Homosexuality as a Necessary Outcome of Variation[1]

John M. Saul[2]

Abstract: Homosexuals and other individuals whose behaviors are incompatible with personal biological parenthood are expected outcomes of human variation, both genetic and non-genetic. This conclusion emerges from a brief reconsideration of two commonly held beliefs: 1) that variation should not exceed the limits of viability and 2) that variation is an exclusively genetic matter.

Key Words: non-genetic variation, genetic variation, natural selection, homosexuality, LGBTQIA, descent with modification, reproduction

The existence of homosexuals may seem incompatible with natural selection. Yet childless individuals with homosexual orientations are present in approximately the same low proportion in all human societies (Balthazart 2011) and homosexual behaviors have been reported for nearly 500 species of animals (Anonymous 2009, Bagemihl 1999).

The conditions required to maintain a proportion of homosexuals in the overall population are evidently present or renewed in each generation. Researchers have proposed correlations between human homosexuality and genes (Horton 2015, Sanders et al. 2017, Soh 2017, Price 2018), genes and environment (Alanko et al. 2010, Långström et al. 2010), internal environment (Hines 2011), interactions between sex hormones and the developing brain (LeVay 1991, Savic and Lindström 2018), external environment including social interactions (Bogaert et al. 2007, Blanchard 2008), exposure to atypical endocrine conditions during development (Balthazart 2011), and epigenetics (Rice et al. 2012, Nugun and Vilain 2014). A correlation also exists worldwide between male homosexuality and childhood separation anxiety (Soh 2017).

Some of these correlations have a genetic component. Others do not, or may not, and the diversity of outcomes of such studies leads to suspicions that the causes of human homosexuality are multifactorial. At one level, this is clearly true. Yet all the proposed causes, genetic, non-genetic, and the two in combination, can be encompassed by a single term. All can be labeled as manifestations of Darwin's descent *with modification* (Darwin 1837-1838, 1859), though "modification" these days is usually expressed as *variation*.

Genetic variation alone is extremely broad and is perhaps only limited by fundamental constraints imposed by physics and chemistry, and by our evolutionary history (which excludes humans with wheels, for example). Yet

[1] Received on November 9, 2018. Acceoted on January 2, 2019. Last revisions received on January 5, 2019.

[2] ORYX, 16, rue du Pré-aux-Clercs, 75007 Paris, France. ORCID 0000-0002-2282-2430. E-mail: john.saul@wanadoo.fr . Web Site: www.tomebook2.com

DOI: 10.9784/LEB6(2)Saul.01
Electronically available on February 27, 2019. Mailed on February 25, 2019.

even this does not fully express the range of human genetic variation, for *genetic variation exceeds viability.* Examples of excessive genetic variation include fertilized eggs that disintegrate after a few futile cell divisions, the many early-term miscarriages that have genetic causes linked to unsuccessful variation (McNair and Altman 2012), and infants who are born genetically destined never to reach the age of reproduction.

In addition, among those who do survive their births and live to the age of reproduction, some will not have progeny for a variety of non-genetic reasons specific to the individual and not (necessarily) derived from their parents. These (arguably) non-genetic factors, which include certain personality traits, addictions, incarceration, missed opportunities, and religious and philosophical convictions, suggest that non-genetic variation is also very broad.

Survivors constitute a population with a large range of variation – a large "variety of variation" – and this variation, genetic and not genetic, includes all things sexual. The births and development of cisgender individuals, the births and development of non-reproducing homosexuals, and the births and development of people situated anywhere throughout the multidimensional LGBT domain (LGBTQIA Resource Center 2017) are all expected outcomes of variation, as, too, are the genetically caused early-term miscarriages. It is through this doubly broad variation – genetic and non-genetic – that natural selection operates.

Variation, however caused, is independent, "unconcerned" by the viability or fate of the individual before its birth or after, or by its sexual identity, sexual behavior, or reproductive potential. Few natural limits inform variation "where to stop". Past confusion, particularly among those not trained in evolutionary biology, has arisen from *two assumptions that are commonly insufficiently examined: that variation should not exceed viability,* and *that "variation", a word with a Darwinian ring to it, should "by nature" involve genes and heredity, or at least, epigenetics.*

The range of natural variation among humans is greater than is commonly understood or socially accepted. This is especially notable in the domain of sexual orientation and behavior. Terms such as "straight", "homosexual", and "LGBTQIA" are too constrained to depict a full image of humanity. Humans vary.

Acknowledgments

Six reviewers provided useful feedback on this and previous versions of this paper.

Literature Cited

Alanko, K., P. Santtila, N. Harlaar, K. Witting, M. Varjonen, P. Jern, A. Johansson, B. von der Pahlen, and N. K. Sandnabba. 2010. Common genetic effects of gender atypical behavior in childhood and sexual orientation in adulthood: A study of Finnish twins. *Archives of Sexual Behavior* 39(1):81-92. https://doi.org/10.1007/s10508-008-9457-3

Anonymous. 2009. 478 "Gay" Animals. *ProCon.org. The Leading Source for Pros & Cons of Controversial Issues*. https://borngay.procon.org/view.resource.php?resourceID=000162 (Accessed on October 11, 2018.)

Bagemihl, B. 1999. *Biological Exuberance: Animal Homosexuality and Natural Diversity*. St. Martin's Press. New York, NY, USA. 751 pp. Updated data on animal homosexuality at https://en.wikipedia.org/wiki/List_of_mammals_displaying_homosexual_behavior#List (Retrieved on 27 November 2018).

Balthazart, J. 2011. *The Biology of Homosexuality*. Oxford Series on Behavioral Endocrinology. Oxford University Press, Inc. New York, NY, USA. 208 pp. https://doi.org/10.1093/acprof:oso/9780199838820.001.0001

Blanchard, R. 2008. Review and theory of handedness, birth order, and homosexuality in men. *Laterality* 13(1):51-70. https://doi.org/10.1080/13576500701710432

Bogaert, A. F., R. Blanchard, and L. E. Crosthwait. 2007. Interaction of birth order, handedness, and sexual orientation in the Kinsey interview data. *Behavioral Neuroscience* 121(5):845. https://doi.org/10.1037/0735-7044.121.5.845

Darwin, C. 1837-1838. Notebook B. In, Darwin Papers & Manuscripts. Darwin Online. http://darwin-online.org.uk/manuscripts.html (Accessed on November 1, 2018.)

Darwin, C. 1859. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. John Murray. London, England, UK. 502 pp.

Dobzhansky, T. 1973. Nothing in biology makes sense except in the light of evolution. *American Biology Teacher* 35(3):125-129. https://doi.org/10.2307/4444260

Hines, M. 2011. Gender development and the human brain. *Annual Review of Neuroscience* 34:69-88. https://doi.org/10.1146/annurev-neuro-061010-113654

Horton, R. 2015. Is homosexuality inherited? *Frontline: A Gay Gene*. http://www.pbs.org/wgbh/pages/frontline/shows/assault/genetics/nyreview.html (Accessed on November 1, 2018.)

Långström, N., Q. Rahman, E. Carlström, and P. Lichtenstein. 2010. Genetic and environmental effects on same-sex sexual behavior: A population study of twins in Sweden. *Archives of Sexual Behavior* 39(1):75-80. https://doi.org/10.1007/s10508-008-9386-1

LeVay, S. 1991. A difference in hypothalamic structure between heterosexual and homosexual men. *Science* 253(5023):1034. https://doi.org/10.1126/science.1887219

LGBTQIA (Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual) Resource Center. 2017. University of California. Davis, California. https://lgbtqia.ucdavis.edu/about/index.html (Accessed on November 3, 2017.)

McNair, T. and K. Altman. 2012. Miscarriage and Recurrent Pregnancy. pp. 438-447. In, *The Johns Hopkins Manual of Gynecology and Obstetrics*. Hurt, K. J., M. W. Guile, J. L. Bienstock, H. E. Fox, and E. E. Wallach (Editors). Lippincott Williams & Wilkins. Philadelphia, Pennsylvania, USA. 688 pp. https://books.google.com/books?id=4Sg5sXyiBvkC&pg=PA438#v=onepage&q&f=false

Nugun, T. C. and E. Vilain. 2014. The biological basis of human sexual Orientation: Is there a role for epigenetics? *Advances in Genetics* 86:167-84. https://doi.org/10.1016/B978-0-12-800222-3.00008-5

Price, M. 2018. Giant study links DNA to same-sex experiences. *Science* 262(6413):385-386. https://doi.org/10.1126/science.362.6413.385

Rice, W. R., U. Friberg, and S. Gavrilets. 2012. Homosexuality as a consequence of epigenetically canalized sexual development. *Quarterly Review of Biology* 87(4):343-368. http://www.jstor.org/stable/10.1086/668167 (Accessed on December 5, 2017.)

Sanders, A. R., G. W. Beecham, S. Guo, K. Dawood, G. Rieger, J. A. Badner, E. S. Gershon, R. S. Krishnappa, A. B. Kolundzija, J. Duan, J. Shi, D. F. Levinson, B. J. Mowry, A. Olincy, F. Amin, C. R. Cloninger, D. M. Svrakic, J. M. Silverman, N. G. Buccola, W. F. Byerley, D. W. Black, R. Freedman, P. V. Gejman, J. M. Bailey and E. R. Martin. 2017. Genome-Wide Association Study of Male Sexual Orientation. *Scientific Reports* 7:16950(2017). https://www.nature.com/articles/s41598-017-15736-4 (Accessed on November 9, 2018.)

Savic, I. and P. Lindström, 2008. PET and MRI show differences in cerebral asymmetry and functional connectivity between homo- and heterosexual subjects. *PNAS* 105(27):9403-9408. https://doi.org/10.1073/pnas.0801566105

Sow, D. W. 2017. Cross-cultural evidence for the genetics of homosexuality. *Scientific American Mind* 28:7-9. https://doi.org/10.1038/scientificamericanmind0717-7 .