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The Concurrent Evolution of “Sex” with Biology

Three topics of conversation should always be avoided in polite company: income, religion, and sex. If the list had to be shortened, it would contain only the last topic in large capital letters: SEX. Even the word itself carries several negative connotations: notions of impurity, disobedience, and irrationality all come to mind simply upon hearing the word uttered. Fortunately, the development of biology allows academia to discuss sex without all of these complications. However, advances in the same field seem to further obscure the concept of sex.

What exactly does the word “sex” refer to? There are two ideas associated with the word: the sex act and the sex type (socially referred to as gender). The sex act is any process through which genetic traits are transferred to produce offspring (Franklin 29). The sex type is a category an organism falls under that describes its role in reproduction. Until recently, sexual reproduction was biologically understood to require two individuals, one providing sperm and another providing an egg, resulting in the establishment of two sex types: male and female (Fausto-Sterling). In humans, these categories were further characterized by the common presence of other attributes—such as facial hair or breast development—among members within a sex type to produce the two-party sex system widely accepted at present.

As novel research and new modes of sexual reproduction are developed, one must re-evaluate both the sex act and the sex type. The advent of in vitro fertilization, gestational surrogacy, and cloning has introduced entirely new methods for the sex act. Because sex types are defined by roles in the act of sex, the introduction of new sex acts suggests the formation of new sex types. In addition, advances in embryology, endocrinology, and surgery also have impacts on sex types, simultaneously challenging and reinforcing the previously established two-party system (depending on how knowledge is applied).

In vitro fertilization (IVF), gestational surrogacy, and cloning have redefined the sex act. As mentioned earlier, the sex act was traditionally understood to involve two partners for the production of offspring. The most apparent departure from “normal” sexual reproduction resulting from these techniques is a lack of requirement of physical contact between the parties involved. In all three sex acts, the physical process of fertilization is in the hands of an entirely uninvolved party, either a scientist or medical professional. This introduces a new biopower for said scientist/medical professional, who now has the ability to allow sterile mothers to have children. In short, the sex act—previously understood to involve physical contact between a male and a female to fertilize an egg—can now be done in a Petri dish under a microscope by experts in white lab coats. In effect, the traditional method of sexual reproduction has been rendered superfluous by the introduction of these new techniques.

With in-vitro fertilization and gestational surrogacy, biological material from at least three people are involved in the sex act: sperm is collected from a male and used to fertilize either a donor egg (in IVF) or an egg from the male’s partner (in gestational surrogacy), and the resulting fertilized egg is implanted in either the male’s partner (IVF) or a surrogate mother (gestational surrogacy) (Thompson 179). While previously established sex types, male and female, still apply to the individuals involved in these processes, they no longer refer specifically to the role each person plays in the act of sexual reproduction. The main issue raised by IVF and gestational surrogacy is not the sex type of individuals involved, but rather the relationships between them. Such simple relationships as a child’s mother, previously established through the sex act, are now more complicated because one woman provides genetic material in the form of the egg while the other provides her bodily fluids and nutrients during gestation. Because of this ambiguity, a new definition was crafted to describe the parents of a child as the pair of partners having the *intent* of producing a child (Thompson 179). Thus, the parent-child relationship traditionally created

through the physical act of sexual reproduction is now created through the more abstract *intent* as a result of the development of in vitro fertilization and gestational surrogacy.

Similar to in vitro fertilization and gestational surrogacy, cloning has also rendered the physical sex act unnecessary. However in addition, cloning also eliminates the need for the male sex type entirely. The technique referred to when scientists discuss cloning is a process called somatic cell nuclear transfer (SCNT): the nucleus is extracted from a somatic cell of one organism and injected into an enucleated egg from another organism. This newly nucleated egg is then implanted into a surrogate mother who will bear the child (Franklin 25). The organisms providing the enucleated egg or the gestational body must be female, but the organism being “cloned”—that is, the organism providing the somatic cell nucleus—can be either male or female. Thus SCNT shifts the biopower of reproduction entirely to females, whereas before it was split equally between males and females. This could, in theory, eliminate the male sex type entirely as an example of the most extreme effect the development of cloning has on the sex act.

While concepts of the sex act have been revolutionized by IVF, gestational surrogacy, and cloning, understandings of sex type have been more heavily influenced by the advances made in embryology, endocrinology, and surgical techniques. The two major sex type related results of these developments are intersex definition and sex determination. As mentioned previously, the male and female sex types were developed based on the traditional understanding of sexual reproduction involving a physical exchange between two individuals (Fausto-Sterling). Once these sex types were established, it was assumed that all individuals would fall under one of the two categories. However in reality, some individuals are born with characteristics of both categories and are referred to as intersexuals. The definition of intersexuals was made possible by advances in understandings of anatomy, genetics, and endocrinology. Usually upon the birth of an intersexual, medical professionals are faced with the task of sex determination in which the

intersexual will undergo surgery and hormone therapy to develop into either a male or female. Thus, while some advances in biology allow us to define intersexuals (thereby increasing the number of sex types), others are used to transform these intersexuals so the two-party sex system remains unchanged.

The appearance of intersexuals in the population is not new—only the ability to differentiate them based on newfound understandings of biology is. A Professor of Biology at Brown University, Ann Fausto-Sterling has proposed the existence of five sex types based on an individual's chromosomes, gonads, hormones, genitals, and secondary sex characteristics. One can only imagine how quickly the incorporation of additional biological attributes could increase the number of sex types defined. Because new discoveries are continually being added to our understanding of human biology, it is more beneficial to think of sex types as a gradient ranging from male to female, rather than as a set number of categories that can be separated and defined.

Perhaps because we have adhered to the male-female sex system for so long, several advances in biological knowledge are being applied to maintain this two-party system. This is most evident in the process of sex determination. Advances in anesthesia, surgery, embryology, and endocrinology have developed a principle of “rapid postnatal detection and intervention for intersex infants” (Chase 191). The intersexual is perceived as an underdeveloped individual who did not complete the process of sex differentiation. Because surgery and hormone therapy is available as a means through which these individuals can complete their sexual differentiation, a new professional, the intersex specialist, has emerged with the task of determining whether the infant should be transformed into a male or female (Chase 193). This effectively places the biopower of sex determination into the hands of intersex specialists—a biopower that formally belonged only to deities, luck, or fate, depending on one's personal beliefs. The sex designation of an intersexual is usually determined to be the sex type that will give the individual the best

change of reproducing in the future: this is a clear example of the influence of understandings of the sex act on definitions of sex type. However, the sex types are considered immutable in this situation, as sex determination is employed to ensure that all individuals fall into either of the two pre-established sex categories.

As our knowledge of biology expands, so does our ability to identify differences among individuals and place them in newly constructed categories. Sex type is not the only example of a category based on biological differences: race categories have also been implicated as manifestations of differences in human biology. Sex and race as categories share three common features: 1) there is controversy over how subcategories of sex and race are defined, 2) along with the development of these categories, a social hierarchy is also established, and 3) the creation of these categories results in new forms of biopower.

Because humans are so diverse, the concepts of sex and race exist more as a gradient across two extreme phenotypes—male and female for sex, black and white for race—than as clearly separate categories spanning this range of phenotypes. Perhaps the most important note on sex and race categories is that they do not naturally exist: both are examples of social constructions based on physical variations (Smedley 693). As a result, defining subcategories often raises such issues as how populations should be divided and who has the authority to make these subcategories. In the case of sex categories, these questions have only recently been expressed as intersexuals increasingly make their voices heard. The male-female sex categories have been so firmly ingrained in members of society that the validity of these categorical distinctions has been left largely unquestioned until now. In the case of race categories, these issues were encountered in the planning stages for the Human Genome Diversity Project (Reardon 379). While the project was being proposed, researchers were confronted with the problem of deciding on a basis for the differentiation of groups: Should language serve as the

determinant of group definition? Kinship? Religion? History? In addition, designations of biological and cultural experts in identifying the separate groups and members of specified groups, respectively, resulted in problems with reinventing group identities and identifying biological groups that did not map onto cultural groups (Reardon 377). Thus, both sexual and racial categories are ambiguous in their definition and assignment of members to categories because there is little consensus on how populations should be divided and resultant subsets defined.

However, this does not mean that a person's sex and race is too difficult to ascertain to serve as useful categories. In fact, in several cases, these attributes can be predicted simply by looking at the individual. Through a combination of historical practice and the ease with which such differences as sex and race in humans can be ascertained, these categories have also been used as the basis for social hierarchies. In the case of sex, males have historically been privileged in society, receiving inheritance rights, title successions, and universal suffrage before females in the United States. With the emergence of intersexuals, the members of this new sex type are placed at the bottom of the social hierarchy. Intersexuals are commonly viewed by medical professionals as underdeveloped individuals who can be *fixed*, as made apparent by the fact that "likely prospect of emotional harm due to social rejection" is the most widely used justification for the surgery and hormone therapy employed to convert intersexuals into either males or females (Chase 191). In the case of race, evidence of racial discrimination in the US is numerous, originally stemming from English ethnocentrism and culminating in the development of the "white 'racial' category" at the top of the social ladder in early colonial times (Smedley 695). Biological justifications for the racial hierarchy in the past were based on myths of inherently inferior moral, intellectual, and behavioral features of non-white races. Thus as was

the case in the sex hierarchy, racial hierarchies are also based on faulty assumptions about the biological origins of racial categories.

The final similarity between sexual and racial categories is the creation of biopower resulting from the establishment of such subtypes. In the case of sex, medical professionals are imbued with the biopower of sex determination of individuals—a process that is only deemed necessary because the two sex types, male and female, are so firmly established as the only two true sexual categories. In the case of race, individuals of certain races receive biopower in the form of compensation for past discrimination or oppression of their race. For example, being Native American could gain an individual a share of profits generated on Native American reservations allotted by the government as compensation for near extinction of the race during colonial times (Smedley 696).

Sexual and racial categories have become widely accepted categories today, and are even considered to be key components of an individual's identity. However, one must realize that these categories only exist as social constructions, and do not actually reveal anything about a person's character, contrary to what stereotypes might suggest. Sexual categories are particularly malleable thanks to recent developments in biological knowledge and technologies. In addition, the act of sex upon which these sex types were originally defined are also changing in response to biological discoveries and innovations. While it may still be inappropriate to discuss sex at the next Sunday brunch, one can be comforted by the fact that notions of sex, both the act and the category, are changing as new knowledge is added day by day. Perhaps it will be acceptable to talk about sex in a social setting in a few years—although it might still be advisable to avoid specific details if food is being served at the same event!

Bibliography

Chase, Cheryl. 1998. Hermaphrodites with Attitude: Mapping the Emergence of Intersex Political Activism. *GLQ: A Journal of Lesbian and Gay Studies* 4(2): 189-212.

Duster, Troy. 2001. The Sociology of Science and the Revolution in Molecular Biology. In *The Blackwell Companion to Sociology*. Edited by Judith R. Blau. Blackwell Publishers Limited, 213-226

Fausto-Sterling, Anne. 1993. The Five Sexes: Why Male and Female Are Not Enough. *The Sciences*, March-April: 20-24.

Franklin, Sarah. 2007. Sex. In *Dolly Mixtures: The Remaking of Genealogy*. Duke University Press, 19-45.

Reardon, Jenny. 2001. The Human Genome Diversity Project: A Case Study in Coproduction. *Social Studies of Science* 31(3): 357-388.

Smedley, Audrey. 1999. "Race" and the Construction of Human Identity. *American Anthropologist* 100(3): 690-702.

Thompson, Charis. 2001. Strategic Naturalizing: Kinship in an Infertility Clinic. In *Relative Values: Reconfiguring Kinship Studies*. Edited by Sarah Franklin and Susan McKinnon. Duke University Press, 175-202.