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WHICH HALF IS MOMMY? TETRAGAMETIC CHIMERISM AND TRANS-SUBJECTIVITY

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Imagine being told by a doctor that a twin, one you never knew you had, exists inside you. It is well known that fraternal twins arise from two fertilized eggs that develop into nonidentical siblings. Less well known is that these two zygotes sometimes overlap and fuse so completely as to develop into one body with two distinct sets of DNA, a phenomenon called tetragametic chimerism (Tippett 1983). We explore how this rare occurrence exposes complex links between understandings of DNA, human subjectivity, and definitions of motherhood. We focus on cases in the United States of two chimeric women, Lydia and Karen, who were subjected to genetic tests for parentage and subsequently deemed by medical authorities not to be the mothers of their children. The stories of these two women offer opportunities to investigate how definitions of motherhood are constructed, legitimized, and contested by and through science.

According to Marilyn Strathern (1992), nature does not offer us an adequate basis on which to develop a culturally relevant model for kinship. Nevertheless, Western perceptions of kinship increasingly refer to genetic categorizations of bodies as means for defining legitimate mothers and fathers. Aryn Martin (2007a) suggests that there is something of the self that has “become bound up in cells, in response to a cultural rhetoric of genetic reductionism...facilitated by a broader political shift toward privatization and individual responsibility in the late twentieth century in America and in other advanced liberal states” (222). We outline the foundations that enabled this shift toward valuing genetic makeup as a component of modern citizenship. Specifically, we argue that the process of genetic testing works to publicly legitimate the effectiveness of the test itself while acting to stabilize a narrow and powerful definition of motherhood based on testable biological attributes. We then compare the performative aspects of the chimeric mother with notions of “passing” and offer a consideration of human chimerism as posthuman drag. Finally, we

argue that the political implications of the established means used to define legitimate mothers extend beyond the trans-genomic quality of chimeric mothers to inform inquiry into reductionist arguments confronted by transgender parents and their children.

For our analysis, we largely focus on the experiences of Lydia and Karen as they are presented in the *New England Journal of Medicine*, a National Public Radio interview, and a Discovery program with the title *I Am My Own Twin*. We conduct a genealogy of the conditions that have led to the momentary unintelligibility of chimeric mothers within a genetic reductionist framework and extend this to other trans phenomena. Throughout the analysis, we apply Foucault's concept of biopower, whereby the chimeric individual undergoes a process of objectification and subjectification within a framework of technoscientific expertise and intervention.

INTRODUCING THE MYSTERY

The Discovery (2005) documentary first introduces Lydia, a Caucasian single mother with two young children and pregnant with a third, applying to receive welfare aid for her family. Through standard procedure, she and the African American father of her children took requisite blood tests to verify parentage. The lab results reported that the father was a match, but that Lydia could not possibly be the mother of her children. She and her family were subjected to multiple tests, emotional anguish, and accusations that she had obtained her children through illicit means. Even Lydia's father suspected she was not being honest about her conception and pregnancy. Eventually she was accused of welfare fraud and taken to court so that the state could determine parentage and reassign custody of the children accordingly. A tearful Lydia describes dropping her children off to day care with the concern it might be the last day she would see them. Unable to procure a lawyer because of the strength of the DNA evidence against her, she appeared in court alone. Seeing that Lydia was pregnant with her third child, the judge appointed a witness to observe Lydia's birth and run DNA tests on both her and the infant. The results came back negative, suggesting she was telling the truth, though to Lydia's chagrin the new results only fostered accusations that she had been a surrogate.

The second case in the documentary involves Karen, a financially secure Caucasian mother of three grown children. During the histocompatibility process for a kidney replacement, Karen's doctors insisted that only one of her sons was related to her; the other two were not. Karen claims that she believed the hospital had made a severe mistake. Nevertheless, she started to look at her children differently. Was there something about her third son that made him more like her? Would her other sons accept her as their mother? Could she treat them the same way as before? Karen relates to the viewer her fear that the other two sons might "somehow think of her as less their mother and that was very saddening...that somehow it was more like an adoption or it was just not the same as being their mom" (Discovery 2005). Unlike Lydia, who was threatened with losing custody of her children, Karen attracted the attention of a physician at the National Institutes of Health (NIH). Believing that she was an "upstanding citizen," researchers asked her to take part in an NIH-funded study to find a scientific explanation for this conundrum.

After extensive testing involving genetic identifications of several parts of her body, the researchers determined that Karen was a tetragametic chimera. Instead of the standard twenty-three pairs of chromosomes, she had forty-six. As a result, some of her tissues and organs were genetically mapped to a first set of chromosomes and others to a second. Karen's case was outlined in an article published in the *New England Journal of Medicine* (Yu et al. 2002), which fortuitously caught the attention of a state attorney involved in Lydia's case. After being introduced to the theoretical possibility that Lydia *could* be a chimera and following the established precedent of Karen's case, the judge eventually granted Lydia official motherhood of her children. After the court's determination, Lydia continued to cooperate with scientists, she too having become interested in her origins. During extensive examinations of her tissues, two sets of chromosomes were identified in her cervical smear results.

The identification of Lydia and Karen as "chimeras" follows a long etymology of the term, which we briefly summarize here. A chimera in Greek mythology (dating back to Homer, circa eighth century BCE) refers to a monstrous creature made of the parts of several different animals, typically the head of a lion, the body of a goat, and a snake for a tail (Lesky 1966). Beginning in the early twentieth century, the term has been applied metaphorically within scientific discourse to describe vari-

ous phenomena, from grafted plants containing cells derived from different sources, to viruses that have appropriated genetic material from another organism, to nonhuman animals incorporating genetic material from an outside source. However, it was not until 1953 that the term “chimera” was first applied to a human being (Martin 2007b). In that year, geneticists identified the presence of two blood groups, A and O, in a woman referred to in the literature as Mrs. McK. Though the term “chimera” was being used in the 1950s to refer to an organism whose cells were derived from two distinct zygotes, this was never definitively demonstrated in Mrs. McK’s case. Martin (2007b) suggests that researchers’ expansion of the term to include Mrs. McK reflects the “politics and contingencies of scientific nomenclature” (102). In a more recent application, Donna Haraway (1991) uses the word when discussing cyborgs, referring, in part, to technohuman hybrids, or humans bodily incorporating varying degrees of technology.

Few definitive cases of tetragametic chimerism have been recorded since the 1950s. Until Lydia and Karen, most chimeras had presented with particular phenotypic characteristics, such as nonstandard genitalia or patchy skin and eye pigmentation (Yu et al. 2002), which prompted further inquiry and diagnosis. Karen and Lydia presented no such outward signs; the discordance between their DNA and that of their children most likely would have gone undetected had they and their children not been subjected to genetic testing.¹

Given the experiences of these women, we might ask whether genetic testing is an effective way of establishing motherhood. But such a question presupposes that the concept of motherhood is durable or even an attribute that can be tested for in the first place. The event of human chimerism in childbearing women does not challenge genetic testing as much as it problematizes Western definitions and regulations encompassing maternity. An effect of genetic testing is that it in part structures our concept of what motherhood is. These tests can only be effective arbiters of motherhood to the extent that they are seen as legitimate and given power to reinforce particular notions of what being a mother means. Karen shares DNA with her sons but only approximately half her cells contain that DNA. Genetically speaking, she is both their mother and their aunt. Which organs are related to the children and which are not? Is she only a fraction of a mother?

SITUATING THE CHIMERIC MOTHER

Anthropologists have long dealt with complexities involved in defining kin and the centrality of resulting definitions in social interactions. The Western concept of biologically determined structures within the technos of kinship is only one of many explanations for “blood relations” between kin.² For example, some Australian aboriginal relations involve totem systems and concepts of reincarnation, which do not rely exclusively on knowledge about physiological procreation or notions of individual paternal consanguinity (Malinowski 1913). While contemporary Western definitions of kinship are strongly associated with cipherable biological links, in some cultures this link is neither as clear nor as durable. These biological associations have not always been so salient in Western traditions of kinship.

Through what conceptual mechanisms have genetic codes come to occupy a privileged position in Western definitions of motherhood? In the sections that follow, we argue that explanations can be found in the historical development of modern medicine’s treatment of the human body, the rise of medical and scientific authority, and undercurrents of determinism in Western culture. We extend this familiar account to include the legitimating cycles of bio-identity performances, both social and institutional.

OBJECTIFICATION

Contemporaneous with the rise of public hospitals, clinics, and laboratories during the eighteenth and nineteenth centuries was a shift in the way doctors developed understandings about patients, their bodies, and their diseases. Before this shift, doctors were in an inferior social position to that of their mostly wealthy patients and relied primarily on patient descriptions of feelings and symptoms. Afterward, doctors became actively involved in the exploration of patients’ bodies through visual inspection, palpation, percussion, taste, and auscultation (Bynum 1994).

In French schools, surgery and medicine were treated as two branches of the same science. Resultantly, corpses were provided to medical students, who were taught to see disease the way a surgeon would, in terms of anatomic structures (Bynum 1994; Risse 1984). With few therapies available for suffering patients, nineteenth-century diagnosticians concentrated their efforts on nosology. This biologically based mode of categorization has been characterized as a shift toward the objectification

of bodies (Rosenburg 1981; Waldby 2000). Through such an understanding, bodies are envisioned as things to be studied, as a corpse would be. During the process of objectification, the human is silenced and investigated as a mechanism. A decoupling is achieved, one that separates the physical body that people *have* from the person that they *are*.

Lydia and Karen's trans-genomic status presents an opportunity to expose these strains of objectification involved in the sorting out of their status as mothers. Before the process of testing had begun, both women entered the phlebotomist's station as whole selves. Inside, they were fractured by a needle, which sucked away a part of their bodies to be interrogated. Their slightly damaged selves left the room, while a small part of their bodies stayed behind to be stored, shaken, mixed, dropped, inspected, recorded, verified, and eventually thrown away. Wrapped in a bar-coded and numbered label, this part of their bodies represented them completely. Their selves became silent as this part of their body alone spoke for their experiences, capabilities, honesty, and other attributes, including their status as mothers. Importantly, these test outcomes eventually entered into Lydia and Karen's consciousness, informing their own subjectivity as mothers. This process is a variation of what Foucault views as a technology of confession, whereby expanding methods of science coerce bodies and their internal mechanisms to speak for people. The mother is rendered an object of knowledge whose internal structures tell the truth about her and become the basis of self-scrutiny—a simultaneity of objectification and subjectification (Dreyfus and Rabinow 1983).

SCIENTISM AND APPEALS TO METHOD

Through what historical and contemporary conceptualizations have these scientific confessions achieved their legitimacy? By the mid-nineteenth century, both the United States and Britain had established medical educational facilities, licensing, professional societies, periodicals, and laws regulating medical practice. Doctors understood that a privileged scientism could combat calls for lay control of medical practice. Shortt (1983) argues that inhabitants of the nineteenth century “internalized first the authenticity and then the utility of science” (167–168). Furthermore, scientific inquiries became increasingly shaped around the techniques and restrictions encountered in a laboratory setting as well as by opportunities enabled through chemistry, measurement instruments, and laboratory materials. Olga Amsterdamska (1993) explains that “sometimes the tech-

nical opportunities begin to serve not only as means to an independently specified goal, but as an end in themselves” (38). This importance of method as a constituent of science is further supported by John Moore (1993), who claims that “science is both knowledge of the natural world expressed in naturalistic terms and the procedures for obtaining that knowledge” (502).

From an eighteenth-century perspective, the thought that a vial of blood could speak for emotions, sexual experience, pregnancy, childbearing, and love would seem perfectly ludicrous. Even if the technological capacity for such a performance were available two centuries ago, it would not have been esteemed but more likely considered a criminal act. In contemporary Western society, however, the vial of blood calls upon established expertise and claims on method. These performances are involved in a process heavily influenced by a scientism whereby contents of a statement can become less significant than the established expertise of the person doing the stating.

DETERMINISM

In the early twentieth century, biological determinism surfaced as a way of bringing findings of medical research to bear on social issues. In its extreme form, social problems were seen as the result of genetic flaws that could be tracked and eliminated through eugenics. For example, William March’s (1954) book and subsequent film, both titled *The Bad Seed*, follow the realization of a mother that her adolescent daughter, despite her ideal upbringing, has “inherited” a murderous instinct from her grandmother. Determinist explanations presume biological attributes as foundations for social interactions and identities. For instance, if a woman is a biological mother, she is presumed to be capable and interested in fulfilling society’s ideal standards of motherhood (Rogus 2003).

Today’s predominantly biogenetic model for defining kin, often assumed as self-evident and impartial, has been criticized for being recent, modernist, ethnocentric, and heteronormative (Franklin 1997; Hird 2004). David Schneider (1980) argues that this model of kinship should be understood as a specific symbolic system, one that is markedly Eurocentric. In the “American cultural conception,” he notes, “kinship is defined as biogenetic. This definition says that kinship is whatever the biogenetic relationship is. If science discovers new facts about biogenetic relationship, then that is what kinship is and was all along” (1980, 23).

The experiences of Lydia and Karen also expose a degree of determinism present in contemporary scientific definitions of motherhood. For example, why did Lydia's court case revolve around DNA testing and not statements by her children indicating who their mother was? Even medical records showing that Lydia had given birth to her children were apparently trumped by an epistemological framework that privileges genetic evidence. Why were interrogations aimed at blood samples and not her family, her community, or members of her church? A court might argue that none of these people could speak authoritatively on whether she was a surrogate or perhaps adopted or even stole her children. The "legitimate" mother in this case is not the adopting mother, the caregiver mother, the family mother, or perhaps even two gay male "mothers," but the person who can display that her DNA forms a match with her children's. The result is a specific type of motherhood that is defined through seemingly fixed and lawlike biological attributes (Franklin 1995). So if Lydia's going to claim to be a mother, she'd better have the chromosomes to prove it.

PERFORMANCE, LEGITIMACY, AND POWER OF KINSHIP MODELS

According to Dorothy Nelkin and Susan Lindee (2004), media representations largely influence public conceptions of genetic relatedness. Television programs increasingly highlight individuals searching for their "roots" through locating their biological parents. Other shows bring families on stage to genetically sort them out into "real" parents and others—as if factors involving child rearing and care were less important if not accompanied by a complementary set of genetic material. Cultural weightings in the technos of kinship, largely derived through interactions with family and relations, are dialectically engaged with concepts of biological commonality.

In the same way that performativity of gender becomes part of the power associated with gender (Butler 1997; 1999), so DNA testing achieves credibility not exclusively through its functional value of defining related kind but through its very performance as such an indicator. The biological tests are *doing* kinship. And through the doing of kinship, biological testing enters into the flow of power surrounding the identification and definition of shared kind. A key aspect to performativity is repetition (Butler 1997). Every television show, magazine article, or interpersonal conversation that relates the story of a genetic test for par-

entage builds the power of the test as a valid means of identification. In addition, legitimacy develops by proxy through various other public discourses featuring essentialist claims, from genetic factors in depression to the search for a “gay gene.”

Additionally, the repetition of performance acts to position biological surveillance as a *meaningful pursuit*. Private or public institutional support for genetic testing that is spoken, written, enacted, or implicitly embodied through policy bolsters the validity of the entire project of genetic testing and lends legitimacy to bio-experts as justified actors pursuing legitimate activity (Yanow 1996). The result is a self-reinforcing system whereby subsequent calls for political attention start from a higher level of legitimacy. For mothers, these repetitive performances act to buttress a narrowing toward biogenetic policing of their status as parents.

Performances and the resulting power flows involved in the legitimization of this model, however, should not be characterized purely as an autonomous technoscientific process. Undoubtedly, actors are involved in every step. For example, we might expect mothers themselves to invest less in biologically determined definitions of motherhood. After all, they have their own experiences as mothers to draw upon. Wouldn't a genetic test be insignificant in the face of such experience? In the case of Lydia and Karen, the answer is clearly *no*. After Karen's transplant and Lydia's court case, both women volunteered to cooperate with further genetic testing of their tissues. Their actions serve to patch the cracks formed in the genetic foundation of kinship and to restore the related science to a now stronger position as the legitimate arbiter of motherhood. It seems their experiences are in part structured through genetic understandings of kinship and cannot be so easily separated from these biological associations.

The salience of biologically bound definitions of motherhood becomes evident as we witness Karen questioning the nature of her own motherhood after having conceived, carried to term, given birth to, and raised her children. She reflects, “I felt that part of me hadn't passed on to them. I thought, ‘Oh, I wonder if they'll really feel I am not quite their real mother’” (NPR 2003). One of her sons had DNA that formed a match with her own, prompting Karen to speculate, “Are there certain physical characteristics that make this third son look more, act more, is his personality more in tune with what my group of genes is producing?” (Discovery 2005). As Karen begins to call into question her own relationship to her children, we see the Foucauldian notion of subjectification at

work—the process whereby subjects come to work on themselves within a disciplinary technology of the self (Foucault 1990)—redefining their own sense of subjectivity and their identities as mothers in biogenetic terms. Karen and her husband called a family meeting to tell their children that the doctors were saying they were not related to their mom. Her legitimacy as a mother came into question as the biological link between her and her children was contested. Perhaps this is why she agreed to subject her body to a series of highly invasive tests in order to determine her “origins” and to harmonize her biologically bound status as a mother with her otherwise understood standing as one.

POSTHUMAN DRAG

In Jenny Livingston’s (1991) documentary film *Paris Is Burning*, a light-skinned Latina preoperative transsexual named Venus Xtravaganza effectively appropriates “realness norms” as a white woman in drag pageanttries and as a sex worker on the streets; ultimately, however, she fails to pass on one occasion when she is killed by a client, presumably for violating gender norms. Judith Butler (1993) points to both what she calls drag’s simultaneous denaturalization and reidealization of gender norms in moments of passing and to the exposure of extreme regulatory forces at work when Venus fails to pass and is murdered.

We propose the possibility that human chimeras could be envisioned as a form of drag that readily passes as that which it seeks to imitate—like Venus Xtravaganza, who passes, yet doesn’t pass, in a “repetition which works at once to legitimate and delegitimate the realness norms by which it is produced” (Butler 1993, 131). The human chimera passes when her bodily manifestation of dual genetic material appears indistinguishable from a body that arose from one set and fails to pass only in moments of kinship marking. Furthermore, considering that reproductive technologies such as in vitro fertilization and implantation of multiple embryos result in an estimated thirty-three-fold increase in the chances of human chimerism (Strain, et al. 1998), the chimera could be viewed as a kind of posthuman subject, in line with Haraway’s concept of a cyborg—an integration of human and technology. In such instances, the chimera can be read as “human” and is revealed to be passing only via a set of genetic technologies, which, ironically, are related to those that allowed for her creation.

Marjorie Garber (1992) ponders the dualism of “passing” and “not passing” and what it reveals about the performativity of gender and its

problematic linear trace back to biological sex by asking: If females cross-dressing as males are “taken for males throughout their lives, to what gender *do* they belong?” (47). We might pose a comparable question of chimerism: If chimeras pass as humans with a single set of DNA, to which side of the emerging dividing practice of chimera/nonchimera do such people belong? Must a person be conscious of her status as “other” to be said to pass, and what happens when this “other” is not yet available within consciousness as an alternative? To address these questions we turn briefly to Garber’s reference to Ellen Craft, a light-skinned slave who escaped from slavery by passing as a white man, described in William and Ellen Craft’s *Running a Thousand Miles for Freedom*. The family that owned the Crafts became annoyed when Ellen was mistaken for a white child in the family. Garber argues that “Ellen Craft’s ‘crime,’ in the eyes of the white family, is to look as if she belongs—a kind of ‘passing’ which is not deliberate but inadvertent, based upon similarity and contiguity: passing as metonymy” (1992, 282). Chimerism is just this sort of unintentional passing, which is revealed as such only in the moment that it no longer passes. In other words, “not passing” here requires exposure of both an admission of the possibility *to* pass and the admission of a successful passing prior to the moment at which one is said *no longer to* pass.

Anne Fausto-Sterling (2000) offers a more recent example of this unintentional passing, which begins to expose the role of scientific authority in both the identification and resolution of norm violations. Maria Patiño, a hurdler on Spain’s 1988 Olympic team, was summoned, per regulations, for chromosomal sex testing before her event. To her surprise, Maria failed the test: “She may have looked like a woman, had a woman’s strength, and never had reason to suspect that she wasn’t a woman, but the examination revealed that Patiño’s cells sported a Y chromosome, and that her labia hid testes within” (1). Consequently, Maria was barred from the Olympics as well as future events, stripped of past titles, and publicly outed by the press, which led to a number of upheavals in her personal life, including the loss of a boyfriend and a scholarship, as well as difficulty securing a job. Like our chimeric mother Lydia, Maria also became dependent on the intervention of scientific experts in her defense. After being diagnosed with an intersex condition called androgen insensitivity syndrome, Maria underwent a number of extensive examinations in order to argue that her cells’ “inability to respond to testosterone” (2) had left her body “feminine enough to compete,” according to her doctor (Vines 1992, 41). In 1992, following the

intervention of medical authorities, Maria was reinstated by the International Olympic Committee.

Notably, chimeras with both XX and XY genetic makeup can be phenotypically male, female, or intersex, as a result of presumably differential proportions of cell lines in the gonads (Simon-Bouy, et al. 2003; Tippett 1983). Those with phenotypically standard genitalia might be said to be “passing” within a narrowly conceived biomedical framework that often insists upon concordance between gender identity and sexual anatomy, including chromosomes, as evident in Maria Patiño’s case.

Lydia’s “crime” appears to be similar to that of Ellen Craft and Maria Patiño, but in her case, she was passing as a mother. It seems clear that the court held the relationship between genes and motherhood to be self-evident. Motherhood was defined solely on evidence establishing a genetic link between mother and child. Had Lydia been the surrogate mother of these children, we might imagine none of this to have ever occurred. Her only crime was claiming to be a “real” mother, when, viewed within a scientifico-legal framework, she was merely a pseudomother. At the end of the trial, Lydia provided no more evidence that she was not a surrogate than at the beginning. The legitimacy of the claim that Lydia *could* be a chimera appears to have motivated the court to grant her official motherhood status.

Karen, unlike Lydia, enters into this discourse with science “on her side,” but the overall process is one of the regulation of knowledge and bodies. What can we say, then, about passing in Karen’s case? Can she be said to pass as something she was not aware she was *not* in the first place (a human with the standard twenty-three pairs of chromosomes)? While “chimera” is not yet a household term for another kind of being, the inexplicable genetic status of both Karen and Lydia was, in fact, used as a dividing practice within medical and juridical discourse and one that had profound effects on their own identity and subjectification. Like Lydia, the moment at which Karen can be said to pass comes when it is revealed that the DNA of her children does not match her own. Despite her normal appearance, she is revealed to be a chimera who had managed to evade the regulatory radar. In the moment at which Karen is diagnosed as chimeric, a moment in which science is said to have found the answer, the chimera simultaneously reidealizes the regulatory norm of science as purveyor of truth, reidealizes the status of the “normal” human being, and denaturalizes the entire framework by exposing the process at work.

THE ROLE OF EXPERTISE IN TECHNOLOGICAL CONFESSION

Donna Haraway (1997) defines kinship as “a technology for producing the material and semiotic effect of natural relationship, of shared kind” (53). The technology of kinship was once understood and practiced on a level immediately accessible to the actors and clans of actors involved in its regulatory application. Because of their human scale and accessibility, Aboriginal as well as early Western kinship models allowed citizens to be equals in comprehension of their placement in social structures. The shift toward a more exclusive view of a biological determinant of kinship is a movement away from accessible technologies that deliver the self to the social world and toward inaccessible technologies that direct inquiry inward.

Contemporary Western understandings of kinship are informed by complex genetic tests, which are neither fully understood nor simple enough to be administered by individuals. In contrast to social movements, such as that involving HIV/AIDS activists whose lay expertise transformed related clinical research and treatment (Epstein 1996), the chimera is isolated and can travel only to a certain point before being required to proceed on faith. Such a system carries democratic implications as it erodes informed choice and bypasses the feedback mechanism upon which democratic engagement relies.

If, for example, Lydia had a more comprehensive knowledge of the genetic means through which she was being judged, or at least a representative with such an understanding, she might have been better able to protect her motherhood status by challenging the specificity of the genetic test from the beginning. In Karen’s case, having a class advantage over Lydia, one recognizes variability in the regulatory process of power. Karen was offered medical representation from the NIH, which helped her navigate the complexities involved in dealing with a motherhood model grounded in highly technical definitions of kinship. Conversely, Lydia initially ended up alone in a courtroom, unable to afford legal or alternate medical representation to defend her family.

From the experiences of Lydia and Karen, we can see that defense against accusations of false motherhood requires either highly specialized expertise or an intermediary technician. These technical resources, whether learned through education or provided through a representative, are not distributed evenly in American society. Lydia, coming from a lower socioeconomic position, did not have the resources that were avail-

able to Karen for her legal defense. Nor was a simple mode of engagement sufficient to adequately secure her status as a legitimate mother. Lydia never made claims that her DNA matched her children's. She entered the court claiming simply that she was the natural mother of her children and had the birth certificates to prove it. Yet these were the wrong tools to counter accusations framed in a court recognizing only genetically based relations between women and their offspring.

We note here the similarity between Lydia's situation and the challenges transgender parents face in a juridical system that silences the individual while privileging the medical knowledge and expertise that confesses on their behalf. Taylor Flynn (2006) thoroughly chronicles legal precedents involving transgender adults whose parental relationships were nullified by the courts. In case after case, trans parents who *are* genetically related to their children have had their parental relationships erased because they do not conform to societal standards of parenthood that insist on concordance between sex assigned at birth and gender expression or identity. Trans parents who are not biologically related to adoptive children by marriage may also find this legal relationship voided if their marriages are deemed fraudulent on the grounds that they are in same-sex relationships as indicated by their sex assigned at birth. Even in relatively rare cases when courts have sided with transgender people, appeals are made to scientific expertise, particularly the argument that internal biological attributes such as brain sex are causally related to the stability of gender identity (Flynn 2006). Confessions of trans people are expunged in favor of assertions by intermediary technicians who speak on their behalf, often after invasive and humiliating examination.

Like other trans people, human chimeras must undergo extensive examinations to establish their intelligibility as persons within a system where "scientific norms...seem almost sacred" (Dreyfus and Rabinow 1983, 174). However, unlike the phenotypically standard chimera who does not necessarily present a gender identity discordant with the sex assigned at birth, other trans individuals face additional moral obstacles associated with gender and sexuality; Flynn references a court that forbade visitation between a trans mother and her children because of "the need to protect the children's 'moral development'" (Flynn 2006, 42).

THEORETICAL, LEGAL, AND POLITICAL IMPLICATIONS

Paul Rabinow (1999) addresses the influence of biological attributes on

social structures with the term “biosociality,” a play on the word “sociobiology.” The concept of biosociality stresses the prominence of biological means as culture is naturalized through constitutive metaphors of nature. Definitions of motherhood are constantly defined and redefined within these increasingly biologically informed technos through the actions and tacit understandings of the participants involved. We have argued that an effect of genetic testing is its increased predominance in the construction of kinship conceptualizations.

Strathern (1992) proposes that shifts in conceptualization have cultural consequences. Strains of objectification, scientism, and determinism in modern medicine allow for the deployment of technocratic means to categorize not only kin relations but bodies more broadly. Through the process of objectification, the physical body that a mother occupies is decoupled from the person that she is. This physical element is interrogated alone but allowed to speak for the entire mother as if she had not been fractured at all. Appeals to scientific expertise lend credibility to the means by which this process is performed. Furthermore, tacit and determinist understandings, outlining what mothers are and should be, come to be inscribed onto physical body elements. In effect, a new mother is formed through this inscription. Each performance of this fracture and fusion further legitimates the process until the underlying practice is eventually understood as natural truth, which is unquestioned and obvious. The event of chimerism in childbearing mothers offers a site of resistance, wherein the physical elements do not so neatly match with the determinist and idealized inscription being applied.

Scientific authorities create technological confessions for these mothers through a privileged objectification of their biological attributes. The women can challenge this confession but cannot challenge the process of confession itself. Through widespread and repetitive performances, the technological confession is articulated as it gravitates toward stabilization, which, in effect, sanctifies it. Both transgender and transgenomic parents are restricted to working within the scientific frame to refute confessions that have been made for them.

When the widely accepted and unquestioned technos of kinship is revealed to be a means of regulatory control, the foundations of a collective human subjectivity are fractured and the process begins again, but never entirely from scratch. The pieces of scientific knowledge are recycled, erected in novel ways, rather than fully discarded, and thus, subjec-

tivity becomes inseparable from the technological processes that are used to construct those individual units of knowledge. Authorization and allocation of power is distributed throughout the process, resulting in a delocalized power network (Foucault 1990). Members of the scientific community may not consciously aim to control Karen and Lydia, but they are working within the means-based rationality of an established system of truth, which eventually does control the women's status as mothers.

Mechanisms of control are not limited to the scientific and legal communities; Karen and Lydia come to work on themselves, redefining their own identity as mothers. The control is so powerful that it changes the way Karen conceptualizes her relation with her sons. The mothers are forced to wait in a fractured state until a scientific explanation can sweep up the pieces, reassemble them in a novel way, and ultimately reaffirm the utility of science as a purveyor of truth.

In the face of new reproductive technologies and a multiplicity of family structures, agencies of the state struggle to hold on to rules of kinship based on traditional sex-differentiated notions of family. The expected increase in diagnosis of both existing chimeras and chimeras resulting from new reproductive technologies threatens to further disrupt these markers of kinship (Strain et al. 1998). By officially decreeing Lydia as the mother of her children with the emerging possibility that she could be a chimera, the state reinforces its power to determine lineage, reaffirms scientific practice as an integral part of juridical discourse (the introduction of the concept of chimerism into the discourse having affected the outcome), and exposes itself to contestation by revealing the instability of biogenetic definitions of motherhood. This completes the Foucauldian framework of power that flows reciprocally between bodies and the scientific framework in which they are inscribed to a legal system that socially enacts the resultant technologies to maintain and manage that framework.

In contrast to chimeric mothers, who can ultimately demonstrate a genetic link to their children, many biological transgender parents find this is not enough to secure their legal rights. The insistence that anatomy at birth determines one's gender as well as one's ability to be an appropriate mother or father appears to trump shared genes in this case. For Lydia, as well as biological and nonbiological transgender parents, there is a common reductionist tendency to privilege anatomical information over other possible criteria in defining one's ability to be an effective parent.

Like other trans phenomena, human chimerism positions itself as one among many possible sites of contestation revealing the science of life as cultural practice. Earlier, we claimed that chimerism does not challenge genetic testing as much as it challenges Western definitions and regulations surrounding kinship. The phenomenon of human chimerism will expand the already growing diversity of families, comprising both trans and nontrans individuals, for whom genetically referenced categorizations of kinship will hold less practical significance. A challenge to professionals and lay individuals is (and will continue to be) to imagine alternative legal and medical frameworks that open more space to valuing lived experience over genetic codes. Legal precedents such as functional parenthood, which can extend custodial or child visitation rights to genetically unrelated adults, are likely only the beginning of a larger trend in this direction. These legal precedents will not only directly challenge deterministic genetic assumptions but will also become reflexively involved with our evolving conceptualizations of bodies and their interrelations.

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NOTES

1. We are not aware of any paternity disputes involving chimeric fathers and therefore do not examine this possibility, though we imagine there are cases that have gone undetected.

2. We borrow this terminology from Haraway (1996), who speaks in terms of a kinship “technos” when discussing genetics and genetic patenting. We use “technos” here to highlight that concepts of kinship are constructed technical systems, not mirrors of natural fact.

WORKS CITED

- Amsterdamska, Olga. 1993. "From Pneumonia to DNA: The Research Career of Oswald T. Avery." *Historical Studies in the Physical and Biological Sciences* 24:1-40.
- Butler, Judith P. 1993. *Bodies That Matter*. New York: Routledge.
- . 1997. *Excitable Speech: A Politics of the Performative*. New York: Routledge.
- . 1999. *Gender Trouble: Feminism and the Subversion of Identity*. New York: Routledge.
- Bynum, William F. 1994. "Medicine in the Hospital." Pp. 25-54 in *Science and the Practice of Medicine in the Nineteenth Century*. Cambridge: Cambridge University Press.
- Discovery. 2005. "I am My Own Twin." in Discovery Health. USA: Discovery Channel.
- Dreyfus, Hubert L. and Paul Rabinow. 1983. *Michel Foucault: Beyond Structuralism and Hermeneutics*. Chicago: University Of Chicago Press.
- Epstein, Steven. 1996. *Impure Science: AIDS, Activism, and the Politics of Knowledge*. Berkeley: University of California Press.
- Fausto-Sterling, Anne. 2000. *Sexing the Body: Gender Politics and the Construction of Sexuality*. New York: Basic Books.
- Flynn, Taylor. 2006. "The Ties That [Don't] Bind: Transgender Family Law and the Unmaking of Families." Pp. 32-50 in *Transgender Rights* edited by P. Currah, R. M. Juang, and S. P. Minter. Minneapolis: University of Minnesota Press.
- Foucault, Michel. 1990. *The History of Sexuality*. Translated by R. Hurley. New York: Vintage.
- Franklin, Sarah. 1995. "Science as Culture, Cultures of Science." *Annual Review of Anthropology* 24:163-184.
- . 1997. *Embodied Progress: A Cultural Account of Assisted Conception*. London: Routledge.
- Garber, Marjorie. 1992. *Vested Interest: Cross-dressing and Cultural Anxiety*. New York: Routledge.
- Haraway, Donna J. 1991. *Simians, Cyborgs, and Women: The Re-invention of Nature*. London: Free Association.
- Haraway, Donna J. 1996. "Universal Donors in a Vampire Culture: It's All in the Family: Biological Kinship Categories in the Twentieth-Century United States." In *Uncommon Ground: Rethinking the Human Place in Nature*, ed. W. Cronon, 321-78. Boston: Norton.
- Haraway, Donna J. 1997. Modest-Witness@ second-Millennium. *Femaleman-Meets-Oncomouse: Feminism and Technoscience*. New York: Routledge.
- Hird, Myra J. 2004. "Chimerism, Mosaicism and the Cultural Construction of Kinship." *Sexualities* 7:217-232.
- Lesky, Albin 1966. *A History of Greek Literature*. Translated by J. Willis and C. d. Heer. London: Methuen.
- Livingston, Jennifer. 1991. "Paris is Burning." Prestige/ Off White Productions.

- Paris Is Burning* [video recording]; produced and directed by Jennifer Livingston. 71 min; color; USA; English.
- Malinowski, Bronislaw. 1913. *The Family Among the Australian Aborigines*. London: University of London Press.
- March, William. 1954. *The Bad Seed*. New York: William Morrow.
- Martin, Aryn. 2007a. "The Chimera of Liberal Individualism: How Cells Became Selves in Human Clinical Genetics." *OSIRIS* 22:205-222.
- . 2007b. "Incongruous Juxtapositions': The Chimaera and Mrs Mck." *Endeavour* 31(3):99-103.
- Moore, John A. 1993. *Science as a Way of Knowing*. Cambridge: Harvard University Press.
- Nelkin, Dorothy and Susan Lindee. 2004. *The DNA Mystique: The Gene as a Cultural Icon*. Ann Arbor, MI: University of Michigan Press.
- NPR. 2003. "Sophisticated DNA Testing Turning Up More Cases of Chimeras, People with Two Sets of DNA." in *Morning Edition*, August 11. Washington, DC.
- Rabinow, Paul. 1999. "Artificiality and Enlightenment: From Sociobiology to Bio-sociality" Pp. 407-416 in *The Science Studies Reader*, edited by M. Biagioli. New York and London: Routledge.
- Risse, Günther B. 1984. "A Shift in Medical Epistemology: Clinical Diagnosis, 1770-1828." in *History of Diagnostics: Proceedings of the 9th International Symposium on the Comparative History of Medicine- East and West*, edited by Y. Kawakita. Osaka: Taniguchi Foundation: Division of Medical History.
- Rogus, Caroline. 2003. "Conflating Women's Biological and Sociological Roles: The Ideal of Motherhood, Equal Protection, and the Implications of the *Nguyen v. INS* Opinion." *Journal of Constitutional Law* 5:4.
- Rosenburg, Charles. 1981. "Inward Vision and Outward Glance: The Shaping of the American Hospital, 1880-1914." Pp. 19-55 in *Social History and Social Policy*, edited by D. J. Rothman and S. Wheeler. New York: Academic Press.
- Schneider, David M. 1980. *American Kinship: A Cultural Account*. Chicago: University of Chicago Press.
- Shortt, Samuel E. D. 1983. "Physicians, Science, and Status: Issues in the Professionalization of Anglo-American Medicine in the Nineteenth Century." *Medical History* 27:235-268.
- Simon-Bouy, Brigitte, Michelle Plachot, Ali Mokdad, Nicole Lavaud, Christine Muti, Alain Bazin, François Vialard, and Joëlle Belaisch-Allart. 2003. "Possible Human Chimera Detected Prenatally After In Vitro Fertilization: A Case Report." *Prenatal Diagnosis* 23:935-7.
- Strain, Lisa, John Dean, Mark Hamilton, and David Bonthron. 1998. "A True Hermaphrodite Chimera Resulting From Embryo Amalgamation After In Vitro Fertilization." *The New England Journal of Medicine* (338):166-69..
- Strathern, Marilyn. 1992. *Reproducing the Future: Essays on Anthropology, Kinship and the New Reproductive Technologies*. Manchester: Manchester University Press.
- Tippett, Patricia 1983. "Blood Group Chimeras: A Review." *Vox Sang* 44:333-59.

- Vines, Gail. 1992. "Last Olympics for the Sex Test?" *New Scientist* 135:39-42.
- Waldby, Catherine. 2000. *The Visible Human Project: Informatic Bodies and Posthuman Medicine* London: Routledge.
- Yanow, Dvora. 1996. *How Does a Policy Mean?: Interpreting Policy and Organizational Actions*. Washington: Georgetown University Press.
- Yu, Neng, Margot S. Kruskall, Juan J. Yunis, Joan H. M. Knoll, Lynne Uhl, Sharon Alosco, Marina Ohashi, Olga Clavijo, Zahid Husain, and Emilio J. Yunis, Jorge J. Junis and Edmund J. Yunis. 2002. "Disputed Maternity Leading to Identification of Tetragametic Chimerism." *The New England Journal of Medicine* 346:1545.