

Article

Genealogical Systematics

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Abstract: Genealogical research usually begins with the discovery of affinity among individual humans. Such kinship is induced by direct observation, as well as by hearsay (indirect observation) that can be independently confirmed. Those who want to continue investigating a case history after the observational mode of fact-finding is no longer sustainable have no other choice than to switch to the discovery of consanguineous relationships. This involves a paradigm shift, where investigation dramatically changes from observation to inference, from inductive to deductive reasoning. Individuation is important in characterizing the personhood of an individual, but those same facts are of little empirical value in establishing the unification of a family. In addition, genealogists rely on marriage as an observable source of evidence for unification. However, this extrapolation is not completely convincing because marriage does not take into account the uncertainty of paternity. Individual parents usually descend from different parts of family history, which suggests genealogists should evaluate cultural factors responsible for non-random mating in attempting to infer consanguinity. For example, there is the incest taboo, a cultural convention which addresses the abnormal genetic consequences of inbreeding. Other non-random mating factors of a more general nature may also be identified in the unification of genetically different individuals. Here, for example, causality is expected in cultural principles that are of a cohesive and integrative nature. Those kinds of evidence may determine an unmarried pair's earliest engagement and may also be responsible for the origin and maintenance of the marriage relationship, even throughout post-reproductive life. Lastly, current genealogical research is severely infected with confirmation bias, and from which it must be protected if it is to achieve the status of a scientific discipline. Critical rationalism provides a solution to that kind of problem. It is with remediation in mind, as it applies to all of the aforementioned issues, that genealogical systematics is characterized.

Keywords: affinity; critical rationalism; deduction; genealogy; genealogical systematics; individuation; induction; paradigm shift; unification



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1. Introduction

Genealogists are concerned with the discovery of human relationships, both the person and the family to which that individual belongs. A sequence of such things constitutes what genealogists refer to as a family tree. According to tradition, that tree is historical, its parts being ancestor-descendant relationships. I employ family terminology throughout this paper because a family entity is some part of that tree. Kinship terminology, while another possibility, tends to be guided more by ahistorical cultural relations.

Basically, genealogists appeal to only two concepts, individuation and unification, in their discovery of relationships. Individuation is to distinguish from all others of the same kind (Strawson 1959; Gracia 1988), i.e., all other humans in the case of genealogy. The traditional kind of marriage relationship, between a male and a female, has long been considered an example of unification.

Genealogical research usually begins with individuation because it is critical in establishing personhood. Individuation usually involves the determination of one or more given names and a date of birth for each of the individuals investigated. A date of death also characterizes each person, as do their places of birth and death. Dates and places of

birth and death are referred to as vital records or statistics, no doubt underscoring their collective importance in documenting personhood.

Genealogists approach discovery of human relationships from two different perspectives. They usually begin with the affinal, which is defined as kinship due to marriage. The other approach is consanguinity, discovering relationship due to common ancestry. Consanguinity is a blood-line kind of kinship (*sensu* Darwin 1859). The oldest use of the word ‘genealogy’ in the English language, including its etymological variants, has been traced to the medieval poem *Cursor Mundi* (unknown author, ca. 1300 AD, Oxford English Dictionary). As might be expected, the word genealogy in this pre-Darwinian work refers to affinal relationships.

Each genealogical family is usually labeled with a personal name. It almost always references a particular male. My use of male and female terminology throughout this paper is biologically determined (see below). According to Blackstone (1793, p. 441), the concept of coverture in English law, where a married couple becomes one person, is the basis for the female giving up her legal existence as well as her last name (Bellesiles 2020, pp. 176–77). Genealogists also use male-referenced names as evidence of unification, where the name stands for a common-descendant part of the family tree. A relative age convention (Murdock 1961) may be required in such references because not all persons in a generation are the same age. Typically, and according to convention, the oldest family name is considered the first, whatever the part of the family tree the genealogist is discussing.

I assume genealogical research will be improved with a synthesis of first principles (Wilson 1998). It is for that reason I begin by considering background issues, largely pertaining to individuation, unification and history. This section is followed with reviews of protocols and evidence currently used in genealogy, in the discovery of affinal and consanguineous relationships. I not only attempt to expose deficiencies therein but devote the penultimate section of this paper to remediation, largely with the application of critical rationalism. It is with these efforts that I attempt to characterize, both historically and scientifically, the research field of genealogical systematics (also see Levinton 2010, pp. 32–80).

2. Background

Stating part/whole inclusion, a thing within a thing, can be important to precise and accurate description and understanding. Exploring that inclusion is certainly critical to the discovery of history, such as determining the parts of the genealogical family tree. When I use the term individual (particular), or imply something is a thing, it is meant in an ontological sense, with ontology being the nature of being and becoming, with what is real. For example, individual things have the property of self-delimitation, whereas universals entail theories formulated by humans (Popper 1983, p. 109). Basically, theories are invented by investigators in order to explain a set of observed or hypothesized related things. Rationally argued, or not, theory formulation involves some form of abstract thinking. As such, I consider individuality and universality to be opposites, as is their respective ideographic and nomothetic study (also see Ghiselin 1974; Hull 1978).

An individual is restricted in space and time. Those things once discovered and determined to be important are usually formally named. Such conditions are hypotheses as to what actually populates the universe. A particular taxon, such as the human species binominal, *Homo sapiens*, is intended to have that kind of status. A thing’s existence, like that of species, is not how a researcher might want it to be, and so it is defined. Rather, a particular thing’s existence is sought in discovery, by rational means (Maxwell 1974). Names, particularly those delimiting the human family, play a significant role in genealogical discovery.

In principle, only ideographic evidence is empirically relevant to discovering relationships of the historical kind. A general conceptualization of that kind of evidence is the transformation series, sequences of change intrinsic to individual organisms. As Grant and Kluge (2004, p. 24) argued, “Darwin’s (1859, p. 420) theory of descent, with modification,

specifies transformation from ancestral to derived conditions ($a \rightarrow a' \rightarrow a''$, etc., where \rightarrow is a transformation event that may involve the modification of a complex phenotypic character or the substitution, insertion, or deletion of a nucleotide) as the explanation of all heritable variation among living things". While it is clear that historical relations can be deduced from the shared states of transformation series, they cannot be judged in terms of property-based nomothetic concepts, like the notion of similarity that is commonly used in genealogy (see next two sections). Indeed, as Darwin (1859, p. 413) emphasized, hypotheses of historical relationships are based on something other than "mere resemblance".

Elsewhere, I defined the species category as the "*smallest historical individual* within which there is a parental pattern of ancestry and descent" (Kluge 1990, p. 417; italics in the original). Further elaborating (pp. 419–20), I stated that when "the actions of an individual can be ascribed to the additive actions of included, smaller, units of diversity then that individual is termed historical". And, as such, historical individuals "are epiphenomena, developed or evolved from lower level processes" (p. 423). Thus, ontologically speaking, species as historical individuals are themselves not involved in processes; they are effects, not affecters.

In an attempt to clarify these claims, I used the term contemporary individual for the parts of species that do affect things (Kluge 1990, pp. 419, 422–23). As stated (p. 419), "the term contemporary individual is reserved for those entities which are spatiotemporally restricted and are directly involved in cohesive and integrative processes" (see below). Where historical and contemporary individuals meet is the "threshold" of Frost and Kluge (1994, p. 275). The inclusive things genealogists attempt to discover, like the family entity, are contemporary individuals, as is each human being included in those things.

Apparent in my review of principles of genealogy is how little concern there has been for epistemology (also see Durie 2017). Notably missing is a clear and compelling answer to a critically important question in genealogical research: What justifies claiming to know the family entity is a real part of human history, that it has the potential to be the object of observation and inference? Perhaps, family is merely a taxonomic category without ontological status, like the race category (Fuerst 2017). If this question cannot be answered convincingly then we may question whether genealogical systematics is actually the study of something inclusive like the family entity. It is certainly possible that genealogical discovery is limited to the study of individual human relationships, without regard to the family to which they may or may not be referred.

The nature of marriage and the role it plays in genealogy are controversial topics. Bear in mind, the concept of marriage is a matter of definition, and of which there are several kinds. Potentially problematic in genealogy is opposing definitions, that marriage is the union of a male and a female, or that it is gender neutral. The former pairing is the more traditionally recognized variant in genealogy, in the affinal kind of discovery. Its usage extends to at least the early 14th Century, where dynastic control was sought through ancestor-descendant relationships (see Section 1). That origin was usually concerned with the ruler (king) producing an heir. A yet more strictly biological argument for the origin of the male-female kind of marriage has to do with the evolution of long-term pair-bonding in the human species. Not only is the female human parent directly and continuously involved with a long pregnancy, but several additional years of parental care are required after the birth of her offspring. Optimally, the female parent marries the biological father, both sharing in material ways as to the well-being of the offspring. Whatever differential reproductive success that may be due the male assumes the certainty of his paternity in that unification. An especially interesting aspect to this argument has to do with the empirically observed generality of the pairing, suggesting that it may be a trait diagnostic of *Homo sapiens*. It is difficult to similarly generalize, in these historical and biological terms, as to the union that is gender neutral (see below).

Arguably, I am not overly concerned in this paper with the contentious nature of what is marriage. Indeed, my thesis narrowly focuses on the family entity, and its descent, fully recognizing that paternity is uncertain. Genealogical systematics, as I am formulating

it, is without any necessary regard for the particular male's contribution, certainly after fertilization, such as might be provided by the marriage relationship.

In this formulation I begin by appealing to four largely invariant and uncontested biological principles in my theorizing that the human family is a historically real entity, something that is not necessarily a function of marriage: (1) The sexes are different; the male is heterogametic (its diploid pair of sex chromosomes is XY), the female homogametic (XX). There are intersex individuals, only about "0.018%", where the chromosome distinction is inconsistent with the "phenotypic sex, or in which the phenotype is not classifiable as either male or female" (Sax 2002, p. 174). (2) The historically unique origin of a human begins with fertilization, the union of a male's and a female's haploid gametes, the sperm and egg, respectively. Achieving the haploid from the diploid number involves meiosis, a reduction division of the normal chromosome number. Phenotypic sex, including the rare intersex condition, is observable at the time of birth, and it is that natal condition which is recorded on a birth certificate. (3) An offspring's extensive time of growth and development begins with fertilization. (4) An offspring's sexual maturity is established at the point at which it forms its own family by means of fertilization.

It is natural for an individual human to be part of more than one family entity. The sexually immature offspring is part of its parent's generation, and it forms its own generation when it becomes sexually mature. Such observed changes in an individual's growth and development are natural. They do not violate the individual's spatiotemporal restrict-edness, nor do they violate the scientific standard of empiricism, provided the organism in question is treated as a semaphoront. Semaphoront is an object of identification, which "corresponds to the individual [an organism] in a certain theoretically infinitely small time span of its life, during which it can be considered unchangeable" (Hennig 1966, p. 65; also see Frost and Kluge 1994, p. 261).

I also contend that the family unit of generational change is still identifiable even though its contents change. For example, divorce or the death of either or both parents, or even their offspring, does not deny the existence of the entity to which those particular things and events apply. A family entity is generational (see principle 4 above). It is something to be discovered. It is not an abstraction.

These qualifications for the reality and uniqueness of the family entity, and how it functions historically in genealogical systematics, do not make a case for gender essentialism. I do not deny other kinds of human classification, like the intersex condition, nor adoption, gender identity and sexual orientation-based relations (e.g., see "LGBTQ Genealogy": <https://sixgen.org/lgbtq-genealogy/>, accessed on 29 November 2022). Nonetheless, it is easy to lose sight of what is traditional genealogy in these other cases. Might those relations be different class concepts, intensionally defined sets, whose members are appended to an already discovered, or assumed, ancestor-descendant family tree? This is not intended to be a pejorative question. Hopefully, it may lead to a reconciling answer as to what is genealogy. While I fully embrace asking these categorical kinds of questions, they are beyond the epistemological scope of the current paper.

Continuing to theorize as to the kind of case I am attempting to make, I suggest genealogists should focus more on the culture of contemporary individuals, where the origin and evolution of the family entity is a function of historical kinds of social structure (see Kluge 1990, p. 419, and above). As Chapias (2016, p. 46) summarized, "contemporary kinship [family] structures are cultural constructs, the outcome of cumulative cultural elaborations that initially built upon a rich biological substrate comprising genealogical structures, the primate criteria of kin differentiation, the intrinsic properties of kinship, and a number of primate cognitive and social adaptations" (also see Chapias 2010). An obvious, but misguided, way genealogists attribute such structure to the family entity being studied is through the unifying event of marriage. I say misguided because that cultural convention rarely, if ever, addresses the uncertainty of fatherhood (see below). I also doubt gender identity and sexual orientation relations can be construed as consequential parts of Chapias'

cultural construct, because he is referencing an evolved male-female system, one involving differential reproductive fitness.

We may further claim to know by observation that the individual parents in such a generation do not usually come from closely related lines of family descent. It is also well-established that sexual intercourse between individuals belonging to the same family entity often gives rise to offspring with lower reproductive fitness (Charlesworth and Willis 2009). Thus, marriage relationships may be expected to be exogamous, and to which cultural conventions, like the incest taboo, are reinforcing. In fact, such a taboo seems to be about as close to a cultural universal as exists in humans, thereby suggesting exogamy is an ancient human trait. The few exceptions include dynasties, the ruling lineages in ancient Egypt, the Austrian Hapsburg monarchy, and modern Samoans (Vilas et al. 2019; M. Eddowes, pers. com.), all of which can be explained by an overriding concern for acquiring and maintaining power in the near term (Shore 1976). Highly inbred natural populations, such as the famous Devils Hole pupfish, are usually recognized as critically endangered, if not on the verge of extinction (Tian et al. 2022).

Cultural conventions like the incest taboo are usually characterized in terms of affinity, those relationships stemming from a bisexually characterized kind of marriage, or a functionally equivalent union (Schneider 1987). Civil laws concerning incest tend to reference consanguineous relationships. Many nation-states do not legally ban sexual relations between parent and offspring, or between two full-blooded siblings. Most US states legally ban marriage between first cousins; some states even ban marriages between first cousins once removed. In any case, incest avoidance is another important sexual aspect of human social structure. It is important because it provides additional evidence for what genealogists study are real things, things with an evolutionary history.

Whatever is done in science with the purpose of avoiding rejection is ad hoc, whether it is used to save a piece of evidence, a particular argument, or even a conclusion. These kinds of ad hoc actions must be minimized, if not avoided altogether, in our attempt to maximize the explanatory power of the accumulated evidence. If that power is not exercised, conclusions in research cannot be distinguished from whatever is the bias of the individual investigator. Unfortunately, the ad hoc plagues all science, and for which the discovery of genealogical history is certainly no exception (see below).

Personal names provide a basis for identifying individual and group relationships in humans. In general, a person's given name(s) is only individuating, whereas the inherited last name may also serve as a basis for unification, among family entities, parts of the family tree. In Western culture, the family name is called a surname when it is understood to have been culturally passed from one generation to the next by way of the biologically defined male line of descent. Such unification may be known for a fact in the genealogist's observations of affinal relationships; however, consanguinity is not necessarily inferable from sharing similar last names (see later section).

3. Discovering Affinal Relationships

What genealogists claim to know of affinity comes from observations of the individuating and unifying events of birth, death, marriage and personal names; they can be considered matters of fact. According to correspondence theory, true propositions involve consistent facts (however, see immediately below). This is a form of inductive reasoning, ideally based on what is directly observed, from what constitute facts. Confirmation is to find objective support for something previously accepted, to make more definite, more clearly true or real when it is confirmed. When an induction obtained from one class of facts coincides with an induction obtained from a different class of facts it is referred to as a consilience of inductions (e.g., see Frost and Kluge 1994, pp. 259, 263), presumably thereby achieving greater significance in its confirmation (Wilson 1998).

I believe much of the evidence used by genealogists in the study of affinity is actually indirectly observed. It would be called hearsay evidence in the practice of law; what is admitted in court is only what can be independently confirmed. An extensive use of

hearsay evidence in genealogy suggests a weakening of induction and the beginning of the shift to deduction.

In spite of the apparent exactness of observations (direct, and even indirect), they can still be evaluated as to kind, generality and confirmation. For example, there is the relative rarity of direct observation, such as witnessing the when and where of the birth of one's younger sibling. However, even that observation cannot be proven (*sensu stricto*) to be factually true because the required proof from repeated observation can never be completely achieved operationally. More often what is factual to the genealogist involves learning indirectly from the observations of others, usually from parents or extended family members, or from culturally important aspects of family life, such as written on the personal pages of family Bibles. Facts, as to grandparents, aunts and uncles, and cousins, are often passed on orally as personal knowledge, from kin to kin, presumably originating from actual, confirming, eyewitness accounts (e.g., see [White 1969](#); [Kluge 2013](#)).

An example of affinity from my personal genealogical research comes from Benjamin Bee [White II \(1993, 1997a\)](#), who summarized a large part of his history, through eight generations, both lineal and collateral, beginning with James England White (1830–1895). [White II's \(1997a\)](#) most up-to-date book-length summary of these relationships is based almost entirely on the personal knowledge provided by his kin ([White II 1993, 1994, 1995, 1996, 1997b](#)). In this research he was effectively acting as a cluster genealogist. Indeed, I have been able to corroborate almost all of the information given to White II concerning his family relationships, except for establishing paternity relationships ([Kluge n.d.a](#)). On the other hand, I have falsified many of [Oliver's \(1979\)](#) inferred consanguineous conclusions involving three lineal generations preceding James England White ([Kluge n.d.b](#)).

Of course, personally relevant observation may be found in other sources, in such widely available publications like governmental censuses and civil society offerings. One of the latter's most detailed is William Wade Hinshaw's survey of Quaker monthly meeting minutes, wherein a member's history is often recorded by name, age and kinship. It is on that factual basis I claim to know there was a Josiah White, born 12-7-1779, in Perquimans County, North Carolina, who was the fourth son of Benjamin White and his wife Milicent, and that his father was the Benjamin White who died 05-15-1808 (see [Hinshaw 1936](#), p. 19; see below). We may suppose all such records are likely to be based on eyewitness accounts. I will again refer to this Josiah White below, in my discovery of a case of bastardy.

Fundamental to the observational aspect of empiricism is the assumption that what is seen is what is known (e.g., see [Schulz 2010](#), pp. 53–66). However, that knowing involves different biological processes, perception and memory, and with each observer being a different individual there is a reasonable chance the same thing may be known differently. Even the temporal order of observations may be considered problematic, according to the theory of special relativity which claims every observer has a unique perspective on where and when events would have occurred ([Einstein 1916](#)).

Failures in bearing witness are fast becoming legendary. Particularly noteworthy in this regard is the criminal justice system, beginning with [von Liszt's \(1902\)](#) experiments. Even more dramatic are the many successes of today's Innocence Project, where reinvestigation has legally overturned what were once thought to be well-established convictions, many based on independently confirmed eyewitness accounts. I submit that genealogists can no longer simply ignore the possibility that observations may be erroneous. I leave countering the possibility of this kind of wrongness to skepticism and the practice of testability (see Section 5).

Studies of affinity usually involve personal names, given and family. A christening event is certainly a directly observable basis for claiming to know an individuating given name, and a birth certificate may even confirm that information. In the absence of these directly observable and official confirming sources, oral history is often used as an authority for the origin of a personal name, like Arnold, although not always convincingly (e.g., see [Kluge n.d.a](#)). Then there is the widespread use of the family name in the identification of a genealogical entity, and from which there is claimed to be the discovery of some part

of the family tree. Again, oral history may be considered an important source of such information, especially when it involves surnames. For example, again from my own genealogical research, oral histories confirm that Lafayette Franklin Remy (1856–1941) unofficially, and permanently, changed his surname to Ramey, in an attempt to conceal his identity in a gun duel, on 20 Mar 1898, in Lexington, Cleveland, Oklahoma Territory, in which he participated. While Lafayette Ramey may have thought he killed his opponent, that does not appear to have been the case (Kluge n.d.a). Generalizing, the importance of surnames in the discovery of affinal relationships is significantly diminished if the male-line of descent is unknowable by observation. Fortunately for the genealogist, Lafayette Ramey could not keep from bragging to relatives about his duel and personal name change. He even bequeathed a much revered pistol; the one he claimed was used in that shooting.

The identity of the female parent may be considered factually knowable, because the actual birth can be observed, by all those attending such an event. Not only can an offspring's mother be known, so can the date and place of the offspring's birth. However, the male involved in fertilization cannot be known for a fact, except under unusual artificial circumstances, like intrauterine insemination (IUI) or in vitro fertilization (IVF). Observing the male's contribution is most unlikely under usual circumstances, simply because it takes place within the female's body. Thus, knowing, by marriage, a particular father, unlike knowing the mother, is very rarely anything more than circumstantially relevant to discovery, even when an official marriage license names the purported father (see next section). The human male is generally known to be more promiscuous than the female, and that only adds to the uncertainty of being able to actually know a biological father.

Birth, death and marriage are often recorded by governmental agencies, usually state (colonial) and local, and they too are considered factual by most genealogists. In these cases, marriage is just assumed to be of the traditional kind, between a male and a female. Some of that evidence also comes from legal documents, like probate and bastardy bonds. A bastardy bond is a legally binding promise to pay for the care (clothing, room and board) and education of an illegitimate child. The promise of bond money ensures that few, if any, public funds will be spent on the child who is born out of wed-lock. The bond usually states the amount of money to be paid, and who is expected to provide it. The mother of the bastard is almost always tasked with that financial responsibility when fatherhood is contested, as it often is. However, here again, it is misguided to simply treat any such observation as being confirmatory, and without error. That they should not be accepted as such, in observing affinity, and treated as nothing more than evidence requiring further testing and corroboration, often comes from knowing the source of the information provided is not always one of directly observed (personal) knowledge of the event in question.

The modern death certificate is a good example of supposedly factually correct vital information having been officially recorded, and therefore thought to be without error. Consider that such information is not always based on personal knowledge, as might be obtained from the spouse or children of the deceased. These data are frequently obtained from a distraught and/or distant family member, well after the death, even from an unrelated family friend, none of whom are likely to have an accurate memory for the records in question, let alone direct observation of those past events. Indirectly observed evidence may be considered corroborated by officially notarized records, but that kind of documentation is almost never provided at the time of death.

While an act of marriage is an observable event, it is but a cultural convention of limited value in today's discovery of a family entity. Basically, it only establishes two individuals coming together in a ceremony, minimally at a place and time. Some might argue the traditional marriage is nothing more than a male and female sharing a family name. A typical marriage certificate doesn't necessarily document cohabitation. Most emphatically, no record of marriage, even a directly witnessed ceremony, provides indisputable evidence of conception, the event characterizing the natural beginning of a human offspring, and the unifying role genealogists use it for in establishing an ancestor-descendant family history

(see above). Arguably, the act of marrying does not provide directly observable evidence of a family entity, nor the family tree of which it is a part. The male subject's role is a matter of inference (see below).

Also, there is the question of being able to claim a particular generation's history is factually knowable from directly observing an offspring becoming mature and forming its own family entity. Answering affirmatively seems most unlikely if doing so requires recapitulating part of the family tree from the process of maturation, given that general biological argument was long ago discredited and relegated to mythology. That such a possibility may be deducible in other ways is explored in the next section.

Finally, there is a significant downside to starting genealogical research with the discovery of affinal relationships. The problem involves claiming to know, by some form of observation, the individualities, family entities and history of a sequence of generations, and then moving on to deductive reasoning, as most genealogical research of a particular family tree eventually does (see next section). There is an insidious aspect to this situation, which is that as discovery extends from induction to deduction the researcher continues to seek evidence confirming what was observed, or accepted as having been observed by others. Especially consequential is continuing to assume, and thereby confirm, part of the family tree from the family name. By extension, that kind of biased confirmation contaminates whatever scientific research is eventually undertaken in the deduction of the blood-line relationships of those generations. Moreover, the potential for that kind of bias would seem to be at its greatest when the researcher is either a lineal or an immediate collateral part of the history being investigated, which is often the case. No reasoning can be considered scientific when confirmation bias exists. To maintain scientific authority, a methodology must be implemented that earnestly attempts to avoid that bias (see Section 5).

4. Discovering Consanguineous Relationships

The discovery of family history can continue once all of the sources of direct and indirect observation are exhausted, and even when conflicting personal information predominates. This continuation necessarily involves a paradigm change in discovery, switching from inductive to deductive reasoning, from observations pertaining to the facts of affinal relationships to the deductive methods of scientific inference and the empirical evidence relevant to testing and explaining blood-line history. It should be obvious that this paradigm change is not necessarily a single discernable event in the study of family history. Indeed, a back and forth is expected when previously unknown, or reevaluated, facts are identified and used in a process of rediscovery.

That genealogists claim to know of consanguinity by means of deduction is to achieve explanation through testability and corroboration. Corroboration is to strengthen with evidence. Unlike confirmation, corroboration does not necessarily have anything to do with establishing the truth of a proposition. As discussed in the previous section, there is potential error in the evidence used to individuate the entities in a generation, in the observations of birth, death and given name(s), just as there is in the unifying act of marriage.

Inexpensive DNA analysis is currently available to anyone investigating paternity, and inferring consanguinity more generally. Analyses of this kind are readily obtained from a variety of commercial vendors, and at surprisingly little cost. However, those results almost always involve taking short-read molecular sequences from the prospective father and the child whose fatherhood is in question. And, it is on the basis of the proportion of nucleotide matches (or mismatches) that paternity is assessed in terms of a probabilistic model, one based on those matching similarities (or dissimilarities). Alternatively, I advocate a protocol that includes long-read DNA samples, and where the algorithm employed in the analysis treats the evidence as nucleotide transformation series, where it seeks to maximize the explanatory power of such evidence. The sources of the sampled DNA are no less important in these more ideal considerations of relationships. In addition to that of the child whose paternity may be in question, samples would be taken from its mother, other siblings, and two or more reproductively mature males unrelated to that family, including the

prospective father. Under this kind of sampling and testing regime, the father may then be hypothesized when the evidence maximally corroborates that he is part of the family entity which includes the child whose paternity is at issue (see below). Assuming history to be unique does not violate that kind of inference.

Error exists in the inference of consanguinity, even when empirical evidence is obtained from official sources, like immigration and census records. In particular, consider the commonly used early United States Federal Census records, 1790–1840. They must be judged incomplete and potentially inaccurate descriptions, and from which consanguineous relationships can only be guessed from the accompanying age estimates and the given and family names, which are based on similarity.

Degree of similarity is also often used to establish temporal-order and nearest neighbor (see below), but even making those kinds of judgements is not a substitute for the theoretically relevant, the empirical evidence concerning those ancestor-descendant processes, such as state and local records which most genealogists employ. Bear in mind, as for a more severe criticism, vital records and given names do not represent events in transformation series, and accordingly many genealogists may not be prepared to accept them as evidence in the inference of consanguinity.

Still, vital records can provide legitimate tests for temporal consistency of hypothesized consanguineous history. For instance, it would be logically inconsistent to find parents younger than their offspring. Such a test may also apply when a date of death is used. For example, a presumptive father can be understood to have died at any time within 280 days (on average) before his offspring is born, although the mother cannot be declared dead before her offspring's birth, except under the most unusual circumstances. Notice, however, that these are logical tests; they are not scientific. They determine what cannot be true by some logical standard; they are not empirical evidence, as a test, of what may have occurred. I believe this critical interpretation applies to all of the time-ordered sequences constructed by genealogists.

A shared similarity may be ontologically consistent with the discovery of a universal, but employing a property like that in the inference of consanguineous relationships amounts to a category error. While it may be common practice to carry over what is learned of surname history, from observing affinity and inferring consanguinity, it is still an ontological error to use shared similarities, such as a shared personal name, in the inference of human historical relationships. But, the problem does not end there. Males bearing the same surname are assumed to have acquired that name from a father, his father, that father's father, etc. Contrary to simply assuming uninterrupted lineal inheritance, we may ask, what is the likelihood the same, or similar, surname arose independently? For example, consider the likelihood the Brandon surname came from English Royalty, those bearing the same name. [Caskoden's \(1898\)](#) once popular book provides a longstanding basis, according to several genealogists, for connecting by marriage the Colonial commoner Charles William Brandon (1750–1838) to English Royalty ([Kluge n.d.c](#)).

There is, however, much more to be learned from this example. In Anglo-Saxon time, from ca. 410–1066 AD, brandon meant hill where broom grows. There are several perennial leguminous species of shrubs in the genus *Genista* occurring naturally in England. One of the most common is Scotch Broom (*G. scorpius*), which is well-known for its conspicuous yellow flower. In Old English, the Brandon surname, a conjunction of the words brōm and dūn, yielding a place-name, is associated with at least four geographically separate Anglo-Saxon settlements where Scotch broom is known to have grown, those in Durham, Norfolk, Suffolk, and Warwickshire counties. Thus, all males bearing a Brandon surname cannot be assumed to be necessarily related by common ancestry. It is being informed as to the potential for the independent origin of these things that calls into question the assumed uniqueness of common ancestral descent based on surname similarity, such as from English royalty. As Benjamin [Franklin \(2003, p. 14\)](#) is believed to have formulated this very issue, "What signifies knowing the names, if you know not the nature of things?" Restating Franklin's admonition, 'the things in question are individual humans, but whose

name alone does not necessarily characterize the nature of its origin' Thus, I claim it is a category error to rely on surname similarity, as the basis for a historical relationship, royal or otherwise (however, see [Durie 2017](#)). It is also ad hoc to continue to assert the uniqueness of a surname, for whatever inferential purpose, knowing that the name in question is likely to have had more than one origin.

As already noted above, when genealogists are concerned with the unity of the family they tend to focus just on evidence of marriage by observation. However, the marriage act is better understood as an outcome of a unifying process. Seeking evidence of that process must be considered a potentially significant aspect of discovering human history, because only then might the genealogist account for the coming together of a male and female who normally have different family (historical) origins. While diversification within species is usually discussed and summarized as diverging lines of descent, upon closer scrutiny we know that research rarely, if ever, accounts for these more complex and common life-time patterns of individual relationships. For example, [Simpson \(1953, fig. 48, panel A\)](#) attempted to illustrate all of the different patterns of descent, but he did not completely achieve that goal. In particular, he only showed human parents originating from historically close family lines, whereas the usual case is for them to have diverged from more distantly related parents.

Neither the marriage act nor the license to marry very rarely provides evidence for what it was that brought the couple together in the first place, from their different family origins. This deficiency is especially obvious when the couple comes from geographically distant places, such as different states, even continents. Nor do marriage documents provide evidence for the maintenance of those unions after the marriage event. Basically, what is missing in the discovery of marriage unification, both affinal and consanguineous, is an empirical basis for explaining the unity of the adult male and female within a generation (see above). A trivial definition of chance, as in flipping a coin, provides a general explanation for such unions, but that simple accounting does not help us to understand the varied cultural backgrounds in which we expect incest to be avoided ([Emery 2015](#)). More problematic for that simple kind of accounting, all "[e]vents are rendered non-unique *in thought only* [my italics], by choosing to use them as examples of a type or class" ([Joynt and Rescher 1961](#), p. 151; see helium example in [Frost and Kluge 1994](#), p. 263). Indeed, that particular claim in historical inference is usually qualified, with an aphorism like that attributed to Mark Twain, "while history doesn't repeat itself, it often rhymes".

Consider the definition of cohesion (including adhesion), which is things forming a united whole. Also consider the definition of integration, which is the mixing together of once separated things. While [de Queiroz and Donoghue \(1988; also see Cracraft 1989\)](#) appear to have been the first to discuss in some detail cohesion and integration in establishing historical relationships, they mistakenly sought the causality of those actions in the patterns of character variation in historical entities, like species. I say mistakenly because these kinds of entities are judged to be "neither replicators [nor] interactors" ([Kluge 1990](#), pp. 418–19). The stickiness of the pattern of character covariation de Queiroz and Donoghue attributed to species is more simply explained as coincident to common ancestry. Also, as for the meaning of the word sticky in the present context, it is a consequence of adhesion, not cohesion (see water as an example of that distinction).

What is obviously important in cohesion and integration is where that potential evidence comes from. Cohesive and integrative evidence is likely to be cultural, and to be circumstantial because it is not part of a transformation series (see above). Thus, genealogical evidence would be of two kinds, direct and indirect, what arguably is related to, or what cannot be connected directly to, the biology of the human subject. Nonetheless, it still might be said that the evidence from these direct extrinsic sources, together with the intrinsic transformation series, constitutes the largest amount of evidence identified for analysis. This would be the total evidence ([Kluge 1998](#)), cultural and biological, from which the consanguineous history of the family entity might be discovered by deduction.

Cultural evidence for the unification of males and females in a generation may be particularly evident in the non-random cohesive effects of social bonding among individuals, such as particular school(s) attended and level of education achieved, political party affiliation, enlistment in the military service, and religious preference. Even the cohesiveness that obtains from belonging to a particular income-life style, such as farming, cannot be ignored as a possible source of indirect circumstantial evidence. Of course, prospective parents may even be limited to some extent by geography, where marriage is more likely to occur among neighbors, than it is among persons who reside far apart.

Various general principles founded in social science research may be referenced in the inference of particular consanguineous relationships. For example, there is considerable generality in the principle of endogamy, the practice of marrying within a specific social entity, religious denomination, caste or ethnic group. Indeed, it is common in many ethnic groups. Cultural anthropologists have even identified bases for rejecting individuals from other groups as unsuitable for marriage and the formation of a family. Anti-miscegenation laws may explain many of the unions of particular males and females as parents. These laws enforce racial segregation in marriage by criminalizing interracial marriage. Anti-miscegenation laws were introduced in several of the original US Thirteen Colonies, and remained enforceable in at least some states until 1967. Ethno-nationalism and ethnoreligious groupings provide other examples with explanatory power based on social science principles. Ethno-nationalism is where the nation and nationality are defined in terms of a shared heritage, which usually includes a common language, faith, and ethnic heritage. Those belonging to other ethnicities are then recognized as ‘the other’, as second-class citizens. Ethnoreligious groupings are assemblages of people unified by a common religious and ethnic background. Generalizing, the term homogamy may refer to marriages between individuals who are the same, in some culturally significant condition. Homogamy is a kind of sexual selection involving assortative mating. Such unions in humans are based on socioeconomic status, class, gender, caste, ethnicity, religion, and even age.

Some of the most compelling arguments for unification in humans are found in the cultural conventions of religion. Consider the Religious Society of Friends, whose members are known as Quakers. Further consider two of that Society’s conventions (so well-documented and enforced that some members call them legalisms): Quakers marry within the Society of Friends. And, Quakers marry in the Quaker tradition. This is certainly not a complete list of the dos and don’ts of Quakerism at all times in Colonial history, but they do appear to be two of the Society’s most frequently exercised conventions during that early history. We do know for a fact that Quakers who deviated from these rules were sanctioned by the Society’s governing elders. Typically, such an action led to the transgressor being banned from attending regular business meetings, both local and more regional, gatherings that they would have ordinarily been expected to have attended. This must be considered an important inducement to marry in kind because the sanctioned were then denied the opportunity to voice their opinions concerning matters relevant to their well-being in the community in which they resided. These often included important political and economic issues.

In addition, a particular sanction was considered sufficiently important to the Society’s cohesion that it was written down in the official records of the sanctioned person’s local Monthly Meeting. Violating either of the marrying rules (above) was clearly labeled therein as “mcd”, marrying contrary to discipline (Hinshaw 1936, p. xv). I consider such a published record to function in the same way presumed adulterous Puritan women were required to wear the scarlet letter A (Hawthorne 1850). Such a well-defined and recorded sanction was available for all members of the Society to read, and to debate. Obviously, such publically available knowledge was intended to coerce, with marriages among Quakers being the state preferred by the Society’s governing body, as well as all its members in good standing.

Although Quaker elders judged their sanctions useful, if not necessary, in maintaining the unity of their religion, appeals were allowed. At least some of the sanctioned were

even encouraged to seek forgiveness, with reinstatement in the Society being the desired outcome by all those involved. The sanctioned, or some literate surrogate, was required to openly acknowledge (usually in writing) the fault in question. That included apologizing for the violation, agree to comply with it, and all of the Society's rules, going forward, and plead for reinstatement in the Society. The successful were then listed by name in their Monthly Meeting official records as "rst", as having been officially reinstated ([Hinshaw 1936](#), p. xv). I believe the possibility of reinstatement in a religious community is especially important in maintaining its cohesiveness, because that is the kind of organization where repentance and redemption are otherwise regularly sought. I argue it is these institutionally prescribed norms (mdc) that may be forgiven, after having been violated (rst), that are especially affective in maintaining unity. And, it is their documentation in individual cases that makes them readily available to genealogists, as empirical evidence in the inference of the consanguineous history of Quakers.

Not only is it likely the cohesive and integrative effects of culture explain the coming together of distantly related individuals, say prior to marriage, but these same features are likely to serve as effective bases for the continuation of individual relationships, even long after any potential for parenthood has passed. Still further, the use of cultural evidence provides an empirical basis on which the genealogist can legitimately proceed beyond the discovery of the historical individual to that of the contemporary individual. Without it, research in genealogical systematics is limited, and unnecessarily so. As social scientists have long argued, understanding cultural change is required if we are to more fully characterize human species evolution.

Evidence that can be sampled in individual humans, which is directly relevant and is justifiably inherently transformational, occurs in shared sequences of molecular nucleotide changes. While making these observations, and using multivariate algorithms to analyze them, is beyond the expertise and financial resources of most practicing genealogists today, it is not unreasonable to imagine a time in the not too distant future when such empirical evidence and scientific methods of analysis will not be prohibitively expensive, and will be available to anyone who wants to use them. At present, readily available molecular kinds of evidence are health related. For instance, Type 1 diabetes is observable, and its intrinsic molecular transformational history is well understood.

As underscored above, all sources of information used as evidence in genealogy, even the most elementary individuating vital records, are but propositions requiring additional testing. These observations suggest the need for an iterative investigative process in genealogy, a continuous cycle of critical evaluation-reevaluation. And, under these circumstances, no one kind of evidence, from the observable to the circumstantially relevant, is likely to be of equal value (or of equal weight) in the inference of the composition of a family entity, or its history. By extension, the genealogist is likely to be left with honestly unresolved competing hypotheses of family discovery, surely in the inference of consanguinity.

Lastly, currently available computer platforms, such as the popular searchable databases Ancestry.com and FamilySearch.org, do not make it easy to record all kinds of genealogical research. Apparently, the currently widely available format for presenting evidence and arguments is based on the discovery of affinal relationships, where observable factual information is cited and used affirmatively. Arguably, this format for reporting all genealogical research is too limited. For instance, it is too difficult, if not impossible, to easily summarize research into consanguinity, where competing explanations of descent come from many different kinds of evidence, and are used deductively. Indeed, when evidence is circumstantial it necessarily involves more lengthy descriptions and discussions than is required of the directly observable.

The necessity for a more open kind of format is particularly evident when there are competing propositions of fatherhood, and especially when the possible outcome is one of bastardization. For example, again from my own research, there is the descent of Isaac White (1803–1870), the father of James England White (see above; [Kluge n.d.b](#)).

Quaker Monthly Meeting Minutes for Perquimans County, North Carolina, documents the religiously approved marriage of Isaac's mother, Sarah Elliott (1775–1810), to Josiah White (1779–?) in 1809. Both were born in that county to Quaker parents. However, it was that marriage in 1809, occurring six years after Isaac White's birth, which caused me to entertain the possibility of Isaac having a different father, as well as to the possibility of his bastardy.

What I judge to be constraining in the currently popular computer platforms in this example is not being able to fully report, if at all, the considerable circumstantial evidence supporting an alternative explanation for Isaac White's fatherhood. To begin with, it is well established that Quaker elders attempted to control the movement of their members, even to geographically adjacent Quaker Monthly Meetings. When officially approved, the move was recorded as to time and place in their Monthly Meeting minutes, although rarely as to purpose (Hinshaw 1936). It is this source that provides evidence for Isaac's mother, Sarah Elliott, residing as a young girl in the household of a dying Quaker patriarch, Benjamin White (1736–1789), in the adjacent county of Pasquotank. There is evidence that Sarah Elliott and the young wife of the dying elder were cousins. In any case, it was in this large household where she no doubt came to know the patriarch's son, Josiah White (1773–1816), they being nearly the same age. I hypothesize that it was on her second officially recorded visit to Pasquotank, in 1802, during the time Josiah White was mourning the death of his first wife, Mary (McAdam) White, and that of their newborn son, Joseph, as well as needing help in caring for his two surviving young daughters, that he and Sarah Elliott again came together, and during which time I hypothesize they conceived Isaac, out of wedlock.

I interpret the marriage of Sarah Elliott to Josiah White (1779–?) in 1809 in Perquimans to have been arranged by the Religious Society of Friends, as the Society was known to do. I explain the undisputed fact of this union, occurring about six years after Isaac's hypothesized conception in Pasquotank, as due to the Society's concern for the well-being of its members, such as the financial weight of the bastard bond (see above), and especially for those nearing the end of life. Indeed, we know that Sarah Elliott's Quaker father had publically disinherited her, in August, 1802, and that she lived only one year after her recorded marriage to Josiah White (1779–?), leaving Isaac White in the care of that Quaker stepfather. The possibility of a similarly arranged marriage to Josiah White (1773–1816), who I hypothesize to be Isaac White's biological father, would have been untenable because he is known to have been disowned by the Quaker hierarchy, much before that time, and who had remarried again outside the Society not long after the death of his first wife, and the conception of Isaac. Describing such detail, and especially the competing explanations, requires being able to record largely circumstantially complex narratives. Being able to communicate the complicating sameness of the father's and stepfather's identical names, Josiah White, as well as the fact that both of them had fathers named Benjamin White, adds significantly to the difficulty using the currently available system(s) for reporting genealogical research. It is more than just difficult; I find it stultifying.

5. Critical Rationalism

Several epistemological problems in current genealogical research are exposed in the previous two sections. Of special concern are confirmation bias and the need for iterative testability. Both can be countered with the application of critical rationalism, arguably with what is a replacement for objective confirmation (Popper [1934] 1959, 1983). The feature distinguishing critical rationalism from other forms of rationalism is falsification. It begins with conjecture followed by earnest attempts to demonstrate the falsity of what is hypothesized. In this context, Popper's ([1934] 1959, e.g., see p. 415) concept of degree of corroboration (DOC) has been summarized as "the relative and tentative confidence assigned to one hypothesis over another, based upon the performance of each under critical tests" (Lienau and DeSalle 2009, p. 187). The critical test characterizing DOC is one attempting falsification. Clearly, DOC is not a confirming approach to discovery. It is not concerned with claiming something to be true by confirmation. It involves a doubting mindset, from the beginning to the end of the process of discovery. However, let me be

clear, claiming that nothing can ever be communicated about the natural world (extreme skepticism) is not part of that kind of thinking.

Critical rationalism was conceptualized initially, and as it continues to be argued, in the context of the nomothetic (as in discovering laws of nature). This process stands in sharp contrast to the inference of human history, which is obviously concerned with the ideographic, the conjecturing and critical testing of competing family tree hypotheses (Kluge 2009). However, that such a problem is not an obstacle to the historical sciences was offered long ago by Karl Popper, the person most responsible for developing the philosophy of Critical Rationalism. He argued that “conclusions may be derived from [historical statements] (with the help of a theoretical system) such that the falsification of these conclusions may falsify the singular [historical] statements in question” (Popper [1934] 1959, pp. 75–76). Thus, switching from verification to falsification is possible for the historically concerned genealogist, as it has been for the phylogenist (Kluge 2009), but it still requires adherence to a theoretical framework and methodological set of rules.

There is the testability part of the theoretical system that is to be adhered to, which in the present case addresses whether or not a proposition, like a consanguineous hypothesis of family history, is falsifiable. In terms of falsifiability that means counterexamples to the hypothesis being tested are logically possible, and that it is practically feasible to observe them. Also part of the aforementioned system, epistemological access to causal explanation and explanatory power of genealogical history is sought with deductive argumentation, not with induction. Deductive inference based on falsifiability entails the *modus tollens* of propositional logic, proof by the contrapositive (formally expressed as *if p then q, if not -q then not -p*). This entailment involves competing hypotheses of genealogical history being tested conditionally, as in assuming this, then that. The assumption in such a conditional is governed by regularities, ideally those holding under a stipulated set of conditions throughout the universe. For example, in the case of phylogenetic systematic inference, there is the Law(s) of Inheritance, which concerns changing genetic events, a transformational process. There is an appeal to the regularity of paired genetic factors in that case, segregation, independent assortment and dominance. However, as Popper (1983, p. 221) went on to underscore, “[w]e no longer look upon a deductive system as one that establishes the truth of its theorems by deducing them from ‘axioms’ whose truth is quite certain (or self-evident, or beyond doubt); rather, we consider a deductive system as *one that allows us to argue its various assumptions rationally and critically*, by systematically working out their consequences [my italics]. Deduction is not used merely for purposes of proving conclusions; rather, it is used as an instrument of rational criticism”.

A lesser kind of regularity may be recognized when a large proportion of conditional instances are observed. Such regularity is usually labeled a principle by social scientists. While I know of no universal laws that determine the regularity of cultural kinds of evidence, the considerable likelihood of some relevant principle, like endogamy, may well meet a relaxed standard of lawfulness.

Inconclusive or conflicting evidence can render genealogical inference indeterminate. Other historical sciences, like the inference of species history, use the evaluative rule of parsimony in attempting to avoid that inconclusive state. Appealing to the parsimony criterion not only provides a basis for eliminating superfluous process model assumptions from background knowledge, but parsimony also serves to minimize ad hoc propositions (Sober 1984, 1988, p. 11), where the more complex conclusion is often the cause of the indeterminate state. No less important than maximizing the explanatory power of the evidence by minimizing ad hoc propositions, the parsimony criterion determines, in theory, the least falsified, the most corroborated, proposition(s) tested (Popper [1934] 1959, p. 470). Yet to be put to use in genealogical research is a parsimony algorithm, where competing propositions of family entity relationships are conjectured. Of course, parsimonious reasoning may be applied throughout the evidentiary discovery process, prior to that of actually inferring a part of human family history.

Have observations used in discovery been accurately described and recorded before their combined analysis? Those genealogists who report only a single, empirically derived, research conclusion overlook the problem that, as their research moves to an earlier historical time, the observability of evidence has likely diminished, such as the instances of birth, death and marriage, as does the researcher's overall claim of increased accuracy. There is the prospect of having to admit that there is more than one possible hypothesis of family history with that loss of factuality, if only owing to increased investigator error.

An additional complicating factor in the inference of the family entity and its history over many generations is that relevant evidence is likely to be of two basic kinds, factual and circumstantial. Should evidence of these different kinds be treated as equal in the discovery of a particular generational part of history? And if such a justification cannot be argued in principle, then on what basis are those two kinds of observations to be analyzed together? One possibility is to analyze all of the available evidence, the total evidence, with an algorithm based on an optimality criterion like parsimony. Such analyses will surely require that genealogists become familiar with summarizing their findings as an executable matrix (organisms referenced by independent evidentiary statements, inclusive of both the biological and the cultural).

6. Conclusions

The family entity is a real, spatiotemporally restricted, thing. It has many of the qualities of individuality, with the property of self-delimitation and descent being especially noteworthy. Even proper nouns are regularly applied to family entities. As such, the family is both observable and inferable.

While specific in its general meaning, the family entity's contents can vary in its complexity. The simplest state is an offspring and a female biological parent. Complexity increases as a function of both parents being hypothesized, as well as there being more than one offspring. It also increases when offspring share only one parent. In whatever historically unique state of complexity the family entity exists, it can be disassembled to a simple three-person statement for purposes of empirical historical analysis. In all such efforts there must be a concern for propinquity of descent, as well as maintaining the condition of individuality for each sub-entity recognized. The latter requires treating each entity as a semaphoront. Also, as a contemporary individual, whatever the composition of the family, it is an effector of what is the human species, the historical individual of which it is a part.

Genealogists investigate two kinds of relationships, affinal and consanguineous. Research usually begins with the former, where relationship due to marriage is readily made by observation. Discovering consanguinity, as it relates to the family and family tree relationships, naturally proceeds once the sources of observable evidence are exhausted, even when research seemingly reaches an impasse because of off-setting differences in observation. However, this continuation necessarily involves a paradigm shift in discovery, from observations pertaining to the facts of affinal relationships to the deductive methods of scientific inference and evidence relevant to explaining consanguineous history. The former involves confirmation, the latter corroboration by means of testability.

This paradigm change is worth underscoring for a variety of reasons. For instance, the family entity is a place in the hypothesized history of humans where different approaches to discovery can be directly compared and contrasted. It is where induction and deduction meet in the discovery of history. It is where a natural and a social science meet, in a conceptually meaningful context (Chapias 2016, p. 46). An obvious subject of this kind is the comparison of genealogical systematics to LGBTQ Genealogy.

The question remains as to the kinds of cultural evidence that can be justified in the ideographic study of a contemporary individual, like the human family. Effectively, I am asking if a concept like the transformation series (*sensu* Grant and Kluge 2004), relevant to some part of the biology of the organism in question, can be convincingly identified in cultural evidence. For example, we know the act of marriage is usually preceded by a time

of engagement. We also know those individuals entering into courtship normally come from different family histories. In this, I take it to be sufficient that our cultural evidence only need explain the results of non-random (assortative) mating, a principle well-grounded in evolutionary theory. What other kinds of cultural evidence can be justified by the concept of transformation series in the study of contemporary individuals? This is an important question for genealogists willing to explore the theoretical boundaries of their research.

Records of birth and death individuate a particular person in a family generation. They do not constitute evidence of historical unification, even when directly observed, as a matter of fact. In addition, unification due to marriage is largely misunderstood. While genealogists may even claim to know mother-offspring unity by direct observation, it is clear that paternity is not established with that kind of confidence. It is because the certainty of fatherhood is called into question that the shared family name can be of little value in the inference of the more inclusive part of history to which the family entity belongs. The uncertainty of paternity would appear to be especially consequential for organizations like the Daughters of the American Revolution (DAR), which emphasize observing the male line of descent from marriage and birth documents. Moreover, for the DAR to then deny inference of descent from probate records seems logically inexplicable.

To infer family generation history from a shared similarity amounts to a category error; that is to say, what applies to the nomothetic does not apply to the ideographic. Clearly, that error obtains in the many instances in genealogical inference that appeal to the similarity of personal names, such as having the same surname.

There is considerable potential for confirmation bias in genealogical inference. To avoid that possibility, the study of human relationships might be undertaken as a form of critical rationalism, where falsification, not confirmation, is the *modus operandi*. In that endeavor, the genealogist seeks to discover the least-falsified, most highly corroborated, hypothesis. The nature of research based on total evidence, the factual as well as the circumstantial, the biological as well as the cultural, is likely to lead to some indeterminate result. A well-argued solution to that dilemma is to seek the most-parsimonious proposition(s) of family relationships, and thereby a most highly corroborated hypothesis.

Having reached the above conclusions concerning genealogy, I suggest the metaphysical boundaries of the field that I am calling genealogical systematics may now be more fully explored (Frost and Kluge 1994). Surely, much of that future will involve empirical research, and for which genealogists are especially well-known.

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