mention in David Damschroder: *Thinking about Harmony: Historical Perspectives on Analysis*, Cambridge: Cambridge University Press (2008), p. 247.
- 4 For Berton's biography, see Petter Hellström: *Trees of Knowledge: Science and the Shape of Genealogy*, Uppsala: Acta Universitatis Upsaliensis (2019), chapter 4.
- 5 Henri Montan Berton: *Arbre généalogique des accords*, second edition, Paris: Duhan (1815). All translations are my own.
- 6 For Rameau and his theories, see, in particular, Thomas Christensen: *Rameau and Musical Thought in the Enlightenment*, Cambridge: Cambridge University Press (1993).
- 7 Jean-Philippe Rameau: "Lettre de M*** à M. D****, sur un ouvrage intitulé l'Origine des sciences, suivie d'une controverse sur le même sujet", in: *Mercure de France* 1 (1762), pp. 103–119, pp. 116–117.

Further Readings

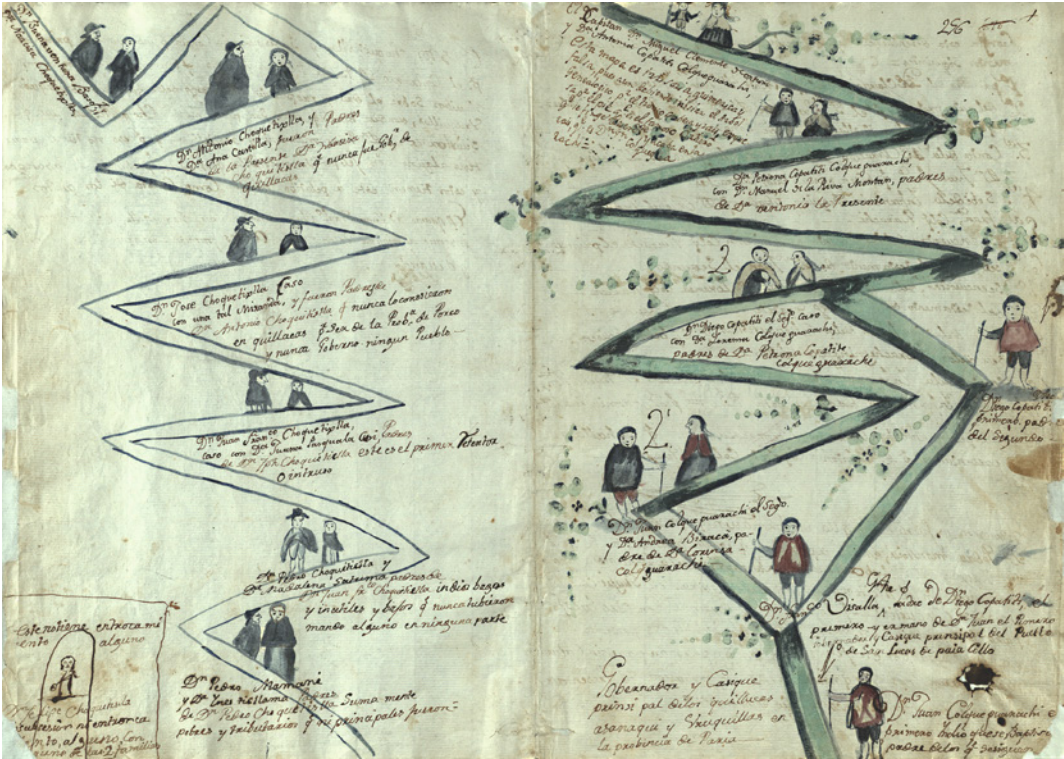
Malcolm Boyd, Kailan R. Rubinoff (eds.): *Music and the French Revolution*, Cambridge: Cambridge University Press (1992).

Thomas Christensen: *Rameau and Musical Thought in the Enlightenment*, Cambridge: Cambridge University Press (1993).

Suzannah Clark, Alexander Rehding (eds.): *Music Theory and Natural Order from the Renaissance to the Early Twentieth Century*, Cambridge: Cambridge University Press (2001).

Petter Hellström: *Trees of Knowledge: Science and the Shape of Genealogy*, Uppsala: Acta Universitatis Upsaliensis (2019). A revised version of the dissertation is forthcoming with Zone Books.

OPPOSING DIAGRAMS Exploring the Diagrams



Untitled manuscript, described as "Autos seguidos ante la Audiencia de Charcas, entre doña Narcisca Choqueticlla Colque Guarachi, cacique y gobernadora del repartimiento de Atunquillacas, partido de Paria con Antonia Copatite Colqueguarachi, sobre el derecho de propiedad a dicho cacicazgo", 266 folios, early 19th c. (ca. 1800-1804), Archivo y Biblioteca Nacionales de Bolivia, EC Ad-1804-82, 255v-256r.

The diagrams of doña Narcisca Choqueticlla and doña Antonia Copatiti Colque Guarachi.

When seeking visual diagrams in the National Archive of Bolivia, the one shown here captivated my attention immediately. It surprises the viewer on various levels, and with each look something new can be discovered.

At first glance it is immediately clear that it cannot be of European origin, and yet it is obvious that it must contain genealogical information. Due to the fact that different persons are connected horizontally by lines, a kinship connection between them becomes apparent, even if the form seems peculiar and unusual for most. After a brief overview, several questions arise: why are there two diagrams and, especially, why is the one on the right much more colorful, both the lines and the people, while the one on the left is kept in a dull gray? Why are the people in the right diagram so much more detailed, and why does it have an extra branch in the middle? And what is that grim-looking figure in the lower left doing? In order to get to the bottom of these and other questions, it is first necessary to trace the general circumstances of the creation of this diagram.

A streaming video created by the author examines some peculiar features of the diagrams and the questions posed above, focusing in turn on each relevant section of the manuscript.

Julian Miguez: "Exploring the diagrams", streaming video (2022), based on untitled manuscript, early 19th c. (ca. 1800-1804), Archivo y Biblioteca Nacionales de Bolivia, EC Ad-1804-82, 255v-256r.
VIDEO ► cache.ch/0404

OPPOSING DIAGRAMS Legal Dispute

Both diagrams are part of one archival unit of more than five hundred pages that dealt with a legal dispute over the succession of a *cacicazgo*, that is, simply put, a territory of an indigenous ruler. It includes dozens of individual documents such as testimonies, wills, and legal explanations dating back over four centuries. The diagram itself probably dates from the beginning of the nineteenth century, when the legal dispute took place. At the center of the dispute were *doña* Narcisa Choqueticlla, seen in the upper left, and *doña* Antonia Copatiti Colque Guarachi, standing with her husband at the top of the right-hand diagram.



Detail from untitled manuscript, early 19th c. (ca. 1800-1804), Archivo y Biblioteca Nacionales de Bolivia, EC Ad-1804-82, 255v-256r.

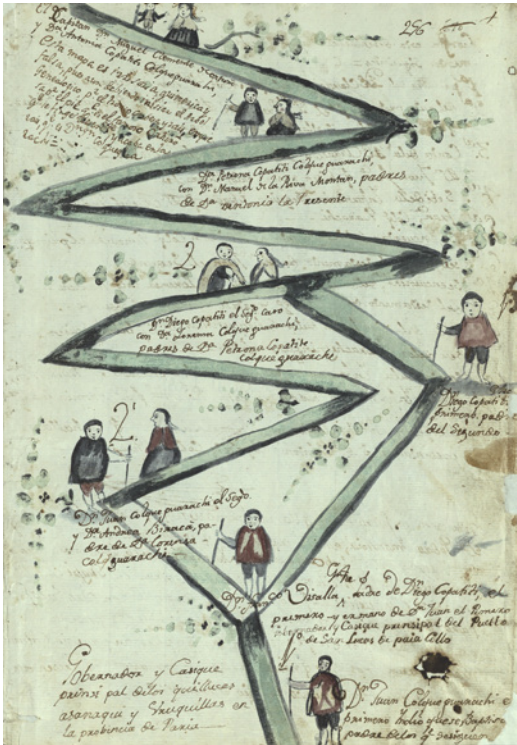
Doña Narcisa Choqueticlla standing with her husband, seen at the top of the left diagram.



Detail from untitled manuscript, early 19th c. (ca. 1800-1804), Archivo y Biblioteca Nacionales de Bolivia, EC Ad-1804-82, 255v-256r.

Doña Antonia Copatiti Colque Guarachi and her husband, standing at the top of the right diagram.

OPPOSING DIAGRAMS Colors and Cousins



Detail from untitled manuscript, early 19th c. (ca. 1800-1804), Archivo y Biblioteca Nacionales de Bolivia, EC Ad-1804-82, 255v-256r.

The diagram of *doña* Antonia Copatiti Colque Guarachi.

"Gobernador and casique principal of Quillacas, Asanaqui and Uruquillas in the province of Paria. Don Juan Colque Guarachi the first indio to be baptized, father of those who follow."

Untitled manuscript, early 19th c. (ca. 1800-1804), Archivo y Biblioteca Nacionales de Bolivia, EC Ad-1804-82, 255v-256r.

The texts to the left and right of *don* Juan Colque Guarachi at the bottom of the right diagram.

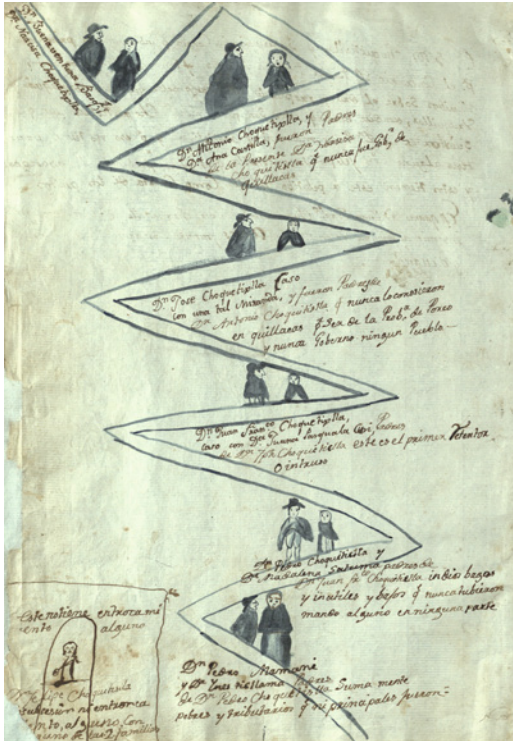
First, let's look at the brightly colored diagram of Antonia on the right. At the bottom is *don* Juan Colque Guarachi, a powerful indigenous leader of the sixteenth century, ruler of large territories and, as his description makes clear, the first indigenous person to be baptized. Antonia invokes his ancestry, and the diagram begins with him. The thick, colored lines seem to represent a path on which *don* Juan has firmly placed his staff. The path zig-zags upward as if it were a steep mountain trail in the Andes. First, it goes straight up to the first junction where his brother Francisco stands. From there, one path branches off to the left and the other to the right. The first goes to *don* Juan the second, son of the first, and his wife. The second path goes to *don* Diego Copatiti, son of Francisco. The paths then rejoin again because at the top where the two are reunited stand Diego Copatiti the second and Lorensa Colque Guarachi, second cousins to each other, who through their marriage

reconnect the paths. They are the grandparents of Antonia.

A streaming video created by the author leads the viewer up the path of the diagram, explaining in detail the kinship relations between the individuals in the right-hand diagram.

Julian Miguez: "Climbing Up the Diagrammatic Path", streaming video (2022), based on untitled manuscript, early 19th c. (ca. 1800-1804), Archivo y Biblioteca Nacionales de Bolivia, EC Ad-1804-82, 255v-256r. VIDEO ► cache.ch/0402

OPPOSING DIAGRAMS Poverty and Prison



Detail from untitled manuscript, early 19th c. (ca. 1800-1804), Archivo y Biblioteca Nacionales de Bolivia, EC Ad-1804-82, 255v-256r.

The diagram of *doña Narcisca Choqueticlla*.

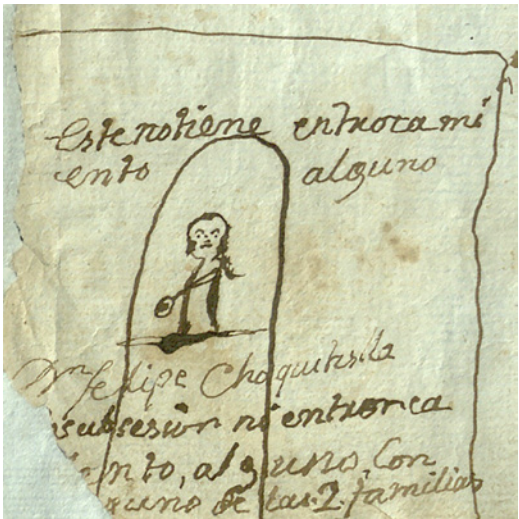
While Antonia's diagram attempts to show her illustrious descent from powerful indigenous leaders, the one on the left of Narcisca does just the opposite. Let's have a closer look at this diagram. According to the descriptions, her ancestral parents at the bottom were exceptionally poor and never leaders. The following generations are also described as lazy, useless, and without any exercise of power. This should probably also become visually recognizable. The path is much shorter in many places, sometimes narrow and entirely colorless. The characters are all kept in a boring gray and can hardly be distinguished from each other.

"Don Pedro Mamani and doña Ynes Ticllama, parents of Don Pedro Choqueticlla, [they were] downright poor and tributaries who never even were leaders. Don Pedro Choqueticlla and doña Madalena Satuma, parents of Don Juan Francisco Choqueticlla, lazy, good for nothing and low indios who never had any authority in any place."

Untitled manuscript, early 19th c. (ca. 1800-1804), Archivo y Biblioteca Nacionales de Bolivia, EC Ad-1804-82, 255v-256r.

This text appears with the bottom two ancestral generations of Narcisa.

But what did the grim-looking man in the bottom corner, who has the same last name as Narcisa and yet didn't even make it into the insulting diagram of her, do? Apparently, no one wanted to have anything to do with him, and even the artist drew him inside a box in the corner, locked away from the rest. It is as if they wanted to put him in a prison from where he should have no chance to get into either diagram. As specified in the description, Felipe has no family ties to either of the two lineages.



Detail from untitled manuscript, early 19th c. (ca. 1800-1804), Archivo y Biblioteca Nacionales de Bolivia, EC Ad-1804-82, 255v-256r.

Don Felipe Choqueticlla, the grim looking man at the bottom left corner. The description emphasizes that he has no connection to either family.

OPPOSING DIAGRAMS Persuasion and Criticism

The example shows how kinship diagrams could acquire entirely new forms in the colonial context and, in this case, were used in legal disputes to derive indigenous privileges and property claims. The juxtaposition of the two diagrams, one intended to show one person's favorable lineage and the other one a different person's claimless ancestry, creates a

powerful image intended to captivate and, of course, persuade the viewer. Its intention was to be used as evidence in this legal dispute. However, by no means did this representation seem to convince everyone. At the top right, under Antonia's name, in a different script, someone harshly criticized the diagram. Probably irritated by the form of the diagram, which in the same sentence was called map and genealogical tree, the writer stated that it was ridiculous, delusional, and just completely wrong. Diagrams are therefore by no means self-explanatory, and their persuasiveness seems to be often in the eye of the beholder.

Further Readings

Mario Julio Graña: "Autoridad y memoria entre los killakas: Las estrategias discursivas de don Juan Colque Guarache en el sur andino (Siglo XVI)", in: *Histórica* 24/1 (2000), pp. 23-47.

Mario Julio Graña: "La verdad asediada: Discursos de y para el poder. Escritura, institucionalización y élites indígenas sur andinas. Charcas. Siglo XVI", in: *Andes* 12 (2001), pp. 1-13.

Lewis Hanke and Gunnar Mendoza (eds.): *Historia de la Villa imperial de Potosí por Bartolomé Arzáns de Orsúa y Vela*, 3 vols., Providence: Brown University Press (1965).

Ximena Medinacelli: *Los pastores de Oruro, mediadores culturales durante la colonia temprana* (Doctoral Thesis, Universidad Nacional Mayor de San Marcos 2006).

PRACTICE

INTRODUCTION

When we look at "diagrams of relatedness" – what do we see? Lines that cover sheets or printed pages, straight or in serpentine, circles that make space for letters or figurines, colored forms, or a few ink strokes. It is commonplace to say that diagrams are not just interesting because they represent, by visualizing or constructing, a phenomenon that is assumed to exist beyond them; that they, moreover, are products, or leftovers, of practices and uses. But do we see that, too, when we look at diagrams of relatedness? Do we see casual ways of doing or elaborate techniques, hands scribbling over a sheet? Engraving tools laboring on a copper plate? Do we see presentations of diagrams in learned circles or their being abandoned in a drawer for turning out to be failed attempts? How do we know that something is a finished product or just a trace of something else being produced?

Trivial as it may appear, it is worth posing this question: what, in fact, do we see? Products of procedures and traces of uses need to be shown and argued to be just that. This is what the authors in this section do, and by doing so, they add layers and dimensions to the diagrams at hand.

We learn, in the contribution of Amos Kuster, how a sparse family tree whose few "brittle branches" evoke a profound and enduring solitude obfuscates a quite brimming (if not unencumbered) social network that surrounds a certain Robert Häfeli – and was of no interest to those who used the mental ward as a source of gathering data on hereditary disease.

► PRACTICE/PSYCHIATRIC TREE Compared to the Häfeli family tree bearing the trace of a failed instance of data gathering, the pedigree of a deaf-mute family introduced in Amir Teicher's contribution makes this very "messiness and manifoldness" of data disappear. Presenting a supreme match of Mendelian theory (as depicted in the pedigree) and real-life events (as subtly claimed by a caption in narrative past tense) it is, however, a fully-fledged artifact produced by a "pedagogical blurring process" that was quite successful in consolidating Mendelian theory for biopolitical purposes. ► PRACTICE/MENDELIZING PEDIGREES The diagrammatic work done by maps of the Austrian empire, which convey clear-cut classifications of ethnicities and nationalities as shown in Eric Hounshell's contribution, must be understood as equally artificial, namely as "false concretizations of murky concepts." ► PRACTICE/MAPPING ETHNICITY

No blurring or falseness is at work in the genealogical diagrams of German dynasties presented by Michaela Hohkamp, but they are just as flexible. ► PRACTICE/STEMMA, TABULA, SYSTEMA Or how else can we interpret that a female ancestor first disappears according to changing concepts of kin relations, only to reappear centuries later – not in the wake of novel ways of conceiving kin but in service of a novel claim for evidence that turned genealogies into "an instrument for proving dynastic relations." And what about the table of descent that depicts a certain Josef Katzensteiner as having grandparents but no parents, neither father nor mother? With astounding ease, this diagram analyzed by Elisabeth Timm breaks with the rules of the family tree – just to hide (or amend?) the unruly event of illegitimate birth.

► PRACTICE/GENEALOGY OF ILLEGITIMACY Finally, as if to make a deliberate case for eclectic "diagramming," the engraving Stéphanie Prieto contributes to the collection reveals itself to be just that: an enigmatic mesh of figurines, hearts, and hands resulting from a Protestant pastor making use of canonist traditions when searching for novel ways of illustrating incest prohibitions. ► PRACTICE/OF HANDS, HEARTS, AND TREES

Is it a coincidence that many contributions in this section do not only convey the splendid creativity of diagrammatic practices but also make it seem like diagrams of relatedness play some kind of hide-and-seek with the observer? (At least with an observer who does not con-

tent herself with beholding the elaborate craftsmanship or, just as well, the aesthetic of the sketchy and unintended, the unfinished and casual on display.) Is it by mere chance that a semantics of "obfuscating," "obscuring," "hiding," and "blurring" runs through the contributions? Given the fact that diagrams are epistemological and demonstrative tools, it comes as no surprise but is all the more noteworthy that they more often than not are driven by a desire for completeness while being the result of highly selective practices and also more often than not claim naked evidence while being highly imaginative – and that the authors of diagrams equally more often than not are themselves well aware of these contradictions. Can this be attributed to the fact that diagrams of relatedness are particularly prone to be used by political power since they concern social organization? Or, to put it in a different perspective, that they are conspiring with specific politics from the get-go? Many contributions to this section attest to such a history of diagrammatic politics or political diagramming.

And how would all this sharpen the sense for epistemological politics when scholars, as David Sabeau does in his contribution on kinship diagrams in anthropology and social history, reflect upon their own diagrammatic practice? ►PRACTICE / GENEALOGY AND SOCIAL HISTORY Perhaps more urgently than it might seem for their explanatory outlook, diagrams of relatedness thus raise the question: what do we see when we look at them?

MENDELIZING PEDIGREES Deaf-mute Family

In 1934, an expert advisor (*Gaureferent*) on racial research for the National Socialist Teachers League (NSLB) by the name Hermann Römpp, published a paper for high school teachers outlining the basic mechanisms of Mendelian inheritance. Römpp began by explaining that

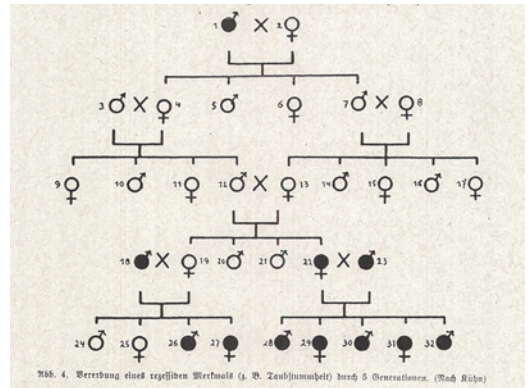
"A recessive disposition [...] can reappear after dozens of generations, if it is recombined with another recessive disposition."

Hermann Römpp: "Mendelismus" [Mendelism], in: *Der praktische Schulmann* 10 (1934), p. 45.

He illustrated this phenomenon by attaching to his paper a pedigree, which, he argued,

"demonstrates this in an especially meaningful way. The family forefather 1 of the entire clan was deafmute (deaf-mutism is inherited recessively!), the family foremother 2 was healthy. All of their children and grandchildren (3 to 17) showed no sign of deaf-mutism; but some of them certainly contained the recessive disposition for this disease, hidden. Now, when the blood-related grandchildren 12 and 13 married, a deafmute appeared among their offspring. Obviously, two recessive dispositions, hitherto hidden, were joined, and that led to deaf-mutism."

Hermann Römpp: "Mendelismus" [Mendelism], in: *Der praktische Schulmann* 10 (1934), p. 44.



Hermann Römpp: "Mendelismus" [Mendelism], in: *Der praktische Schulmann* 10 (1934), p. 45.

Data or Theory?

A pedigree of deaf-mutism, presented as if it depicts a real-life family.

A careful observer familiar with Mendelian genetics may note certain peculiarities in the accompanying pedigree. Above all, it seems too perfect to represent a real-life family. It elegantly covers all possible matings related to recessive inheritance, with most couples having exactly four children – the most convenient number for illustrating Mendelian ratios – children whose traits are then distributed in strict accordance with Mendelian expectations. An examination of the source for Römpp's pedigree reveals that, indeed, this pedigree was construed as a scheme, or a theoretical model, of Mendelian inheritance, not as a record of an existing family. Römpp's narrative style, however, gives no indication that this is the case. On the contrary, as he represents it, the pedigree purportedly corroborates the veracity of Mendelian theory by showing how it manifested itself in real life.

MENDELIZING PEDIGREES Empirical Data or Theoretical Models?

Literature of human Mendelian inheritance often conflates theoretical models (how inheritance "should" work according to the Mendelian paradigm) and actual observations on maladies in families. This conflation is at times so severe that non-expert readers simply cannot tell whether a given pedigree chart is "real" (that is, observation-based) or fictional (a theoretical model).

The disciplinary dynamics that underlie this are manifold. At the very outset, the mere drawing of a pedigree is heavily impregnated with theoretical considerations which relate to a researcher's guiding analytical framework. One needs to choose which relatives to depict and whom to omit, what additional data should be given on each person and what may be discarded as irrelevant, how many generations need to be shown, and, of course, whether the resulting pedigree is meaningful at all.

Moreover, since genetics is, in many senses, a game of chance – any given offspring may inherit his/her mother's/father's genes in equal probabilities – Mendelian patterns only emerge when many pedigrees are accumulated and considered together. Only a few of these display the expected distributions of traits that theory projects. It is these few, however, who are chosen as representative examples to be printed and reproduced in textbooks and pedagogic materials. The messiness and manifoldness that characterizes the original data is thereby easily lost from sight or remains buried in professional publications.

On top of selection bias and the necessary reduction of supposedly irrelevant information, once pedigrees are printed in textbooks, pedagogic considerations become supreme. Spouses, children, or grandparents who seem irrelevant to the guiding interpretative framework are quickly discarded. Plausible suppositions – for example, that the origin of a certain familial malady was a distant grandmother who had been an asymptomatic carrier of a defective gene – turn into factual statements. These may appear as descriptions attached to the text, or as signs integrated into the pedigree (most often: the signaling out of those who were presumably carriers or recessive dispositions), or finally, as solutions to exercises for the novices ("why were [...] afflicted by [...]? True! The great-grandparent was a carrier of [...]") – a reasonable hypothesis disguising itself as a proven fact). Taken together, the consequence of all these processes is that pedigrees in textbooks offer a selective, highly processed, theory-laden depiction of findings on familial inheritance.

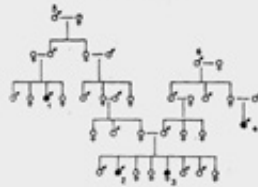
Lastly, at the same time that pedigrees are gradually transformed to align with genetic theory, this theory is also commonly presented in the format of imagined pedigrees. These pedigrees, just like Römpp's chart, exemplify genetic dynamics by neatly covering all types of genetic mating and their expected consequences. The result is the aforementioned inability of later observers – professional scientists, doctors, educated readers, students, and the lay public – to distinguish empirical evidence from theoretical expectations. In many senses, the consolidation of Mendelian theory, and its great propagandistic appeal for twentieth century governments, geneticists, and eugenicists, owe much to this pedagogical blurring process.

Aus der Universitäts-Klinik für Hals-, Nasen- und Ohrenkrankheiten
zu Tübingen.

Über die Vererbung der konstitutionell sporadischen Taubstummheit, der hereditären Labyrinthschwerhörigkeit und der Otosklerose.

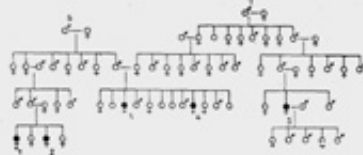
Von W. Albrecht.

Stamm-Tafel I.



♂ ♀ taubstumm.
○ im ersten Lebensjahr gestorben.

Stamm-Tafel II.



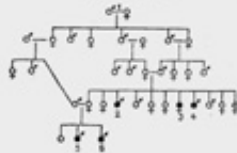
♂ ♀ taubstumm.
○ im ersten Lebensjahr gestorben.

Stamm-Tafel III.



♂ ♀ wahrscheinlich Mutterverwandt.
○ im ersten Lebensjahr gestorben.

Stamm-Tafel IX.



Stamm-Tafel IV.

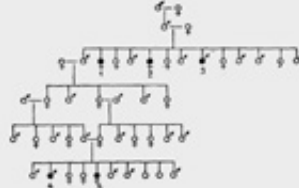


○ im ersten Lebensjahr gestorben.

Stamm-Tafel V.



Stamm-Tafel VI.



Stamm-Tafel VII.



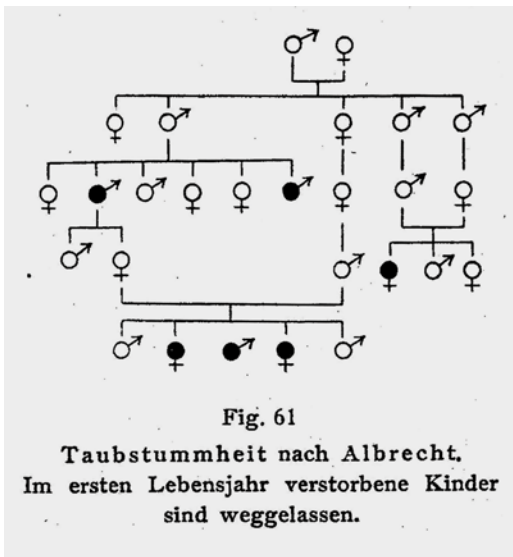
Stamm-Tafel VIII.



Walther Albrecht: "Über die Vererbung der konstitutionell sporadischen Taubstummheit, der hereditären Labyrinthschwerhörigkeit und der Otosklerose"; [On the Inheritance of Constitutionally Sporadic Deaf-muteness, Hereditary Labyrinthine Hearing Loss and Otosclerosis], in: *Archiv für Ohren-, Nasen- und Kehlkopfheilkunde* 110/1 (1923), pp. 15-48.

Step 1: Accumulating pedigrees.

Some of the pedigrees that appeared throughout a paper by otolaryngologist W. Albrecht about the Mendelian inheritance of deaf-mutism. The sum of these pedigrees (and others, not shown here) corroborated for Albrecht that deaf-mutism was probably inherited as a recessive trait.



Fritz Lenz: "Die krankhaften Erbanlagen" [The Pathological Hereditary Dispositions], in: Erwin Baur, Eugen Fischer, Fritz Lenz (eds.): *Menschliche Erblchkeitslehre und Rassenhygiene* [Human Heredity and Racial Hygiene], Munich: J.F. Lehmann (1927), p. 213.

Step 2: Choosing a representative pedigree.

In 1927, a popular German textbook on heredity used one pedigree taken from Albrecht's paper (Stamm-Tafel IV, top right in the previous image) to demonstrate that deaf-mutism was a recessive Mendelian trait. En route, some of the relatives shown in the original pedigree were discarded, seen as irrelevant for propagating the Mendelian paradigm.

Further Readings

Peter J. Aspinall: "How the Use by Eugenists of Family Trees and Other Genealogical Technologies Informed and Reflected Discourses on Race and Race Crossing during the Era of Moral Condemnation: Mixed-Race in 1920s and 1930s Britain", in: *Genealogy* 2/3 (2018), p. 21.

Robin L. Bennett: "Pedigree Parables", in: *Clinical Genetics* 58 (2000), pp. 241-249.

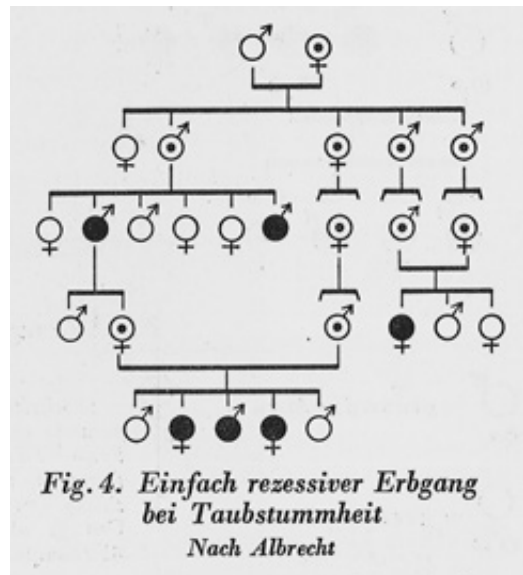
Jean-Paul Gaudillière: "Exoteric Knowledge and Esoteric Knowledge: Ludwig Fleck, Pedigrees and the Visualization of Pathological Heredity", in: *Medicina nei Secoli* 20/3 (2008), pp. 767-789.

Bernd Gausemeier: "From Pedigree to Database: Genealogy and Human Heredity in Germany, 1890-1914", in: *A Cultural History of Heredity III: 19th and Early 20th Centuries*, Berlin: Max Planck Institute for the History of Science (2005) (= MPIWG Preprint 294), pp. 179-192.

Paul A. Lombardo: "Pedigrees, Propaganda, and Paranoia: Family Studies in a Historical Context", *Journal of Continuing Education in the Health Professions* 21/4 (2001), pp. 247-255.

Mark Shotwell: "The Misuse of Pedigree Analysis in the Eugenics Movement", in: *The American Biology Teacher* 83/2 (2021), pp. 80-88.

Amir Teicher: "How Family Charts Became Mendelian: The Changing Content of Pedigrees and its Impact on the Consolidation of Genetic Theory", in: *History of the Human Sciences* (forthcoming 2024) (Special Issue: *In the Shadow of the Family Tree: The Diagrammatics of Relatedness in Genealogy, Biology and Anthropology as Epistemic, Cultural and Political Practice*).

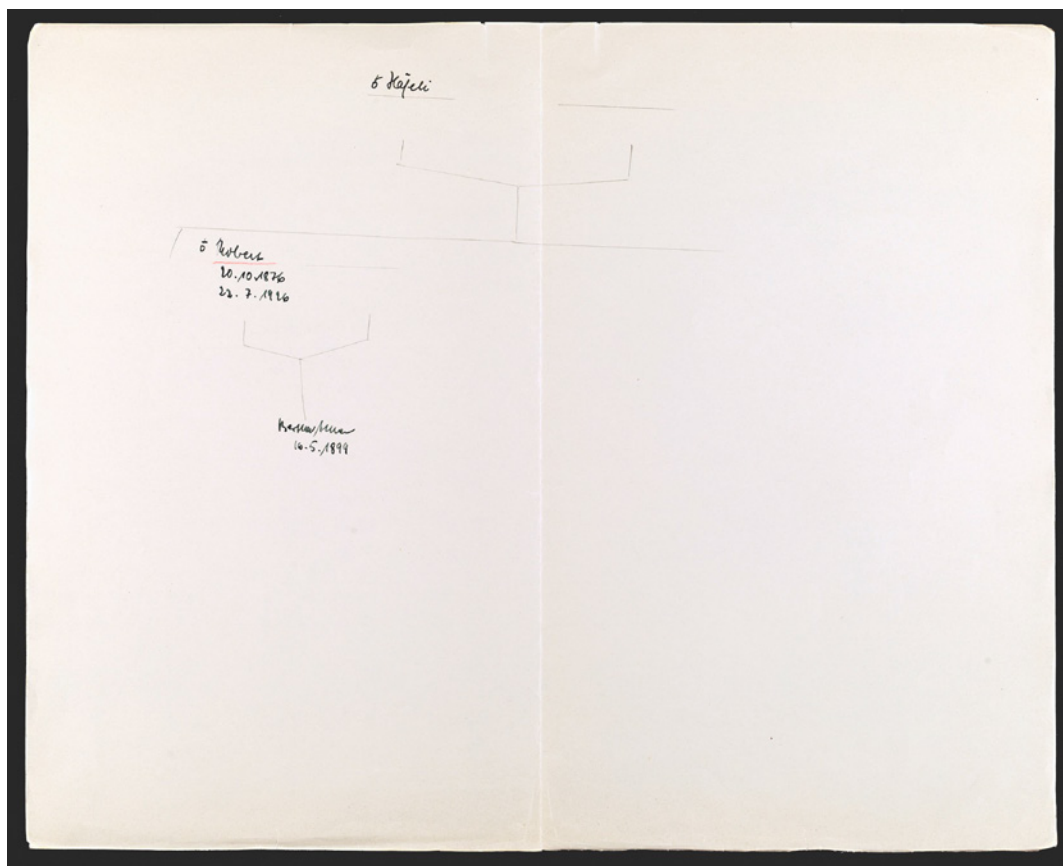


Arthur Gütt, Ernst Rüdin, Falk Ruttkte: *Zur Verhütung erbkranken Nachwuchses. Gesetz und Erläuterungen* [On the Prevention of Genetically Diseased Offspring. Law and Explanations], Munich: J. F. Lehmann (1934), p. 23.

Step 3: Visualizing Theory.

In 1934, the official *Commentary on the Nazi Sterilization Law* (1933) reproduced Albrecht's pedigree from the 1927 textbook. To emphasize the Mendelian hypothesis, a dot was added to signify which individuals were the purported carriers of the recessive disposition.

PSYCHIATRIC TREE Brittle Branches



Family tree from the clinical files of Robert Häfeli, Staatsarchiv Basel-Stadt, KG 53 (I) 14158.

Two persons are registered in this genealogy: Robert Häfeli and his daughter Bertha Anna. These two are set in an arrangement of lines drawn in pencil, which indicate where to fill in Häfeli's parents and the mother of his daughter. The empty space on the sheet is not quite *empty* but refers to the idea of what should have been there.

A couple of brittle branches make this pedigree a sad and withered diagram. Gnarled and mostly barren, it stands apart from the exuberant trees that carry in their branches the fruits of old power and long-lasting fertility. This lousy pedigree stems from a psychiatric ward, and it bears witness to the research in heredity in the 1920s. In their genealogical research, scientists at the time gathered data for their statistical approach to the problems of heredity. They would pick a single person as a starting point from which they would try to inquire into his or her biological family. As these procedures were also performed in mental institutions, they left traces in the medical records. There, one can find admission forms sketching family histories as well as trees of such kind.

"The first task for the study of families according the approach prescribed by experimental heredity research is to register all blood relatives of a subject whose hereditary formula is to be determined according to several natu-

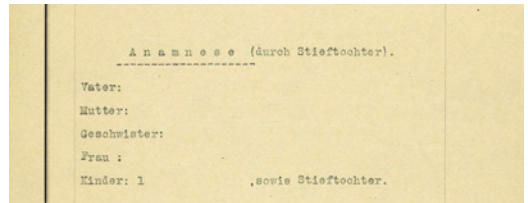
ral-scientific perspectives, including both his ascendants and descendants and collaterals – not just the ill relatives but also the healthy [...]"

Ernst Rüdin: "Einige Wege und Ziele der Familienforschung, mit Rücksicht auf die Psychiatrie", in: *Zeitschrift für die gesamte Neurologie und Psychiatrie* 1/7 (1911), pp. 487–585, p. 528.

Robert Häfeli is located all alone on the edge of a vast sheet of paper. Only his daughter stands by him. No parents, no wife, no grandparents. Needless to say, the medical personnel at the Basel psychiatric clinic had tried to obtain more information on his family. On the front page of his admission form they prepared a list of family members they wanted to get hold of – father, mother, grandfather, grandmother, etc. But this empty space remained empty. Was there nobody to provide this information? No relatives, no family? But not only this: in a letter sent to the communal authorities of Häfeli's hometown, they made inquiries about his parents and possible siblings. These efforts were not very rewarding. Apparently, the records revealed no siblings, and regarding his parents no information could be found. Hence all the blanks on the outlined tree had to remain empty. Actually, this genealogical tree might give the impression that Robert Häfeli was a man lacking almost all family ties.

"For an extremely important medical inquiry that should inhibit the proliferation of pathological hereditary dispositions and thereby contribute essentially to the maintenance of public health, I request a graciously cost-free response to the following questions regarding: Robert Häfeli, born 20.10.1876."

Letter from John E. Staehelin to the Communal Counselor Flumenthal, from the medical files of Robert Häfeli, Staatsarchiv Basel-Stadt, KG 53 (I) 14158.



Entry in medical history from the clinical files of Robert Häfeli, Staatsarchiv Basel-Stadt, KG 53 (I) 14158.

In the anamnestic part of the medical history, the psychiatrists left space for Häfeli's family members. The only filled-in blank records that he has a child as well as a step-daughter.

Of course, loneliness is not an uncommon phenomenon in psychiatric institutions – neither today nor in the past. Sometimes it was obvious, more obvious than in the case of Häfeli. People were secluded, solitary, and forlorn. For one patient, her file reads that she was "completely alone and has no relatives here in Basel."¹ Even more unambiguous is the verdict on a patient not only without family but cut off from all relationships: "Supposedly no relatives at all and completely alone in the world."² For every human being, the researchers assumed biological parents. Father and Mother. That is how families were presumed, and based on this presupposition research was carried out. Were those family members missing, would that mean that people were lonely? And does aloneness mean solitude in the first place?

"In fact, at the root of every delusion is the tendency of the personality to loneliness – the enhanced ego-orientation with a particular experience of relations and of meaning and the affectivity that follows from it, which approaches every experience with the question: What does that mean for me? more precisely: what does that mean for me in my loneliness?"

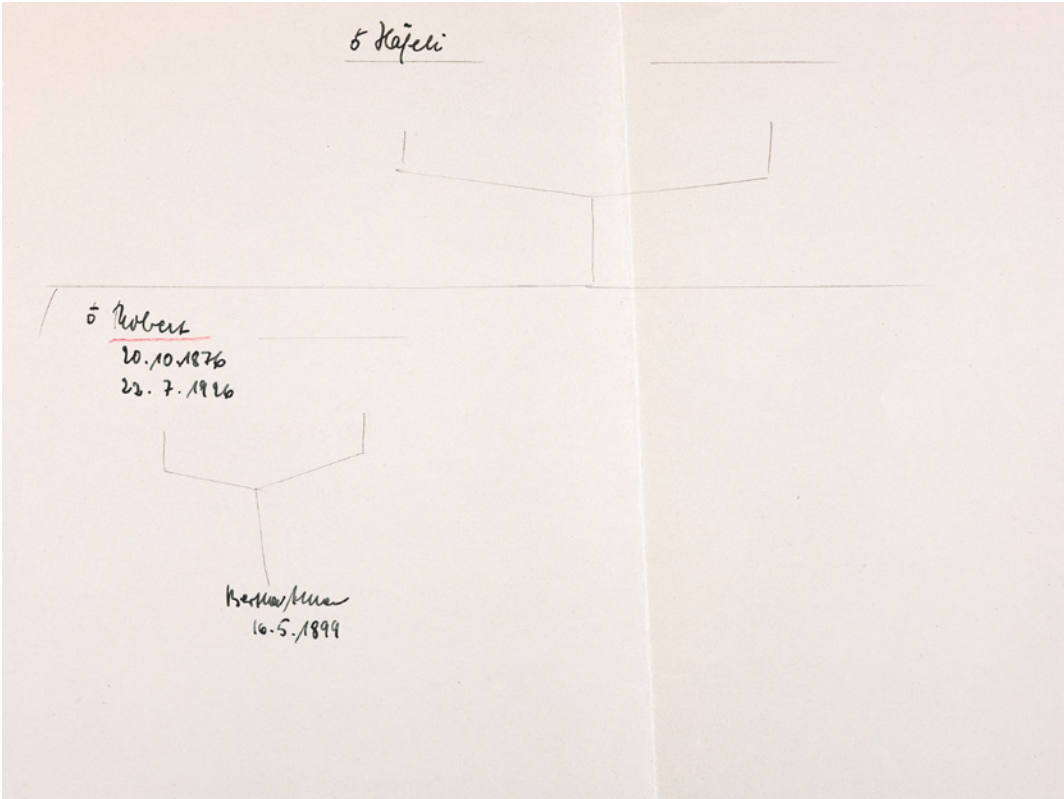
Eugen Kahn: "Über Wahnbildung", in: *Archiv für Psychiatrie und Nervenkrankheiten* 1/88 (1929), pp. 435–454, p. 440.

"Work conditions demand a lot of solitude of the patient. Under the influence of such periods, there gradually develops a high degree of nervous irritability and a depressive disposition with states of anxiety (particularly when alone), headaches, sleep disruption, obsessive sexual thoughts, to which are added erotic hallucinations during nights with a lack of sleep."

Leopold Loewenfeld: "Weitere Beiträge zur Lehre von den psychischen Zwangszuständen", in: *Archiv für Psychiatrie und Nervenkrankheiten* 3/30 (1898), pp. 679–721, p. 703.

PSYCHIATRIC TREE Revenant Relationships

For sure, to have a family implied knowing about those belonging to it. Every diagram began with sketching out the known individuals. When researchers could not get beyond these persons to fill out a complete family genealogy, they would leave the diagram as it was, unfinished. The tree conjures the image of an abandoned construction site with skeletal structures looming into the sky. Maybe this is in fact what happened, and this tree has been given up. Were the researchers discouraged by the setback in their investigation? Was the case material shifted elsewhere, where it left no traces in our sources? In any case, the clinical story of Häfeli's tree ended right there.



Detail from the family tree from the clinical files of Robert Häfeli, Staatsarchiv Basel-Stadt, KG 53 (I) 14158.

The basic structure of the tree has been sketched out with a pencil. Those strokes build the framework of the relations which can be assumed to must have existed from a biological point of view.

Fingert-Mahman J., Tapes-Matr. Pfeister Paul, Ausl. Siegist R. Hiltz- meister Waldvogel Karl, Schachdlen. Wissens Joh. Reia, 22 "Schaffersmann B. Barkhart Rob. Komm. Grawwiler Hans, Wagzwilfer Haller Herm., Farb- arbeiter Jauslin Ernst, De- psechtiger Moss Alf., Orlts. Nater Beria, Glitt. Nater Wwe. Maria Pawelzik Joh., Schneider Stavelli Theod., Austl.	2 "Hranneri Feld- schlösschen Bernardi Joh., Mar- merol. Kaiser Hans, Brofbeck Hans, Metalldruckerm. Braun Hans, Clauf. Häfel Rob., Wirt Roth Hch., Schreiner Völk Joh., Farbhar. 3 "Frey Heimr., Schuhm.mstr. Pädler Ast., Labor- Runges Joh., Maaser Völlmy Ad., Schloss- 1 "Burgandiner 4 "Noll Friedr., Zie- händler Noll Fr., Zahntechn. Ohrenuss Josef, Schloper Wittlin E., Schreiner 5 "Greiner Frida, Mercurio, und "Greiner V., Mercurio Greiner Wwe. Maria Schweitzer Greiner, Mercuriwaren Odermatt Josef, Mat. "Müller Hch., Kfm. Eli Laute	Oldemann Reish., Part. Hägi Gottl., Elektro- meister Kaiser Hans, Schloper Kaiser Wihl., Betr.- Assistent Röbel H., Zimmer- 12 "Dörfel Max, Conferrmstr. Dörfel Max, Spedit- Assistent Thrmann E., Monteur Lischka E., Hiltzharb. Kollert P., Polzhkorp. 14 "Dünger Wwe. L., Möbeldiele Müller Joh., Handarb. Pfeiffer Wwe. K. Pfeiffer Lina, Bürat. Schneider Ernst, Handlungser Zimmermann Ezz., Spengler 15 "Dücker J., Farb- arbeiter Purter K., Erdarb. Glinker Rich., Buch- händler Misch Ludw., Labor- Schmidlin Paul, Komm. Strub A., Fabrikarb.	Baumann Rich., Schilling Franz, Fahr- knecht Schmaki Emil 26 "Karet Theod. Haag Maria, Hiltzharb. Haa Wilh., Schrein- Hans Karl, Betr.- Assist. Hltz. Hans K., Schreiner Hitz Joh., Wagen- führer Ohrenuss Maria, Ladenarb. Ohrenuss Jos., Brennertrngl. Eugenbach & Cie., z. Arm. Kolonialw. 21 "Saur Jul., Spedit-Matr. Dörflinger Friedr., Hiltzarbeiter Gauschi Adolf, Landwirt Gröbhel Ernst, Elektriker Maier Emil, Schloss- Saur Fr., Sengeler 22 "Schurer Wwe., Kfth. Hiltzka Leopold, Collegiumstr.	Wirth Karl, Kommu- Wirth Wwe. Marie 28 "Lachsmeyer E. 27 "Schuster O. H. Ammann Wwe. Rich. Ammann Karl, Kommist Ammann Max, Hiltz- arbeiter Ammann Paula, Ein- legerin Düger Alb., Tafl. Lacher Wwe. Barb. Lacher Wwe. Ida Meier Jos., Schlosser Röbel Wihl., Fabrik- schneider Stählin Jos., Hiltzharb. 28 "Grimm Jakob, Buhharb. Alt Wwe. Emma Düret Jos., Kfth. Glätzer Fr., Erdarb. Hediger Rod., Komm. Pirgander Rosa, Kelln- Pirgander Wwe. i. Rigola Fr., Maaser Ritter Jos., Kfm. Schütz Emil, Pöde- Tallert Carl, Silber- bergarb. Tschudin Paul.
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Address book of the City of Basel and the Commune of Riehen 1926, Staatsarchiv Basel-Stadt STA H 43 72, p. 170.

The entry in the directory shows Robert Häfeli's address. He as well as his son-in-law are specified, though their spouses remain invisible.

Then again, sometimes things take a turn. It so happens that Häfeli wasn't wholly devoid of relationships as the diagram of him and his family might suggest. A look into his file in the clinic renders a series of interactions that place him in a quite close-knit web of kin and acquaintances, albeit not entirely conflict-free. His second wife brought a daughter into their marriage. One time, Robert Häfeli was brought to the clinic by his first wife's new husband – on another occasion his son-in-law signed his admission forms. Häfeli lived under one roof with his second wife, his stepdaughter, his daughter, and her husband. In this exact house, Häfeli kept an inn – all involved with the neighborhood. But all this is simply of no interest to a tree created to gather biological descent and aimed at statistical research on the heredity of disease.

Notes

- 1 Entry in medical history from the clinical files number 11894, Staatsarchiv Basel-Stadt, KG 53 (I) 11849.
- 2 Entry in medical history from the clinical files number 1628, Staatsarchiv Basel-Stadt, KG 53 (I) 1628.

Further Readings

Jean-Paul Gaudillière: "Exoteric Knowledge and Esoteric Knowledge: Ludwik Fleck, Pedigrees and the Visualization of Pathological Heredity", in: *Medicina nei Secoli* 20/3 (2008), pp. 767–789.

Bernd Gausemeier: "Pedigrees of Madness: The Study of Heredity in Nineteenth and Early Twentieth Century Psychiatry", in: *History and Philosophy of the Life Sciences* 36/4 (2015), pp. 467–483.

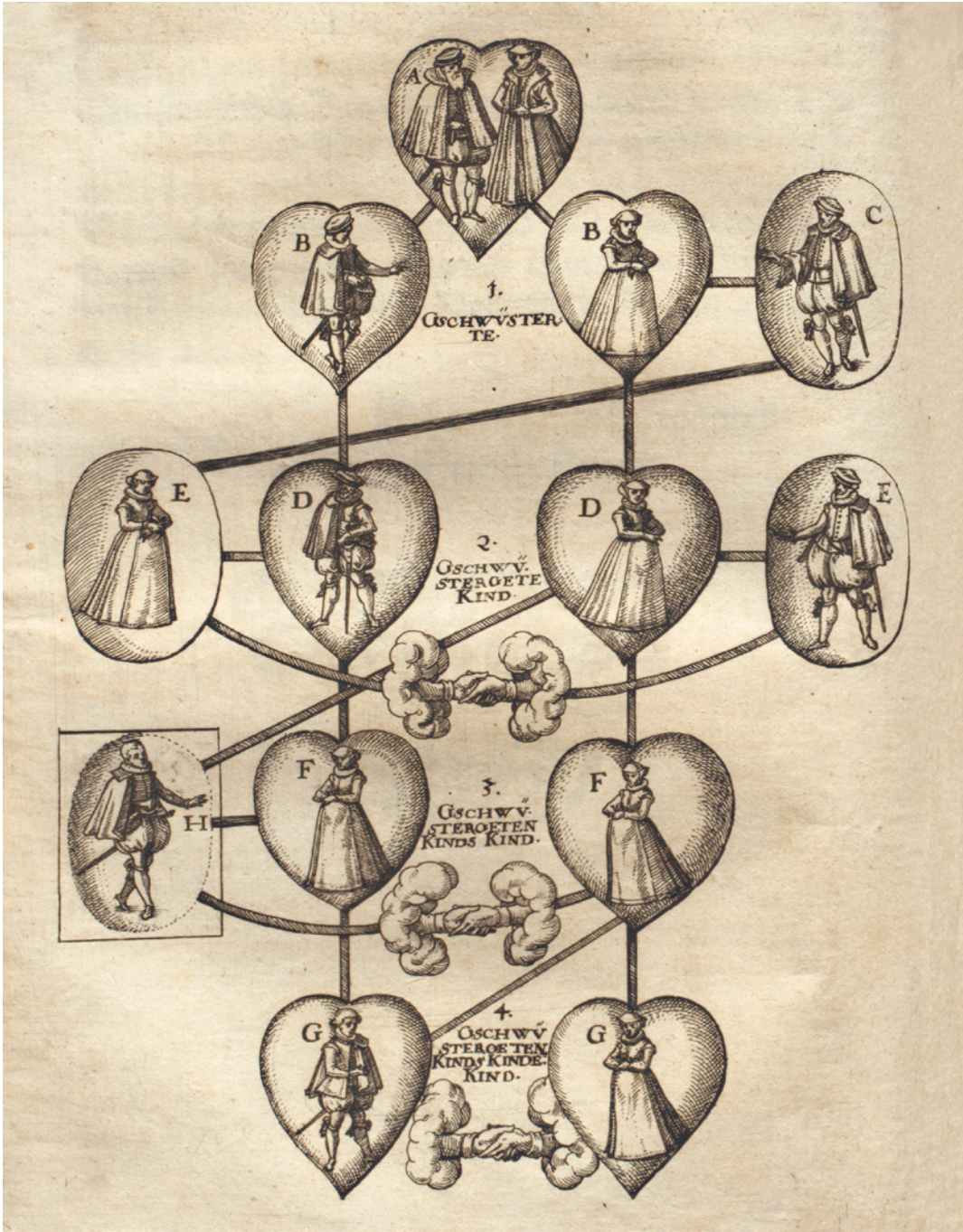
Yoshio Nukaga: *A Genealogy of Genealogical Practices: The Development and Use of Medical Pedigrees in the Case of Huntington's Disease*, Montreal: McGill University Press (2000).

Theodore M. Porter: *Genetics in the Madhouse: The Unknown History of Human Heredity*, Princeton: Princeton University Press (2018).

Sigrid Weigel (ed.): *Genealogie und Genetik: Schnittstellen zwischen Biologie und Kulturgeschichte*, Berlin: Akademie Verlag (2002).

OF HANDS, HEARTS, AND TREES

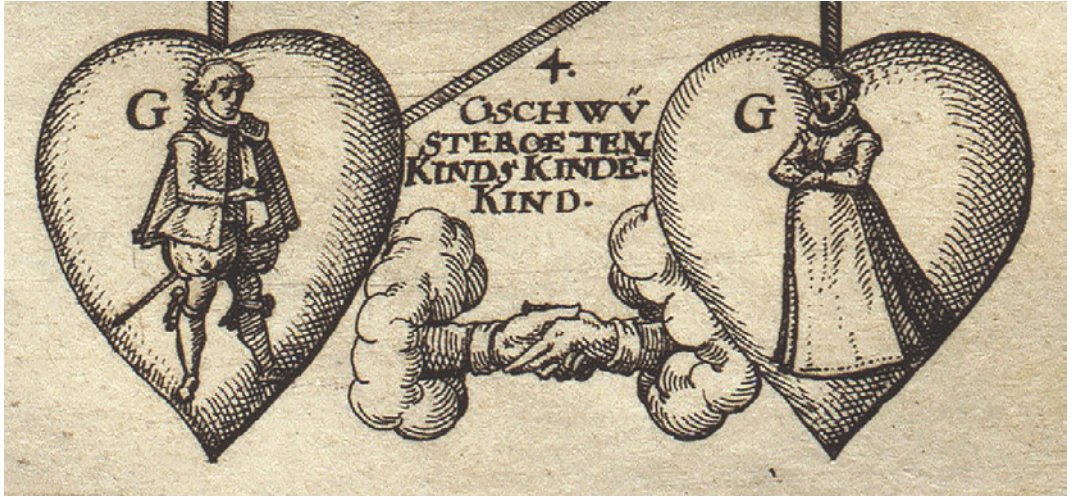
Forbidden Marriages



Johann Jakob Breitingen: Verstandtliche Anleitung, wie man in
Statt unnd Landschafft Zürich aussrechnen solle die Freund-
schafft: sampt einer Figur, in welcher begriffen unnd fürgebildet
wirt der gantze Innhalt der Statt Zürich loblicher Ehesatzungen.
und letstlich ein summarischer Bericht, warumb in der Bluoß-
reundschaft der dritte Grad bey uns verboten seye [...]. Jetzt aber

getruckt zu Zürich. bey Joh. Jacob Bodmer (1626), Zentralbiblio-
thek Zürich, 6.120.4. Online: <https://doi.org/10.3931/e-rara-11090>.

Could this be an illustration of a love treatise? To the modern-day reader the copper engraving preceding Johann Jakob Breitingers comments in his *Verstendliche Anleitung* (Zurich 1626), a comprehensible instruction to the forbidden degrees of marriage, must seem endearing. Reminiscent of an illustrated story, seven male and seven female figurines are arranged in carefully shaded heart-shaped and elliptical bubbles. Narrow bands interlace the figurines, displaying the entanglement of their various relations. The two vertical rows in the middle build a strong, symmetrical core vying for the reader's attention. However, while dominating the diagram spatially, hierarchically the center is subsidiary to the only couple pictured. Prominently placed at the top of the page, their union crowns the network.



Detail from Johann Jakob Breitingers: *Verstendliche Anleitung, wie man in Statt unnd Landschafft Zürich aussrechnen solle die Freundschaft* (1626), Zentralbibliothek Zürich, 6.120.4. Online: <https://doi.org/10.3931/e-rara-11090>.

Moreover, three pairs of intertwining hands, reaching out of small clouds, connect their descendants with the "outsiders" to their left and right. A symbol that highlights and reinforces each couple's union, and that Breitingers calls *Treu*. Often used as a metonymic representation of an intervening God, here the hands are an emblematic representation of the (marital) fulfilment of duty and reliability. However, while seemingly playful and rich in details, the diagram's actual purpose is of didactic and legal nature: rendering the forbidden degrees of kinship and making them comprehensible.

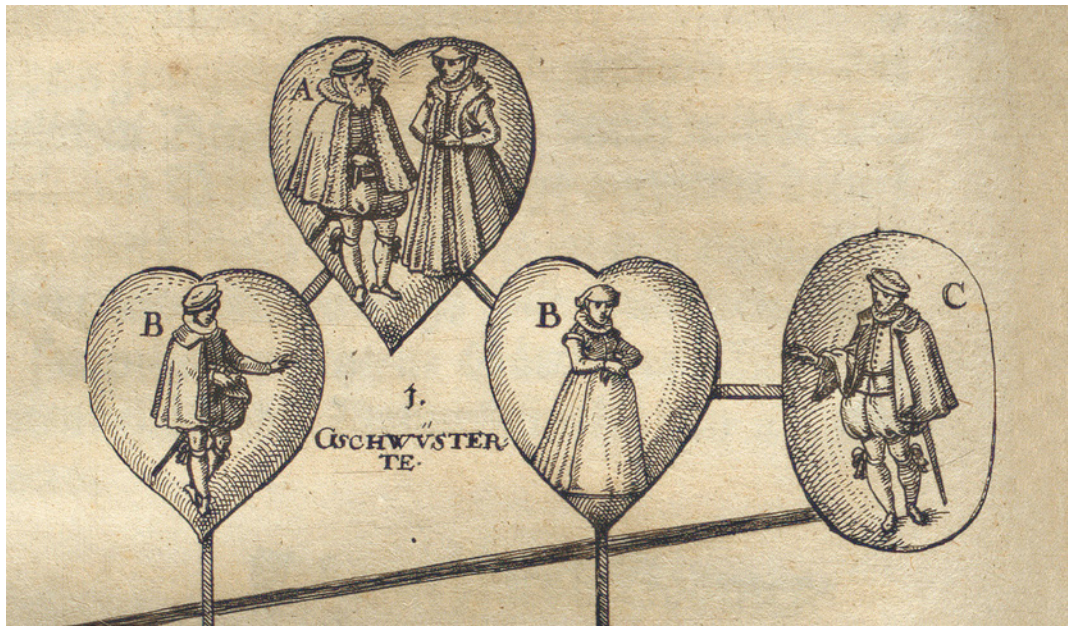
"Verstendliche anleitung / Wie man in Statt vnnd Landschafft Zürich auszrechnen solle die Freundschaft. Sampt Einer Figur / in welcher begriffen vnnd fürgebildet wirt der gantze Inhalt der statt Zürich Loblicher Ehesatzungen."

Furthermore, as was commonly the case with early modern publications, the title doubles as a synopsis. The *Verstendliche Anleitung* introduces readers to correctly calculate the degrees of kinship (*die Freundschaft*), and Breitingers illustrates this concept with a *Figur*, a simple diagram depicting the familial relations. Announced in the title as representing all of Zurich's marriage statutes (*Ehesatzungen*), this diagram was clearly meant to appeal to readers as a helpful tool. With its positioning right at the beginning of the work, Breitingers and his printer, Johann Jakob Bodmer, clearly understood the diagram's quality as an abstract: by offering readers a compact, explanatory version of the *Ehesatzungen* to study and consult,

Breitinger and Bodmer enhanced its readability and comprehensibility. In addition, the careful embellishment of the diagram emphasizes its significance as a visual medium, a medium that not only serves ornamental purposes but also conveys complex content.

OF HANDS, HEARTS, AND TREES

Diagrammatic Details



Detail from Johann Jakob Breitinger: *Verstendtlliche Anleitung, wie man in Statt unnd Landschafft Zürich aussrechnen solle die Freundschaft* (1626), Zentralbibliothek Zürich, 6.120.4. Online: <https://doi.org/10.3931/e-rara-11090>.

The stylized heart as a symbol of love has been used in Western contexts since the late thirteenth century. In this diagram, the hearts frame the various blood relatives and closely link the heart as a vessel of love and life with the blood as a constitutive substance of kinship. Although provided with guiding numbers and kinship labels for better understanding, the reader still seems to be missing some crucial information to read the diagram. To decipher the letters, A-H, and the relations depicted, Breitinger printed a legend to the diagram on the opposite page. Here, readers learn of their diagrammatic 3-in-1 deal, so to speak, simultaneously showing the allowed marital unions of *Bluotfreundschaft* (consanguinity), *Maagschaft* (here meaning a distant blood relative), and *Schwagerschaft* (affinity) to the fourth degree.¹



In dieser Figur ſiehe man die Blutsfreunds-
ſchafft/Naagschafft vnd Schwagerschafft.

Blutsfreundsſchafft wirt angebildet durch die Herren / in das
vierte Glied. A. der Stamm. B. D. F. G. die Glied.

Naagschafft/durch die Mannsperson in der gevierten figur / im
dritten Glied. H.

Schwagerschafft/durch die zwei personen zur ſeiten / im anderen
Glied. E.

Wo ein Treu iſt/bedeutet daß dieſelben personen in ihrer Sip-
pſchafft einanderem frey mögind zur Ehe haben.

Wo aber bey einer Treu von einer vnderen perſon zur oberen
ein ſtrich gezogen/bedeutet daß man müſſe erlaubnuß haben.
G. F. der vierde vnd dritte Grad der Blutsfreundsſchafft. H. D.
der dritte vnd ander Grad der Naagschafft. E. C. der ander
vnd erſt Grad der Schwagerschafft.

OF HANDS, HEARTS, AND TREES Arboreal Kinship

Since the Early Middle Ages, Catholic theologians and specialists of canon law had developed diagrams – *arbores consanguinitatis et affinitatis* – to define the range of kin falling under incest prohibitions. Used to quantify, measure, and teach kinship in degrees, the bifurcated diagram had become a synonym for descent. Luther, however, demanding a return to the sole authority of the Scripture, rejected the canonists' diagrammatic practices of systematizing kinship – including its most popular form: the tree. By dismissing canonists' centuries' worth of work on the *arbores*, Luther also rebuffed any theological and legal knowledge provided by the church's philosophical fathers. Hence, starting anew, Protestant scholars relied on God's word for a definition of incest, learning that incest was not to be prohibited by degrees but by naming the forbidden relations. The list in *Leviticus* 18 of the twelve women forbidden for men to marry was first published in 1522, but it was soon deemed incomplete and in need of further interpretation. Challenging the biblical text's unambiguousness, the exegesis of *Leviticus* 18 led to a variety of publications in the sixteenth and seventeenth centuries. These publications struggled to produce valid alternatives to the tree diagram, explaining the complex web of kinship and their restraints with the use of lists, enumerations, and biblical examples. Breitingger gives testimony to this revision, namely by combining the use of degrees with the naming of relations, while lexically resorting to *arbores* terminology.

"In dieser Figur sieht man die Blutfreundschaft/Maagschaft vnd Schwagerschaft. Blutfreundschaft wirt abgebildet durch die Hertzen / in das vierte Glid. A. der Stamm. B.D.F.G. die Glid. [...] G.F. der vierdt vnd dritt Grad der Blutfreundschaft. H.D. der dritt vnd ander Grad der Maagschaft. E.C. der ander vnd erst Grad der Schwagerschaft"

When illustrating consanguinity up to the fourth degree (*viert vnd dritt Grad*) and calling the ancestral couple "A." the stem (*Stamm*) and their descendants "B.D.F.G." the branches (*Glid*), Breitingger clearly abandons the initial exegetical optimism of the early Protestant theorists. His somewhat eclectic use of diagrams of relatedness proves his high didactic standards since he is rather concerned with symmetry of perspective and completeness of content. While scholars often fought their battles on paper only, Breitingger, Antistes of Zurich, was primarily concerned himself with the spreading and teaching of his faith. Nevertheless, this diagram is a convincing example of the *arbores*' dominance and the way they have shaped the western understanding of kinship and its systematization. Breitingger represents a new generation of Protestant scholars, with a willingness to adjust to readers' needs by making the Scripture accessible – just as Luther would have liked it.

Notes

- ¹ *Maagschaft* was often used as a synonym for marital kin but could also mean distant blood relatives. In the diagram, Breitingger distinguishes between *Maagschaft* and *Schwagerschaft*, but in the text itself he discards this distinction and only uses the two terms *Blutfreundschaft* and *Maagschaft*, i.e. blood relations and affinity.

Further Readings

Már Jonsson: "Incest and the Word of God: Early Sixteenth Century Protestant Disputes", in: *Archiv für Reformationsgeschichte* 85 (1994), pp. 96–119.

Christiane Klapisch-Zuber: "The Genesis of the Family Tree", in: *I Tatti Studies in the Italian Renaissance* 4 (1991), pp. 105–129.

David C. Steinmetz: *Luther in Context*, Bloomington: Indiana University Press (1986).

Simon Teuscher: "Flesh and Blood in the Treatises on the Arbor Consanguinitatis (Thirteenth to Sixteenth Centuries)", in: Christopher H. Johnson, Bernhard Jussen, David W. Sabeen, Simon Teuscher (eds.): *Blood & Kinship: Matter for Metaphor from Ancient Rome to the Present*, New York: Berghahn (2013), pp. 83–104.

STEMMA, TABULA, SYSTEMA Kinship at a Glance

Johann Daniel Schöpfli (1694-1771), scholar and historiographer of the Margrave of Baden, published a seven-volume history of the Margrave House in the 1760s that was mainly a collection of official documents.¹ The written parts, mainly contained in the first three volumes, were in Latin, the language of scholars until well into the nineteenth century. The entire work was planned for publication in a practically manageable dimension comparable to today's A4 and intended for library collections. Schöpfli sought to identify the ancestors of the House of Baden. With the publication of his work, he had in his view proven the blood kinship of the Margrave of Baden with the Dukes of Zähringen since the High Middle Ages in the male line on the basis of official documents. In the first volume of his *Historia Zaringo-Badensis*, Schöpfli worked through the stories and histories disseminated throughout the Upper-German scholarly world regarding the ancestry of the Margraves of Baden and the houses that were linked with them and included the relevant ancestry tables (*Stammtafeln*). The following "Tabula III," elaborated by Schöpfli, shows a *stemma* from the Dukes of Zähringen from the eleventh to the beginning of the thirteenth century.

TABULA III DUCUM ZARINGIAE STEMMA							
BERTOLDUS, qui in Chartis Ann. 999. 1004. 1008. Comes Brisgoviae legitur.							
BERTOLDUS I. ex Comite Brisgoviae Dux Carinthiae creatus Ann. 1060. in compensationem Suevici Ducatus, quem Agnes Imperatrix Rudolpho Rheinfelden Comit. Ann. 1057. concesserat; decessit Ann. 1073. titulo tamen Ducis retento; † 1077. sepultus Hirfingae. Ux. 1. Richwara filia incerta. 2. Beatrix, filia Ludovici Comitis Monconis † 1092.	HERMANNUS Marchio, <i>Badensium fautor</i> , ex Marchione monacho Cluniacensis † 1074. Vide infra Tabulam VI. Marchion. Badens.			GERHARDUS, ex monacho Hirfing. Episcopus Constantiens. Ann. 1084. † 1110.			
BERTOLDUS II. Dux Saxonie renunciatus a Guelphis adversus Fredericum Scaufenen A. 1092. Abbatum D. Petri in Silva Nigra condit. A. 1093. Transactio cum Friderico Scaufenen inita Suevici Ducatum amittit. A. 1098. † d. 12. Apr. 1111. Uxor Agnes, Rudolphi Suevi Anticacris filia.	CONRADUS Dux Zaringiae A. 1127. in Comitibus Spirensibus ab Imp. Lothario II. qui Rainaldum proscripterat, Comitatum Burgundiae & Reftoratum totius Regni Burgundici obtinet. Inde Titulus <i>Duxis & Reftoris Burgundiae</i> . † 1152. Ux. Clementia, filia Godofredi Namurcensis Comitis.			RUDOLPHUS † in tenera aetate. AGNES, nupta Sophiano I. Burgundiae Comiti, cui agnomen <i>Tite-hardi</i> , cujus filius Guilielmus III. puer periret improlis An. 1126.			
BERTOLDUS III. Dux Zaringiae Friburgum Brisgoviae condit. Ann. 1126. † 1123. Molheim in Alfaria occidit. Ux. Sophia, filia Henrici Nigri, Bavariae Ducis.	ADELBERTUS, cuius mentio in Charta An. 1152. & 1181. <i>Ducum Terrarum</i> auctor. Vid. Tab. IV. Duc. Tero.			RUDOLPHUS, in Archiep. Mogunt. electus A. 1160. fed non confirmatus, fit Episcopus Leodienfis. An. 1168. † 1189.			
BERTOLDUS IV. Dux Zaringiae & Reftor Burgund. Transactio cum Friderico I. Imp. & Beatrice, Rainaldi filia, init. An. 1156. qua, dimisso Regni Archiducis Reftoratu & Comitatu Burgundiae eis Juram. Reftoratum in Burgundiam minorum seu Helvecum retinet. Friburg. Helv. condit. in Pago Avenchenfi A. 1178. † 14. Sept. 1188. Ux. Heilwigis filia incerta.	CORRADUS, cuius mentio in Charta An. 1152. & 1181. <i>Ducum Terrarum</i> auctor. An. 1168. † 1189.			HUGO, cuius mentio in Charta An. 1152. & in alia An. 1080.			
BERTOLDUS V. Ducum Zaringiae ultimus; Bernam condit. An. 1191. folio Imperii delictans A. 1195. acceptis a Philippo Suevo XL mille maris argenti juri suo renuntiat. † Kal. Maji 1218. inprolis. Uxor Clementia, filia Sophiani, Avenae in Burgundia Comitis, marito superflua.	AGNES, nupta Egenoni Comiti Uracensi; unde Comes Friburgi & Friburgenberges, qui mortuo Bertoldo V. Suevici Zaringorum & Silvae Nigrae terras cum Friburgo Brisgoviae acceperunt. Vid. Tab. V. Comitum Friburg.			CLEMENTIA, nupta Henrico Leonis A. 1147. repudiata An. 1167. Germana vel Anna de Zeringen, ux. Humberti III. Comitis Sabaudiae † 1162.			

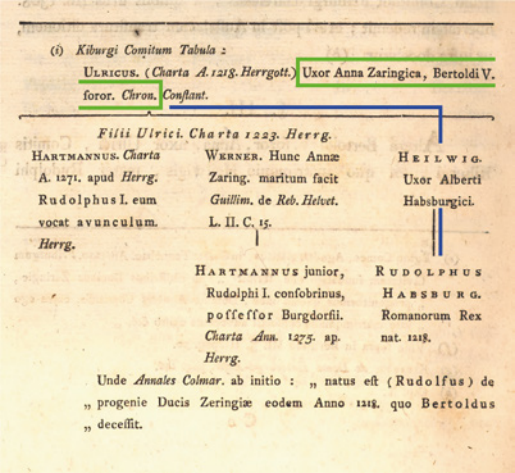
Johann Daniel Schöpfli: *Historia Zaringo-Badensis*, vol. 1, book 1, Karlsruhe: Officina Macklotiana (1763), Tabula III "Ducum Zaringiae Stemma", after p. 40. Reproduction from Universitätsbibliothek Freiburg, H 3621-1. Online: http://dl.ub.uni-freiburg.de/diglit/schoepfli_hist_zar_bad_ga.

This *stemma* gives a diagrammatic representation of the series of Dukes of Zähringen from Bertold I to Bertold V, left-justified and vertically from top to bottom in an order that presents the succession from son to son, omitting successions that deviate from this idealized form, for instance from brother to brother. To the right of each Bertold, his brothers and sisters are listed. If the latter were married, the husband and his position are noted. The wives of the persons listed as Dukes of Zähringen are mentioned according to their ancestry. By creating a line of Dukes of Zähringen named Bertold on

the left, the diagram suggests a continuous succession of rule from father to son that does not conform to actual events. In fact, there was a succession between the brothers Bertold and Conrad (shown here by the red line added by MH). But the latter does not appear on the left-hand side and thereby interrupt the continuous line of Bertolds. And yet the representation is not exactly false: Conrad does appear elsewhere in the diagram. Patrilineal succession aside, the diagram also broaches the relatedness between the Habsburgs and Zähringen, with Anna von Zähringen, the second sister of Bertold V, as the key link.

For Schöpflin, this diagram did not only prove the blood kinship of the Margraves of Baden by denoting Hermann (the first of this rank) as bodily brother of the Bertold II, Duke of Zähringen. With its mention of Agnes and Anna, the two sisters of Bertold V, Duke of Zähringen, this *stemma* was also a flashpoint in the debate over the politically volatile question as to whether and in which way exactly the House of Habsburg and the Dukes of Zähringen were related. Here the second sister of Bertold V, Anna von Zähringen, occupied a key position. She and her descendants were the link to the Counts of Habsburg, of whom Rudolf I (1218-1291) in the thirteenth century was the first of a long line of members of this house to be King of the Holy Roman Empire.

In the eighteenth century, the Habsburgs treated the question of Anna's existence as a matter of power politics. If she had in fact existed, then Anna von Zähringen was the mother of Heilwig von Kyburg. She, in turn, was married to Ulrich, Count of Kyburg, and from this marriage came Rudolf I. This perspective found diagrammatic representation in the first volume of the *Historia Zaringo-Badensis*. In his diagram, Schöpflin refers to the *Annales Colmarienses* penned by Dominican clergy in the thirteenth century.²

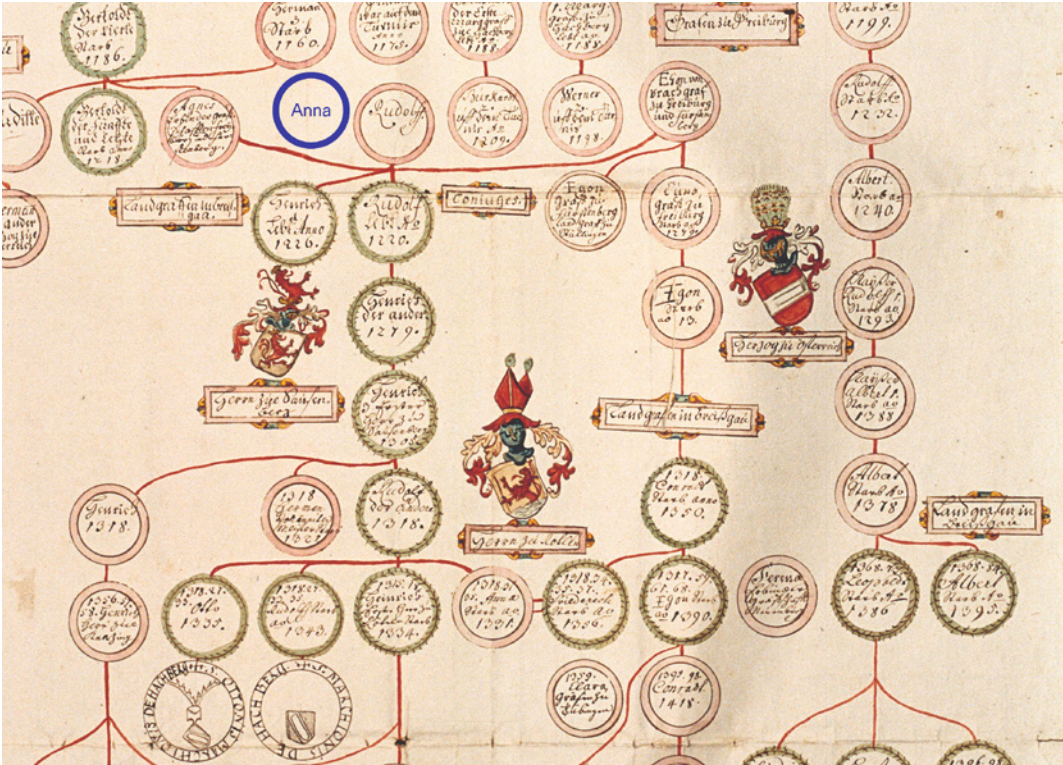


Johann Daniel Schöpflin: *Historia Zaringo-Badensis*, vol. 1, book 2, section 8, paragraph 3: "Zaringacorum Terrarum Divisio", Karlsruhe: Officina Macklotiana (1763), p. 202. Reproduction from Bayrische Staatsbibliothek, 4 Germ.sp. 305-1. Online: <https://mdz-nbn-resolving.de/details:bsb10003293>.

This table shows Rudolf I (1218-1298), elected king of the Holy Roman Empire in 1273, as the possible grandchild of Anna von Zähringen, the second sister of the Duke of Zähringen Bertold V. Rudolf's year of birth is said to be the same as Bertold V's year of death. As a reference, Schöpflin mentions the *Annales Colmarienses*, which are dated to the turn of the fourteenth century. Schöpflin also offers, as an alternative to his own findings, a version by the Swiss historian Franz Gulliman (1568-1612), according to whom Anna was an aunt of Rudolf I.

In the five hundred years between the creation of the *Annales Colmarienses* and the publication of Schöpflin's *Historia*, Anna von Zähringen had become invisible as sister of the last Duke of Zähringen while appearing as a spouse. Changes in the conception of bodily substances (blood, semen, flesh) and kinship practices since the end of the Middle Ages made it possible for female descendants and collateral kin to disappear from genealogical trees so long as they did not function as the beginning of a collateral line like Agnes von Zähringen, who took her place at the beginning of a linearly structured series of male blood relatives as a progenitrix (of the Counts of Freyburg and Fürstenberg).³ Although she was also a sister of

the last Duke of Zähringen, Anna of Zähringen was a different case than Agnes. Anna was not understood as a progenitrix of a collateral line like Agnes but as a possible ordinary link between the Dukes of Habsburg and the Dukes of Zähringen within a vertically designed order of succession. However, as male blood constituted more and more representations of vertically designed ancestry in the following centuries, Anna consequently disappeared from the family trees designed around blood.⁴ Paradoxically, Anna reappeared at a time when blood was considered decisive for kinship. But this was also a time in which, for the purpose of establishing evidence, official documents were used to prove dynastic relations. Thus, the transfer of property between the Dukes of Zähringen and the Counts of Habsburg via Anna and her daughter Helwig came into focus and led to the revival of Anna von Zähringen. Diagrammatic representations like those by Schöpflin, who reconstructed kinship in the form of a stemma based on charters and similar documents, made Anna von Zähringen once again visible after centuries.



Detail from genealogical diagram on rag paper (end of 17th c.),
Generallandesarchiv Karlsruhe, 47/521/1.

This image, with its blood-red lines linking individuals, shows kinship between the Counts of Habsburg, the Dukes of Zähringen, the House of the Margraves of Baden, and other noble houses in a complex net of bloodlines in which Agnes von Zähringen is shown as a progenitrix of a collateral line, whereas Anna von Zähringen is missing. The genealogical diagram indicates the complex political structure of the southwest territories of the Holy Roman Empire. The kinship of the Dukes of Zähringen with the Counts of Habsburg was of utmost political significance and shaped genealogical practices in the early modern period in word and deed through the second half of the eighteenth century. Here it serves as an example of the long practice of making Anna von Zähringen invisible.

STEMMA, TABULA, SYSTEMA (In)visible Kinship and Evidence

In 1769, only a few years after the publication of Schöpflin's *Historia*, a text appeared from the pen of the Göttingen historian Johann Christoph Gatterer in volume 12 of the *Allgemeine Historische Bibliothek* on "Evidence in Genealogy" with an anonymous "Beyspiel zur Erläuterung der Gattererschen Methode in der Genealogie" (Example for Elucidation of the Gatterer Method in Genealogy) in which he laid out his principles of evidence in genealogy.⁵ For Gatterer, official documents as evidence for genealogical claims were absolutely fundamental. The author of the "Beyspiel" broached this point in the course of reconstructing the kinship relation between the houses of Fürstenberg and Habsburg. Along with the Habsburgs, in this instance, came once again the Dukes of Zähringen and the question of the existence of sisters of the last Duke, Bertold V. The existence of Agnes, the matriarch of a collateral line, was for the author beyond doubt. By contrast, according to the author of the "Beyspiel," a second sister could not be confirmed from the available written material. Such a person found no mention in the records. But, he argued, the fact that parts of the property of the Zähringen were in the hands of the Counts of Kyburg pointed to the existence of a second sister, the missing Anna.

genslem, quam postremam affinitatem in medio relinquimus. Stemma vero Comitum Vroburgensium, prout nostris traditur in monumentis, sub numero VIII. producimus.

TABULÆ GENEALOGICÆ.
I.

Comitum, post Ducum ZARINGENSium,
Rektorum Minoris Burgundiæ.

PIRITHILO, BIRTHILO, BIRCHILO, BYRCHILO, BIRCULO, BERTHOLDUS Comes in pago Brisachgowe, fundator ecclesiæ S. Cyriaci in Solzberch, vel Solzbach. *Ch. an. 968. fer. IV. 990. 18. Jun. 994. 22. Dec. 995. 9. Dec. in alia ch. ad finem sec. X. n. CLIV. & LV. 1004. 25. Jun. 1010. 28. Mart.*

Gebhardus. *Ch. anni 1010. 28. Martii.*

BERCHTOLDUS, BERTOLFUS Comes in pago Brisichgowe. *Ch. an. 1028. 1043. 1. Jun. 1073. 20. Maji.*
In diplomate Henrici memoratur, quod comitatus in pago Brifigove ab hoc Bertolfo, jam non Duce, ad ecclesiam Argentinensem sit translatus. 1077. XV. Kal. Jul. num. CLXXXVII.

BERTHOLDUS DUX. *Ch. an. 1114. num. CXCH. XCIV. & V. 1125. 8. Jan. 1126. 2. Jan.*

CONRADUS DUX, advocatus S. Blafii, 1123. 28. Dec. 1125. 8. Jan. & 28. Dec. 1126. 2. Jan. 1130. 8. Febr. 1138. 28. Novembr. 1139. 17. Febr. & 28. Maji. 1141. 10. Apr. 1144. 8. Jul. 1150. 20. Augusti.

BERCHTOLDUS advocat. abbatiae S. Blafii, & in Witthowa, DUX & RECTOR ADELBERTUS. HUGO. Burgundiæ. 1141. 10. Apr. 1166. 1. Nov. 1070. 16. Maji. 1173. 4. Mart. 1181. 1181. 1181. 1186. num. CCXLIX.

BERCHTOLDUS DUX, & RECTOR Burgundiæ, Turegici loci advocatus & judex, Dei, Imperatorum & Regum dono. 1137. num. CCL. & LI. 1210. num. CCLXI. 1212. num. CCLXVI.

* ANNA, teste Guillim. uxor Wernheri Comitiss de Kiburg, fratre sine liberis decedente, Burgundiam obtinuit, eamque marito suo in dotem attulit, quæ ipsa dein Burgundia per matrimonium Eberhardi Comitiss Habsburgici ad Kyburgios posteros devolvitur.

TOM. I. M m II.

Marquard Herrgott: *Genealogie diplomatica Augustae Gentis Habsburgicae* [...], Vienna: Typographia Leopoldi Joannis Kaliwoda (1737), vol. 1, book 6, heading 2, p. 273. Reproduction from Bayrische Staatsbibliothek, 2 Bibl.Mont. 2793-1. Online: <https://mdz-nbn-resolving.de/details:bsb10721289>.

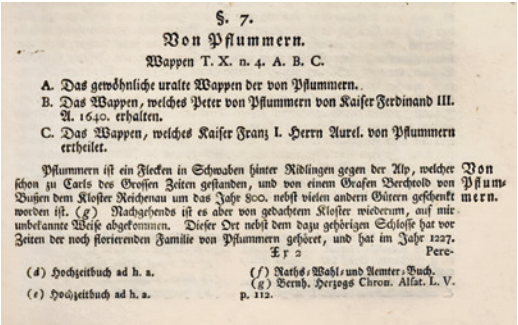
This "tabula" is the work of a Benedictine monk from the Habsburg monastery St. Blaise in the Black Forest. Here, Anna is not explicitly mentioned as the sister of Bertold V. Yet she, her connection to the Counts of Kyburg, and her role in the transfer of Zähringen property are nevertheless

allocated a place in the "tabula." The publication of Herrgott covers two volumes. The first volume tells the history of the house of Habsburg from its beginnings. The second volume presents the corresponding documents. Herrgott wrote for the learned world of the eighteenth century in Latin.

The anonymous author of the "Beyspiel" concluded that the "genealogical theorem" (or axiom: *genealogischer Hauptsatz*) that Anna is the sister of the last Duke of Zähringen, spouse of Count Ulrich of Kyburg, and mother of Helwig of Kyburg (herself the mother of the Holy Roman King Rudolf I) was not finally "demonstrable."⁶ And the historian Gatterer, who had declared that documents were an indispensable requirement for the production of a "genealogical statement" (*genealogischer Satz*), concluded that they constituted the skeleton of ancestry tables.⁷ Yet he also placed Anna in his representation of the kinship of the two houses Fürstenberg and Habsburg in the position: "(7. Anna) was Berthold the IV's daughter and Count Ulrich von Kyburg's spouse." In the "genealogical statement," Anna von Zähringen was the "daughter." In the diagram in which this statement is found, she is likewise identifiable through the numerical designation "7" as sister of Bertold V. In this way, *stemma* and *tabula* were the ultimate condensation (or the diagrammatic implementation) of text, of "genealogical statements" that contained nothing other than "what is necessary for the knowledge of ancestry and distinction of one person from another."⁸

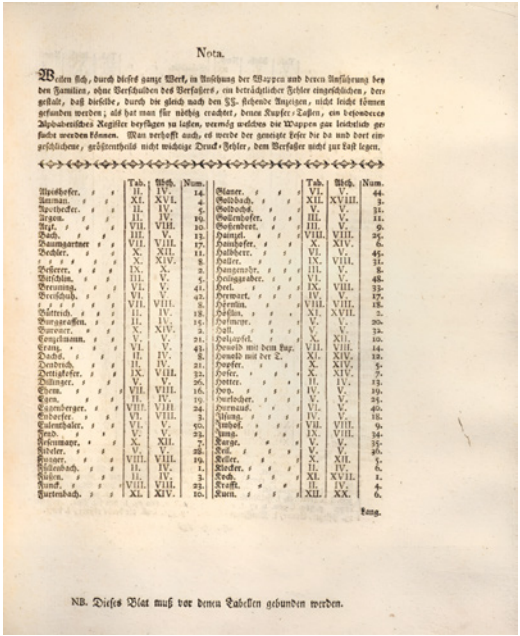
STEMMA, TABULA, SYSTEMA Genealogy of Power

Paul von Stetten did without the transformation of genealogical statements into ancestry tables. He was concerned not with corporeal kinship but with a male-dominated genealogy of political power. A member of the noble elite of the free imperial city of Augsburg and city administrator, von Stetten discovered a research desideratum concerning the history of the urban nobility. He noted that scholars who wrote about the German nobility hardly addressed this group without doubt for lack of sufficient evidence.⁹ There were isolated works, but they had shortcomings. They were partly too short, partly incorrect, or made no particular distinction between the families of the larger and smaller towns. They dealt with the subject matter more according to legal scholarship or spread many fabulous speculations which could not be proven. His *History of the Noble Families in the Free Imperial City of Augsburg* (printed in 1762) was to remedy these defects.¹⁰ For this purpose, he developed his own "Systema."¹¹ This system consisted of a sequence of statements in which he chronologically arranged and related information about the Augsburg patrician families. He provided detailed, reliable information about the property status of the individuals (including their offices and services) and the privileges of the described family. In footnotes, he listed the documents from which he had taken the information. Gravestones, coats of arms, and seals served him as sources as did honor- and wedding-books (*Heiratsbücher*) and other original documents that the families themselves had made accessible to him.¹² Stetten's *Systema* was a collection of so-called genealogical statements (*genealogische Sätze*) in the sense of Johann Christoph Gatterer, written in the vernacular German rather than Latin as with Schöpflin and Herrgott, that allowed the reader to draw conclusions about political influence and social position of the families described.



Paul von Stetten: *Geschichte der adelichen Geschlechter in der freyen Reichs-Stadt Augsburg*: sowohl in Ansehung ihres besondern Standes als auch in Ansehung einer jeden einzeln Familie. Mit 228. in Kupfer gestochenen Wappen und Siglen versehen, Augsburg: Haid (1762), p. 347. Reproduction from Bayrische Staatsbibliothek, 999/Bav.686. Online: <https://mdz-nbn-resolving.de/details:bsb11083698>.

Von Stetten was interested not in reconstructing corporeal kinship but in offering a practical genealogy of political power. He used the instrument of footnotes to document his sources such as those found at the bottom of the page depicted here, which in turn refer here to wedding books (*Hochzeitsbücher*), a book of elections and offices, and a chronicle.



Paul von Stetten: *Geschichte der adelichen Geschlechter in der freyen Reichs-Stadt Augsburg*, Augsburg: Haid (1762), p. 449. Reproduction from Bayrische Staatsbibliothek, 999/Bav.686. Online: <https://mdz-nbn-resolving.de/details:bsb11083698>.

Von Stetten's register of families, arranged (as the note at the bottom instructs) before the tables of coats of arms, was ordered alphabetically. It made the slim volume, printed on thin paper, an appropriate tool for informing oneself of the local nobility.

Reproduction from Bayrische Staatsbibliothek, 999/Bav.686. Online: <https://mdz-nbn-resolving.de/details:bsb11083698>.

The last of twelve total tables of seals and coats of arms provided as an appendix by von Stetten, here showing those of the Pflummern (4A, B, and C).



Paul von Stetten: *Geschichte der adelichen Geschlechter in der freyen Reichs-Stadt Augsburg*, Augsburg: Haid (1762), p. 473.

Notes

- 1 Parts of this chapter were translated by Eric Hounshell.
- 2 The *Annales Colmarienses* are a collection of sources from the thirteenth century. Parts of it are available in the original. Manuscript copies are housed at the University of Basel library, the Municipal Library in Colmar, the Württemberg Landesbibliothek in Stuttgart, and the State Archive of Zurich.
- 3 See Christopher H. Johnson, Bernhard Jussen, David Warren Sabean, Simon Teuscher (eds.): *Blood and Kinship: Matter for Metaphor from Ancient Rome to the Present*, New York: Berghahn (2013).
- 4 Gianna Pomata: "Blood Ties and Semen Ties: Consanguinity and Agnation in Roman Law", in: Mary Jo Maynes, Ann Waltner, Birgitte Soland, Ulrike Strasser (eds.): *Gender, Kinship, Power: A Comparative and Interdisciplinary History*, New York: Routledge (1996), pp. 43-66.
- 5 Johann Christoph Gatterer: "Von der Evidenz in der Genealogie", in: Johann Christoph Gatterer (ed.): *Allgemeine Historische Bibliothek von Mitgliedern des königlichen Instituts der historischen Wissenschaften zu Göttingen*, Halle: Johann Justinus Gebauer (1769), vol. 12, pp. 3-16; Anonymous: "Beyspiel zur Erläuterung der Gattererschen Methode in der Genealogie", in: Johann Christoph Gatterer (ed.): *Allgemeine Historische Bibliothek von Mitgliedern des königlichen Instituts der historischen Wissenschaften zu Göttingen*, Halle: Johann Justinus Gebauer (1769), vol. 12, pp. 18-46.
- 6 Anonymous: "Beyspiel zur Erläuterung der Gattererschen Methode in der Genealogie", in: Johann Christoph Gatterer (ed.): *Allgemeine Historische Bibliothek von Mitgliedern des königlichen Instituts der historischen Wissenschaften zu Göttingen*, Halle: Johann Justinus Gebauer (1769), vol. 12, p. 19.
- 7 Johann Christoph Gatterer: "Von der Evidenz in der Genealogie", in: Johann Christoph Gatterer (ed.), *Allgemeine Historische Bibliothek von Mitgliedern des königlichen Instituts der historischen Wissenschaften zu Göttingen*, Halle: Johann Justinus Gebauer (1769), vol. 12, p. 9. Genealogical statements are the result of the inspection of the available materials. These give information, first, on the ancestry of a person: "Time and place of birth, status group and office, honor (*Würde*), children (for persons of the male gender always, but for female persons only when one intends to show the maternal descent of a person). [...] If this is observed, insofar as it is possible, for all persons who one wishes to derive genealogically, then one compiles one or more genealogical tables (*Stammtafeln*) in the conventional way with the guidance of the genealogical statements that have been drawn from the sources."
- 8 Johann Christoph Gatterer: "Von der Evidenz in der Genealogie", in: Johann Christoph Gatterer (ed.), *Allgemeine Historische Bibliothek von Mitgliedern des königlichen Instituts der historischen Wissenschaften zu Göttingen*, Halle: Johann Justinus Gebauer (1769), vol. 12, p. 10.
- 9 On the problem of evidence in genealogical writings, see Michaela Hohkamp: "Kinship Matters: Genealogical and Historiographical Practices between 1750 and 1850", in: Erdmute Alber, David Warren Sabean, Simon Teuscher, Tatjana Thelen (eds.): *The Politics of Making Kinship: Historical and Anthropological Perspectives*, New York: Berghahn (2023), pp. 53-78.
- 10 Paul von Stetten: *Geschichte der adelichen Geschlechter in der freyen Reichs-Stadt Augsburg: sowohl in Ansehung ihres besondern Standes als auch in Ansehung einer jeden einzeln Familie beschrieben und aus bewährten Geschicht-Schreibern und Urkunden gezogen durch Paul von Stetten. Mit 228. in Kupfer gestochenen Wappen und Siglen versehen* [History of the Noble Families in the Free Imperial City of Augsburg, described both in terms of their particular status and in terms of each individual family and drawn from proven historians and documents by Paul von Stetten, younger. With 228 coats of arms and sigils engraved in copper], Augsburg: Haid (1762), Vorrede p. 2v.
- 11 "*Systema*" was a common term in the 18th century, at least since the publication of Carl von Linné, *Systema naturae, sive Regna tria naturae systematice proposita per classes, ordines, genera, & species*, Leiden: Haak (1735).
- 12 Paul von Stetten: *Geschichte der adelichen Geschlechter in der freyen Reichs-Stadt Augsburg: sowohl in Ansehung ihres besondern Standes als auch in Ansehung einer jeden einzeln Familie beschrieben und aus bewährten Geschicht-Schreibern und Urkunden gezogen durch Paul von Stetten. Mit 228. in Kupfer gestochenen Wappen und Siglen versehen* [History of the Noble Families in the Free Imperial City of Augsburg, described both in terms of their particular status and in terms of each individual family and drawn from proven historians and documents by Paul von Stetten, younger. With 228 coats of arms and sigils engraved in copper], Augsburg: Haid (1762), Vorrede p. 6r.

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GENEALOGY OF ILLEGITIMACY

Peopling a Book

Josef Katzensteiner was a lumberjack in nineteenth-century Gschöder, a hamlet in the parish of Weichselboden in Styria. He can be found on a genealogical tableau in a book entitled *Die Bevölkerung der Pfarre Weichselboden in Steiermark genealogisch dargestellt* (1920).¹ Its author Konrad Brandner, a priest and teacher at the *Gymnasium* for boys in Graz, did a complete survey of the parish's church registers during his summer holidays there in 1919. Like some contemporaries, he had the idea to expand "genealogical research" that in his view for a long time had been confined to ruling or noble families by including "all the people of a municipality or a region or a whole country."² Therefore, he assembled the clergy to generate a "Styrian *Volksgenealogie*" for which he estimated "several decades" of work.

Höhn—Katzensteiner. Tafel VI

5. Hölz.

Lorenz, Holzarbeiter in Dürndorfer
Philipp, Holzarbeiter in Weichselboden,
verm. (1822) mit Walburga Brandl (II, 12)

6. Hölz.

Adalbert, Bauer in Neudorf in Böhmen,
verm. mit Mathilola Brandl

Johann, Thiergärtner
in Weichselboden,
geb. 24. Dez. 1892

Anna,
geb. 5. Juni 1885,
verm. (1904) mit
Anton Wacher

Simon,
geb. 27. Okt.
1872

Anton,
geb. 16. Januar 1884, verm.
in 2. Ehe (1912) mit
Adelheid Buchner

Franz,
geb. 1. Apr.
1869

Michael,
geb. 29. Sept.
1878

Juliana,
geb. 4. Mai 1881, verm. (1919)
in Marburg mit Augustin
Bretter

Karl,
geb. 19. Okt.
1883

Johann,
geb. 1. Febr.
1887

Maria,
geb. 25. März
1889

Heinrich, Holzarbeiter in Hohen,
geb. 7. Juli 1854,
verm. mit Viktoria Vorkberger (XVII, 1)

Josef,
geb. 11. März
1875

Agnes,
geb. 15. Jan.
1877

Anton, Holzarbeiter in Weichsel-
boden, geb. 7. Juni 1880,
verm. mit Juliana Pözl
(XI, 6)

Klement,
geb. 12. Febr. 1882,
verm. (1909) in Neuberg
mit Franz Reisch

Leokadia,
geb. 26. Nov.
1884

Franz,
geb. 18. Nov.
1885

Luca,
geb. 31. Okt.
1885

Sebastian,
geb. 18. Juni
1890

Franz,
geb. 1. April
1901

Hermengild
geb. 18. März
1888

Gabriele,
geb. 15. Nov. 1909

Johanna,
geb. 7. Febr. 1911

Heinrich,
geb. 8. Juni 1912

12. Hölzler.

Matthias, vulgo Hausbauer in Gschöder,
verm. mit Theresia Nachbauer

Josef,
geb. 10. Febr.
1775

Emerenziana,
geb. 2. Nov.
1770

Matthias, vulgo Hausbauer in Gschöder,
verm. (1815) mit
Eusebia Reiter

Georg,
geb. 11. Apr.
1781

Oswald,
geb. 1. Aug.
1780

Walburga,
geb. 17. Febr.
1786

Johann,
geb. 13. Aug.
1788

Maria,
geb. 1. Sept.
1791

Anton, vulgo Hausbauer in Gschöder,
geb. 10. Jan. 1812, verm. (1845) mit
Konstantia Katzensteiner (VI, 21)

Maria,
geb. 12. Jan.
1815

Konstantin,
geb. 8. Sept. 1801,
verm. (1845) mit
Paul Vorkberger
(XVII, 4)

Anton, Holzarbeiter in Weichselboden,
verm. mit Agnes Pödlner (XI, 9)

Theresia,
geb. 28. Sept.
1865

Franz,
geb. 27. März
1869

Adam,
geb. 21. Dez.
1869

17. Hölzler.

Agnes, Holzarbeiter in Dürndorfer,
verm. mit Juliana Högner

Karl, Holzarbeiter in Dürndorfer,
geb. 23. Jan. 1881, verm. (1919) mit
Emma Plach (IV, 9)

Heinrich, Holzarbeiter in Dürndorfer,
geb. 12. Juni 1886, verm. (1913) mit
Elisabeth Föcker (VII, 14)

Florentin,
geb. 8. Sept. 1881,
verm. (1914) in
Malsburg mit
Matthias Kutsch

18. Hölzler.

Johann, vulgo Franchner in Gschöder,
verm. mit Theresia Föcker

Blasius, vulgo Franchner in Gschöder,
geb. 23. Jan. 1811, verm. (1851) mit
Maria Klögl

Michael,
geb. 13. Sept.
1813

Andreas,
geb. 25. Nov.
1815

Dorothea,
geb. 2. Febr.
1816

Eva,
geb. 13. Dez.
1809

Theresia,
geb. 8. Juli
1812

Juliana,
geb. 8. Juli
1812

Johann,
geb. 12. Mai
1874

Helena,
geb. 15. Aug. 1855, verm.
in 1. Ehe mit Vital Todt,
in 2. Ehe (1885) mit
Johann Föcker (X, 6)

Eugen,
geb. 1. Sept.
1899

Johann,
geb. 12. Mai
1874

19. Kanner.

Johann, Wirt in Gschöder,
verm. mit Elisabeth Fögl

Rudolf,
geb. 28. März
1872

Josef, Franz,
geb. 25. März
1874

Hubert,
geb. 25. Febr.
1875

21. Katzensteiner.

Matthias, Köhler in Groß-Rolling,
verm. mit Rosalia Rieger

Konstantia,
geb. 15. Okt. 1819
in Groß-Rolling,
verm. (1849) mit
Anton Elbauer
(VI, 12)

Josef, Holzarbeiter in Gschöder,
verm. mit Aloisia Kanner (VIII, 13)

Josef,
geb. 23. Febr. 1875,
verm. mit Jakob
Bracker (II, 16)

Hermann,
geb. 17. Januar 1877

20. Kasperger.

Leopold, in Dürndorfer,
verm. mit Maria Wolter

Josef, Holzarbeiter in Weichselboden,
geb. 3. Febr. 1791, verm. (1812) mit
Konstantia Föcker (V, 12)

Paul,
geb. 10. Jan.
1814

Johanna,
geb. 24. Mai 1818, verm.
mit Josef Neid (IX, 3)

To cover the expensive printing of large tableaux, Brandner got funding from the diocese to publish his first book, including seventeen genealogical tableaux (*Tafeln*), each printed on a horizontal format sheet that has to be unfolded several times from the vertical octavo format book. The tableaux are counted with Roman numbers, while the families within each tableau have Latin numbers. The oldest evidence of a surname in the registers defines the male ancestor of a "family," and the younger generations that Brandner assigned this man like a patrilineage followed top-down. Thus, the "families" that meet on one of the seventeen fold-out tableaux do so because of the alphabet, not because of reproductive or contractual relatedness between them (if pertinent, such relations are cross-referenced with the Roman-Latin tableau code that is added to an individual's surname).

14

WEICHSELBODEN-Reg.1

Verzeichnis der Stammbäume.

	Tafel		Tafel		Tafel
Ablasser	I, 1	Hartel	V, 19, 20	Neudofska	IX, 5
Ahrer	— 2	Haselwander	— 18		
Aigner	— 3	Hatler	— 21	Oberfeuchtinger	— 6
Asch	— 4	Häußler	— 22	Ofner	— 7
Auer	— 5—10	Heinrich	— 23	Ortner	— 8—10
		Heißl	— 24		
Bauer	II, 1, 2	Heß	— 25	Pachler	— 11
Baumann	— 3	Hochauer	— 26	Parzer	— 12
Berger	— 4—7	Hochfellner	— 27, 28	Pesl	— 13
Bizjak	— 8	Hofer	— 29, 30	Petritz	— 14
Brandl	— 9—15	Hoggauer	— 31, 32	Pichler	— 15—17
Bruckner	— 16	Höhn	VI, 1—5	Pichlmayr	X, 1
Brunader	— 17	Holik	— 6	Pietsch	— 2
Brunegger	— 18	Hollerer	— 7	Pilz	— 3
Brunnstainer	— 19	Holzer	— 8, 9	Pircham	— 4
Butter	— 20	Hönigl	— 10	Pirkner	— 5, 6
		Hoppaus	— 11	Plachel	— 7, 8
Castelrotto	— 21			Pladerer	XI, 1
Chundolf	— 22	Illmaier	— 12-18	Plasizer	— 2
				Plenker	— 3
Danner	— 23	Karner	— 19	Plintenhofer	— 4
Dolin	— 24	Kassegger	— 20	Ploderer	— 5
Duspiva	— 25	Katzensteiner	— 21	Pölzl	— 6
		Kern	VII, 1, 2	Porteder	— 7, 8
Flora	III, 1	Klaringer	— 3	Prader	XII, 1

Konrad Brandner: *Die Bevölkerung der Pfarre Weichselboden in Steiermark genealogisch dargestellt*, Sonderabdruck aus dem *Jahresbericht des Fürstbischöflichen Gymnasiums am Seckauer Diözesan-Knabenseminar Carolinum-Augustineum in Graz*, Graz: Self-published by the author (1920), p. 14.

Detail from the index of ancestral trees with Roman and Latin numbers referring to the tableaux and the families appearing in them.

GENEALOGY OF ILLEGITIMACY Hiding Mothers

Konrad Brandner was cutting-edge in his choice of Weichselboden for didactical reasons. In order to create a generic type of full parish survey, he sought a small one with church registers as recent as possible. Since this parish had been established in 1775 as part of Mariazell, it met Brandner's criterion of a manageable corpus of sources and cases. He saw this as a

start to prove that in Styria "nearly the whole resident population by their ancestral trees [*Stammbäume*] can be tracked down at least 200–300 years, if not most of them even 400 years." But why, after all this effort to obtain completeness, does Josef Katzensteiner's life appear in this tree diagram without birth and death? Where are his parents? Brandner was a meticulous genealogist, and he was explicit about why and how he created and bridged the gaps concerning illegitimacy.

"Regarding the development of the ancestral trees, a particular factor needs to be emphasized. The church registers are books of official character; that is, they are not public books in the sense that their contents [...] could be opened to the public through a publication. They contain certain records that must remain secret in the interest of the honor and good reputation of individuals and families. A publication of such facts would be a coarse tactlessness and could in some circumstances have unholy consequences for those involved. Thus, carefulness is to be applied without impairing the truthfulness of representation. [...] In the case of extramarital descent [...] the matter can mostly be designed in such a way that this state of affairs is not made visible. Should, however, the citation of such cases be in the interest of a complete ancestry table be desired, it can be aided by entering children of extramarital birth as descendant directly from the grandfather or great-grandfather with the remark 'grandson' or 'great-grandson'."

Konrad Brandner: *Die Bevölkerung der Pfarre Weichselboden in Steiermark genealogisch dargestellt, Sonderabdruck aus dem Jahresbericht des Fürstbischöflichen Gymnasiums am Seckauer Diözesan-Knabenseminar Carolinum-Augustinum in Graz, Graz: Self-published by the author (1920), p. 8.*

werden mit der Bemerkung 'Enkel' oder 'Urenkel'."

"Bezüglich der Ausarbeitung der Stammbäume muß noch auf einen besonderen Umstand aufmerksam gemacht werden. Die Matrikenbücher sind Bücher mit ämtlichem [sic] Charakter; sie sind also nicht öffentliche Bücher in dem Sinne, daß ihr Inhalt [...] durch eine Publikation der Öffentlichkeit übergeben werden könnte. Sie enthalten manche Aufzeichnungen, die im Interesse der Ehre und des guten Rufes einzelner Personen und Familien geheim bleiben müssen. Eine Veröffentlichung solcher Tatsachen wäre eine grobe Taktlosigkeit und könnte unter Umständen von heillosen Folgen für die Beteiligten sein. Es muß daher Vorsicht angewendet werden, ohne daß dabei die Wahrhaftigkeit der Darstellung leiden darf. [...] bei nichtehelicher Abstammung [...] läßt sich [...] die Sache meist so gestalten, daß dieser Tatbestand nicht ersichtlich wird. [...] Ist [...] die Anführung solcher Fälle im Interesse einer lückenlosen Stammtafel doch erwünscht, so kann dadurch geholfen werden, daß Kinder nichtehelicher Geburt als direkt vom Großvater, beziehungsweise Urgroßvater, abstammend eingetragen

Hermann,
geb. 17. Jänner 1877

III/28

GENEALOGY OF ILLEGITIMACY

Investigating Heredity

While its catholic inventors hoped to enforce the rural population's sense of regional belonging after WWI, Styrian *Volks-genealogie* got its moment in the history of genealogical practices not according to their intentions but by the emergence of Mendelian genetics since 1900 and the following efforts to find manageable samples to prove and to practice it in humans and to combine it with the concepts of race and eugenics. In 1925, a young student of physical anthropology, Eberhard Geyer, who had learned how to combine genealogical and anthropometric methods during his stay with Herman Lundborg at the University of Uppsala in the summer semester 1920, came from the University of Vienna to measure the antihelix (*Anthelix auriculae*) of 401 individuals in the hamlet Gußwerk of the Weichselboden parish during a four-week stay. This sample encompassed all inhabitants older than one year. Geyer chose this locality with reference to Brandner's Weichselboden book that "spared me genealogical investigations," furthermore he pointed to the social homogeneity of the population ("lumberjacks") who lived in "enclosed remote valleys" under "same environmental conditions."³ Anthropologist Otto Reche in his review praised Geyer's thesis as "a very good work," based on "well-chosen data [...], namely an inbred-population."⁴ Thus he transformed the Weichselboden ancestral trees from a visualized accolade of ethnic rootedness (*Bodenständigkeit*) to a stain that substantiates the investigation of heredity.

"My work method (because has grown out of practice) is rather the same as yours. Regarding illegit. children, I put all of them on my lists and would be happy if I could capture all illeg. children because illeg. children in particular offer very valuable material for statistics, heredity, etc."

Pastor Josef Demleitner to Konrad Brandner, 22 December 1922, Diözesanarchiv Graz-Seckau, Nachlass Konrad Brandner.

"Meine Arbeitsmethode ist (weil aus der Praxis herausgewachsen) so ziemlich die gleiche wie die Ihrige. Was illegit. Kinder betrifft, so nehme ich alle in meine Listen auf u. wäre froh wenn ich alle illeg. Kinder erfassen könnte, weil gerade illeg. Kinder für Statistik, Vererbung etc. sehr wertvolles Material liefern."

Though also a catholic priest, the proponent of the Bavarian group of *Volks-genealogie*, Josef Demleitner, saw illegitimacy not as *komproamat* but as a resource.

"The total of ancestral trees represents, as mentioned, a vertical cross section of the development of Weichselboden. [...] A major deficit [...] is the inattention to death dates. For this reason these ancestral trees are unusable for biological and population-statistical inquiries. With attention to these dates, they would be an inestimably rich source for these disciplines in particular."

Viktor Lebzelter: "Steirische Volks-genealogie", in: *Wiener Zeitschrift für Volkskunde* 28 (1923), p. 90-92, p. 91.

"Die Summe der Stammbäume stellt, wie gesagt, einen Vertikalschnitt der Entwicklung Weichselbodens dar. [...] Ein schwerer Mangel [...] ist die Nichtberücksichtigung der Sterbedaten. Dadurch werden diese Stammbäume für biologische und bevölkerungsstatistische Untersuchungen unbrauchbar. Bei Berücksichtigung dieser Daten wären sie eine unschätzbare Fundgrube gerade für diese Disziplinen."

Handwritten genealogical chart from a church register, showing family connections and dates. The chart is organized into sections labeled I, II, III, and IV. It includes names, birth dates, and death dates, along with notes on illegitimacy and other family details.

Pfarre St., N.-D.
(Wo keine Ortsangaben ist St. zu verstehen.)

Nicolaus
Färber und Hofamtmann
* 5.12.1737
† (wo ?) 12.11.1793
* 26.4.1768
Maria Magdalena Heibinger
* 14.3.1745
† . . .

I.

II.

III.

IV.

Artur Maria Scheiber: *Einführung in die Familiengeschichtsforschung: Ein kurzer Leitfaden für Anfänger, zusammengestellt über Anregung des Arbeitsbundes für österreichische Familienkunde*, Graz, Vienna, Linz: Self-published by the Landesstelle Linz des Arbeitsbundes für österreichische Familienkunde (1929), p. 11.

The co-founder of the *Arbeitsbund für österreichische Familienkunde* in 1927 had learned how to draw a *Stammtafel* from church registers by reading Brandner's Weichselboden book. However, in his popular "short guidelines for beginners" he designated illegitimacy explicitly (but anonymized the parish's name) to contribute to racial hygiene (*Rassenhygiene*). Scheiber recommended using curly brackets to relate children to their parents on a printable format, and he demanded following one timeline top-down and counting the generations with the Roman numbers on the right to address questions of heredity (*Vererbungslehre*).

Notes

- 1 See my discussion of other aspects of this case in Elisabeth Timm: "Grounding the Family: Locality and its Discontents in Popular Genealogy", in: *Ethnologia Europaea: Journal of European Ethnology* 42/2 (2012), pp. 36–50; Elisabeth Timm: "Reverenz und Referenz: Zwei Weisen der populären Genealogie seit dem 19. Jahrhundert und ein neuer genealogischer Universalismus?", in: Christine Fertig, Margareth Lanzinger (eds.): *Beziehungen Vernetzungen Konflikte: Perspektiven Historischer Verwandtschaftsforschung*, Cologne: Böhlau (2016), pp. 209–231.
- 2 Konrad Brandner: *Die Bevölkerung der Pfarre Weichselboden in Steiermark genealogisch dargestellt, Sonderabdruck aus dem Jahresbericht des Fürstbischöflichen Gymnasiums am Seckauer Diözesan-Knabenseminar Carolinum-Augustinum in Graz*, Graz: Self-published by the author (1920), p. 1.
- 3 Eberhard Geyer: *Gestalt und Vererbung der Gegenleiste (Anthelix) des menschlichen Ohres* (Phil. Diss, University of Vienna 1925), p. 5.
- 4 Eberhard Geyer, Otto Reche: "Beurteilung der Dissertation des cand. phil. Eberhard Geyer", n.d. [before 18 June 1926], Archiv der Universität Wien, Ph RA 9108.

Further Readings

Margit Berner: "From 'Prisoner of War Studies' to Proof of Paternity: Racial Anthropologists and the Measuring of 'Others' in Austria", in: Marius Turda, Paul J. Weindling (eds.): *Blood and Homeland: Eugenics and Racial Nationalism in Central and Southeast Europe, 1900-1940*, Budapest: Central European University Press (2006).

Brigitte Fuchs: *"Rasse", "Volk", Geschlecht: Anthropologische Diskurse in Österreich 1850–1960*, Frankfurt/Main: Campus (2003).

Katja Geisenhainer: "'Rassenkunde' und 'Rassenhygiene' an der Philosophischen Fakultät in Wien 1923–1938", in: Andre Gingrich, Peter Rohrbacher (eds.): *Völkerkunde zur NS-Zeit aus Wien (1938–1945): Institutionen, Biographien und Praktiken in Netzwerken*, vol. 1 (= Veröffentlichungen zur Sozialanthropologie 27/1), Vienna: Österreichische Akademie der Wissenschaften (2021).

Hans-Peter Kröner: "Von der Vaterschaftsbestimmung zum Rassegutachten: Der erbbiologische Ähnlichkeitsvergleich als 'österreichisch-deutsches Projekt' 1926–1945", in: *Berichte zur Wissenschaftsgeschichte* 22 (1999), pp. 257–264.

Maria Teschler-Nicola: "Der diagnostische Blick: Zur Geschichte der erbbiologischen und rassenkundlichen Gutachtertätigkeit in Österreich vor 1938", in: *Zeitgeschichte* 30 (2003), pp. 137–149.

only the distribution of peoples but also correlations between human difference and the natural landscape.¹

The 1886 map by Franz Ritter von Le Monnier drew from the Austrian census of 1880, the first in the empire to gather language data. The map offered a "completely new and reliable" update to the famous 1855 rendition by Ficker's predecessor at the Central Statistical Bureau (*Statistisches Zentralamt*), Karl von Czoernig. It appeared in Josef Chavanne's atlas of the empire's natural and human resources. Notably, Chavanne organized the language map in the "physical" rather than "statistical" part – with maps of climate and natural resources rather than of demography, military manpower, land use, and livestock.

MAPPING ETHNICITY Concepts and Measurements

The classification of ethnicities and nationalities gained practical political relevance in Austria in the second half of the nineteenth century. The 1867 constitution made the issue especially urgent with its guarantee of equal rights to all nationalities.² Yet, as even contemporary experts readily admitted, nobody knew what this meant. Maps like Monnier's, with its clear distinctions through lines, colors, and gradients, therefore offered false concretizations of murky concepts. Disputes over nationality enlisted language statistics as evidence, even though the statisticians themselves stressed that language did not equal nationality.³ In this way, approximate non-knowledge became fact.

"And in fact this principle [of ethnic nationality] requires the resolution of difficult questions: which ethnic groups exist as nationalities within the state (*Volksstämme im Staate*), under what conditions an ethnic community can be called a nationality (*Volksstamm*), when there is a language indicating nationality (*Volksstamm*) and when there is a mere dialect."

Rudolf Herrmann von Herrnhirt: *Nationalität und Recht, dargestellt nach der österreichischen und ausländischen Gesetzgebung*, Vienna: Manz'sche k.u.k. Hof-Verlags und Universitäts-Buchhandlung (1899), p. 48.

"There is no agreement over these concepts: what is to be understood by folk (*Volk*); what race (*Rasse*) is supposed to mean; what a stock (*Stamm*) is to make one think of; what is meant by a people (*Völkerschaft*), a people as family (*Völkerfamilie*), a nation (*Nation*) or a nationality (*Nationalität*) – no one can say with certainty today [...] A reason for this uncertainty and this vacillation is obviously, among other reasons, due to the fact that these concepts stand in the eternal flow of development [...] This eternal change of things, the eternal flowing into each other and eternal negotiation of essences and forms impede the construction of solid concepts."

Ludwig Gumplowicz: *Der Rassenkampf: Soziologische Untersuchungen*, Innsbruck: Verlag der Wagner'schen Univ.-Buchhandlung (1883), p. 186-87.

The Monnier map represented data on *Umgangssprache* (language of exchange) and *Muttersprache* (mother tongue). For decades, the international statistical community had debated the proper indicators of nationality for state censuses. Most experts admitted that nationality was a complex phenomenon that could encompass customs, material culture, descent, perhaps physical characteristics or "race," and so forth. Yet many also agreed that, while not equivalent to nationality, language was its most practically expedient indicator. Even then, however, there was room for debate over which relationship to language in particular should be gathered – *Umgangssprache*, *Muttersprache*, or *Familiensprache* (family/household language). Each understanding had its own implications for representing the linguistic situation of a given population and spatial unit, especially in multilingual states.

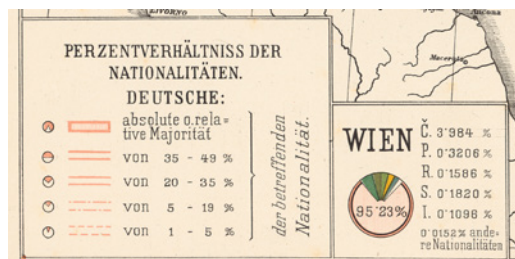
MAPPING ETHNICITY Representing and Obscuring

The historical development of linguistic diversity and the shape of linguistic relatedness were central preoccupations of the time. The legend and color distinctions in Monnier's map reflect these concerns with their classification of linguistic families (German, North Slavic, South Slavic, Magyar, and Romance), with the notable absence, from a certain perspective, of the Jews. In general, the sharp distinctions in the map obscure alternative conceptions of language and ethnicity held by contemporaries.



Detail from Franz Ritter von Le Monnier: "Karte der Vertheilung der Bevölkerung Österreich-Ungarn's nach der Umgangs- beziehungsweise Mutter-Sprache auf Grund der Ergebnisse d. Volkszählung v. 31. Dez. 1880", in: Josef Chavanne: *Physikalisch-statistischer Hand-Atlas von Oesterreich-Ungarn in 25 Bättern mit erläuterndem Text*, Wien: E. Hölzel (1887), n.p.

The legend classified nationalities according to language groups: Germans, North Slavic, South Slavic, Magyar, and Romance.



Detail from Franz Ritter von Le Monnier: "Karte der Vertheilung der Bevölkerung Österreich-Ungarn's nach der Umgangs- beziehungsweise Mutter-Sprache auf Grund der Ergebnisse d. Volkszählung v. 31. Dez. 1880", in: Josef Chavanne: *Physikalisch-statistischer Hand-Atlas von Oesterreich-Ungarn in 25 Bättern mit erläuterndem Text*, Wien: E. Hölzel (1887), n.p.

Monnier and Chavanne highlighted the map's innovation in representing proportionality rather than mere borders and islands. This served a clear German-centric message: each area, first colored according to its dominant linguistic makeup, was patterned to indicate the proportion of Germans. Pie charts also dotted the landscape, each of them representing the local proportion of language groups. The cartographers admitted that simplification necessitated by production compromised the map's accuracy, leaving minorities below 20% invisible. Thus, the map mirrored the common hierarchical picture of highly developed "historical" nations (the Germans among them) versus mere ethnic peoples (*Völkerstämme*). The text underscored German-centrism by stressing their distribution across the empire, assuring the reader that "the Germans are thus not only the numerically strongest but most widely distributed nation among the many peoples of the Austro-Hungarian monarchy. Moreover, through their education and their industriousness they also play an important role where they are only represented in small numbers."

The census that provided data for the map drew on a particular scientific conception of language. Just before the 1880 census, the statistician Ficker teased the imminent appearance of a new map and laid out the principles upon which the language census was based. He stressed unified nomenclature and linguistic classification as preconditions of ethnographic statistics and offered a tree-like tabular classification of European languages.⁴ He drew in particular on the genealogical portrayal by the linguist Friedrich Müller.⁵ Typical of the era, Müller analogized between animal and ethno-linguistic genealogies and held that, like species "types," existing languages and peoples could be traced back to descent from ancestral languages (*Ursprachen*).⁶ Another picture, prominently cited in treatments of nationalities

law, came from the Graz professor Ludwig Gumpłowicz quoted previously. He argued for polygenetic origins of the world's peoples. But he also saw the historical process as one of progressive amalgamation – rather than endless proliferation or static diversity – leading to ever fewer peoples.⁷ A third Austrian picture of ethno-linguistic relatedness came from Hugo Schuchardt and Rudolf Meringer (both of them, incidentally, also in Graz). They challenged genealogy by stressing the arbitrariness of “pure” languages as scientific constructions, multiple origins, constant horizontal mixing, and continuous “gradations” and “waves” of linguistic ethnic attributes across geographical space rather than vertical descent.⁸ Neither scholar captured their contrasting image of linguistic variation and change in an actual map, though in writing they illustrated their vision with geographical language.

“The image of a genealogical tree (*Stammbaum*), by which we seek to imagine the past development of languages that belong together, is so intuitive (*anschaulich*) and seems to be so appropriate that we experience a certain sorrow when we discover [...] that not only, as they say, *omne simile claudicat* [every comparison limps] but that it cannot stand on its feet at all.”

Hugo Schuchardt: *Über die Klassifikation der Romanischen Mundarten: Probevorlesung gehalten zu Leipzig am 30. April 1870*, Graz: [unspecified publisher] (1900), p. 5.

The youthful Schuchardt began his lecture with this attack on the prevailing orientation of linguistics toward a genealogical tree.

“[...] what pertains to the youngest generation, the top of the genealogical tree, pertains as well to the earlier ones because the same conditions were always in play. And two language varieties cannot first have developed and, when they were finished, influenced each other; rather, this mutual influence already began at their divergence. We link the limbs and branches of the genealogical tree through countless horizontal lines, and it stops being a genealogical tree.”

Hugo Schuchardt: *Über die Klassifikation der Romanischen Mundarten: Probevorlesung gehalten zu Leipzig am 30. April 1870*, Graz: [unspecified publisher] (1900), p. 11.

Schuchardt here drew the consequences of horizontal influence, mixture, and transitional forms for the appropriateness of the tree image.

“If we were to sketch a map upon which we specify the contours (*Umfassungslinien*) of all possible phenomena of sound and form by which Latin transformed into Romance, we would perceive some thicker or darker points where more of them cross each other: that is, we would mark out transitions (*Übergänge statuieren*). Yet we would still be far from reaching a classification and at best recognize certain main points of emanation (*Hauptpunkte der Ausstrahlung*) [...] The only means of classifying things that according to their nature are not classifiable but to make them appear to the observer in a certain order is the determination of arbitrary, as it were trigonometric, points on the basis on which others are determined and the whole area measured.”

Hugo Schuchardt: *Über die Klassifikation der Romanischen Mundarten: Probevorlesung gehalten zu Leipzig am 30. April 1870*, Graz: [unspecified publisher] (1900), pp. 29–30.

Schuchardt sketched a picture of language variation and change in terms of transitions and waves. What we take to be the languages in a classification are really scientific constructions. Meringer extended the metaphor in his ethnographic work, imagining ethnic types (in this case house types) as “a great sum of larger and smaller circles that intersect and encircle each other, that are in all thinkable relations with each other [...] like a pond [...] on whose surface many stones and pebbles are cast and from every point where a stone lands or landed waves ripple outward that intersect with the others in the most manifold of ways.” He went on to imply language “purity” was ultimately a political construction.⁹

Absent from the map were Jews, whose status as a language group or nationality grew increasingly vexed. (They appeared instead as “Israelites” in the map of religious confessions.) The issue was highly politicized, but it was also genuinely tricky. First, the choice of which relationship to language to survey (language of exchange, mother tongue, family language)

had particular implications for the Jews. Second, the status of Yiddish as a language, as opposed to a "*Jargon*" or dialect, was still a genuinely academic question.¹⁰ Indeed, for all groups, the status of language as opposed to dialect was a precondition for the rights guaranteed in the Austrian constitution.¹¹

The 1886 map of multilingual Austria both captured and obscured the state of knowledge. To borrow Ficker's word, the map helped the viewer obtain an "overview" far simpler than either the reality or the varied scholarly perspectives on nationality and ethno-linguistic classification circulating at the time. In this way, the map conspired with the political exigencies that made nationality and ethnic types real.

Notes

- 1 On ethnographic mapping in Central Europe, see Eric Hounshell: "Lines, Points, Waves, Streams: Mapping the Ethnographic in Swiss *Hausforschung*, 1880s-1950s", in: *Historische Anthropologie* 31/1 (2023), pp. 140-164. On Austrian cartography, Deborah R. Coen: *Climate in Motion: Science, Empire, and the Problem of Scale*, Chicago: University of Chicago Press (2018).
- 2 Gerald Stourzh: *Die Gleichberechtigung der Nationalitäten in der Verfassung und Verwaltung Österreichs, 1848-1918*, Vienna: Verlag der Österreichischen Akademie der Wissenschaften (1985).
- 3 Emil Brix: *Die Umgangssprachen in Altösterreich zwischen Agitation und Assimilation*, Vienna: Böhlau (1982); Wolfgang Göderle: *Zensus und Ethnizität: Zur Herstellung von Wissen über soziale Wirklichkeiten im Habsburgerreich zwischen 1848 und 1910*, Göttingen: Wallstein (2016).
- 4 Adolf Ficker: "Die 'Ethnographie Internationale'", in: *Statistische Monatsschrift* 4 (1878), p. 549-563, p. 558.
- 5 Ficker cited Müller's 1868 analysis of the data gathered by Austria's Novara world expedition (1857-59) and his *Allgemeine Ethnographie* (1873; 2nd ed. 1878).
- 6 Friedrich Müller: *Allgemeine Ethnographie*, Vienna: Alfred Hölder (1873), p. 5.
- 7 Ludwig Gumpowicz: *Das Recht der Nationalitäten und Sprachen in Oesterreich-Ungarn*, Innsbruck: Verlag der Wagner'schen Univ.-Buchhandlung (1879); Ludwig Gumpowicz: *Der Rassenkampf: Soziologische Untersuchungen*, Innsbruck: Verlag der Wagner'schen Univ.-Buchhandlung (1883).
- 8 Stefani Engelstein: *Sibling Action: The Genealogical Structure of Modernity*, New York: Columbia University Press (2017).
- 9 See Rudolf Meringer: "G. Bancalari und die Methode der Hausforschung", in: *Mitteilungen der Anthropologischen Gesellschaft in Wien* 33 (1903), p. 258; Rudolf Meringer: *Das Deutsche Haus und sein Hausrat*, Leipzig: B.G. Teubner (1906), p. 6.
- 10 On Jewish nationhood, Malachi Hacohen: *Jacob & Esau: Jewish European History between Nation and Empire*, Cambridge: Cambridge University Press (2019); Gerald Stourzh: "Max Diamant and Jewish Diaspora Nationalism in the Bukovina", in: *From Vienna to Chicago and Back: Essays on Intellectual History and Political Thought in Europe and America*, Chicago: University of Chicago Press (2007), pp. 190-203.
- 11 In legal theory, for example: Rudolf Herrmann von Herrnitz: *Nationalität und Recht, dargestellt nach der österreichischen und ausländischen Gesetzgebung*, Vienna: Manz'sche k.u.k. Hof-Verlags und Universitäts-Buchhandlung (1899), p. 48; Edmund Bernatzik: *Über nationale Matriken*, Manz: Vienna (1910), p. 81.

Further Readings

Deborah R. Coen: *Climate in Motion: Science, Empire, and the Problem of Scale*, Chicago: University of Chicago Press (2018).

Wolfgang Göderle: *Zensus und Ethnizität: Zur Herstellung von Wissen über soziale Wirklichkeiten im Habsburgerreich zwischen 1848 und 1910*, Göttingen: Wallstein (2016).

John B. Harley: *The New Nature of Maps: Essays in the History of Cartography*, Baltimore: Johns Hopkins University Press (2002).

Steven Seegel: *Mapping Europe's Borderlands: Russian Cartography in the Age of Empire*, Chicago: University of Chicago Press (2012).

Gerald Stourzh: *From Vienna to Chicago and Back: Essays on Intellectual History and Political Thought in Europe and America*, Chicago: University of Chicago Press (2007).

GENEALOGY AND SOCIAL HISTORY Roots of a Method

Are research practices destined to reproduce the cultural biases of their wielders, or can they also be tools for overcoming biases such as Eurocentrism and historical anachronism?¹ When techniques wander from one scientific field to another, do their presuppositions and biases travel with them? Especially after the critique of genealogical practices in social anthropology, these are questions we can pose to the corpus of social history built in part on those methods.²

Genealogical practices in the field of social history have several roots. One crucial source came from the French Institute for the Study of Demography (INED) and especially Louis Henry (1911-1991), who pioneered what came to be known as "family reconstitution." Henry popularized the "richness" of archived parish registers through a series of essays, some aimed at historians associated with the Annales school, and a handbook, written together with Michel Fleury, *Des registres paroissiaux à l'histoire de la population: Manuel de dépouillement et d'exploitation de l'état civil ancien* (1956).³ While Henry found some genealogical research useful for historical demographic research – notably in his 1956 study of Genevan families – he was interested in them as sources of data for the reconstitution of families and demographic analysis, not as insight into kinship structures or practices.⁴ But the genealogical method – in its classic statement by W.H.R Rivers from 1910, the second source for social historians – aimed at linking data between and among families and households and redacting all kinds of relational information to reconstruct the social fields in which families developed.⁵ Social history developed both of these methods in a fruitful effort to exploit both published and archival materials in innovative ways.

Mari : **BUZENAC** Prénom : **Pierre** Fils { **Antoine** **tisserand**
Perrette **CHAZARENC**
 Femme : **QUÈBRE** Prénom : **Raymonde** Fille { **jean** **brassier**
(+) **jeanne** **SAHUC**

PROFESSION **brassier**
 de la par. de S'Aureil
 (installé à Thézels après
 son mariage)
 du lieu de Sadoit
 (par. de Thézels)

THÉZELS
 (commune et canton
 de CASTELNAU-DE-
 MONTATIER - LOT.)

85

MARI S'AUREIL 289

YMOYE 1410 1366

21

13-2-1725

12-1-1792

66

43

veuvage 10

2-10-1769

21

50

50

24

23-11-1773

av. 1798

av. 1792

av. 1792

16-11-1747

25-11-1747

18-3-1749

14-5-1753

23-7-1756

20-4-1759

3-10-1760

26-2-1766

18-5-1754

ap. 1798

ap. 1792

9-7-1780

c. 9j

c. 1

c. p.d.

m. 34

c. 14

24

av. 1798

av. 1792

Pierre
Catherine = VERDIE (430)
Marguerite
Pierre = RATIER
X (2)
Raymond = LAVIALE
jeanne (X.39)

BUZENAC et de Raymonde
QUÈBRE mariés, baptisés
par la sage-femme et mort
tout de suite après sa
naissance

OBSERVATIONS

Fiche de famille remplie. Format 21 x 27

COMMENTAIRE : Cette fiche, en partie imaginaire, rassemble divers cas. Y figurent, les inscriptions faites lors de l'établissement de la fiche et les résultats des calculs préliminaires à l'exploitation (Ch. IV). Les renseignements provisoires et les résultats approximatifs sont au crayon (traits pointillés).

La mention YY dans les colonnes de gauche indique que la femme est hors observation dans tout le groupe d'âges considéré (mariage postérieur, fin d'union antérieure).

Trois enfants se sont mariés : Catherine dans la paroisse — une fiche, n° 430, a été établie pour la famille du premier type formée par ce mariage — Pierre et Raymond hors de la paroisse.

L'existence du mariage de Pierre n'est connue que par le décès de sa femme; il n'y a pas eu, de ce mariage, d'enfant baptisé dans la paroisse; on n'a pas établi de fiche de famille.

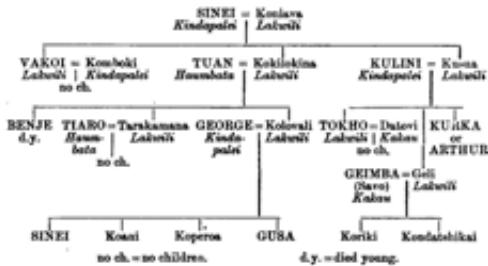
Raymond a eu un enfant baptisé dans la paroisse en 1792; on a établi pour la famille du second type formée par le mariage de Raymond une fiche, n° X 39. La femme, décédée en 1797, était déjà veuve. Raymond est donc mort entre 1792 et 1797. On a inscrit, au crayon, son âge au milieu de la période, considéré comme âge approximatif au décès.

"Completed family form", in: Michael Fleury, Louis Henry: *Des registres paroissiaux à l'histoire de la population: Manuel de dépouillement et d'exploitation de l'état civil ancien*, Paris: Institut national d'études démographiques (1956), pp. 68-69.

"This form, which is partly imaginary, brings together various cases." Fleury and Henry provided examples of forms to use for noting down the data extracted from parish records in a standardized way suitable to compilation: baptism, marriage, burial, and here the offspring of marital pairs. Social facts such as occupation were included only to identify individuals in parish or civil registers.

The genealogical method consolidated by Rivers aimed to standardize the collection of genealogical data in a way that would allow anthropologists to figure out how natives actually constructed relationships and would offer a schema to compare societies with each other. Aside from collecting data on relatedness, Rivers called for the collection of all social facts about individuals — occupation, place of origin, territorial attachment, clans, and any other "facts" of social significance. In this way, genealogical research would reveal not only the system of relationships and the regulation of marriage in a given society but also other

aspects interesting to social historians such as the inheritance of property, demographic patterns, and, further, the function of relatives in ceremony, magic, and religion and more generally the duties and privileges of kin. Also of relevance eventually to historians: Rivers thought the genealogical method could add time depth, allowing the researcher to get back before "the effects of European influence" and to chronicle change. And finally, Rivers thought the genealogy should always be ready at hand when investigating any social transaction, exchange, drama, or dispute: did the event map out onto the genealogical diagram?



W.H.R. Rivers: "The Genealogical Method of Anthropological Inquiry", in: *The Sociological Review* 3/1 (1910), pp. 1-12, p. 1.

"[S]mall pedigree [...] given as a sample" by Rivers, collected in Guadalcanar in the East Solomon Islands from a single informant, "Kurka or Arthur." Rivers emphasized that "A most important feature of the method is to record as far as possible the social conditions of each person included in the pedigree."

W.H.R. Rivers: "The Genealogical Method of Anthropological Inquiry", in: *The Sociological Review* 3/1 (1910), pp. 1-12, pp. 1-2.

The following list of terms of relationship should be obtained :

Father	...	...	...	...	son
Mother	...	...	...	...	daughter
Elder brother (m.s.)	...	...	...	...	younger brother (m.s.)
Elder brother (w.s.)	...	...	...	...	younger sister (m.s.)
Elder sister (m.s.)	...	...	...	...	younger brother (w.s.)
Elder sister (w.s.)	...	...	...	...	younger sister (w.s.)
Father's brother	...	...	...	...	brother's child (m.s.)
Father's brother's wife	...	...	...	...	husband's brother's child
Father's brother's child	...	...	...	...
Father's sister	...	...	...	...	brother's child (w.s.)
Father's sister's husband	...	...	...	...	wife's brother's child
Father's sister's child	...	...	...	...
Mother's brother	...	...	...	...	sister's child (m.s.)
Mother's brother's wife	...	...	...	...	husband's sister's child
Mother's brother's child	...	...	...	...
Mother's sister	...	...	...	...	sister's child (w.s.)
Mother's sister's husband	...	...	...	...	wife's sister's child
Mother's sister's child	...	...	...	...
Father's father	...	...	...	...	son's child (m.s.)
Father's mother	...	...	...	...	son's child (w.s.)
Mother's father	...	...	...	...	daughter's child (m.s.)
Mother's mother	...	...	...	...	daughter's child (w.s.)
Husband	...	...	...	...	wife
Wife's father	...	...	...	...	daughter's husband (m.s.)

W.H.R. Rivers: "The Genealogical Method of Anthropological Inquiry", in: *The Sociological Review* 3/1 (1910), pp. 1-12, p. 4.

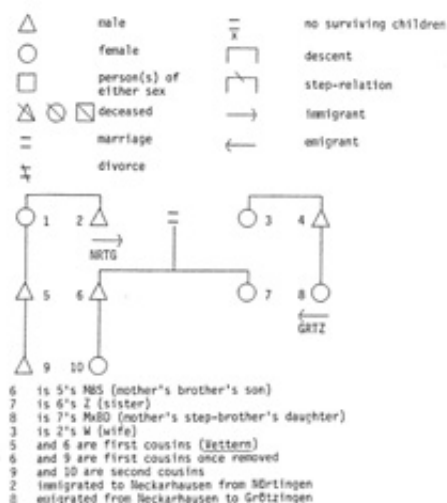
Excerpt from list of terms of relationship to be obtained.

GENEALOGY AND SOCIAL HISTORY

A Method Redeployed

In the early post-WWII decades, social historians explored ways that demography could reshape our understanding of the past. With an archive of sufficient depth for the village of Neckarhausen in Württemberg, Germany, my own approach, in short, was to synthesize the practices of Louis Henry for extracting and organizing data from historical records with the "genealogical method" of W.H.R. Rivers. Here, genealogical diagrams played a crucial role as instruments not only for organizing data but for revealing patterns that were otherwise not visible to either the "naked eye" of the historian or even, perhaps, to the actors themselves.

On reading kinship diagrams



David Warren Sabean: *Kinship in Neckarhausen, 1700-1870*,
Cambridge: Cambridge University Press (1997), p. xvii.

The kinship diagram, ubiquitous in anthropology, required a guide for the target audience of historians for *Kinship in Neckarhausen* in the 1990s. Ironically, the user guide contained an error: there should be a cross on the line connecting 3 and 4 to designate a step-relation, so that in the explanation below the diagram, 8 is 7's mother's step-brother's daughter.

Initially, I reconstructed five ten-year cohorts forty years apart. For each cohort, I began with ten marriages and added all their siblings and all previous and subsequent marriages. Each expanded cohort offered 35-40 couples who had at least one child to study. For each couple, I generated a genealogy back three generations to great grandparents and then downwards through all of their children to the generation following the initial couple (five generations altogether). In order to take in relatives by marriage, I went out to siblings of marital partners of "ego's" siblings, their marital partners, and their siblings and marital partners. Generating a long and wide kinship universe for selected couples meant that the complete set of genealogies included marriages for twenty years or more before and after an initial decade.

Following Rivers's lead, I could then refer to a set of genealogies in hand whenever anyone in my sample showed up in court or property records: cursed someone out, offered testimony, sold a field, mortgaged a house, worked for a wage, lent money, stood as a godparent. My basic question was whether kinship ties – by blood or by marriage – were used in any way. Deployed in this way and to answer this question, a genealogy was an instrument to map how people act. It in no way implied a particular meaning or recognized relation for any connection on the genealogical grid. Indeed, I operated with the "null hypothesis" that any two people on the diagram did not understand themselves to be related or acted in any particular way because they were related. Information gathered in this manner could be used to probe personal histories or complex events or form the basis for statistical correlations or marking repeated patterns of behavior.

Genealogical diagrams provided a tool for exploring kinship behaviors in Neckarhausen,

without the assumption in the first instance that there were any or that they took any particular shape. Take, for example, the question of whether people sought out kin to marry, and if so, what kind. Around 1700, spouses never brought equal property to a marriage: one spouse was usually much wealthier than the other, either the husband or the wife. Around 1800, spouses brought almost exactly the same amounts of property. And, as it turns out, in these two different models of property distribution, there were two quite different kinds of marriage structures.

Between 1700 and 1740, there were no marriages with anyone connected by blood – no first, second, or third cousins; and no marriages in which the couple had the same surname. But there were repeated alliances of two types. One type to be found repeatedly was marriage between two people who were first cousins to each other (only through fathers) with two siblings. The other type involved a circle of three or four households: a marriage took place between two households, A and B, and then between B and C, with a further one between C and A. This systematic alliance system only became visible through genealogical diagrams. My assumption has been that the patterns and forms that I elicited resulted from a myriad of practical decisions and that the actors themselves may not have been able to give an account of the structures.

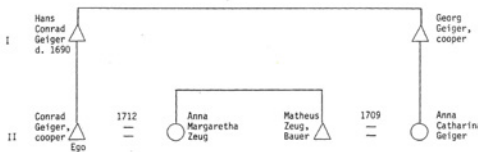


Figure 5.4

David Warren Sabean: *Kinship in Neckarhausen, 1700–1870*, Cambridge: Cambridge University Press (1997), p. 111.

Through diagrammatic representation of the 1700–1709 cohort, two patterns of marital alliance emerged. Figure 5.4, type 1, offers an instance where the Zeug siblings married the Geiger cousins. In the eighteenth century, whenever cousins entered into such an alliance, they were always “agnatic” cousins (patrilateral parallel first cousins). This offered unexpected hints of patrilineal elements in a totally bi-lateral, partible system of property devolution, which posed significantly new questions to be followed up.

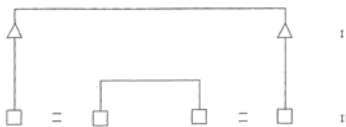


Figure 5.19

David Warren Sabean: *Kinship in Neckarhausen, 1700–1870*, Cambridge: Cambridge University Press (1997), p. 123.

With one exception, all of the examples considered for the cohort 1700–09 conformed to a small set of variations. Figure 5.19 demonstrates both the descent of the cousins from brothers and the possibility of positioning genders in different permutations in generation II. Depending on whether parents in generation I were alive, the marriage which concluded the link could network three or four houses together. This pattern doubled consanguineal ties (brothers in generation I) with affinal ties in generation II.

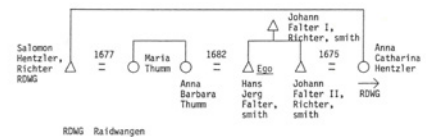


Figure 5.14

David Warren Sabean: *Kinship in Neckarhausen, 1700–1870*, Cambridge: Cambridge University Press (1997), p. 119.

Another diagram from the 1700–1709 cohort, Figure 5.14, describes a second type of marital alliance, one between three houses: Hentzler (in the village Neckarhausen and the hamlet Raidwangen, both in the Neckarhausen parish), Falter, and Thumm. Usually, such networks were ordered hierarchically, with one male relatively rich or powerful – in this instance, father and son (successor) Johann Falter were lifetime members of the village court (*Richter*).



Figure 5.20

David Warren Sabean: *Kinship in Neckarhausen, 1700–1870*, Cambridge: Cambridge University Press (1997), p. 123.

Figure 5.20 illustrates linkages between three households through affinal ties (wife's brother, sister's husband, brother's wife's brother, sister's husband's brother, wife's sister's husband). Here also the gender possibilities are open. The marriage that forges the last link reinforces an earlier exchange between two sibling groups with a third sibling group already allied to the original set. These forms allowed houses or families to ally with each other through marital ties, avoiding forbidden consanguineal marriages. Although the diagrams abstract from time, they initiate research into strategies for constructing networks over several years.

From the period 1800–1840 (expanded from the cohort 1820–29), we find a completely different structure to alliance with the emergence of consanguineal ties and the disappearance of affinal ties of the older type. Now, emerging through the genealogical diagrams, were “brother-sister exchanges,” whereby two siblings married two siblings, rather than linkages through three or more households. And there were a significant number of marriages with the deceased spouse’s consanguineal kin, particularly with the deceased wife’s sister – legally impossible a hundred years earlier. But the big innovation was with first and second and even third cousin marriage. And such alliances bringing two lines together were frequently repeated over several generations, reflecting strategies for exercising influence, consolidating networks, and managing wealth.

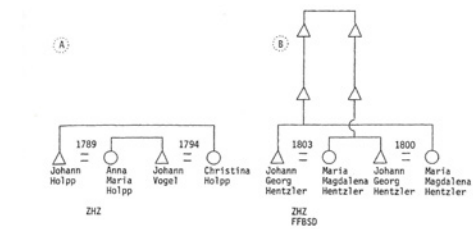


Figure 15.4

David Warren Sabean: *Kinship in Neckarhausen, 1700–1870*, Cambridge: Cambridge University Press (1997), p. 277.

Figure 15.4 offers two instances of brother-sister exchange in the 1820–1829 cohort. In the left-hand example Johann Holpp married Anna Maria, née Vogel in 1789, and that marriage was followed five years later with the marriage of their siblings. In the right-hand example we find two characteristic forms combined: second cousins and brother-sister exchange.

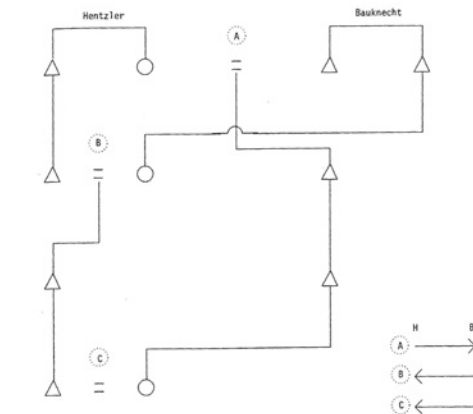


Figure 12.5

David Warren Sabean: *Kinship in Neckarhausen, 1700–1870*, Cambridge: Cambridge University Press (1997), p. 225.

Figure 12.5 follows marriages between two substantial farm families, the Hentzlers and Bauknechts, over four generations. This extracts one set of marriages from a much more complicated diagram of many marriages between the two patriline. The discussion in the book explains the use of



Figure 15.5

David Warren Sabean: *Kinship in Neckarhausen, 1700–1870*, Cambridge: Cambridge University Press (1997), p. 277.

Figure 15.5, also from the 1820–1829 cohort, illustrates the marriage of a man with his deceased wife’s sister, a marriage possibility only legal in Württemberg from 1797. Beginning in the late eighteenth century and proliferating in the nineteenth century, new forms of endogamy among kin together with class endogamy came to mark marriage strategies in Neckarhausen.

“patriline” in this context. In this example, the first union took place in 1724 (A) and was followed by a second in 1758 (B). Daniel Hentzler married the daughter of his paternal aunt’s brother-in-law. This allowed the two lines to ally a second time without violating still considerable resistance against cousin marriage. Two generations later in 1827 (C) Johann David Hentzler married Anna Maria Bauknecht, related to him as a second cousin and twice over as a fourth cousin (both illustrated here).

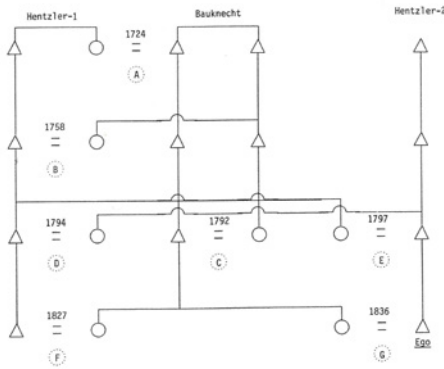


Figure 12.6

David Warren Sabean: *Kinship in Neckarhausen, 1700–1870*, Cambridge: Cambridge University Press (1997), p. 225.

Figure 12.6 offers another extract from the more complex set of exchanges between the two lines over several generations, showing various permutations of affinal and consanguineal unions from 1724 to 1836.

For me, when interpreting these diagrams, it was important not to read any particular marriage union as a single sentence but to take the whole set of marriages from a sibling set or a lineage as a paragraph, so to speak. It is then that one can open up the broader strategies and the characteristic mechanisms for constructing alliances among families over many generations. Marriage unions are only part of the picture, the framework of the system, or to take another metaphor, the hard-wiring. Such genealogies allow the researcher to study property devolution, land sales, political alliances, patronage, many forms of dependence, class dynamics, legal services, and all the other reciprocities that cement social relations. One of the ironies in working with genealogies and with the notion of "kinship" derives from the fact that such analysis was developed for working with "primitive" societies or colonized subjects. The toolkit anthropologists developed to differentiate the West from the Rest turns out to offer supple instruments for reversing the gaze and discovering new things about ourselves. All along we were living kinship.

Notes

- 1 This text is based on a paper given by David Sabean at The Social History Seminar in Siggen, Germany, July 14, 2016 and has been adapted for this publication with the assistance of Eric Hounshell.
- 2 For the critique, see David Schneider: *A Critique of the Study of Kinship*, Ann Arbor: University of Michigan Press (1984); Mary Bouquet: *Reclaiming English Kinship: Portuguese Refractions of British Kinship Theory*, Manchester: Manchester University Press (1993); Mary Bouquet: "Family Trees and Their Affinities: The Visual Imperative of the Genealogical Diagram", in: *The Journal of the Royal Anthropological Institute* 2/1 (1996), pp. 43–66.
- 3 Michael Fleury, Louis Henry: *Des registres paroissiaux à l'histoire de la population: Manuel de dépouillement et d'exploitation de l'état civil ancien*, Paris: Institut national d'études démographiques (1956).
- 4 Louis Henry: *Anciennes Familles Genevoises: Étude démographique: XVIe-XXe siècle*, Paris: Presses universitaires de France (1956) (= Travaux et Documents 26), pp. 13–24.
- 5 W.H.R. Rivers: "The Genealogical Method of Anthropological Inquiry", in: *The Sociological Review* 3/1 (1910), pp. 1–12.

Further Readings

Gérard Delille: *Famille et propriété dans le royaume de Naples (XVe-XIXe siècle)*, Rome: Ecole française de Rome (1985).

Sandro Guzzi-Heeb: *Passions alpines: sexualité et pouvoirs dans les montagnes suisses (1700–1900)*, Rennes: Presses universitaires de Rennes (2014).

Michel Nassiet: *Parenté, noblesse et Etats dynastiques: XVe-XVIe siècles*, Paris: Editions de l'Ecole des hautes études en sciences sociales (2000).

RECURRENCE

INTRODUCTION

Diagrams tend to have a long life. In their geometrical or, more broadly, topological simplicity, current instantiations of diagrams immediately call up forebears from centuries, even millennia ago. There is something ornamental about them that evokes the beginnings of human art. And indeed, not so long ago, a team of researchers in the UK claimed to have deciphered a notational system in 23'000 years old cave paintings. Hunter-gatherers in the ice ages apparently used "non-figurative" dots, lines and y-shaped signs, "in which a second line diverges from a first," to encode information about the reproductive cycles of the animals humans hunted back then. The authors of the corresponding study are hesitant to speak of a writing system representing written language but address the signs as "exosomatic devices" designed to serve as a kind of external memory system which, as they emphasized, "remained stable over a wide geographical area and over a period of tens of thousands of years."¹

Histories of diagrammatic representations therefore tend to be histories in the *longue durée*. Some examples may illustrate this. Theodore W. Pietsch's *Trees of Life: A Visual History of Evolution* (2012) begins with some bracketed sections of text from Conrad Gessner's *Historia animalium* (1555). Manuel Lima's richly illustrated popular works, *The Book of Trees* (2014) and *The Book of Circles* (2017), take us all the way back to Bronze Age Mesopotamia. And even those scholars who, a while ago already, have described epochal changes in the deployment of diagrams – Stephen Jay Gould in his provocative *Time's Arrow, Time's Cycle* (1987) and Giulio Barsanti in his masterful *La scala, la mappa, l'albero* ("The scale, the map, and the tree," 1992) – take account of these changes as a protracted, laborious process, in which "old" and "new" ways of envisioning the natural world coexist and alternate. Diagrams seem to present us with an achronic medium. It is difficult, if not impossible, to associate particular diagrammatic shapes with stable meanings on historical time scales in order to tease out the "new" from the "old." As a consequence, and perhaps more productively than historians tend to think, diagrams constantly invite anachronistic readings.²

This section provides glimpses of some of the patterns of recurrence – "gaps, loops, redeployment, nesting, layering," as Ruth Amstutz and Eric Hounshell put it in their Editorial – that characterizes the history of diagrams. Marianne Sommer offers a wonderful example of layering. ►RECURRENCE / THE HUMAN FAMILY TREE On the face of it, Henry Fairfield Osborne's "Recent Evidence to the Ascent or Phylogeny of Man" presents us with an evolutionary tree, a "family tree" of humans and their closest relatives, extant and extinct, that emphasizes genealogical relationships. But as the title of Osborne's diagram already indicates, and as Sommer brings out through her thorough analysis, a hierarchical arrangement of hominids along an evolutionary scale is superimposed onto the treelike diagram, erasing any direct relations among human races, not to speak of humans and more ape-like creatures.

The same layering and, more specifically, nesting of different diagrammatic elements has characterized tree-like representations of genealogy from their European beginnings in the Middle Ages. Not depicting actual genealogies but rather degrees of kinship, as Christiane Klapisch-Zuber shows, *arbores consanguinitatis* could be drawn out into linear successions but were generally contained by a male "figure of presentation" – "Christ, a crowned sovereign, or a wise man" – that clasps, or embraces, the proliferating diagram.

►RECURRENCE / TREE OF CONSANGUINITY It is tempting to ascribe a similar function of containing an open-ended process, depicted in the branching "tree of mankind," to the stratigraphic grid and overall frame of Osborne's diagram. The tree icon may generally suggest processes of open-ended growth and diversification, and tree diagrams were often designed with that in

mind, as Astrit Schmidt-Burkhardt shows with an example from art history, Nathaniel Pousette-Dart's "Gestaltian Chart of American Art" (1938). ►RECURRENCE/TREES OF ART As her analysis reveals, this chart was designed and revised as a "robust riposte" to contemporary totalitarian conceptions of art. But Klapisch-Zuber's and Sommer's case studies demonstrate the equally prominent urge to impose limits onto the openness of the figure of the tree, especially when it came to depicting human relatedness; in the case of the medieval *arbores* to such a degree that the tree actually grows downwards, resulting in an arrow that, curiously to us, points backwards (or "up") in time.

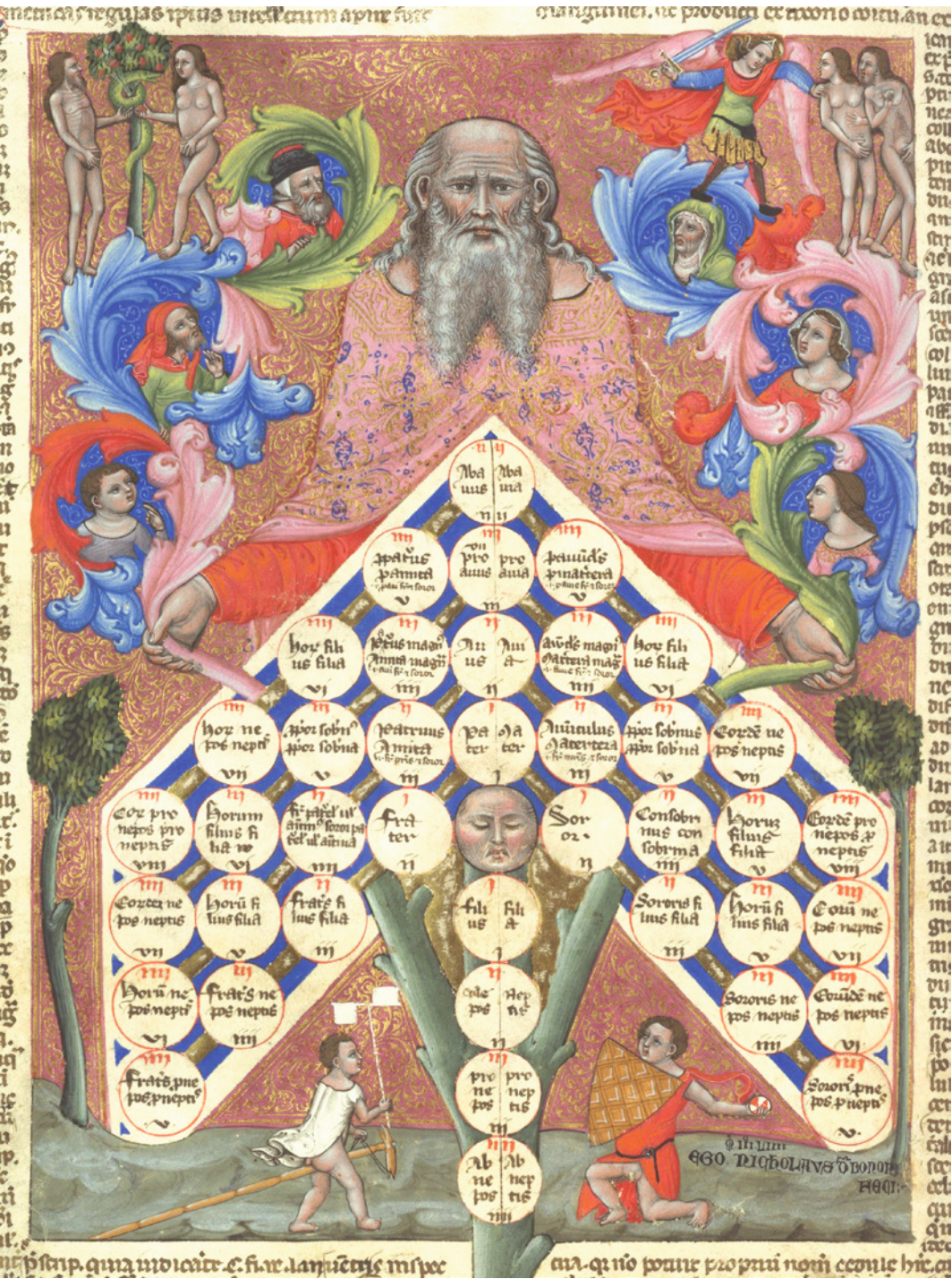
Ruth Amstutz's essay literally takes us with her back in time to meet Jan Czekanowski, a Polish anthropologist active in the first half of the twentieth century with a predilection for squares. ►RECURRENCE/BIOMETRIC MOSAICS His *Quadrantenmethode*, at its time a rather esoteric device to graphically represent similarities from multiple measurements taken from a series of skulls, is strikingly similar to the "clustered heat maps" that abound in present biosciences not only to represent ancestry but also a whole range of other phenomena, such as gene expression and metabolic networks. Amstutz reveals the underlying mechanics of constructing such representations – and how much depends on certain decisions in the process. Again, the diagram turns out to be an instrument to contain or, quite palpably, encase diversity rather than unleashing it. A similar leap, spanning centuries rather than decades, is performed by Niklaas Görsch, who compares diagrams employed by the seventeenth-century polymath Joachim Jungius in his botanical writings with contemporary plant identification apps. ►RECURRENCE/TREE BLOSSOMS An important diagrammatic tool that Jungius employed, the decision tree, is still fundamental to the AI technologies. But it has become black-boxed in the mobile apps we employ: a diagram persisting in hiding.

Historians of science are notoriously wary of anachronism; past representations by scientists should be analyzed and evaluated in light of their particular context alone. Historians of technology, in contrast, have learned to appreciate the "shock of the old" (David Edgerton) to counter their discipline's obsession with innovation. This part addresses diagrams as technologies with long historical careers that take surprising turns – just like the lever, the wheel, or the screw. Looking at such technologies across time can become speculative and abstract – think of Tim Ingold's "comparative anthropology of the line." But it also has great potential of revealing the inner mechanics of diagrams, how they work, both in isolation and in conjunction, and beyond the meaning with which they are invested by particular cultures.

Notes

- 1 "Londoner solves 20'000-year Ice Age drawings mystery", in: *BBC News*, <https://www.bbc.com/news/uk-england-london-64162799> (January 5, 2023); see also Bennett Bacon et al.: "An Upper Palaeolithic Proto-Writing System and Phenological Calendar", in: *Cambridge Archaeological Journal* 33/3 (2023), pp. 371–89, p. 373.
- 2 For a recent attempt to tackle this problem, see Nick Hopwood et al.: "Cycles and Circulation: A Theme in the History of Biology and Medicine", in: *History and Philosophy of the Life Sciences* 43/89 (2021).

TREE OF CONSANGUINITY Avoidance of Incest



Detail from Niccolò da Bologna, "Arbor consanguinitatis", in: Giovanni di Andrea, *Novella in libros Decretalium*, Bologna (1354), Salzburg: Bibliothek der Erzabtei Sankt Peter, ms. a XII, 10, f° 118r.

The image by Niccolò da Bologna brings together a rich visual and symbolic heritage. Niccolò da Bologna was a renowned miniaturist who illuminated, in the second half of

the 14th century, treatises on law and liturgy, devotional books, books for corporatist groups, and classical literary works.

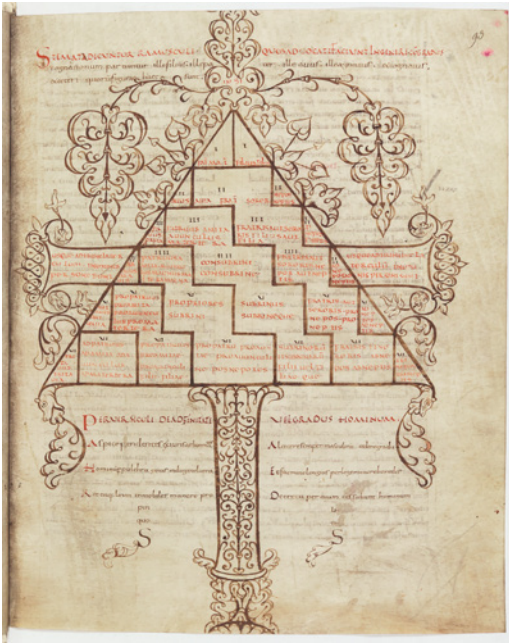
The author of the book where this image appeared, Giovanni di Andrea (ca. 1271-1348), was a famous Bolognese jurist and teacher described by his contemporaries as the "Fountain and Trumpet of Law" (*Fons et tuba juris*). Linked to the power of his city, he issued a number of expert opinions on behalf of the Bolognese commune and acted as mediator in conflicts between it and the university. He is author of the *Commentaries on the Decretals* (the miniature is taken from one of these, published after his death) and, among other works, a *Summa de consanguinitate ou Lectura arboris consanguinitatis*.

At the center of this superb, iconographically layered fourteenth-century miniature by Niccolò da Bologna (ca. 1325-1403) is a consanguinity table, a table of kinship positions, and the terms designating them, to which are added Roman numerals indicating the degree of kinship with "Ego," here represented by a round face. The table allows the cleric who consults it to prevent incestuous situations below the limit of consanguineous kinship, which was then fixed at four degrees.

The role of guarantor of incest prohibition is occupied in the image from Niccolò da Bologna by a bearded patriarch holding the branches of the tree that springs up from the bottom of the painting. The branches end in scrolls and volutes where characters representing the "stages of life" are placed. Thus, at the bottom of the miniature we can see children playing age-appropriate games, while from bottom to top the scrolls successively carry the busts of the representatives of youth, adulthood, and old age, with men on the left (the most prestigious heraldic position) and women on the right. These figures also refer to the moral hierarchy of virgins, husbands, and widowers favored by the Church. Finally, in the upper corners of his miniature, the artist harks back to the origin and justification of the laws regulating marriage: on the left the Temptation and Original Sin, on the right the Expulsion from Paradise.

TREE OF CONSANGUINITY Figures of Presentation

The miniature by Niccolò da Bologna combines numerous visual and symbolic antecedents. In the ninth century, some of the characteristics of a real tree suggested by the word "*arbor*," which had been used to designate such diagrams since antiquity, were soon incorporated into this picture. In the Byzantine tradition, rather than a tree the emphasis was on a "figure of presentation," a man clasping the ends of the table with his arms, in the then-current seventh degree.¹ The figure shown here is in turn endowed with attributes showing him as Christ, a crowned sovereign, or a wise man – all guarantors of the laws instituting matrimonial prohibitions.



"Arbor consanguinitatis", in: Isidore of Seville, *Etymologiae* (9th c.), Paris: Bibliothèque nationale de France, Département des Manuscrits, Latin 10292, f° 93.

This ninth-century edition of Isidore of Seville's *Etymologiae* incorporated characteristics of a real tree which had been suggested by the word "arbor" that had been used to refer to such diagrams since antiquity.



"Arbor iuris", in: Isidore of Seville, *Etymologiae* (11th c.), Paris: Bibliothèque nationale de France, Département des Manuscrits, Latin 2169, f° 195.

Instead of a tree, this eleventh-century Byzantine edition of Isidore of Seville's *Etymologiae*, inspired by Byzantine images, deployed a "figure of presentation" who holds the table. Other Western images of this type display qualities of Christ, a crowned sovereign, or a wise man.

The overabundance of themes that Niccolò da Bologna uses in his miniature is exceptional; his image recapitulates the course of visual representation that grew richer over time, from a simple graphic stemma to a composition with multiple references, primarily framed as trees. One can imagine a priest using it as mnemonic aid for his preaching, thus giving yet another dimension of *ars memoriae* to the centuries-old form of *arbores consanguinitatis*.

Notes

- 1 Evelyn Patlagean: "Une représentation byzantine de la parenté et ses origines occidentales", in: *L'Homme* 6 (1966), pp. 59–91.

Further Readings

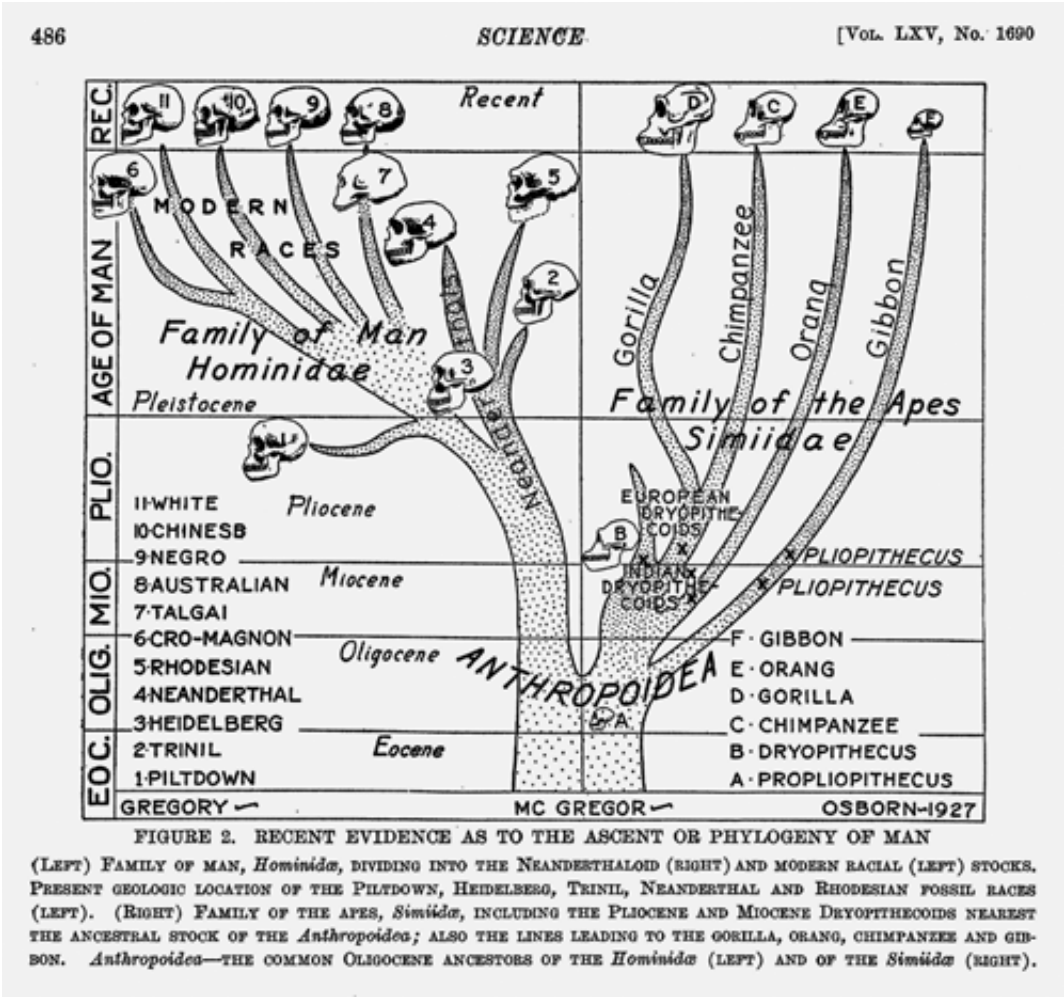
Christiane Klapisch-Zuber: *L'arbre des familles*, Paris: Edition de la Martinière (2003).

Christiane Klapisch-Zuber: "The Genesis of the Family Tree", in: *I Tatti Studies in the Italian Renaissance* 4 (1991), pp. 105–129.

Christiane Klapisch-Zuber: *Stammbäume: eine illustrierte Geschichte der Ahnenkunde*, Munich: Kneesebeck (2004).

THE HUMAN FAMILY TREE Human Phylogeny

How exactly the image of the *family tree* came into anthropology, and from where, is unclear. The common denomination as family tree suggests that there was some borrowing from genealogy, with *genealogy* also being used for "phylogeny." It was most likely the German polymath Ernst Haeckel, who first applied it in evolutionary anthropology to also include "the modern human races."¹ With the discovery of *Pithecanthropus erectus* (in the image "2. Trinil") at the of the nineteenth century, and of other "more developed" (supposedly) fossil hominids that were estimated to be not too removed from each other in time, a unilinear notion of human evolution gave way to a branching model – a process that began with the Neanderthals being re-read as a separate species and relegated to a side branch of the human ascent.²



Henry Fairfield Osborn: "Recent Discoveries Relating to the Origin and Antiquity of Man", in: *Science* 1690/65 (20 May 1927), pp. 481-488, Figure 2, p. 486.

Although diverse diagrammatic images were used to convey human relatedness in anthropology, including net-like configurations, branching structures have dominated the field with the beginning of an evolutionary framework. This phylogeny of the highest primates that includes the "family of man" is quite representative of its time, the early decades

of the 20th century, when paleoanthropology had come of age with the discovery of fossil remains of *Homo erectus* (then called *Pithecanthropus*) at the end of the 19th century, in addition to the existing knowledge about Neanderthals and Cro-Magnons.

From a wealth of images, I have chosen this diagram because it brings together several elements. Henry Fairfield Osborn, president of the American Museum of Natural History in New York and world-renowned paleontologist, liked to symbolize the hominids with the outline of skulls. This is doubly interesting, because on the one hand, it reminded the viewer of the portraits of people in genealogical family trees, and on the other hand, it referred to the central importance of the shape and size of the skull in (paleo)anthropology. The reader would immediately have surmised that the hominid forms on the left side are "more advanced" than the simians on the right, and that there is a hierarchy from left to right, i.e. from the "White" to the "Chinese," the "Negro," and all the way "down" to the "Australian," that was supposedly structured by the degree of brain development. This makes clear that the branching diagrams to convey human relatedness in anthropology could still incorporate the notion of scales – the linear hierarchical series that were used to order the cosmos since Antiquity. Further to the serial, the tree structure with its numbers, letters, and skull-outlines is contained in a rectangle, the sections of which stand for layers of the earth and therefore for geological epochs, from the Eocene to recent times. This iconicity is taken over from the widely used imagery of stratigraphic series in geology. It gives a third meaning to the skulls because they appear to be the fossil remains resting in the geological epochs during which the hominids lived, respectively in the stratigraphic layers in which they were found. Osborn's reference to "recent evidence as to the ascent or phylogeny of man" in the caption underlines this indexical character of the skulls in the image.

The use of the tree to symbolize evolutionary descent in anthropology might seem straight forward, given the long-standing traditions of conveying family genealogies, plant and animal pedigrees, or even religious genealogies in similar ways.³ However, there are several decisive transformations associated with its uptake. To begin with, and very obviously so in my example, the transfer of a structure that connects individuals to one that connects groups of organisms may introduce a typological element. Entire genera, with all their natural variety, are condensed into an individual specimen or type (here symbolized by a skull).

When the existing human diversity is included in a tree that shows the descent of species and higher taxa, there is the additional consequence that human populations appear to be as different from each other as these species or higher taxa. In fact, trees like the one by Osborn were an integral part of racial anthropology. Many scientists conceived of the different "races" as constituting at least different species. Showing them to have long independent lines of descent therefore captured these scientists' interpretations.⁴

Genealogical trees are devices to connect people, to show how the individuals of a family are related through blood (even if they at the same time exclude certain individuals). However, trees in evolutionary anthropology may deny close relatedness, in our image not only between the so-called *races* but also between other taxa and between the "Family of Man" and the "Family of the Apes." Visually divided from each other by a vertical line, humans and apes constitute separate families, barely touching each other in the Oligocene at least 16'000'000 years ago, where they merge in a very distant and diffuse *Anthropoidea* stock (marked by *Propliopithecus*). Osborn, who staged international eugenics congresses and exhibitions at the museum, wanted a noble genealogy for the "White," also referred to as "Caucasian." No fossil form so far found – not even the beautiful and artistic Cro-Magnons – was good enough to be put on their direct evolutionary line, to be their direct ancestor.⁵

Notes

- 1 Marianne Sommer: "The Meaning of Absence: The Primate Tree that Did not Make it into Darwin's *The Descent of Man*", in: *BJHS Themes* 6 (2021), pp. 45–61.
- 2 Marianne Sommer: "Mirror, Mirror on the Wall: Neanderthal as Mirror and 'Distortion' in Early 20th-Century French Science and Press", in: *Social Studies of Science* 2/36 (2006), pp. 207–240.
- 3 Marianne Sommer, Staffan Müller-Wille, Simon Teuscher, Caroline Arni, "In the Shadow of the Family Tree: The Diagrammatics of Relatedness in Genealogy, Biology, and Anthropology as Epistemic, Cultural and Political Practice", in: *History of the Human Sciences* (forthcoming 2024).
- 4 Marianne Sommer: *Bones and Ochre: The Curious Afterlife of the Red Lady of Paviland*, Cambridge, Mass.: Harvard University Press (2007), chapters 10–12; Marianne Sommer: "Population-Genetic Trees, Maps and Narratives of the Great Human Diasporas", in: *History of the Human Sciences* 5/28 (2015), pp. 108–145.
- 5 Marianne Sommer: *History Within: The Science, Culture, and Politics of Bones, Organisms, and Molecules*, Chicago: University of Chicago Press (2016), on Osborn part I; Marianne Sommer: *Evolutionäre Anthropologie zur Einführung*, Hamburg: Junius (2015), chapter 2.2. for an exclusive focus on anthropological family trees; Marianne Sommer: "Die Familie und der Stammbaum des Menschen in der Anthropologie", in: Michael Hecht, Elisabeth Timm (eds.): *Genealogie in der Moderne: Akteure – Praktiken – Perspektiven*, Oldenbourg: De Gruyter (2022), pp. 271–299.

Further Readings

Marianne Sommer: *Bones and Ochre: The Curious Afterlife of the Red Lady of Paviland*, Cambridge, Mass.: Harvard University Press (2007).

Marianne Sommer: *Evolutionäre Anthropologie zur Einführung*, Hamburg: Junius (2015).

Marianne Sommer: *History Within: The Science, Culture, and Politics of Bones, Organisms, and Molecules*, Chicago: University of Chicago Press (2016).

Marianne Sommer: "The Meaning of Absence: The Primate Tree that Did not Make it into Darwin's *The Descent of Man*", in: *BJHS Themes* (2021), pp. 45–61.

Marianne Sommer: "Die Familie und der Stammbaum des Menschen in der Anthropologie", in: Michael Hecht, Elisabeth Timm (eds.): *Genealogie in der Moderne: Akteure – Praktiken – Perspektiven*, Oldenbourg: De Gruyter (2022), pp. 271–299.

BIOMETRIC MOSAICS Speculative Encounter under a Tree

"So I was in the park just now. The roots of the [plane] tree were sunk in the ground just under my bench. I couldn't remember it was a root any more. The words had vanished and with them the significance of things, their methods of use, and the feeble points of reference which men have traced on their surface. I was sitting, stooping forward, head bowed, alone in front of this black, knotty mass, entirely beastly, which frightened me. Then I had this vision. [...]

[M]y head was empty, or there was just one word in my head, the word 'to be.' Or else I was thinking . . . how can I explain it? I was thinking of belonging, I was telling myself that the sea belonged to the class of green objects, or that the green was a part of the quality of the sea. [...]

And then all of a sudden, there it was, clear as day: existence had suddenly unveiled itself. It had lost the harmless look of an abstract category: it was the very paste of things, this root was kneaded into existence. Or rather the root, the park gates, the bench, the sparse grass, all that had vanished: the diversity of things, their individuality, were only an appearance, a veneer. This veneer had melted, leaving soft, monstrous masses, all in disorder – naked, in a frightful, obscene nakedness."

Jean-Paul Sartre: *Nausea*, New York: New Directions (2013 [1938]), pp. 304–306.

De trop! I shouted from my black turtleneck sweater, noticing at that moment a man in bronze sitting on a steamer trunk in the bushes on the other side of the gravel path, looking at me sympathetically.



Monument to Jan Czekanowski in a park in Szczecin, Poland.
 Wikipedia, https://de.wikipedia.org/wiki/Jan_Czekanowski
 (16 June 2023).

His suitcase, the man said, introducing himself as Prof. Dr. Jan Czekanowski, anthropologist and statistician, contained 109 skulls as well as notes on a statistical method¹ – the *Differentialdiagnose* – which, he believed, could be expected to transform my experience of exuberant abundance into a world shaped not by questions of the primacy of existence vs. essence but by patterns of relations of objects to one another.

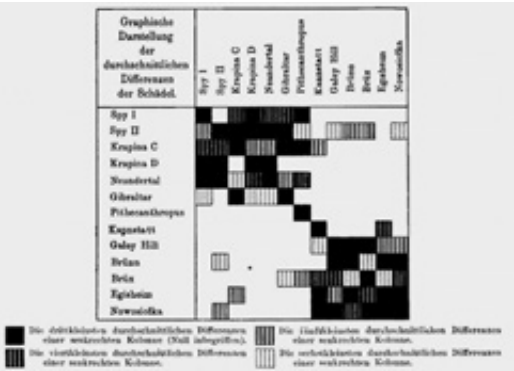
BIOMETRIC MOSAICS Quadrantennetz

By calculating the extent of dissimilarity of two individuals by means of the average difference of 27 features – from the *Innere Orbitale Gesichtsbreite* to the *Bregma Winkel* to the *Kalottenhöhenindex* and other biometric measurements – of pairs of thirteen fossil hominin skulls, Czekanowski explained, he had developed a criterion for determining whether an individual should be assigned to a group or not. He had visualized the results of his *Differentialdiagnose* in a *Quadrantennetz*, as he called it, consisting of tiles of various shades representing the average difference between two skulls in relation to the differences to the respective other skulls.

Tabelle II. Durchschnittliche Differenzen.												
	App I	App II	Krapina C	Krapina D	Neanderthal	Gibraltar	Pithecanthropus	Kanariak	Gulay Hill	Brux	Egghelm	Neuwied
App I	0	5,815	5,802	5,779	5,943	4,543	4,054	10,549	10,559	9,180	9,410	11,089
App II	5,815	0	5,098	5,895	5,945	3,751	10,549	11,717	8,538	9,373	9,987	9,299
Krapina C	5,802	5,098	0	4,684	4,410	3,002	9,307	9,895	8,839	8,591	8,619	8,539
Krapina D	5,779	5,895	4,684	0	4,471	8,141	10,125	15,289	10,799	12,699	12,019	9,141
Neanderthal	5,943	5,945	4,410	4,471	0	8,819	10,119	13,539	10,549	9,393	7,361	9,144
Gibraltar	4,543	3,751	3,002	8,141	8,819	0	13,273	13,791	9,393	9,139	7,169	9,069
Pithecanthropus	10,549	10,549	9,307	10,125	10,119	13,273	0	13,549	14,589	13,439	10,519	11,499
Kanariak	10,559	11,717	9,895	15,289	15,289	15,289	13,549	0	15,479	9,529	4,781	8,799
Gulay Hill	10,559	8,538	8,839	10,549	10,549	9,393	14,589	9,529	0	3,337	5,373	5,169
Brux	9,180	9,373	8,591	12,699	9,393	9,139	13,439	10,479	3,337	0	8,389	3,839
Egghelm	9,410	9,987	8,619	10,799	7,361	7,169	10,519	8,529	8,299	8,389	0	3,737
Neuwied	11,089	9,299	8,539	12,019	9,144	9,069	11,499	8,791	5,169	3,839	3,737	0

Table II. Average differences. Jan Czekanowski: "Zur Differentialdiagnose der Neandertalgruppe", in: *Korrespondenzblatt der Deutschen Gesellschaft für Anthropologie, Ethnologie und Urgeschichte* 40 (1909), pp. 44-47, p. 46.

Compilation of the distance values of 13 skulls. The intersection between two skulls (one in the vertical, the other in the horizontal) yields their average difference.



Graphical representation of average differences of skulls. Jan Czekanowski: "Zur Differentialdiagnose der Neandertalgruppe", in: *Korrespondenzblatt der Deutschen Gesellschaft für Anthropologie, Ethnologie und Urgeschichte* 40 (1909), pp. 44-47, p. 46.

To transform the distance values into a *Quadrantennetz*, the values of the average differences are assigned to each square in a matrix with a side length of as many squares as there are objects to be compared. The squares are then filled with different markings indicating different gradations of distance values. These gradations always refer to the extent of similarity between objects within a vertical column, which in turn gives information about the similarity of a certain object (a) (e.g. the Neanderthal skull) with the other skulls. The similarity of object (a) with another object (b) (e.g. the Bruxer skull) is thus determined in relation to the similarity of object (a) to all other objects with which object (a) is compared. In Czekanowski's diagram, the skulls form two groups: The cluster in the upper left corner is generated by those skulls that Czekanowski assigns to the Neanderthal group. The cluster in the bottom right corner is generated by another, unspecified group. Furthermore, the Pithecanthropus skull proves to be clearly different from the others by its hatchless horizontal column. Note that the gradation of distance values is irregular: It does not start with the smallest differences, but only with the third smallest differences (which, however, also include zero as well as the smallest and second smallest differences) and then proceeds regularly and in smaller steps via the fourth and fifth smallest differences to the sixth smallest difference (each step is represented with differently dense hatchings). The decision of how many and which gradations of difference to represent cannot be derived inductively, i.e. from the data alone. Rather, it is a decision that may highlight or blur existing tendencies of similarity and difference between objects in the data but is based on existing hypotheses about the similarity of objects. Czekanowski assumed that some of the skulls belonged to the Neanderthal group and that the Pithecanthropus skull belonged to a different group than the other skulls – that of Homo Erectus. This may have contributed to his choosing the gradations in a way that the former appeared in the quadrant network as a distinct cluster and the latter as a distinct object.

By the way, did you know, Czekanowski asked, pointing to the tree spreading its branches above *my* skull, that the leaf of the plane tree is easily confused with that of certain maple species because of its hand-shaped, lobed leaves? Without waiting for my answer, he proceeded to explain that, well before some of his students had set out to use his statistical methods to distinguish racial types, he had expected that

"[...] this method will be called upon to play an important role for *Rassedialgnosen*."

Jan Czekanowski: "Zur Differentialdiagnose der Neandertalgruppe", in: *Korrespondenzblatt der Deutschen Gesellschaft für Anthropologie, Ethnologie und Urgeschichte* 40 (1909), p. 44–47, p. 47. Translation by the author.

In particular, he remembered a study by his student Boleslaw Rosinski, who sought to determine the systematic affiliation of Polish smallholders from the western part of Pultusk County via the coefficients of similarity between *Rassekomponenten* – you know, he added: hair color according to Fischer, eye color according to Martin, etc. The *Quadrantennetz*, Czekanowski exulted, had expressed Rosinski's results with extraordinary acuity. A loud bang, followed by a precipitation of gray-brown, scale-like slabs bursting from the trunk of the plane tree, interrupted his explanations.

Tabelle 2. Ähnlichkeitskoeffizienten der Individuen einer anthropologischen Gruppe.

	13	15	14	16	10	12	11	9	4	1	2	3	7	6	5	8
13	+1	+850	+583	+583	+117	-050	-467	-575	-217	-70	-650	-750	-033	+10	-083	+083
15	+850	+1	+642	+733	+233	+183	-133	-358	-233	-717	-733	-933	-317	-267	-283	-167
14	+583	+642	+1	+617	+117	+10	+067	-642	-433	-967	-483	-750	-383	-30	-250	+067
16	+583	+733	+617	+1	+283	+017	0	-308	-050	-650	-517	-708	-30	-383	-908	-350
10	+117	+233	+117	+283	+1	+883	+533	+583	-267	0	-40	-433	-90	-833	-450	-567
12	-050	+183	+10	+017	+883	+1	+717	+575	-10	+075	-267	-217	-883	-833	-30	-317
11	-467	-133	+067	0	+533	+717	+1	+508	+117	+167	+325	0	-667	-950	-550	-867
9	-575	-358	-642	-308	+583	+575	+508	+1	+242	+775	+775	+375	-358	-908	-092	-392
4	-217	-233	-433	-050	-267	-10	+117	+242	+1	+40	+317	+333	+317	+10	-267	-250
1	-70	-717	-967	-650	0	+075	+167	+775	+40	+1	+60	+683	+233	+117	+150	-20
2	-650	-733	-483	-517	-40	-267	+325	+175	+317	+60	+1	+833	+433	+183	0	+067
3	-750	-933	-750	-708	-433	-217	0	+375	+333	+683	+833	+1	+558	+433	+450	+267
7	-033	-317	-383	-30	-90	-883	-667	-358	+317	+233	+433	+558	+1	+917	+433	+450
6	+10	-267	-30	-383	-833	-833	-850	-408	+10	+117	+183	+433	+917	+1	+683	+717
5	-083	-283	-250	-908	-450	-30	-550	-092	-267	+150	0	+450	+433	+683	+1	+833
8	+083	-167	+067	-350	-567	-317	-867	-392	-250	-20	+067	+267	+450	+717	+833	+1

Similarity coefficients of individuals in an anthropological group. Boleslaw Rosinski: "Anthropogenetische Auslese", in: *Anthropologischer Anzeiger* 6/1 (1929), pp. 49–64, p. 51.

Table 2 is laid out such that each individual (1–16) corresponds to both a vertical column and a horizontal row. At the intersection of row and column, the similarity measure of each pairing is indicated. Rosinski arranged the individuals in the table in such a way that the most similar ones are next to each other and, as a result, complexes of strikingly large positive coefficients become visible. To make them even more visually apparent, he enclosed these clusters in frames both in the table and in the *Quadrantennetz* he constructed based on the table.

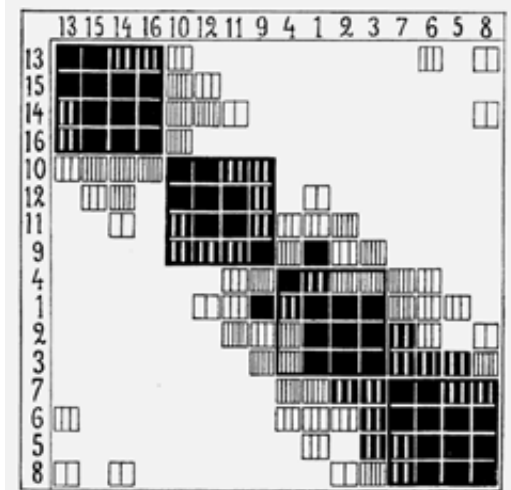


Abb. 1. Graphische Darstellung der Ähnlichkeitskoeffizienten.

Graphical representation of similarity coefficients. Boleslaw Rosinski: "Anthropogenetische Auslese", in: *Anthropologischer Anzeiger* 6/1 (1929), pp. 49–64, p. 51.

On the one hand, the case of Rosinski shows that the columns and rows of the *Quadrantennetz* can be arranged in any order and that it is the choice of this order that makes the clusters recognizable in the first place. On the other hand, it becomes clear how graphical interventions such as the addition of frames can produce the visual effect of relatively distinct groups. This is particularly evident in the lower right corner of the matrix, where the frames create the impression of two clusters, which would not occur with such clarity from the data alone.

A man crawled out of the bushes. The natural spectacle we had just witnessed, he said, was the bark-shedding of the plane tree. Often the splitting of the bark is accompanied by a loud bang, as we had just witnessed. Dr. Wladimir Iwanowicz introduced himself and added that he had inspected the results of the *Rassediagnosen* that Czekanowski's students carried out using the *Quadrantennetz*. His review showed, he argued, that $\frac{3}{4}$ of the individuals belonged to a different racial type than the one assigned. Once again, there was a bang.

"In reality [...],"

Iwanowicz said,

"[Czekanowski's method] raises the similarity of the kind of deviations of the single characteristics of two individuals from a level formed by the complex of arithmetic averages of the single characteristics of the whole group."

Wladimir Iwanowicz: "Die Anwendung der Ähnlichkeitsmethode in der Rassenbestimmung", in: *Anthropologischer Anzeiger* 10/2/3 (1933), p. 225–228, p. 227. Translation by the author.

Meanwhile, the bark continued to crack without pause.

"I believe [...],"

Iwanowicz shouted into the din,

"I do not have to indicate with any greater clarity that the results attained with the aid of Czekanowski's *Ähnlichkeitsmethode* lead directly to absurdity. The essence of the method contains a logical error[!]"

Wladimir Iwanowicz: "Die Anwendung der Ähnlichkeitsmethode in der Rassenbestimmung", in: *Anthropologischer Anzeiger* 10/2/3 (1933), p. 225–228, p. 228. Translation by the author.

Iwanowicz's criticism does not concern the method of the *Differentialdiagnose* by means of the *Quadrantennetz* itself, but the *Ähnlichkeitsmethode* – developed by Czekanowski and used by Rosinski to determine the distance values. The problem Iwanowicz addresses is that the correlation coefficients determined by this method do not represent the absolute magnitude of the deviations of the individual characteristics from their arithmetic mean but only the rank order of these deviations in magnitude. This leads, for example, to individuals who are very similar in their studied characteristics being determined as dissimilar because there are still individuals in the data set that are slightly more similar and these therefore appear closer together in the ranking. The "logical error" in Rosinski's *Rassendiagnose* therefore already occurs in the processing of the data, not in their analysis by means of the *Quadrantennetz*.

BIOMETRIC MOSAICS Clustered Heat Map

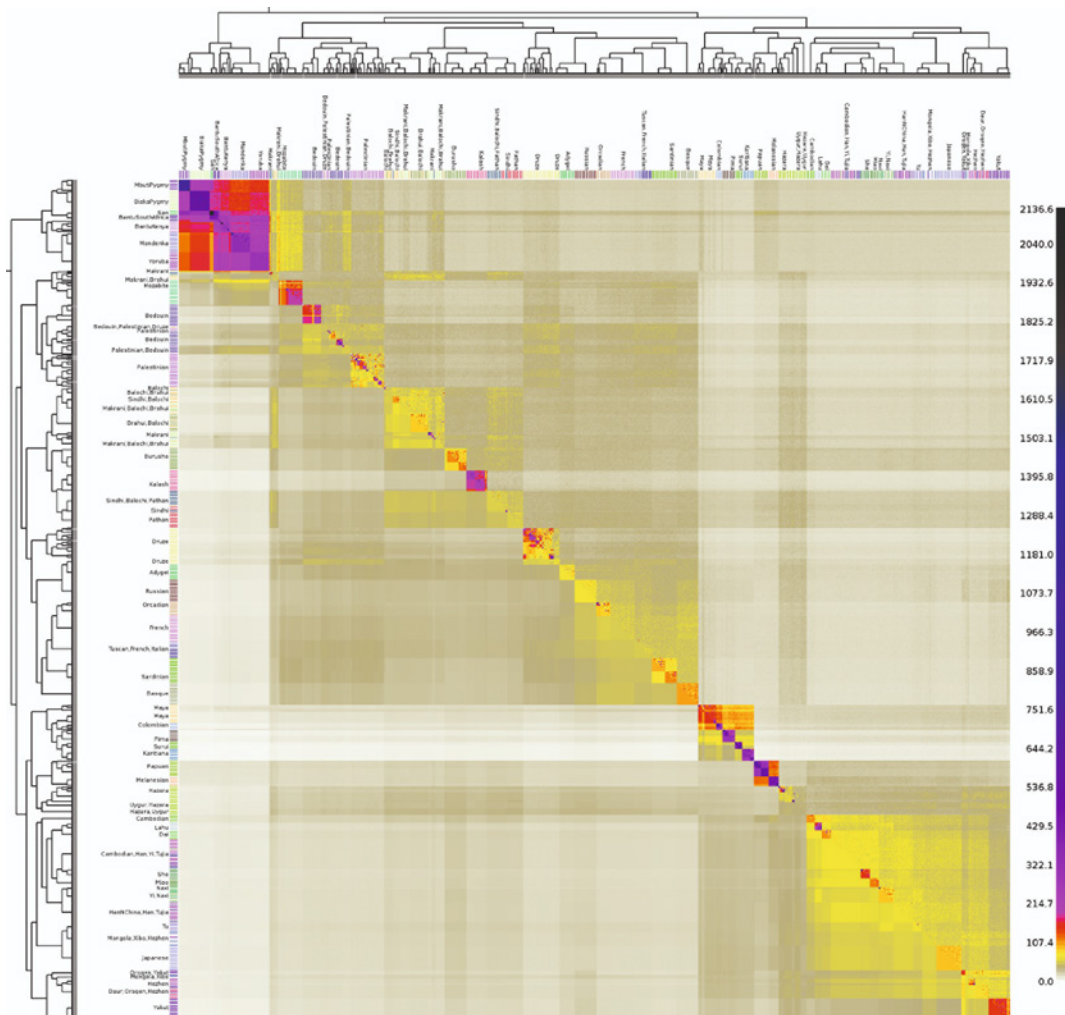
Be that as it may, replied Czekanowski, who in the meantime was standing up to his spats in the bark; in any case, the *Quadrantenetz* bears a striking resemblance to the so-called "clustered heat map," a diagram which, incidentally, is accorded the status of a "postgenomic icon."² He wiped a pile of bark from his epaulettes. The postgenomic era, he explained, as if he had just become aware of the historical situatedness of his counterpart, is difficult to define, but its most characteristic feature is probably the accumulation of huge amounts of genotypic and phenotypic data, which have to be organized, visualized, and interpreted. *De trop!* I blurted once again.

Czekanowski fanned me with his notebook and reassured me that the clustered heat map modeled on the principle of the *Quadratennetz* made it possible to display these enormous amounts of data in a condensed form in a very small space and thus to uncover patterns in the DNA of any organism – from the plant *Arabidopsis thaliana* (a popular model organism in plant biology and genetics) to rainbow trout and suicidal crickets.³ Iwanowicz, meanwhile, crawled back through the bark into the bushes and grumbled:

"Perhaps the *Ähnlichkeitsmethode* is useable for other aims [...]. But for the *Rassediagnose* [it is] absolutely not appropriate."

Wladimir Iwanowicz, "Die Anwendung der Ähnlichkeitsmethode in der Rassenbestimmung", in: *Anthropologischer Anzeiger* 10/2/3 (1933), pp. 225–228, p. 227. Translation by the author.

Well, Czekanowski replied, he knew of a clustered heat map called a "coancestry matrix" in which, based on the analysis of 641'000 markers of 938 individuals, their ancestral relationships could be represented and 226 worldwide populations identified.⁴ With regard to its purposes, he added, this diagram showed unmistakable parallels to the *Rassediagnose* of Rosinski. Obviously, this clustered heat map did not differ significantly from the *Quadrantenetz* – apart from the coloration and, Czekanowski said with a flick of his wrist, from this simplifying tree appendix.



Whole world HGDP coancestry matrix. Daniel John Lawson, Garrett Hellenthal, Simon Myers and Daniel Falush, "Inference of Population Structure Using Dense Haplotype Data", in: *PLoS Genetics* 8/1 (2012), pp. 1-16. Supplementary Material, Figure S14.

The coancestry matrix represents the pattern of worldwide population structure based on an analysis of the Human Genome Diversity Project data set using a population genetic software called "fineSTRUCTURE." In simple terms, the matrix represents the degree of genetic relatedness based on a set of distance values between two individuals. Like the *Quadrantennetz*, the coancestry matrix compresses these multidimensional relationships onto a two-dimensional space. As the developers of the software point out, the intricate structure of the data (reflected in the complex visual structure of the matrix) indicates that many groups must be connected, not by simple hierarchical tree-like relations but also by various admixture events. However, the program also includes a tree-building algorithm that reduces these complex relations precisely to this simple tree-like structure of relatedness (above and left of the matrix).

By the way, Iwanowicz's voice interrupted him from the bushes, did you know that the plane tree sheds its bark due to rapid growth? This, he explained, without waiting for our answer, leads to the fact that the circumference of the trunk and the branches increase to such an extent that the tree's mantle becomes too tight, so to speak, and bursts at the seams, revealing the underlying mosaic-like structure of the tree's cortex. However, he added emphatically, the vitality of the tree itself does not suffer at any time.

Notes

- 1 Czekanowski brought the skulls back from his travels to German East Africa and Equatorial Africa between 1905 and 1909. Today, the skulls – believed to have been looted from the graves of high dignitaries of the Hayo on the island of Busira in Lake Victoria – are in the possession of the Prussian Cultural Heritage Foundation.
- 2 John N. Weinstein: "A Postgenomic Visual Icon", in: *Science* 319 (2008), pp. 1772–1773.
- 3 Julien Bobe, Jérôme Montfort, Thaovi Nguyen and Alexis Fostier: "Identification of New Participants in the Rainbow Trout (*Oncorhynchus Mykiss*) Oocyte Maturation and ovulation processes using cDNA microarrays", in: *Reproductive Biology and Endocrinology* 4/1 (2006), p. 39; Andrew C. Doxey, Mahmoud W. F. Yaish, Barbara A. Moffatt, Marilyn Griffith and Brendan J. McConkey, "Functional Divergence in the Arabidopsis β -1,3-Glucanase Gene Family Inferred by Phylogenetic Reconstruction of Expression States", in: *Molecular Biology and Evolution* 24/4 (2007), pp. 1045–55; D. G. Biron, F. Ponton, L. Marché, N. Galeotti, L. Renault, E. Demey-Thomas, J. Poncet, S. P. Brown, P. Jouin and F. Thomas, "'Suicide' of Crickets Harbours Hairworms: A Proteomics Investigation", in: *Insect Molecular Biology* 15/6 (2006), pp. 731–42.
- 4 Daniel John Lawson, Garrett Hellenthal, Simon Myers and Daniel Falush, "Inference of Population Structure Using Dense Haplotype Data", in: *PLoS Genetics* 8/1 (2012), pp. 1–16.

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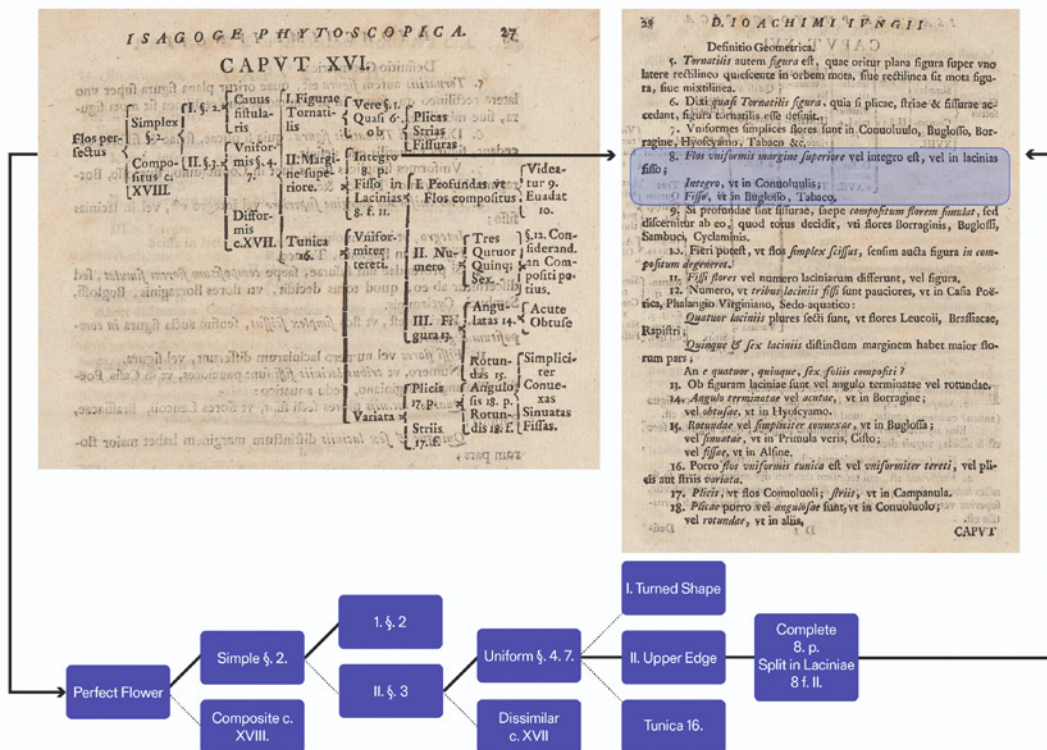
John N. Weinstein: "A Postgenomic Visual Icon", in: *Science* 319 (2008), pp. 1772–1773.

Leland Wilkinson, Michael Friendly: "The History of the Cluster Heat Map", in: *The American Statistician* 63/2 (2009), pp. 179–184.



Nicolás Monardes: *Simplicium medicamentorum*, translated by Carolus Clusius, Antwerpen: Christophorus Plantinus (1579).
Online: <https://www.e-rara.ch/zuz/content/titleinfo/9431271>.

One of the oldest printed images of a tobacco plant. Jungius held a later edition of Monardes's book in his library, so he probably had this image of a tobacco plant in mind or had seen a real specimen. If Jungius indeed knew the plant only from seeing it in a book, we have here an interrelation of books and their information provided via image or text. Writing a text from that which has been seen is a transcription that is only possible with certain terms that are understood by everyone. Defining things with simple terms is one of Jungius's most important approaches. He also aspired to enable his students to draw plants on the basis of these simple terms alone.



How to read Jungius's diagram. Schematic elucidation of Joachim Jungius: *Isagoge Phytoscopica*, republished by Johann Sébastian Albrecht, Coburg: Georg Ottonis (1747). Original edited by Johannes Vegetius, Hamburg: Pfeifferus (1678). Online: <https://www.e-rara.ch/zut/content/titleinfo/5896696>.

Schematic elucidation by NG showing the path that starts on the left with *Flos perfectus* (perfect flower) and ends within the corresponding text passage about *Tabaco* (tobacco) on the right. This method works with an either-or principle between the paths and an "if A and if B then C" principle moving on prescribed paths. When the reader's eyes compare the reference in the diagram to a passage in the text, they must now consult the index to find the plant name in question. In seeking the passage about the plant in the text, the reader uses the text according to the diagrammatic structure. Thus, the text becomes an extended branch of the tree-like diagram and can be seen as part of the diagram. The plants that can be found in the text contain the features of the corresponding path. Furthermore, the reader can walk the path in both directions, though within a section there are sometimes more than one species. In this case, tobacco and *Anchusa* pertain to the category "split in laciniae," but belonging to the same category says nothing about the natural relatedness of both plants. This is consistent with Jungius's aim to provide morphological propositions, although he also made notes about the relatedness of plants in his *Doxoscopiae physicae minores* (1662) and in his unpublished manuscripts.

"In its binary organization, as anyone who knows computer programming sees immediately, the Ramist dichotomized outline is in fact nothing other than a computer flow chart. One can, however, hardly have a successful computer operation until one has a computer. This neither Ramus nor Zwinger had, but there can be little doubt that both would have welcomed one."

Walter J. Ong: *Interfaces of the Word: Studies in the Evolution of Consciousness and Culture*, Ithaca, N. Y.: Cornell University Press (1977), p. 177.

Ong saw early modern dichotomous diagrams like those by Jungius as predecessors to the computer flow chart.

TREE BLOSSOMS Republic of Pictures

In ambiguous cases, an old-fashioned field guide uses the concept of an identification key in order to determine a specific plant. It allows you to compare as many descriptive attributes as needed such as color, whereas the machine behind a present-day app makes the decision that gains the most information, if possible, with zero impurity or pure leaf nodes. If the impurity is higher than zero it becomes more difficult to identify a specific plant part or plant.

Texture classification and feature extraction are quite common techniques for current plant identification apps. These apps include, for instance, *Seek*, *Flora incognita*, or *PlantNet*. The latter is an open-source application working with an image database and image-recognition techniques with a handful of decision trees. These trees and the *PlantNet* community help the user make decisions about the plant species based on the images captured.

Decision trees can serve to classify objects, to tell what kind or category of object it is. That sounds easy, but one basic problem is to decide beforehand which categories shall exist.

To get the best possible classification, one needs to know what is the right feature, what type of question one can ask, and at what point within the tree. The best question is the one that reduces uncertainty the most in order to climb, speaking in botanical terminology, from the roots along the branches to the leaves. In the case of plant identification apps, different decision trees could be implemented to use the concept of the random forest, where many decision trees are combined. A certain decision tree as well as Jungius's diagram both depict parts of a greater whole. *PlantNet's* decision tree supports the search for individual plants within the huge world of plants. Jungius explained plant parts as a subworld of the whole world of knowledge in order to identify plant species as well.

"Compare your sighting with books only after the notes are made. Having the book at hand during the note-taking will only interfere with the process. Many possibly good and valid records have been tarnished because the observer consulted a book before finishing the notes. As a result, the description often is that of the picture in the book, not of the actual live bird seen."

Chuck Bernstein: "Details on Details: Describing a Bird", in: *Western Tanager* 50/6 (1984), p. 2.

The wisdom of crowds: as James Surowiecki writes on the intelligence of groups, an important factor of a crowd's intelligence is that the individual member of a group does not get "corrupted" before making a decision or sharing an opinion.¹

World flora

Species of the World flora

Explore

Families


Genera


Species


Search filter: tobacco


tobacco

Options












Elephantopus mollis Kunth


False tobacco


87  45 observations

Compositae












Elephantopus tomentosus L.


Tobacco-weed


6  4 observations

Compositae











Nicotiana glauca Graham

Tobacco-bush


1,992  1,549 observations

Solanaceae





Nicotiana glutinosa L.


Tobacco


1  1 observation

Solanaceae












Nicotiana paniculata L.


Tobacco


19  5 observations

Solanaceae










Nicotiana tabacum L.

Tobacco

1,391  1,095 observations

Solanaceae

Screenshot by the author of search return for "tobacco," *PlantNet* World flora, <https://identify.plantnet.org/k-world-flora/species?search=tobacco>.

steps for handling the mass of plant data.

The *PlantNet* website makes it easy to search for families, genera, and species of plants. In this case, the English name for *Nicotiana tabacum*, tobacco, was entered to search for an existing database for this plant species. For the identification and classification of plants, an unambiguous nomenclature as well as a clear distinction between families, genera, and species are extremely practical, as one can see on the *PlantNet* website. Both things Jungius did not have in his time. John Ray, Joseph Pitton de Tournefort, and Carl Linnaeus later took the necessary

World flora
Species of the World flora
Identify

Nicotiana tabacum L.
World flora
Observation

Query

Identify / Contribute to PlantNet
The observation can only have up to 4 pictures of the same plant.
At least one photo of leaf, flower, fruit or bark is required for identification to work.
It is recommended to use images of maximum 1200*1200 pixels.

add / drop an image
or add an url

Identify in
World flora

Nicotiana tabacum L.
Solanaceae
Tobacco
0.49%

Compare pictures
It's the right species

Ficus_indica
Nov 30, 2021

Probable name
Nicotiana tabacum L.
Solanaceae Tobacco

Vote for an organ
- 2 - - - -

Vote for the quality
2 0 0

Vote for an organ
- - - 2 - -

Vote for the quality
2 0 0

Vote for an organ
- - - - 2 -

Vote for the quality
2 0 0

Vote for an organ
- - - - - 2

Vote for the quality
2 0 0

Observation contains pictures of several plants? Malformed observation

Screenshot by the author of online form for identification of *Nicotiana tabacum* L. parts in illustration by Nicolás Monardes (1579) by vote, *PlantNet* Identify, <https://identify.plantnet.org/the-plant-list/observations/1012357427>.

Here, the illustration of a tobacco plant, published by Nicolás Monardes more than four centuries ago with a medical intention, becomes its own and searchable data set. On the left side is the input area for images representing specific plant parts. On the right is the vote of the *PlantNet* community. The combination of characters like the flower, leaf, fruit, or bark improves the probability of the identification of the plant. *PlantNet's* community may also help you to find the correct species.

If we assume that Jungius did not primarily try to classify plants themselves, the binary way of decision-making as well as the distinction of features or characters to identify objects are the important similarities between those seventeenth century diagrams and current decision trees in machine learning. The principle of relating features within a path-like structure with if-then linearized rules has become a common tool today, for instance, to estimate the probability of outcomes in a situation with multiple causes and factors. If the machine has learned enough, it even can predict future events. Jungius was not searching for predictions. His primary aim was to find the smallest parts of plants to understand the meaning of nature by arranging the elements together afterwards. But this difference is not surprising since the aims of decision trees vary widely. The method itself is a contribution to science in the sense that you can end up with results that the initiator did not have in mind at the beginning. Although the objectives are different, the functionality of the early modern naturalist's diagram shares similarities with contemporary tools in computer science, as Walter J. Ong already pointed out. On the one hand, there is this observation and analysis tool, on the other the observed objects. In both times, some people knew to bring them together in a similar way: with trees and paths within trees and visualizations of correlations or relatedness. Jungius's botanical work would not have been possible without his network, his students, and worldwide trade. The former Republic of Letters has become a human collaboration

working with effective engines and many pictures of plants as a kind of citizen science. There is another story behind this: Jungius, John Ray, and other naturalists tried to find solutions for storing and comparing information, as predecessors of identification keys. All those approaches are completely done by human brainpower and skills for distinguishing characteristics of plants. In contrast, present engines made by humans calculate similarities, and human beings support them if necessary. The next probable step is an engine that at some point will have learned enough to no longer require humans.

Notes

¹ James Surowiecki: *The Wisdom of Crowds: Why the Many Are Smarter than the Few and how Collective Wisdom Shapes Business, Economies, Societies and Nations*, New York: Doubleday (2004).

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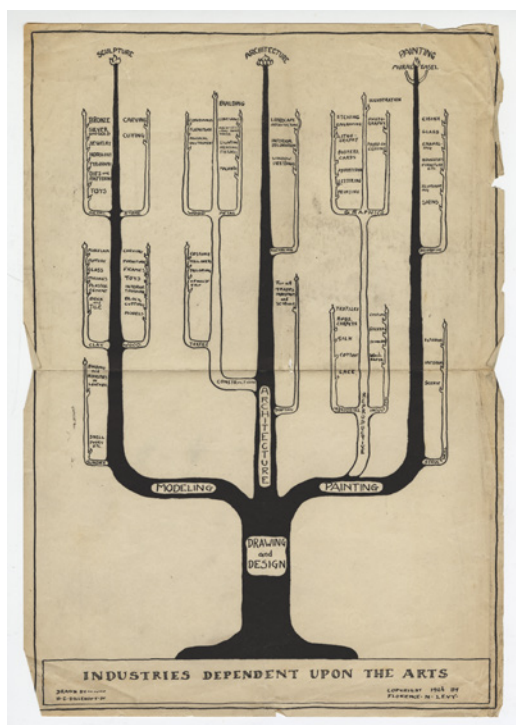
Sara T. Scharf: "Identification Keys, the 'Natural Method,' and the Development of Plant Identification Manuals", in: *Journal of the History of Biology* 42 (2008), pp. 73–117.

Jürgen Schmidhuber: "Gottfried Wilhelm Leibniz: Der erste Informatiker", in: *Frankfurter Allgemeine Zeitung* (19.05.2021).

Plant identification apps (selection):
Flora incognita, <https://floraincognita.com>.
PlantNet, <https://plantnet.org>.
Seek, https://www.inaturalist.org/pages/seek_app.

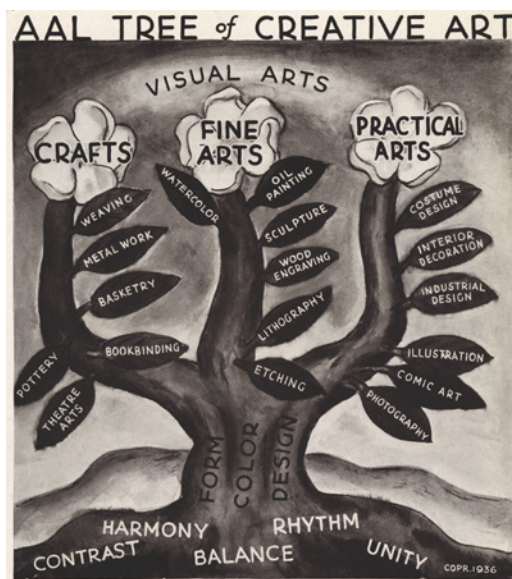
TREES OF ART Relating the Arts

When Nathaniel Pousette-Dart (1886–1965) and his family moved to Valhalla, New York, in 1918, and a short while later he was appointed artistic director of an advertising agency, no one imagined that the landscape painter from Minnesota would make a name for himself in a completely different genre, the genealogy of art.¹ This diagrammatic genre was a product of the scientization of art history and emerged during the seventeenth century as a means of charting the fundamental relationships, derivations, and affinities that exist between the arts. The avant-garde era saw more and more artists making use of the method. In the 1920s and 1930s Pousette-Dart counted among the most ardent champions of commercial graphic design as an art form in its own right, whose efforts to establish a recognized course of training in the discipline were thwarted only by the Great Depression. Fired by his ambitious goal of assuring graphic artists of proper professional standing in the world of business, he wielded both pen and brush. As a writer he adapted the terminology and rhetoric in which art criticism was couched, and as an artist he rendered his arguments visible by availing himself of the model of the family tree.



Florence N. Levy (inv.), H. C. Dillenunt, Jr. (del.): *Industries Dependent upon the Arts* (1924), Suffern, NY: The Richard Pousette-Dart Foundation. Pen and ink on paper, 36.5 x 25.5 cm.

Industries Dependent upon the Arts can be traced back to an idea by arts administrator Florence N. Levy. The figurative chart takes the form of an analytical trident, whose three main branches shoot up vertically as if trained on an espalier. While the branches certainly divide making for diversification at the different taxonomic levels, there is never any intersecting. At the level of "drawing and design," for example, Levy differentiates between "modeling," "architecture," and "painting" on grounds of the very different contribution that each makes to the various branches of industry.



Nathaniel Pousette-Dart: *AAL Tree of Creative Art*, in: *Art Adventure League*, New York (1936), p. 8. The Richard Pousette-Dart Foundation, Suffern, NY.

"Everything in our courses is the logical outgrowth of the fundamental principles of art. True creative joy springs from an understanding of truth and beauty. Art is one of the greatest adventures life has to offer."

Pousette-Dart's own caption. In: *Art Adventure League*, New York (1936), p. 8.

In 1936, seven years after Black Thursday and all the dire consequences that would follow in its wake, Pousette-Dart founded a school called the Art Adventure League (AAL) in New York. To attract talented would-be designers, he published a slim promotional prospectus promising an approach akin to Florence N. Levy's practice of bringing art principles to bear in all walks of life: at home, at work, and at play. The subscription-based training school at 55 Fifth Avenue was initially aimed at amateurs, and Pousette-Dart himself was one of its six teachers.² Among his own contributions to the prospectus was the *AAL Tree of Creative Art*, a work that visibly calibrates the potential benefits of the creative arts for both business and society.

Here, the bald, analytical style of Levy's conception yields to the illusion of a colorful picture in which everything seems to coalesce in perfect harmony. Rooted firmly in the fertile soil of "harmony," "balance," "rhythm," "contrast," and "unity," Pousette-Dart's spreading, leafy tree gives us no inkling of the existential battles with which craftsmen and autonomous and applied artists were confronted in real life. Only a fraction of them were eligible for the safety net of the Federal Art Project initiated by Franklin D. Roosevelt as part of his New Deal to stabilize the precarious social and political situation.

make practical use of art principles, in dress, home furnishing, architecture, etc.

7. Emphasis is placed on self criticism as well as on criticism by art supervisors and fellow students.

COMPLETE EDUCATIONAL PROGRAM		
FINE ARTS Water Color Oil Painting Sculpture Woodcutting Lithography Engraving	CRAFTS Weaving Metal Work Basketry Book Binding Pottery Textile Arts	PRACTICAL ARTS Costume Design Interior Decoration Industrial Design Illustration Comic Art Photography

Through expressing our own feelings and thoughts as clearly as possible, by learning carefully and intelligently to what others have to say, we acquire the ability to select what is true and beautiful.

The Fine Arts courses, now in preparation, are offered first. The student will find that each of these courses gives fundamental training preliminary to the other courses. Since the Art Adventure League encourages individual creative effort, a student may begin at any time of the year.

"Complete educational program", in: *Art Adventure League*, New York (1936), p. 3. The Richard Pousette-Dart Foundation, Suffern, NY.

Teaching at the Art Adventure League, here presented in the form of a table, was based on Gestalt theory, which first conceptualizes a problem in its entirety before any concern with details. This applied to all disciplines listed here. Before an artistic idea could be realized, a plan or concept had to be created.

Viewed against this backdrop, Pousette-Dart's tree chart of art looks naive. Informed solely by the aesthetic sensibilities of the short-lived AAL, it shows the basic structures of its underlying training concept: the creative fields that build on "form," "color," and "design" are shown blossoming under the conceptual umbrella of the "visual arts." The "fine arts" forming the central axis of this arboreal scheme are flanked by "crafts" on the one side and "practical arts" on the other. As these are mutually complementary, "weaving" is shown opposite its practical application in "costume design," just as "metal work" is raised to new heights by "interior decoration" and "basketry" similarly enhanced by "industrial design." Among the more contentious claims made by Pousette-Dart is his ranking of "watercolor," which he himself taught, as second only to "oil painting" as the highest of all the artistic disciplines. How ironic, therefore, that the teacher of the painting class, the "eminent" German immigrant George Grosz, should have become far better known to posterity and enjoyed far more posthumous recognition than Pousette-Dart himself, whom the AAL prospectus introduces as "one of America's most successful artists."

TREES OF ART Freedom of Expression

When Pousette-Dart's school of art and design, which although conceived as a national campaign failed to get off the ground even in New York, closed its doors for good in 1938, its founder tried to salvage his didactic objective of "freedom of expression" by producing nothing less than a tree chart of world art. His *Gestaltian Chart of Contemporary American Art* shows all the "fine arts" of the AAL in full flower, while the marginal "crafts" and "practical arts" have disappeared without trace. The former teacher had apparently placed his faith in a broad-based stylistic system premised at once on parity and pluralism, in which no one branch of art and no one artist would ever predominate.

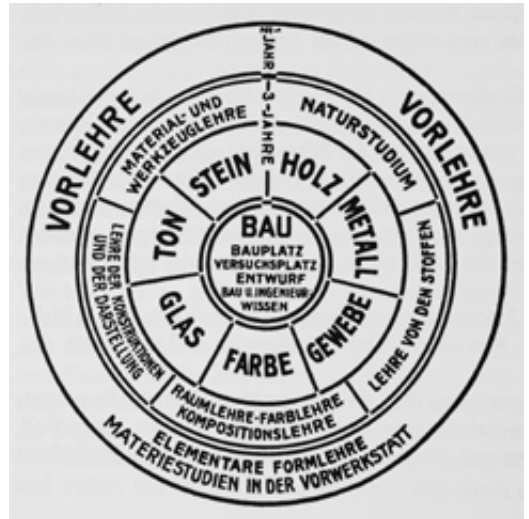
A *Gestaltian Chart of Contemporary American Art* was published together with Pousette-Dart's plea for "Freedom of Expression."³ The text is prefaced by Voltaire's famous motto: "I disapprove of what you say, but I will defend to the death your right to say it." Only by applying that principle could Pousette-Dart safeguard his views on the vital importance of freedom in all aesthetic matters – views that were in part a response to the idea that architecture should be given the "leading role" in art and art training. This was what Walter Gropius had demanded – in "Hitlerian tones," according to Pousette-Dart⁴ – and Levy, true to the Bauhaus tradition. His strikingly bushy tree chart can therefore be read as symbolic of the unbound striving for self-fulfilment that motivated most American artists, especially after learning of the Nazis' touring exhibition of *Entartete Kunst* – "degenerate art" – that opened in Munich in 1937.



Nathaniel Pousette-Dart: *A Gestaltian Chart of Contemporary American Art*, in: Nathaniel Pousette-Dart: "Freedom of Expression", in: *Art and Artists of Today* 1/6 (1938), p. 2.

"It is imperative to create conditions which help every artist to make a good living, but in seeking to solve this problem we must be careful not to create a situation wherein politics, prejudices and favoritism may ultimately destroy **FREE-DOM OF EXPRESSION**."

Nathaniel Pousette-Dart: "Freedom of Expression", in: *Art and Artists of Today* 1/6 (1938), p. 3.



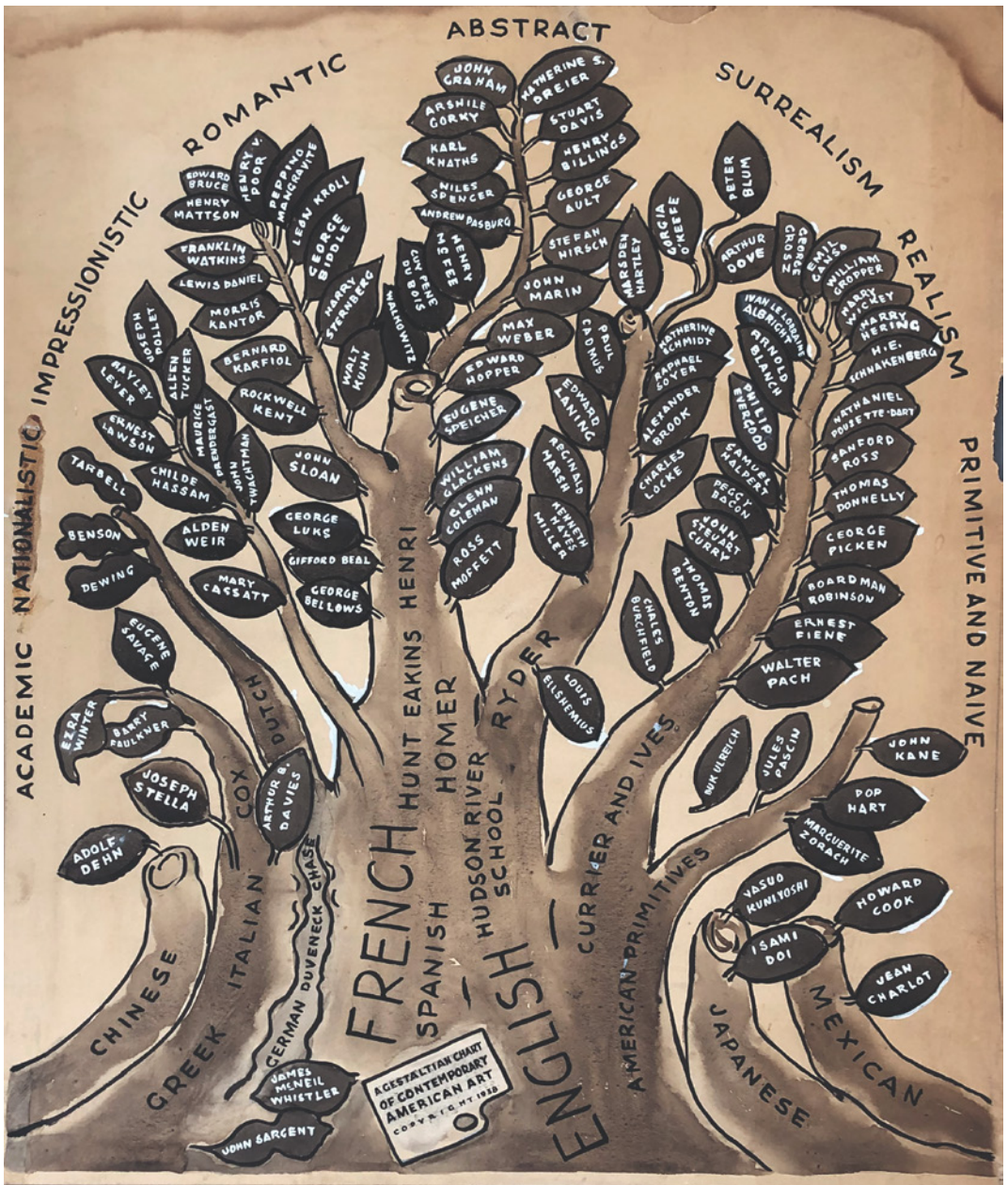
Walter Gropius's diagram of Bauhaus teaching, in: Staatliches Bauhaus in Weimar, Karl Nierendorf (eds.): *Staatliches Bauhaus Weimar 1919-1923*, Munich: Bauhausverlag (1923), p. 10.

The circle symbolizing a hermetic model is Gropius's way of emphasizing the self-contained quality of the Bauhaus training program, all of whose units were geared to one central goal, namely "building," which here is a synonym for architecture.

"There are both individuals and groups in this country who would like to saddle American Art with one definite style. Some of them would make all our art academic; others would prefer it non-objective or abstract or surrealistic and still others, adherents of the American-Scene school would have it realistic. Walter Gropius, in his Chicago Bauhaus experiment, has worked out a plan which if carried out would make painting and sculpture 'mere handmaidens' of Architecture. [...] American Art at the present time is in a very healthy condition for the simple reason that it has no one individual or group dominating it. In America the artist still has FREEDOM OF EXPRESSION and it is the one thing that we must fight to retain."

Nathaniel Pousette-Dart: "Freedom of Expression", in: *Art and Artists of Today* 1/6 (1938), p. 3.

Just how sensitively Pousette-Dart reacted to the latest developments in Europe can be gauged from the fact that shortly before his tree chart went to print, he retouched the "nationalistic" branch of his original ink drawing to make it read "naturalistic," thus turning it into a politically neutral category. The array of styles fanning out to form the crown of the tree is a robust riposte to the "one definite style" then being instrumentalized for propaganda purposes by the Nazis in Germany, the Fascists in Italy, and the Stalinists in the Soviet Union.⁵



Nathaniel Pousette-Dart, *A Gestaltian Chart of Contemporary American Art* (ca. 1938), Suffern, NY: The Richard Pousette-Dart Foundation. Pen, ink and pencil on cardboard, 62 x 53 cm.

"A tree chart suggestive of the diverse and complex influences and developments in Contemporary American Art. It is not possible to make such a diagram accurate as to historical fact because one artist may have stemmed from several roots or branches. Because of the complexity of this problem important artists may have been overlooked or misplaced."

Nathaniel Pousette-Dart's own commentary. Nathaniel Pousette-Dart: "Freedom of Expression", in: *Art and Artists of Today* 1/6 (1938), p. 2.

The diversification of art, Pousette-Dart believed, marked the apogee of a development which had long been inherent in the European tradition but which there was doomed to die out, as were the Asian and Latin American art that his tree chart treats as mere "side shoots." By the same token, "realism" is cast as just one aesthetic style among many, even if its branch is the longest and sturdiest of the whole tree. And as if that were not evidence enough, Pousette-Dart provides another leaden hint by including his own name on the realism branch – an attestation of allegiance that ironically implies a stylistic standpoint not so unlike the official "one definite style" being propagated in Europe.

Notes

- 1 This chapter was translated by Bronwen Saunders.
- 2 The school's annual tuition fees of \$32 were the equivalent of six weeks' rent for a two-room apartment with full-size bath.
- 3 Nathaniel Pousette-Dart: "Freedom of Expression", in: *Art and Artists of Today* 1/6 (1938), p. 3.
- 4 Nathaniel Pousette-Dart: "Freedom of Expression", in: *Art and Artists of Today* 1/6 (1938), p. 3.
- 5 Nathaniel Pousette-Dart: "Freedom of Expression", in: *Art and Artists of Today* 1/6 (1938), p. 3.

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Hispanoamerikas im Vergleich" in *Historische Anthropologie* (2023) and "Ad fontes, Tutorium zur Heraldik."

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cache 03

Shadow of the Tree appeared beginning in summer 2023 as the third edition of the series **cache** (print and online). **cache 03** exhibits work from the members and research network of the Swiss National Research Foundation Sinergia research project *In the Shadow of the Tree: The Diagrammatics of Relatedness as Scientific, Scholarly, and Popular Practice* (2019–2024) formulated and led by Marianne Sommer, Caroline Arni, Staffan Müller-Wille, and Simon Teuscher and based, respectively, at the universities of Lucerne, Basel, Lübeck/ Cambridge, and Zurich.

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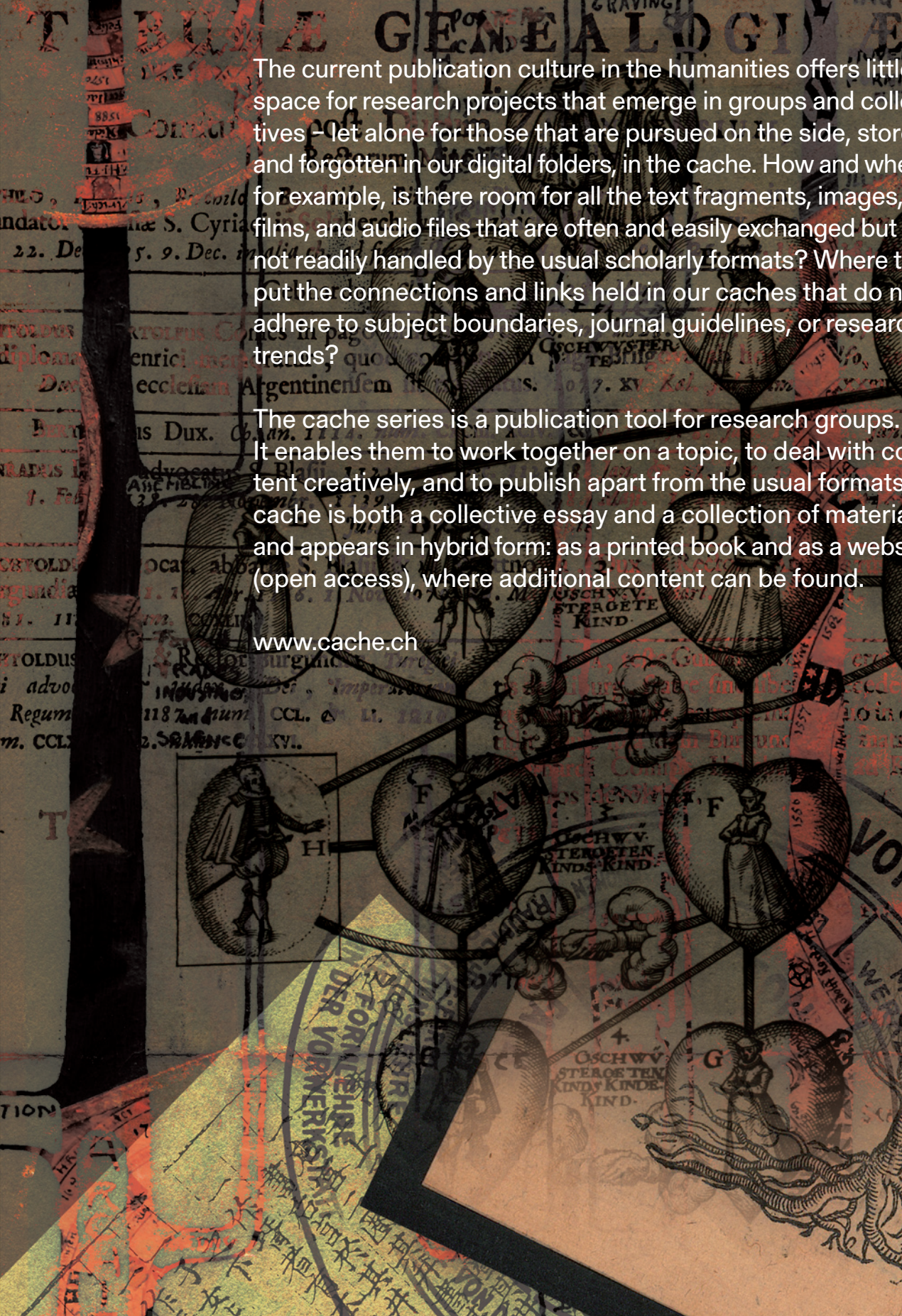
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The current publication culture in the humanities offers little space for research projects that emerge in groups and collectives – let alone for those that are pursued on the side, stored and forgotten in our digital folders, in the cache. How and where, for example, is there room for all the text fragments, images, films, and audio files that are often and easily exchanged but not readily handled by the usual scholarly formats? Where to put the connections and links held in our caches that do not adhere to subject boundaries, journal guidelines, or research trends?

The cache series is a publication tool for research groups. It enables them to work together on a topic, to deal with content creatively, and to publish apart from the usual formats. The cache is both a collective essay and a collection of material and appears in hybrid form: as a printed book and as a website (open access), where additional content can be found.

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Diagrams have long been used to describe, claim, and produce the relatedness of human individuals and groups, animals, and plants. The tree form seems to have attained particular dominance, both within specific domains of practice and in historical scholarship. This pertains, moreover, to representations of non-organismic entities that draw from and flow back into the broad cultural history of the tree. And yet a wide variety of diagrams have been devised, sometimes in connection with the tree, other times as an explicit alternative, or as a novel or idiosyncratic invention. This volume, which brings together a commensurately diverse mix of historians of the natural and human sciences, social historians, philosophers, and historians of art and media, wishes to bring the variety of diagrammatic forms out from under the "shadow of the tree" – while also taking seriously the ubiquity of the tree and its implications.

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