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The Prevention of Infirm or Monstrous Births

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FROM ANCIENT TIMES, HUMANS HAVE TRIED to improve reproductive outcome, that is, to give birth to healthy, beautiful babies. Both folk traditions and medical theories offered hope that infirm or monstrous births could be avoided. While most efforts were ineffectual by modern standards, some may have been beneficial. It was not until well into the twentieth century that clearly demonstrable therapies were developed to improve birth outcomes. However, those therapies were almost as limited as the ancient techniques, in light of the possibilities of genetic therapy in the twenty-first century. In the following essay, we will look at the history of medical and ethical ideas of influencing birth outcome, and of what use they may be in guiding our consideration in an era of the mapping of the human genome and genetic engineering.

I

Attempts to affect the outcome of fetal development are inevitably connected to medical theories. Ancient medical theories, whether Greek or non-Greek, tended to present conception and gestation as dependent on an interplay of male and female seed, and external environmental factors. Aristotle taught that the lighter, more spiritual male seed formed and shaped the more material female seed after conception. Sex was determined by the location in the uterus where the fetus developed. In *De usu partium*, Galen wrote that although animals had multi-chambered uteri suited to multiple births, the human uterus had only two chambers.¹ The warmer, right side caused the development of male children while the colder, left side developed females. During the medieval period, a misunderstanding arose that led to a teaching that the human uterus was seven chambered. Three produced males, three females, and the center chamber produced hermaphrodites.²

¹Margaret Tallmadge May, *Galen on the Usefulness of the Parts of the Body* (Ithaca: Cornell University Press, 1968), 2:625.

²Fridolf Kudlien, "The Seven Cells of the Uterus: The Doctrine and its Roots," *Bulletin of the History of Medicine* 49 (1965): 415–23. Luke Demaitre, *The Fasciculus Medicinæ* (Birmingham, Ala: Classics of Medicine Library, 1988), 54–55. Michael T. Walton, Robert M. Fineman, and Phyllis J. Walton, "Holy Hermaphrodites and Medical Facts," *Cauda Pavonis*, n.s. 18 (1999): 32–36.

This system, in which the male seed worked upon the female seed as a carpenter works upon wood, explained a great many phenomena associated with generation and birth. According to Aristotelian causality, the intended product or end of generation is a perfect male child. Anything less, such as a female child, results from some kind of perversion or failure in generation. For example, a simple insufficiency of heat would thwart nature and create the colder, unfinished female.³ Multiple births were also viewed as monsters produced by generative errors. Twins, triplets, etc., were variously explained as the result of a large quantity of matter being divided among several chambers of the uterus, or a normal amount of matter being similarly divided. Male seed from different sexual contacts could also play a role in multiple births.⁴ Siamese twins and babies born with deformed or missing parts resulted from an imbalance of male and female seed.

Monsters that appeared to be part human and part beast were explained by postulating a mixture of human and animal seed. Some writers considered such births as proof of bestiality, but others did not. Aristotle argued that human and animal seed could produce no fruit because humans and animals had different gestation periods.⁵ When one of his herd gave birth to a human-like monster, Albertus Magnus saved the life of a herdsman charged with bestiality by arguing that the apparent mixture of species was actually the result of astrological influences.⁶ Ambrose Paré, in the sixteenth century, reported monsters generated “by a woman and a dog” and by a herdsman who “fell in love with a goat.” Paré also accepted the idea that such births could also result from both bestial thoughts and actions.⁷ The apparent mixed species problem remained unresolved into the eighteenth century.

External factors were not limited to astrological influences. They included the season, sexual desire, diet, and images the mother saw at conception and during gestation. Soranus, the great compiler of ancient gynecological teachings, set forth the essential doctrines of conception and fetal formation that could help lead to healthy births. Conception required sexual appetite in both the male and female. “Just as without appetite it is impossible for the seed to be discharged by the male, in the same manner, without appetite it cannot be conceived by the female.”⁸

³Demaitre, *Fasciculus Medicinæ*, 54.

⁴J. M. Thijssen, “Twins as Monsters,” *Bulletin of the History of Medicine* 61 (1987): 237–46.

⁵Thijssen, “Twins as Monsters.”

⁶Luke Demaitre and A. A. Travill, “Human Embryology and Development in the Works of Albertus Magnus,” in *Albertus Magnus and the Sciences: Commemorative Essays*, ed. J. A. Weisheipl (Toronto: Pontifical Institute, 1980).

⁷Ambrose Paré, “Concerning the Generation of Man,” in *Works*, trans. T. Johnson (London, 1649), 662, 663, and 648.

⁸Soranus, *Gynecology*, Book 1, trans. Oswei Temkin (Baltimore: The Johns Hopkins University Press, 1965), 41.

Although sexual appetite in both sexes was essential to expel seed,⁹ the formation of seed into a healthy fetus was governed by many factors. Among the most important physical factors was the mother's diet. Soranus wrote,

Moreover, one must realize that the food sufficient for one organism has to be divided for the nourishment and growth of two organisms, so that it no longer remains sufficient for the gravida; for what is devoted to the fetus is of necessity taken away from the gravida.¹⁰

Nicholas Culpeper, in the seventeenth century, recommended a diet including fruit and sage ale.¹¹

The mother's consumption of alcohol also affected the fetus. Because of its ability to disturb both the body and the mind, drunkenness was considered a danger for both conception and the formation of the fetus. This sort of premodern realization of fetal alcohol syndrome was based on the humoral medical theory. Again, Soranus allows us to understand that theory:

[B]ecause the body in a natural state performs its proper functions but it is not in a natural state at the time of drunkenness and indigestion. And just as no other natural function can be effected in such a state, neither can conception. Second, because the seed when attached must be nourished, and takes food from the substance containing blood and pneuma which is brought to it. But in drunkenness and indigestion all vapor is spoilt and thus the pneuma too is rendered turbid. Therefore danger arises lest by reason of the bad material contributed the seed too change for the worse. Furthermore, [the] satiety due to heavy drinking hinders [the] attachment of the seed to the uterus. Just as in drunken people the wine, by vigorously rising up makes wounds difficult to unite, it stands to reason that the attachment of the seed is disturbed by the same cause.¹²

Drunkenness worked, also, on the maternal imagination. This physiological factor ultimately helped to shape the fetus. To ensure the birth of a healthy child, a woman had to control her imagination during conception

⁹The birth of a child did not excuse rape, because the law recognized a distinction between sexual appetite and mental resolve. See, Soranus, *Gynecology*, 1:36.

¹⁰Soranus, *Gynecology*, 1:42. Nicholas Culpeper, *A Directory for Midwives* (London, 1651), 84–85, develops the notion of desire in the female in a Christian context. Love stimulates production of seed; therefore, barrenness often is caused from want of love.

¹¹Culpeper, *Directory*, 147–53.

¹²Soranus, *Gynecology*, 1:38.

and gestation, not only by avoiding drunkenness, but also through concentrating on positive images. Soranus wrote,

What is one to say concerning the fact that various states of the soul also produce certain changes in the mould of the fetus? For instance, some women, seeing monkeys during intercourse, have borne children resembling monkeys. The tyrant of the Cyprians who was misshapen, compelled his wife to look at beautiful statues during intercourse and became the father of well-shapen children; and horse-breeders, during covering, place noble horses in front of the mares. Thus, in order that the offspring may not be rendered misshapen, women must be sober during coitus because in drunkenness the soul becomes the victim of strange phantasies; this furthermore, because the offspring bears some resemblance to the mother as well, not only in body but in soul.¹³

The Talmud also illustrates the widespread belief in the power of external forces and imagination to shape the fetus. For example, it tells the story of a famous heretic:

When the mother of the apostate Elisha ben Abuya was pregnant, she passed an idolatrous temple and smelled the aroma of an idolatrous sacrifice. The aroma spread in her body like snake poison and infected the delicate fetus with the desire for the prohibited.¹⁴

Moreover, the rabbis suggested that women keep good images in their mind during conception. To that end, Rabbi Yochanan, noted for his beauty, “used to sit at the gates of the ritual bath so that women leaving would see him...and beget children as handsome as he.”¹⁵ The passage demonstrates a desire and a methodology for improving birth outcome.

In the sixteenth century, Paracelsus’s chemical understanding of nature yielded a view of conception and fetal development consistent with ancient medicine. He wrote, “Four things play a part in conception and birth: body, imagination, form and influence [astral and other influences].”¹⁶ The maternal imagination could influence her seed profoundly.

The imagination of a pregnant woman is so strong that it can influence the seed and change the fruit in her womb in many directions. Her inner stars act powerfully and vigorously upon the fruit, so that its nature is thereby deeply and solidly shaped and

¹³Soranus, *Gynecology*, 1:39.

¹⁴Talmud Jerusalmi, Chagigah 2:776.

¹⁵Talmud Babli, Berachoth 20a. A woman immerses herself in a ritual bath before resuming marital relations with her husband after a monthly period of prohibition.

¹⁶Paracelsus, *Man and the Created World*, trans. Henry E. Sigerest (1941; repr. Birmingham, Ala.: Classics of Medicine Library, 1988), 105.

forged. For the child in the mother's womb is exposed to the mother's influence, and is as though entrusted to the hand and will of its mother, as the clay is entrusted to the hand of the potter, who creates and forms out of it what he wants and what he pleases.¹⁷

In his doctrine of imagination, the usually unorthodox Paracelsus differs not from more orthodox practitioners. For example, Ambrose Paré also stressed the importance of imagination in forming the foetus, proving the fact with the story of the Ethiopian queen who produced a white child after she thought of a white object during intercourse.¹⁸

Even monstrous births could result from negative imagination.¹⁹ As late as the seventeenth and eighteenth centuries, people blamed the entertainer Johannes Grigg's legless and deformed state on his mother's viewing the mutilated corpses on a battlefield during her pregnancy.²⁰ The importance of imagination required that a woman conceive and gestate in a healthy, pleasant environment.

II

Ideas similar to doctrines from classical, medieval, and renaissance medical writers about improving reproductive outcome continued into the modern era in more or less recognizable form because of their empirical rather than their theoretical basis. Diet and external factors in the mother's life, as well as the context of conception, passed through the eighteenth into the nineteenth century. Diet, alcohol, weather, and astral events all affected the fetus. Maternal psychological factors, imagination, at conception and during gestation were potentially crucial to the proper outcome of a pregnancy. As Paré stressed, too much or too little seed, improper diet, or improper influences on the maternal imagination could produce monstrous births.

In the nineteenth century, however, the notion of heredity re-shaped the understanding of seed. This was the result of the development of the science of embryology and evolutionary theory. The shift in attention to the "seed" as a hereditary vehicle stressed good breeding and taught that although external factors affect the seed, "bad" seed is itself intolerable; moreover, it attracts additional negative influences. For example, in such a view, drunks are born, not made. Heredity and eugenics superseded the more venerable doctrine of maternal imagination. Still, proper sexual prac-

¹⁷Paracelsus, *Man and the Created World*, 106.

¹⁸Paré, *Works*, 592.

¹⁹Paré, *Works*, 648, and Michael T. Walton, Robert M. Fineman, and Phyllis J. Walton, "Of monsters and prodigies," *American Journal of Medical Genetics* 47 (1993): 7-13.

²⁰Ricky Jay, *Learned Pigs & Fireproof Women* (New York: Farrar, Straus and Giroux, 1986), 58.

tice and maternal health were very important in the nineteenth century. Sexual purity and good health were seen, in a Lamarckian way, as shaping heredity. This was, in part, because nineteenth century biological thinkers were very much in the tradition of the Christian synthesis of ancient and medieval moral-theological theorists. Emma Drake's *What a Young Wife Ought to Know* is an example of information on biology and moral philosophy offered to educate young mothers and mothers-to-be. Mrs. Drake combined current science with an evangelist's zeal for a healthy moral society producing healthy moral children. These children would also form a healthy moral society. Not surprisingly, Mrs. Drake referred to the work of Francis Galton, who had written:

I conclude that each generation has enormous powers over the natural gifts of those that follow, and maintain that it is a duty that we owe to humanity to investigate the range of that power, and to exercise it in a way that, without being unwise toward ourselves, shall be most advantageous to the future inhabitants of the earth.²¹

This was consistent with Darwin's idea of pangenesis:

The average proportion of gemmules modified by individual variation under various conditions preceding birth clearly admits of being determined by observation, for the children will, in the average, inherit the gemmules in the same proportion that they existed in their parents. It follows that the human race has a large control over its future forms of activity; far more than an individual has over his own; since the freedom of individuals is narrowly restricted by the cost in energy of exercising their wills.²²

The control over gemmules envisioned by "right thinking people" was selective breeding based on morality, class, and economics. Darwin's philosophy blended with religion:

That we reap what we sow is an inevitable law in the mental and moral as in the physical sphere. While there is this great and awful law, I am so thankful that we can emphasize the far greater and wider reaching gospel of heredity. Into this we can put all the sweet promises whose fulfillment is sure—if we are ever reaching up the higher and nobler aspirations of our nature, and not degenerating to the lower tastes and inclinations.²³

²¹Galton cited in Emma F. Angell Drake, *What A Young Wife Ought to Know* (London: Vir Publishing Co., 1908), 137.

²²Ibid., 136–37.

²³Ibid., 139.

In Mrs. Drake's opinion, temperate, moral, middle-class marriages were the hope for a healthy regular society, whereas socially disadvantaged marriages resulted in defective children. She tells the tragic story of heredity gone wrong:

There is a story of one neglected little girl, poor Margaret, who never had a home, and who grew up a wretched outcast, living a life of sin and shame. After seventy-five years it was reckoned that her descendants numbered twelve hundred; two hundred and eighty of whom were paupers, and one hundred and forty habitual criminals, while most of the whole degraded family cursed the country with vice, crime, pauperism, and insanity.²⁴

Medical, social, and legal attempts were made to control heredity for the good of society. Eugenic laws were instituted in Europe and the United States to keep the unfit from reproducing. In England, the Fabian Society opposed the poor laws and anything that furthered the reproduction of the undeserving poor:

We are very fully conscious of the great importance of the eugenic standpoint in connection with the problems of destitution, especially as regards the feeble-minded. Moreover, there can be no question that the present Poor Law, like many forms of charity, has a definitely anti-eugenic influence, because on the whole it tends to subsidize the reproduction only of the lowest social types, i.e., those who cannot be deterred by the "taint" attaching to Poor Law relief and who regard the Workhouse as a free maternity hospital where their infants can be born and if necessary brought up.²⁵

It is against such a background that nineteenth and twentieth century eugenics yielded to a more detailed understanding of fetal development, and especially genetic research.²⁶ The disaster of racial hygiene in Nazi

²⁴Ibid., 141.

²⁵F. S. S., "Eugenics and Pauperism," *Crusade Against Destitution* (1910), 1:131–32 cited in Pauline M. H. Mazumdar, "The Eugenists and the Residuum: The Problem of the Urban Poor," *Bulletin of the History of Medicine* 54 (Summer, 1980): 204–15.

²⁶Although the eugenics movement and the development of theories of heredity and genetics are beyond the scope of this essay, we feel a brief note on these areas may be of use.

Nineteenth century ideas of heredity and germ plasm led to the rigorous study of heredity. Garland E. Allen, "The Introduction of *Drosophila* into the Study of heredity and Evolution: 1900–1910," *Isis* 66 (Sept. 1975): 322–33, chronicles the work of Thomas Hunt Morgan (1866–1945) and the acceptance of the Mendelian theory. Allen has also shown how the science of heredity was used by social activists to try to improve the human race and society. See also, Garland E. Allen, "The Eugenics Record Office at Cold Spring Harbor, 1910–1940," *Osiris* 2 (1986): 225–64; Garland E. Allen, "Old Wine in New Bottles: from Eugenics to Population Control in the Work of Raymond Pearl," in *The Expansion of American Biology*, ed. Keith R. Benson et al. (New Brunswick, N.J.: Rutgers University Press, 1991), 231–61; and Garland E. Allen, "Julian Huxley and the Eugenic Law of Human

Germany was a powerful force in turning the science of genetics away from improving the gene pool toward curing genetic diseases.²⁷ This more traditional goal comports with traditional medical theories and attempts from ancient times to positively influence birth outcome.

At one level, eugenics yielded to euphenics, the idea of improving not the seed (genotype), but the physical nature and viability of the organism (phenotype). Hence, studies of diet and neural tube defects yielded the information that if a mother took 0.4 mg of folic acid per day in her diet, neural tube defects could be reduced by 50% or more. Fetal alcohol syndrome has been defined and can be prevented.

Perhaps the most interesting example of euphenics is somatic cell gene therapy. This involves inserting a functioning gene into a patient's cells to correct an inborn error of metabolism or some other genetic malady. PKU is a disorder that could be so treated. Many other disorders, from cancer to autoimmune diseases, are theoretically susceptible to somatic cell/gene therapy; yet, such an action would not change the patient's germ line genotype.

Of course, the hope exists that as knowledge of the human genome grows, it will be possible to alter a conceptus's genotype, by correcting an error in the DNA code, and preventing genetic disorders. All such therapy, phenotypic or genetic, is harmonious with humankind's traditional attempts to influence positively reproductive outcome.²⁸

Our theories, however, are on a philosophical, ethical level, not such a radical change from traditional ones that emphasized externals, maternal status, and the adequacy of seed. Our understanding is simply more detailed and our technology more effective. We can demonstrate that we can affect fetal development. We may not, however, have more metaphysical certitude than Aristotle, Galen, Paré, Soranus, or Galton.

Evolution," in *Julian Huxley: Biologist and Statesman*, ed. C. Kenneth Waters and Albert Van Helden (Houston: Rice University Press, 1992).

Pauline M.H. Mazumdar, "The Eugenists and the Residuum: the Problem of the Urban Poor," is an excellent introduction to efforts to improve England through eugenics. Eugenics in Germany is discussed by Peter Weingart, "German Eugenics between Science and Politics," *Osiris* 5 (1989): 260–82. He demonstrates, as does Mazumdar, how science and social thought were combined to argue for the improvement of human kind through eugenics.

²⁷This point is well made by Weingart, "German Eugenics," 260, 280–82.

²⁸There are two ways to view genetic engineering:

- 1) somatic cell engineering—therapy designed to improve the health and well-being of a particular individual;
- 2) germ cell engineering—therapy designed to affect and improve the health and well-being of all subsequent generations.

Historically, therapy was seen as able to affect only the current pregnancy, or at most the current generation. In the future, we could attempt to affect subsequent generations. Only if scientists attempt to change the genome will they step beyond traditional concerns and moral categories. That issue will undoubtedly become more important, but it falls outside the scope of this essay. We seek only to show that humans have traditionally sought to affect in a positive way fetal phenotypic development and that, indeed, in light of their medical ideas, believed that they could.