

Science, Ethos, and Transcendence in the Anatomy of Nicolaus Steno

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Abstract. The anatomist Nicolaus Steno (1638–1686), a key figure of the Scientific Revolution and founder of modern geology, engaged in research on human procreation and proved for the first time that women have ovaries and not so-called female testicles. Steno took the view of “simultaneous animation” of the embryo and demythologized malformations of the embryo by appealing to original sin. His sexual ethics presages the pastoral constitution *Gaudium et spes* (1965). Steno, who was later ordained a priest and consecrated a bishop, was a defender of human life and looked at the human body as an “interpreter” of divine love. He was beatified by Pope St. John Paul II in 1988; his tomb is in the Basilica San Lorenzo in Florence. *National Catholic Bioethics Quarterly* 15.1 (Spring 2015): 107–126.

Nicolaus Steno (1638–1686) stands out as one of the preeminent anatomists of the Scientific Revolution. The term “Scientific Revolution” was coined by Alexandre Koyré in the 1930s.¹ Although not undisputed, the term is widely accepted and

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¹ See Gustav Scherz, “Stensen, Niels, Bl.,” in *New Catholic Encyclopedia*, 2nd ed., ed. Thomas Carson and Joann Cerrito (Detroit, Michigan: Thomson Gale, 2003), 13:508–509; Frank Sobiech, “Stensen, Niels (Steen[sen], Nicolaus Steno[nis], Niccolò Stenone),” in *Neue Deutsche Biographie*, ed. Historische Kommission bei der Bayerischen Akademie der Wissenschaften (Berlin: Duncker and Humblot, 2013), 25:251–253. See also Charles C. Gillispie,

denotes the rise of modern science during the early modern period, especially the seventeenth century. The life sciences were not prominent in the academic discourse of the Scientific Revolution.² However, Steno and his contemporaries were well aware of the importance of the biological discoveries of their day.³ Steno describes them as gigantic compared with those made previously.⁴

Known in Latin as Nicolaus Stenonis (a patronym for the Danish *Steensen*, “son of Steen”) and in modern languages as Niels Stef[e]nson, Niccolò Stenone, and Nicolas Sténon, Steno made his first anatomical discovery—of the excretory duct of the parotid gland (the *ductus stenoianus*, or Stensen’s duct)—when he was a student in Amsterdam in 1660.⁵ He is also uniquely credited as the founder of modern geology.

Steno was born the son of a Lutheran goldsmith in Copenhagen on January 1, 1638 OS (January 11, 1638 NS), and he died as a Roman Catholic vicar apostolic in Schwerin on November 25, 1686 OS (December 5, 1686 NS).⁶ After studying medicine in Copenhagen, Amsterdam, and Leiden, he commenced a study tour that led him via Paris to Florence, where he converted to the Roman Catholic faith on November 7, 1667. Until 1675, the year of his ordination to the priesthood in Florence, he continued with his research.

In 1669, he published his *Prodromus*, now a well-known geological treatise, in which he established the founding principles of crystallography and stratigraphy. From 1672 to 1674, he worked as “Royal Anatomist” in Copenhagen, where he

“Koyré, Alexandre,” in *Dictionary of Scientific Biography*, ed. Charles C. Gillispie (New York: Charles Scribner’s Sons, 1973), 7:485, 487.

² See Charles T. Wolfe, “Why Was There No Controversy over Life in the Scientific Revolution?,” in *Controversies within the Scientific Revolution*, ed. Marcelo Dascal and Victor D. Boantz (Amsterdam: John Benjamins, 2011), 187–219.

³ With respect to the term “Scientific Revolution,” see Robert S. Westman and David C. Lindberg’s introduction to *Reappraisals of the Scientific Revolution*, ed. David C. Lindberg and Robert S. Westman (Cambridge: Cambridge University Press, 1990), xvii.

⁴ See the following paper by Nicolaus Steno in *Nicolaus Steno: Biography and Original Papers of a 17th Century Scientist*, ed. Troels Kardel and Paul Maquet (Berlin: Springer, 2013) (hereafter Kardel and Maquet): “On the Passage of Yolk into the Intestines of the Chick,” doc. 17, 499 (Maar 1:211). See also “Anatomical Observations on the Glands of the Eyes,” doc. 5, 410 (Maar 1:82); and “On a Calf with Hydrocephalus,” doc. 28, 669 (Maar 2:237). Page numbers are to the English translations by Kardel and Maquet. The texts in their original languages are to be found in the two-volume *Nicolai Stenonis opera philosophica*, ed. Vilhelm Maar (Copenhagen: Vilhelm Tryde, 1910); the Maar volume and page numbers are shown in parentheses.

⁵ See Edith J. Applegate, *The Sectional Anatomy Learning System: Concepts*, 3rd ed. (St. Louis: Saunders Elsevier, 2010), 283.

⁶ The abbreviations OS (Old Style) and NS (New Style) indicate dates according to the Julian calendar and Gregorian calendar, respectively. The Gregorian calendar replaced the Julian in 1582. In this article, early modern dates that appear without the dual notation are in the New Style.

delivered his famous inaugural lecture on his dissection of a female corpse.⁷ But his position there was precarious, because his Catholicism was an obstacle for the state church, which was Lutheran.

Steno, who had accepted the call to Copenhagen only for pastoral motives, finally left Denmark with the intention of becoming a priest.⁸ He was ordained to the priesthood in Florence in 1675, and in 1677 was consecrated a bishop in Rome and appointed Vicar Apostolic of the Northern Missions. He worked mainly in Germany (Hanover, Münster, Hamburg, and Schwerin). As the first scientist of the modern age to be raised to the honor of the altars, he was beatified in Rome on October 23, 1988, by Pope St. John Paul II, who cited Steno's "acute powers of observation and his calm objectivity" in the English part of his sermon that day.⁹

Purpose of This Paper

Steno's works and their relevance to the present day offer answers to fundamental questions of scientific ethos and bioethics. In considering his life and work, this paper aims to shed light on the ethical dimensions of early modern anatomy. The history of medical ethics and bioethics in early modernity, the relationship between medicine and theology in early modern times in general, and the religious stance of early modern scientists in particular still constitute large-scale research desiderata.¹⁰ The first historical-bioethical study on the work and reception of an anatomist of the early modern era was about Steno.¹¹

Modern medical ethics begins with the Catholic Antwerpen physician Michiel Boudewyns and his book *Ventilabrum medico-theologicum* [Medical-theological

⁷ Steno, "Preface to Anatomical Demonstrations," in Kardel and Maquet, doc. 31, 679–684 (Maar 2:249–256). Note that "Royal Anatomist" was not an official title, although Steno did receive a salary from the Danish king. Steno was called "Royal Anatomist" by well-intentioned friends.

⁸ Concerning his time in Copenhagen as "Royal Anatomist," see Frank Sobiech, *Herz, Gott, Kreuz: Die Spiritualität des Anatomen, Geologen und Bischofs Dr. med. Niels Stensen (1638–86)*, *Westfalia sacra* 13 (ThD diss., University of Münster, 2004), (Münster, Germany: Aschendorff, 2004), 68–74; and Gustav Scherz in Kardel and Maquet, 281–323.

⁹ *AAS* 81 (1989): 292.

¹⁰ See Darrel W. Amundsen, "The Discourses of Roman Catholic Medical Ethics" (218–254) and Andrew Wear, "The Discourses of Practitioners in Sixteenth- and Seventeenth-Century Europe" (379–390) in *The Cambridge World History of Medical Ethics*, ed. Robert B. Baker and Laurence B. McCullough (Cambridge: Cambridge University Press, 2009); Harold J. Cook, "Medical Ethics, History of Europe I-II," in *Encyclopedia of Bioethics*, ed. Stephen G. Post, 3rd ed. (New York: Thomson Gale, 2004), 3:1555–1589; and Robert Baker, *Before Bioethics: A History of American Medical Ethics from the Colonial Period to the Bioethics Revolution* (Oxford: Oxford University Press, 2013), 19–93.

¹¹ Frank Sobiech, *Radius in manu Dei: Ethos und Bioethik in Werk und Rezeption des Anatomen Niels Stensen (1638–1686)*, *Westfalia sacra* 17, 2nd ed. (Münster: Aschendorff, 2014), with a foreword by the prefect of the Congregation for the Doctrine of the Faith, Gerhard Ludwig Cardinal Müller, dated September 27, 2013. English and Spanish translations of this book are being prepared for publication.



FIGURE 1. The Cappella Stenoniana (Steno Chapel), a side chapel to the north of the nave of the Basilica di San Lorenzo in Florence. The marble sarcophagus containing Steno’s remains can be seen on the left wall. Photographed by Maria Francesca Gallifante, March 31, 2015. Used with permission.

winnowing shovel], published in 1666, which provides a moral theological investigation of questions of medical practice, pharmacists, patients, and the public health care system.¹² This was the year Steno made his discovery of the ovary.

The comparison of modern exponents of bioethics with early modern ethicists constitutes another challenge, which is taken up here by considering Steno with two twentieth-century bioethicists, André E. Hellegers (1926–1979) and Van Rensselaer Potter (1911–2001).

Compatibility of Steno’s Science and Ethics

In 2010, James Tait Goodrich, professor of clinical neurological surgery at the Albert Einstein College of Medicine at Yeshiva University, mused on Steno’s beatification in a letter to the editor of the journal *Neurosurgery*: “With all this wonderful research, amazingly sanguine ideas, and a natural skill at scientific investigation one wonders why he ended up an itinerant traveling titular bishop in poverty trying to bring Catholicism to the heathens of Europe. Even more amazing is that a recent pope considered his efforts so important he has recently become beatified and is now recognized as our patron saint of scientists.”¹³ Goodrich evidently struggled with the idea that a celebrated scientist could give up his promising career to become a bishop. Implicit is the assumption that Steno’s life as a bishop was separate from, if

¹² See Gerrit A. Lindeboom, *Dutch Medical Biography. A Biographical Dictionary of Dutch Physicians and Surgeons, 1475–1975* (Amsterdam: Rodopi, 1984), 236.

¹³ James Tait Goodrich, Comment on “Niels Stensen (1638–1686): Scientist, Neuro-anatomist, and Saint,” by Paolo Perrini et al., *Neurosurgery* 67.1 (July 2010): 9.

FIGURE 2. Steno’s sarcophagus in the Cappella Stenoniana. Notice the many requests for intercession on the lid. Photographed by the author, July 19, 2014.



not incompatible with, his life as a preeminent anatomist. It is this misunderstanding that I seek to correct in this paper.

In contrast, in 1998 Bernard E. Simon, then a plastic surgeon at Mount Sinai Hospital in New York, and two Italian physicians published an article in the journal *Aesthetic Plastic Surgery*, in which they point to the Cappella Stenoniana (Steno Chapel) in Florence, which houses Steno’s tomb, an Early Christian marble sarcophagus from the fourth century that was excavated from the Arno River (Figures 1 and 2).¹⁴ They note the “pilgrimage of faithful academics who visit his remains, and above all young medical students who turn to him to obtain grace and fervor for their studies, leaving behind small notes and flowers with their requests to be fulfilled.”¹⁵ Pilgrims from throughout the world continue uninterruptedly to visit his tomb today and pray for Steno’s intercession to obtain God’s graces. Children also come to trust Steno and deposit requests on his sarcophagus: a boy with the

¹⁴ Simone Grappolini, Massimo Signorini, and Benjamin E. Simon, “Niccolò Stenone: A Life between Science and Faith,” *Aesthetic Plastic Surgery* 22.2 (March 1998): 90–96. See also William H. Honan, “B. E. Simon, ‘Hiroshima Maidens’ Surgeon, 87,” obituary, *New York Times*, August 5, 1999, <http://www.nytimes.com/1999/08/05/nyregion/b-e-simon-hiroshima-maidens-surgeon-87.html>. For information on the chapel, see Frank Sobiech, “The ‘Capella Stenoniana’ in Florence: The Tomb of Blessed Niels Stensen (1638–1686),” *Archivos de Cardiología de México* 85.1 (March 2015): 73–76.

¹⁵ Grappolini et al., “Niccolò Stenone,” 96. See also, more recently, André Parent, “Niels Stensen: A 17th Century Scientist with a Modern View of Brain Organization,” *Canadian Journal of Neurological Sciences* 40.4 (July 2013): 482–492; Goran Strkalj, “Niels Stensen and the Discovery of the Parotid Duct,” *International Journal of Morphology* 31.4 (December 2013): 1491–1497; and Alfredo de Micheli and Raúl Izaguirre Ávila, “A Saint in the History of Cardiology,” *Archivos de Cardiología de México* 84.1 (January–March 2014): 47–50.

first name Niccolò sketched the contours of Africa, an Erlenmeyer flask filled with liquid, and an erupting volcano as symbols of science and wrote, “Nicolaus Steno, I would like to become a great scientist like you.”¹⁶

In the twentieth century, André Hellegers, founder and director of the Kennedy Institute of Ethics at Georgetown University in Washington, DC, said something that reminds us of Steno, which is worth analyzing.¹⁷ According to an editorial at the time, Hellegers spoke at a symposium on the abortion of defective fetuses organized by students at the George Washington University School of Medicine in the fall of 1974. Hellegers made the point that, in the words of the editorial writer, “bioethics does not seek to restrict science but to continually remind scientists that medicine and science are servants, not masters of man. By their seeking to keep within the ethical uses of medicine, it is hoped that physicians and scientists will avoid leading people to believe that science promises more than it can deliver; thus preventing a potential backlash.”¹⁸ The reason for his statement was the definition of health accepted by the World Health Organization in 1948: “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”¹⁹

Hellegers himself described this as “the craziest definition of health ever given.”²⁰ If medicine attempted to treat unhappiness—what the editorial writer called “an essentially subjective ailment”—or include patients’ happiness in treatment, Hellegers feared that it would overstep its bioethical limits.²¹ But science could not fulfill what Hellegers called the “infinite need” of happiness, and bioethics should therefore have the task to serve “as the protector of the scientific method against an anti-scientific backlash.”²² In other words, Hellegers asserted that, without ethical restrictions, physicians and scientists specifically, and medicine and science in

¹⁶ Maria Francesca Gallifante, “‘Fammi andare bene a scuola’: i desideri dei bambini nei biglietti a Stenone,” *L’Osservatore Toscano (Toscana Oggi suppl.)*, December 21, 2014, 6: “Niccolò Stenone[.] vorrei diventare un grande scienziato come te.” I thank Maria Francesca Gallifante, of Florence, Italy, for telling me the entire wording and further details. See also Gallifante, “Le preghiere dei bambini: ‘Fai finire le guerre e il terrorismo,’” *L’Osservatore Toscano*, February 1, 2015, 2.

¹⁷ See Doris Mueller Goldstein, “Bibliography of Resources By and About André E. Hellegers,” *Kennedy Institute of Ethics Journal* 9.1 (March 1999): 89–107.

¹⁸ “Rise in Ethical Problems Laid to Redefining of MD Role, Disease,” editorial, *Obstetrics and Gynecology News* 9.22 (1974): 47. See also “Problem Is Values: [Hellegers] Defends Ethics as Protector of Science and Research,” *Anchor*, editorial, 18.43 (October 24, 1974): 1. I thank the staff of the Bioethics Research Library of the Kennedy Institute of Ethics, Georgetown University, Washington, DC, for forwarding the latter article to me and searching in Dr. Hellegers’ papers for further traces of the 1974 symposium.

¹⁹ Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, June 19–22, 1946; signed July 22, 1946, by the representatives of sixty-one States (*Official Records of the World Health Organization* 2 [1948]: 100) and entered into force April 7, 1948.

²⁰ Hellegers, quoted in “Problem Is Values,” 1.

²¹ “Rise in Ethical Problems,” 47.

²² Hellegers, quoted in “Problem Is Values,” 1.

general, have the potential to become masters of men instead of their servants. He gives as an example water fluoridation without the consent of the individual or even against the individual's will.²³

The priority of moral decision making in the work of scientific discovery, which is exemplified by Steno, guided the bioethical thinking of Hellegers. Van Rensselaer Potter, who coined the term "bioethics" in 1970, was less inclined to acknowledge the limits of science.²⁴ Hellegers would surely have distanced himself from the sort of future political proposal that Potter mentioned in *Bioethics: Bridge to the Future* "to add the antifertility chemicals to certain foods or to water supplies in large cities."²⁵ Potter merely humoristically distanced himself from that proposal.²⁶ What is needed to properly understand the danger of such a proposal is an appreciation of the limits of what science may do.

As "Royal Anatomist" in Copenhagen, Steno delivered an inaugural address during his dissection of a female corpse on January 29, 1673 OS (February 8, 1673 NS), in which he said, "Only the world promises more and greater things than it delivers; Nature delivers more and greater things than it promises; [but] strictly speaking, both are deceptive, because, in both cases, that which lies hidden is different from that which appears."²⁷

By Nature, Steno meant the visible—for example, a precious crystal in a dirty lump of earth.²⁸ According to him both the world, in the negative sense, as suggested by John the Evangelist (John 15:19 and 17:14–15), and Nature are deceptive, but in different ways: the specific Johannine use of the term "world" (in Greek, κόσμος) connotes worldly dominion identified with sin. Nature from Steno's point of view is always fallen Nature, and therefore research into it can blind if one does not look beyond superficial appearances.

Steno as bishop explained visible diseases, malfunctions, and malformations of the embryo by way of invisible "original sin," and thereby demythologized them.²⁹

²³ "Rise in Ethical Problems," 47.

²⁴ Potter first used the term in "Bioethics, the Science of Survival," *Perspectives in Biology and Medicine* 14.1 (Autumn 1970): 127–153. Hellegers used the term on October 1, 1971; see Albert R. Jonsen, *The Birth of Bioethics* (New York: Oxford University Press, 1998), 27.

²⁵ Van Rensselaer Potter, *Bioethics: Bridge to the Future* (Englewood Cliffs, NJ: Prentice-Hall, 1971), 155.

²⁶ *Ibid.*, 156.

²⁷ Steno, "Preface to Anatomical Demonstrations," 680 (2:252): "Solus mundus plura & majora promittit, quam praestat, Natura plura & majora praestat, quam promittit, uterque sano loquendi modo fallit, dum utrobique, quae latent, diversa sunt ab iis, quae apparent." Unless otherwise noted, all translations are by the author.

²⁸ *Ibid.*

²⁹ Steno, "De peccatis: Considerantur mala ex peccato originali et actuali. Provenientia paenitentia non est procrastinanda," ca. 1677, in *Nicolai Stenonis opera theologica cum prooemiis ac notis Germanice scriptis*, ed. Knud Larsen and Gustav Scherz (Copenhagen: Nyt Nordisk Forlag Arnold Busck, 1947), opusculum 5, 2:454. See Frank Sobiech, "Nicholas Steno's

In the seventeenth century, they were ascribed to the fantasies of pregnant women instead.³⁰ In Steno's view, science has the potential to lead one astray owing to "original sin," which also affects creation (Rom. 8:19–23). Therefore, science has the potential to identify with the "world," which "promises more and greater things than it delivers," and with sin. In other words, science can degenerate into ideology. Hellegers thus believed that science can degenerate to become a "master of men," whereas Steno regards it as having the potential for "deception." Steno looks deeper, to the hidden root of "deception"—in other words, to the original sin of mankind which, in biblical terms, has to do with the "father of lies" (John 8:44).

However, as an anatomist who spoke of the "natural light" of reason and inquired after its capacity to comprehend nature, Steno was hopeful.³¹ He discovered in Leiden in 1662/63 that the heart is a muscle and nothing more, that is, it is not what Aristotle called the "throne of the soul."³² This was so important for Steno's spiritual development that after his conversion he modeled his coat of arms on an anatomically correct human heart responsible for the circulation of blood. It exhibits the cardiac apex, from which a cross rises. With this coat of arms he continued to seal his letters as priest; as bishop he added his episcopal insignia (Figure 3). This is an indication of the importance that Steno attached to his discovery; he regarded it as a symbol of the circular flow of divine grace and held that it helped bring about his conversion.

In the context of research on the anatomy of the muscles, Steno wrote in Florence in 1667, "And why should it not be permitted to hope for great things if anatomy was reduced to that point that experience only in the reliable, reason only in the proven will find its fortune, that means if anatomy took an oath on the words

Way from Experience to Faith: Geological Evolution and the Original Sin of Mankind," in *The Revolution in Geology from the Renaissance to the Enlightenment*, ed. Gary D. Rosenberg (Boulder, CO: Geological Society of America, 2009), 183; and Peter Harrison, "Original Sin and the Problem of Knowledge in Early Modern Europe," *Journal of the History of Ideas* 63.2 (April 2002): 239–259.

³⁰ See, for example, the fantastic story of an ape-like newborn that was thought to have resulted from the pregnant mother's having watched an ape at a theater in her fifth month; the story was published in the *Philosophical Transactions* of the Royal Society in their issue of Monday, June 3, 1667 OS (June 13, 1667 NS), along with a reflection on the fate of the soul of the five-month-old embryo. "Extract of a Letter, Written from Paris, containing an Account of some Effects of the Transfusion of Blood; and of two Monstrous Births, &c.," *Philosophical Transactions [of the Royal Society]* (London, 1667), 2:479–480, <http://rstl.royalsocietypublishing.org/content/2/23–32/479.full.pdf+html>.

³¹ Steno to Marcello Malpighi, November 24, 1671, in *Nicolai Stenonis epistolae et epistolae ad eum datae quas cum prooemio ac notis Germanice scriptis*, ed. Gustav Scherz (Copenhagen: Nyt Nordisk Forlag Arnold Busck; and Freiburg: Herder, 1952), letter 65, 1:249: "lume naturale"; or, in English, Howard B. Adelman, ed., *The Correspondence of Marcello Malpighi, 1670–1683* (Ithaca, NY: Cornell University Press, 1975), letter 271, 2:598.

³² Steno, "Specimen of Observation on Muscles and Glands," in Kardel and Maquet, doc. 15, 466 (Maar 1:168–169): "animae thronum."

FIGURE 3. Steno’s seal on his letter of April 19, 1678 OS (April 29, 1678 NS) to the Grand Duke of Tuscany, Cosimo III de’ Medici, written in Hanover, Germany. From the Historical Archives of the Pontifical Gregorian University, Rome; APUG 576, folio 45 verso. Used with permission.



of mathematics?”³³ He believed that knowledge about the human body could help improve the human condition, and more generally, he was optimistic about the ability of science to facilitate progress.

Ethos

From the body of Steno’s writings, it is clear that the four “basic elements” of Steno’s ethos are *intuition*, *reflection*, *empathy*, and *caution*.³⁴ Steno was intuitive, which may help explain his talent for dissections. He was thoughtful, and reflected on events and observations over and over again to reach a well-founded conclusion. He was empathetic and could feel compassion—not only for women who suffered complications during pregnancy, for example, but also for animals undergoing vivisections.³⁵ He was very cautious, carrying out his investigations carefully in order to verify his observations and conclusions, and if he could not verify them, he would keep an open mind.

In this context, special attention should be paid to Steno’s discovery of the human ovary. When he did comparative anatomical research in Florence in 1666/67, Steno proved that women do not have so-called atrophied testicles—that is, male

³³ Steno, “Specimen of Elements of Myology,” in Kardel and Maquet, doc. 22, 547 (Maar 2:64): “Et quidni magna sperare liceret, si eo reduceretur anatome, ut in solis certis experientia, in solis demonstratis ratio acquiesceret, id est, in matheseos verba anatome juraret?”

³⁴ For further analysis, see Sobiech, *Radius in manu Dei*, 54–58.

³⁵ In Kardel and Maquet, see Steno, “The Uterus of a Hare Dissolving Its Own Foetus,” doc. 21, 542 (Maar 2:58); and Steno to Thomas Bartholin, September 12, 1661, “Various New Observations in the Eyes and Nose, Etc.,” doc. 3, 392–393 (Maar 1:57); also in Scherz, *Nicolai Stenonis epistolae*, letter 3,1:142.

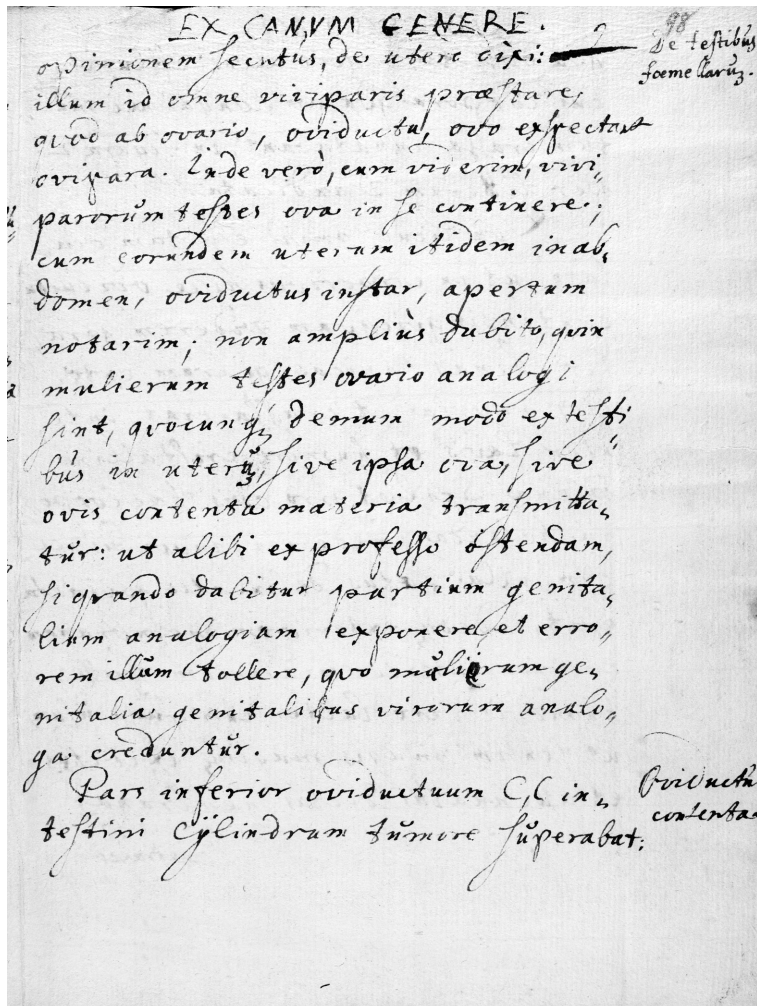


FIGURE 4. Manuscript page (ca. February 1667) of Steno's history of a dissected dogfish, noting his discovery of the ovaries. From the Royal Library, Copenhagen; NKS 4019 4°, folio 98r. Used with permission.

sexual organs in decline—but ovaries, distinct female sexual organs. He published his discovery in the second appendix to his myology, or study of the muscles.³⁶ That manuscript received the imprimatur of Benigno Bruni, OMin, Florentine consultor to

³⁶ The full title is *Elementorum myologiae specimen, seu musculi descriptio geometrica: Cui accedunt canis carchariae dissectum caput, et dissectus piscis ex canum genere* [Specimen of elements of myology or Geometrical description of the muscle: To which are added Dissected head of a Carcharias-shark and Dissected dogfish] (Florence, 1667), 2nd ed. (Amsterdam, 1669). In Kardel and Maquet, see Steno, "Specimen of Elements of Myology," doc. 22, 545–569 (Maar 2:61–111); "A Carcharodon-Head Dissected," doc. 23, 571–595 (Maar 2:113–145); and "Description of the Dissection of a Dogfish," doc. 24, 597–602 (Maar 2:147–155).

the Holy Office, who stated concerning the second appendix (on “dissected dogfish”) that he had found “all described accurately.”³⁷

A complete manuscript of Steno’s myology plus the appendices, written by a copyist and corrected by Steno himself, has been preserved. Figure 4 shows the page on which the discovery of the ovaries is noted, with Steno’s original handwriting at the top of the right margin. It reads in conventional terminology *De testibus foemellarum*, “On the testicles of females.” In the text, Steno points out that the female “testicles” of mammalian animals contain eggs and that therefore they are analogous to the ovaries of oviparous animals. The consequent conclusion is that “the testicles of women are analogous to an ovary.”³⁸ Steno’s discovery that women have ovaries was revolutionary.

Steno was more exact in describing Graafian follicles than their eponym, the Delft anatomist Regnier de Graaf.³⁹ Roger Short states that Steno “is undoubtedly the unsung hero of the ovary, and, if there was any justice in the world, we should be referring to ovarian follicles as Stensen’s follicles, not Graafian follicles.”⁴⁰ In a letter of October 1671, Steno set forth, generalizing, “that the natural things can be perceived sometimes during their process of growing, but concerning their beginnings and in that early formation arranged by Nature, that we do not know nearly all of them.”⁴¹ In other words, we have virtually no knowledge about the beginning of individual life, and, concerning Nature in general, human science can comprehend better the process of growing, such as that of the fetus—an insight that remains true today.

Concerning Steno’s discovery that human reproduction resembles animal reproduction, Matthew Cobb asserts that “Steno would have been horrified had he realized the profound implications of his idea. By suggesting that human generation is no different from that of any other animal, he enabled science to take a tiny step on the road to a materialist understanding of the ultimate origins of all life.”⁴² Cobb is surely right. But nevertheless one should consider that mere knowledge of

³⁷ Gustav Scherz, ed., *Steno: Geological Papers* (Odense, Denmark: Odense University Press, 1969), 116: “omnia accurate descripta.” For information on Bruni, see Antonio Tognocchi a Terrinca, *Genealogicum et honorificum theatrum etrusco-minoriticum . . . anno Domini MDCLXXX elaboratum* (Florence, 1682), 21.

³⁸ Steno, “Description of the Dissection of a Dogfish,” 601 (2:152–153): “mulierum testes ovario analogi sint.” In Figure 4, these words appear on handwritten lines 10 and 11.

³⁹ Max Bierbaum, Adolf Faller, and Josef Traeger, *Niels Stensen: Anatom, Geologe und Bischof 1638–1686*, 3rd ed. (Münster: Aschendorff, 1989), 33.

⁴⁰ Roger V. Short, “The Magic and Mystery of the Oocyte: Ex ovo omnia,” in *Biology and Pathology of the Oocyte: Its Role in Fertility and Reproductive Medicine*, ed. Alan O. Trounson and Roger G. Gosden (Cambridge: Cambridge University Press, 2003), 5.

⁴¹ Steno to Paolo Boccone, October 1671, in Scherz, *Nicolai Stenonis epistolae*, letter 64, 1:247: “que les choses naturelles dans leur accroissement sont quelques fois sensibles, mais dans leurs commencements et dans cette première délinéation, que la nature en fait nous les ignorons presque toutes.”

⁴² Matthew Cobb, *The Egg and Sperm Race: The Seventeenth-Century Scientists Who Unravelling the Secrets of Sex, Life and Growth* (London: Free Press, 2006), 100.

the elements of nature is value-neutral, even when it brings in its wake a seeming demystification, as in Steno's discovery of the heart muscle.

Steno's sexual ethics also stands out for its "calm objectivity," as John Paul II put it concerning Steno's scientific profile.⁴³ In 1673, when Steno delivered his inaugural address in Copenhagen, he talked about human sexuality, taking the beauty of the human skin as his starting point.⁴⁴ He spoke of "especially that act [sexual intercourse] which by itself, with respect to all acts aiming at the procreation of mankind, is of highest dignity, is furthermore accompanied by the highest lust possible as a reward the prospect of which is held out by the author [the Creator] to those who perform it legitimately."⁴⁵

Concerning its characteristic style and its use of the Latin word *dignus* ("of dignity"), Steno's description of the marital act, which was extraordinary for his time, corresponds to remarkably similar words in the pastoral constitution *Gaudium et spes*, promulgated on December 7, 1965. There we read that "the acts by which the spouses unite intimately and chastely are honorable and of dignity, and, conducted in truly humane fashion, denote and foster mutual self-giving, with which they enrich themselves in a cheerful and thankful manner."⁴⁶

During the Second Vatican Council and the drafting of *Gaudium et spes*, experts' reports were being written for Steno's beatification process. Most notably, the general postulator of Steno's beatification process, Paolo Molinari, SJ, wrote chapter 7 of the dogmatic constitution *Lumen Gentium*, promulgated on November 21, 1964.⁴⁷ Whether Steno's inaugural address influenced *Gaudium et spes* is impossible to say at the moment,⁴⁸ but future investigation may shed light on the conspicuous consonance of the two statements.

⁴³ *AAS* 81 (1989): 292.

⁴⁴ Steno, "Preface to Anatomical Demonstrations," 681 (2:253).

⁴⁵ Steno, February 6, 1673 OS (February 16, 1673 NS), in the lecture notes of his student Holger Jacobsen, "Extracts from Holger Jacobæus' Exercitia academica," in Maar, *Nicolai Stenonis opera philosophica*, doc. 36, 2:306: "Ipsa per se considerata actio omnium conservationis actionum dignissima, etiam comitem sibi habet suavitatem maximam in præmium ab Authore propositam rite illam exercentibus." This document is not included in Kardel and Maquet.

⁴⁶ Vatican Council II, *Gaudium et spes*, *AAS* 58 (1966): 1070, n. 49: "Actus . . . quibus coniuges intime et caste inter se uniuntur, honesti ac digni sunt et, modo vere humano exerciti, donationem mutuam significant et fovent, qua sese invicem laeto gratoque animo locupletant."

⁴⁷ Bernd Hagenkord, "Übersetzer, Schreiber, Forscher, Helfer: Ein Pater erzählt vom Konzil," September 7, 2012, <http://blog.radiovaticano.de/uebersetzer-schreiber-forscher-helfer-ein-pater-erzaehlt-vom-konzil>. See also the obituary of Fr. Paolo Molinari, SJ, in *La Gregoriana* 47 (December 2014): 54, http://www.unigre.it/lagregoriana/documenti/LaGregoriana_2014-47_v2_it.pdf.

⁴⁸ When in Rome in July 2014, I was told by Father Peter Gumpel, SJ, former assistant general postulator of the Society of Jesus and relator (investigating judge) in Steno's beatification process, that it might be possible to verify eventually, although it was impossible at the moment.

In one of his sermons, Steno says that the attraction between the two sexes—explicitly called by him *formam amas* (you love beauty)—and the mutual care between husband and wife can be a model for the Christian love for God.⁴⁹ It is significant that Steno’s expression is traceable to the dictum “Amor formae rationis oblivio est et insaniae proximus” (Love of beauty is the oblivion of reason and close to insanity), by which the Stoic philosopher Seneca the Younger meant passionate love between the two sexes.⁵⁰ Steno however adopted a positive attitude. Seneca’s dictum can be found not only in anatomy or theology books of the seventeenth century, but also in Spinoza’s *Ethics*.⁵¹ Spinoza visited Steno’s daily anatomical dissections of the brain in Leiden, and later Steno, after his own conversion, tried to convert Spinoza to the Roman Catholic faith.⁵²

Concerning the animation of the embryo, that is, the theological discussion about the moment of time when the soul is infused, the traditional scholastic viewpoint of “successive animation,” or “delayed ensoulment,” dominated during the seventeenth century.⁵³ According to Aristotle, this meant that there were three steps in animation: the first stage is the *anima vegetativa* (vegetative soul), the second is the *anima sensitiva* (sensitive soul), and the third, after some weeks, is the *anima rationalis* (rational soul). Aristotle’s views on human procreation were based on his incorrect observations and were the conceptual presupposition of his viewpoint of successive animation.⁵⁴ But whatever the precise moment of animation, the Roman

⁴⁹ Steno, “In nativitate Domini,” ca. 1677, in Larsen and Scherz, *Nicolai Stenonis opera theologica*, sermon 1, 2:177.

⁵⁰ Winfried Trillitzsch, ed., *Seneca im literarischen Urteil der Antike: Darstellung und Sammlung der Zeugnisse*, vol. 2, *Quellensammlung (Testimonien)*, (Amsterdam: Adolf M. Hakkert, 1971), 374.

⁵¹ Baruch de Spinoza, *Ethica ordine geometrica demonstrata* [Ethics demonstrated in geometrical order], part of the *Opera posthuma* (Amsterdam, 1677 OS [1678 NS]). See Leen Spruit and Pina Totaro, eds., *The Vatican Manuscript of Spinoza’s Ethica* (Leiden, Netherlands: Brill, 2011), 286. Seneca’s dictum appears, for example, in Francesco Boselli, *Amaltheum medico-historicum, tres in apparatus digestum, doctrinae varietate, cum omnibus historicis et politicis, tum promovendis inprimis et promotis medicis non minus utile quam jucundum. Accessit geminum corollarium: encomii in Academia Patavina medicinae professorum ab anno 1631, et elogii publica in bibliotheca ibidem heroum depictorum* (Padua, 1668), 146 and 552.

⁵² See Pina Totaro, “‘Ho certi amici in Ollandia’: Stensen and Spinoza—science verso faith,” in *Niccolò Stenone (1638–1686): Anatomista, geologo, vescovo: Atti del seminario organizzato da Universitetsbiblioteket i Tromsø e l’Accademia di Danimarca lunedì 23 ottobre 2000*, ed. Karen Ascani et al. (Rome: L’Erma di Bretschneider, 2002), 31; and Stefano Miniati, *Nicholas Steno’s Challenge for Truth: Reconciling Science and Faith* (Milan: Franco Angeli, 2009), 170–174.

⁵³ See Norman M. Ford, “Catholicism and Human Reproduction: An Historical Overview,” *Australasian Catholic Record* 89.1 (2012): 49–62.

⁵⁴ Hans Reis, *Das Lebensrecht des ungeborenen Kindes als Verfassungsproblem* (Tübingen, Germany: Mohr Siebeck, 1984), 137 note 652.



FIGURE 5. Title page of Girolamo Fiorentini’s 1665 work on administering baptism to miscarried human fetuses. From the Library of the Archabbey of St. Peter, Salzburg; SPS-Zelle 7. Used with permission.

Catholic Church always has rejected abortion as sinful, as affirmed by the Congregation for the Doctrine of the Faith in the 1974 *Declaration on Procured Abortion*.⁵⁵

During Steno’s time, there were voices in theology that argued against the viewpoint of successive animation. One of these was Girolamo Fiorentini (1602–1678),⁵⁶

⁵⁵ Congregation for the Doctrine of the Faith, *Declaration de abortu procurato* (November 18, 1974), *AAS* 66 (1974): 734–736, n. 7. See Nicanor Pier Giorgio Austriaco, *Biomedicine and Beatitude: An Introduction to Catholic Bioethics* (Washington, DC: Catholic University of America Press, 2011), 47–50.

⁵⁶ Friderico Nicolao Sarteschi, *De scriptoribus congregationis clericorum regularium Matris Dei* (Rome, 1753), 154–159.

who proposed that the moment of conception was the moment of ensoulment—the viewpoint of “simultaneous animation”—but still with the traditional medical background of the mixture of male and female semen, which was the accepted idea at that time. His *Disputatio de ministrando baptismo humanis foetibus abortivorum* (Figure 5) concluded that all miscarried fetuses had to be baptized at least *sub conditione*.⁵⁷ Fiorentini was also familiar, he tells his reader, with observing “small animals” (*bestiolae*) with the help of a microscope,⁵⁸ but his treatise was primarily a theological one. Although his treatise was lauded by the Congregation of the Index, it was censured *donec corrigatur* in its first edition (Lyon, 1658) on condition that the author’s assertion be presented as only probable and no attempt made to introduce a new rite into the Church.⁵⁹

With respect to Steno’s observation that there is nearly no knowledge concerning the beginning of individual life, and that, concerning Nature in general, science can better comprehend the process of growing,⁶⁰ it is most probable that Steno was cautious; he never put his thoughts on the topic into print. But at least two lines of evidence suggest that Steno favored the moment of conception as the moment of ensoulment of the embryo.

First, as “Royal Anatomist” in Copenhagen, Steno told his students that he would “not determine” the questions concerning the “vegetative soul.”⁶¹ Second, later as a priest and bishop he said in a sermon that God directed “your soul” (i.e., the soul of his listeners) “from the very moment of your conception.”⁶² Steno speaks of only one soul—namely, the “rational soul”—that is infused at the moment of conception, and not of a soul that develops in three steps. Therefore, one can conclude with certainty that in Steno’s view no inanimate embryo existed; for him the embryo (or fetus) maturing in the womb is a human being in the full sense from the moment of conception.⁶³ Steno did not hesitate to use the authority of his office as suffragan

⁵⁷ Girolamo Fiorentini, *Disputatio de ministrando baptismo humanis foetibus abortivorum* [Disputation on administering baptism to miscarried human fetuses], 2nd ed. (Lucca, Italy, 1665), 93; and, discussing Fiorentini, Francesco Emanuele Cangiamila, *Embriologia sacra, ovvero dell’uffizio de’sacerdoti, medici, e superiori, circa l’eterna salute de’ bambini racchiusi nell’utero, libri quattro* (Milan, 1751), 53–54, nn. 2–4.

⁵⁸ Fiorentini, *Disputatio de ministrando baptismo*, 20.

⁵⁹ Sarteschi, *De scriptoribus*, 155–156; and Jesús Martínez De Bujanda, *Index librorum prohibitorum 1600–1966 (Index des livres interdits 11)* (Montreal: Médiaspaul, 2002), 347–348.

⁶⁰ Steno to Paolo Boccone, October 1671, in Scherz, *Nicolai Stenonis epistolae*, letter 64, 1:247.

⁶¹ Steno, “Extracts from Holger Jacobæus’ Exercitia academica,” 291: “non determinavero.”

⁶² Steno, “In Annunciatione B[eatae] Mariae Virg[inis],” ca. 1677, in Larsen and Scherz, *Nicolai Stenonis opera theologica*, sermon 32, 2:307: “a primo conceptionis tuae momento . . . animam.”

⁶³ In the seventeenth century, the terms “embryo” and “fetus” were synonymous.

bishop to the Prince-Bishopric of Münster to give the defenseless unborn protection: unambiguously he called abortion a “crime.”⁶⁴

It is important to stress that Steno, unlike many of his contemporaries, never intermingled natural science and theology methodically, although this did not prevent him from addressing the wonder of creation—for example, the relationship between body, soul, and mind and the “gracefulness” (*gratia*) of the human face enhanced by the collocation of the vasculars and nerves.⁶⁵ In this way Steno facilitated a new relationship between knowledge and faith, and thus in his stance on scientific methodology he already points to the “legitimate autonomy of the sciences” stressed by the Second Vatican Council.⁶⁶ His scientific writings, which were drawn up in Latin, are always precise and unpretentious, putting their content in a nutshell.

Transcendence

Nicolaus Steno engaged in research on the beginning of the individual human life. With his discovery of the ovary in Florence in 1666/67, he set forth a new understanding of human embryogenesis. We may, therefore, use the term “bioethics,” coined by Potter, when outlining Steno’s studies.⁶⁷ The interesting point is that Steno and Potter shared the philosophy of René Descartes, in particular the concept that man is a machine. Potter believed that man was a “cybernetic machine,”⁶⁸ while Steno, in contrast, did not make that conception absolute. Rather, Steno was a “heuristic Cartesian,”⁶⁹ who appreciated Descartes’ philosophy and adapted it to the needs of his research, which required the discovery and use of alternative methods. In his

⁶⁴ Steno to Caspar Strübbe, Prince-Bishopric of Münster, Germany, December 5, 1682, in Scherz, *Nicolai Stenonis epistolae*, letter 288, 2:571.

⁶⁵ See Steno to Marcello Malpighi, November 24, 1671, in Scherz, *Nicolai Stenonis epistolae*, letter 65, 1:249; or, in English, Adelman, *Correspondence of Marcello Malpighi*, letter 271, 2:597–598. See also Steno, “Specimen of Observation on Muscles and Glands,” 478 (1:184).

⁶⁶ Second Vatican Council, *Gaudium et spes*, n. 59, AAS 58 (1966): 1080: “scientiarum legitimam autonomiam.” This builds on the concept of “just liberty” of the sciences, expressed in Vatican Council I, Dogmatic Constitution *Dei Filius* (April 24, 1870), ch. 4: “iustam . . . libertatem.”

⁶⁷ Concerning Potter, see Marianna Gensabella Furnari, “The Scientist Demanding Wisdom: The ‘Bridge to the Future’ by Van Rensselaer Potter,” *Perspectives in Biology and Medicine* 45.1 (Winter 2002): 31–42; Fernando Pascual, “Alcune riflessioni sulla ‘bioetica’ di Potter,” *Alpha Omega* 5.2 (2002): 309–336; José Marques Filho and Márcio Fabri dos Anjos, “Van Rensselaer Potter e a Religião na Bioética,” *Revista Bioethikos* 5.4 (October–December 2011): 427–433, <http://www.saocamilo-sp.br/pdf/bioethikos/89/A9.pdf>; and Henk A. M. J. ten Have, “Potter’s Notion of Bioethics,” *Kennedy Institute of Ethics Journal* 22.1 (March 2012): 59–82.

⁶⁸ Potter, *Bioethics*, 10.

⁶⁹ Sebastian Olden-Jørgensen, “Nicholas Steno and René Descartes: A Cartesian Perspective on Steno’s Scientific Development,” in *The Revolution in Geology from the Renaissance to the Enlightenment*, ed. Gary D. Rosenberg, Memoir 203 (Boulder, CO: Geological Society of America, 2009), 149, 156.

lecture on the anatomy of the brain in Paris in 1665, for example, Steno criticized the scholastic habit of clinging to Aristotelian method when demonstrating the parts of the brain. According to Steno, the consequence of such clinging was that new discoveries resulted from mere luck, because the researcher would recognize only what fit predefined theories.⁷⁰ Later as bishop, when defending Descartes' method—though Descartes' *Opera philosophica* had been censured *donec corrigatur* in 1663—Steno emphasized that “all human things [have] something which one commends, and something else which one reprehends,” meaning that they have both a commendable and a reprehensible side (see 1 Thess. 5:21).⁷¹

Steno would agree with Potter's dictum that mankind's inclination for increasing knowledge is unstoppable, that there will be no “moratorium on new knowledge.”⁷² In Steno's view, God does not despise the diligence of the researcher.⁷³ Steno's position on this did not change; before his conversion, he asked in his myology (1667) “why it should not be permitted to hope for great things.”⁷⁴ Concerning bioethics, Potter advocates “use of the scientific method in seeking wisdom,” and says that “wisdom can be found in the same way that other knowledge can be found.”⁷⁵ Steno would consent to that only insofar as more knowledge on anatomy is able to foster a better ethics, for example, a better understanding of human sexuality and a better foundation for theological reasoning on the moment of the ensoulment of the embryo.

Potter's motto for science was “humility with responsibility,” but he believed only in human life on earth; he did not believe in an afterlife, sin, or a last judgment.⁷⁶ Potter, as a freethinker, considered, in Peter Whitehouse's words, “the necessity for personal death as a part of the further evolution of nature”⁷⁷ and thereby justified “medically supervised abortions” to “provide time for the development and adoption

⁷⁰ Steno, “The Discourse on the Anatomy of the Brain,” in Kardel and Maquet, doc. 18, 517–518 (Maar 2:18); see the critical edition of the original text by Raphaële Andrault, ed., *Niels Stensen (Nicolas Sténon): Discours sur l'anatomie du cerveau (1669), Textes de philosophie 2* (Paris: Garnier, 2009), 113–114.

⁷¹ See René Descartes, *Opera philosophica*, 2nd ed. (Amsterdam, 1650); and De Bujanda, *Index librorum prohibitorum*, 281–282. See also Steno, *Defensio et plenior elucidatio epistolae de propria conversione* (Hanover, Germany, 1680), in Larsen and Scherz, *Nicolai Stenonis opera theologica*, 1:388: “humana omnia quaedam, quae laudes, alia, quae rerehendas.”

⁷² Potter, *Bioethics*, 11.

⁷³ Steno to Heinrich Meibom Jr., April 5, 1673 OS (April 15, 1673 NS), in Niels W. Bruun, “Fem nyfundne Niels Stensen-breve,” *Fund og forskning i Det Kongelige Biblioteks samlinger* 47 (2008): 150.

⁷⁴ Steno, “Specimen of Elements of Myology,” 547 (2:64): “Et quidni magna sperare liceret.”

⁷⁵ Potter, *Bioethics*, 50.

⁷⁶ Van Rensselaer Potter, “Humility with Responsibility: A Bioethics for Oncologists—Presidential Address,” *Cancer Research* 35.9 (September 1975): 2297–2306.

⁷⁷ Peter J. Whitehouse, “The Rebirth of Bioethics: A Tribute to Van Rensselaer Potter,” *Global Bioethics* 14.4 (2001): 39.

of more suitable methods of birth control.”⁷⁸ In other words, for Potter the individual human being counts for nothing in the struggle for the survival of mankind. Potter also states, “We have to proceed *as if* we believed that the solution to man’s major problems includes nothing that isn’t ‘available to the minds of men,’ with just the added ingredient of humility (‘fear of the Lord’).”⁷⁹

At first sight, this might recall the paradox of St. Ignatius of Loyola: “Pray as if everything depended on God; work as if everything depended on you.”⁸⁰ Potter was indeed influenced by a Jesuit, Pierre Teilhard de Chardin.⁸¹ But Potter meant something very different, namely, that religion in general is superstition and that man is a stranger lost in the universe who has to struggle for the survival of his species. In this view, the term “humility” gets distorted. For Potter “fear of the Lord” (Ps. 110:10) is only a secularized technique to aid survival. In contrast, Steno viewed the “love of Christian humility” (Eph. 4:2) as “the most worthy love which a rational soul is capable of . . . a love in order to realize what we are in relation to God and in relation to ourselves,” namely, the kind of love that enables the human being to recognize his relationship to God and therefore his own dignity.⁸² That is the difference between “humility” in the sense of Potter and “humility” in the sense of Steno.

The Steno monument in front of the Faculty Library of Natural and Health Sciences at the University of Copenhagen (Figure 6) can help us comprehend Steno’s spirituality. It depicts Steno during the anatomical demonstration at which he delivered his inaugural address as “Royal Anatomist” in Copenhagen.

The photo was taken at a moment when a ray of light descended from the sky on the right. The ray falls onto Steno’s right hand as it rests on the chest of a female corpse. The resting hand may have been a device that the sculptor, Gottfried Eickhoff, used to point to the fact that Steno began his discourse with observations on the nature of human skin.⁸³ This harmonious interplay between nature and art points to

⁷⁸ Potter, *Bioethics*, 59.

⁷⁹ *Ibid.*, 11–12.

⁸⁰ The saying first appears in Gabriel Hevensi, *Scintillae Ignatianae, sive Sancti Ignatii de Loyola, Societatis Jesu fundatoris apophthegmata sacra, per singulos anni dies distributa, et ulteriori considerationi poposita* (Vienna, 1705). See also Cándido de Dalmases, ed., *Vita Ignatii Loyolae: Auctore Petro de Ribadeneyra—Textus Latinus et Hispanicus cum censuris*, 2nd ed. (Rome: Monumenta Historica Societatis Iesu, 1965), 846 note 27; and William W. Meissner, “The Ignatian Paradox,” *The Way* 42.3 (July 2003): 33–46, <http://www.theway.org.uk/back/423Meissner.pdf>.

⁸¹ See Filho and dos Anjos, “Van Rensselaer Potter e a Religião na Bioética,” 429–430.

⁸² Steno to Gottfried Wilhelm Leibniz, ca. November 1677, in Scherz, *Nicolai Stenonis epistolae*, letter 143, 1:369. Also in Gottfried Wilhelm Leibniz, *Sämtliche Schriften und Briefe*, II-1, *Philosophischer Briefwechsel 1663–1685*, 2nd ed., ed. Leibniz-Forschungsstelle der Universität Münster (Berlin: De Gruyter, 2006), letter 160a, 578, http://www.uni-muenster.de/Leibniz/DatenIII/III_B.pdf: “l’amour de l’humilité chrestienne . . . le plus digne amour dont une ame raisonnable est capable . . . un amour de connoistre ce que nous sommes au regard de Dieu et au regard de nous.”

⁸³ Steno, “Preface to Anatomical Demonstrations,” 681 (2:253).



FIGURE 6. The Steno monument, erected in 1963 in front of the Faculty Library of Natural and Health Sciences at the University of Copenhagen. Photographed by Dr. Sebastian Olden-Jørgensen, November 10, 2011. Used with permission.

the expression “radius seu virga in manu Dei” (pointer in the hand of God) in Steno’s address. Steno used it to say that the anatomist should not boast about his activity, for he is only a tool in the hand of God, no more, no less.⁸⁴ However, the Latin word *radius* means not only “tool” but also “ray,” as in a ray of sunlight. Steno as priest and bishop looked on a ray of sunlight in a spiritual way, as an assistant in the act of creation and as help in human activity and in fulfilling the obligation to do good.⁸⁵ In other words, with this help from God, which enables life on earth and also the scientific activities of the anatomist and the physician, one may respond to God’s love for each human being, including oneself, by using the light for purposes that are in accordance with both the natural and the supernatural order.

Steno especially appreciated the “moments of grace”—moments of spiritual insight granted by God—as a result of his inner conversion in Florence on All Souls’ Day, November 2, 1667. He conveyed this idea with the heart and the cross on his coat of arms (seen on his seal in Figure 3). His spirituality highlights the human body as “interpreter” of divine love: in this, Steno provides a key to medical ethics. Anatomical research can foster better ethics (e.g., sexual ethics) by revealing the nature of human procreation, but science is not identical with ethics. Hellegers recalled this in 1974—specifically, that science cannot supply values.⁸⁶ In 1662/63, having

⁸⁴ *Ibid.*, 679.

⁸⁵ Steno, “Dom[inica] XXIV et ultima post Pentecost[en],” ca. 1680, in Larsen and Scherz, *Nicolai Stenonis opera theologica*, sermon 29, 2:295.

⁸⁶ “Problem Is Values,” 1.

proved the muscular structure of the heart, Steno came to the following conclusion concerning the philosophies of Descartes and Spinoza, for example, which he later, as bishop, took down in retrospect: “If in such an obvious and such a simple matter, and where a certain recourse to experience is granted, men who are regarded as divine according to the judgment of many have stated things so different from the truth, who will promise me that the same [men] bringing up their tenets on God and the soul, where there is no place for such experiments, are the more trustworthy?”⁸⁷ According to Georges Canguilhem (1904–1995), “scientific ideologies” (“idéologies scientifiques”) may also interfere with real science—and therefore with ethics.⁸⁸

Steno knew that the ego may put science at risk: “God granted you that you discover much in natural things, necessary to fix many errors of philosophers and physicians. If in all these things you seek only yourself, that means your pleasure, your benefits, your honor, you seek the transitory, the vanity of vanities.”⁸⁹ Medical science and practice need more: an ethics based on the dignity of each human being whom God provides with an immortal soul that has to be cared for just as the mortal body does. That is what concerned Steno most, and that is his legacy to modern science.

⁸⁷ Steno, *Defensio et plenior elucidatio epistolae de propria conversione* (Hanover, Germany, 1680), in Larsen and Scherz, *Nicolai Stenonis opera theologica*, 1:389: “Si in re tam evidenti tamque facili, et ubi datur certus ad experientiam recursus, adeo aliena a vero dixerunt viri multorum iudicio pro divinis habiti, quis mihi pollicebitur eosdem de Deo et anima, ubi nullus experimentis talibus est locus, sua dogmata proferentes majore fide dignos?”

⁸⁸ These “scientific ideologies” must have as an essential element “an explicit ambition to be science”; see François Delaporte, ed., *A Vital Rationalist: Selected Writings from Georges Canguilhem* (New York: Zone Books, 1994), 36. This could be compared with the writings of André E. Hellegers, who was a member of the Papal Commission on Birth Control and who, having the explicit ambition to speak as a scientifically thinking biologist, opposed Pope Paul VI’s encyclical *Humanae vitae* (1968); see LeRoy Walters, “Religion and the Renaissance of Medical Ethics in the United States: 1965–1975,” in *Theology and Bioethics: Exploring the Foundations and Frontiers*, ed. Earl E. Shelp (Dordrecht, Netherlands: D. Reidel, 1985), 9–10; and Warren Thomas Reich, “The ‘Wider View’: André Hellegers’ Passionate, Integrating Intellect and the Creation of Bioethics,” *Kennedy Institute of Ethics Journal* 9.1 (1999): 40–41.

⁸⁹ Steno, “De actionum perfectione in generali,” ca. 1680/81, in Larsen and Scherz, *Nicolai Stenonis opera theologica*, opusculum 9, 2:489: “Dedit tibi Deus . . . ut in naturalibus multa videres ad philosophorum et medicorum multos errores tollendos necessaria. Si in his omnibus te tantum quaeris, scilicet tuam voluptatem, tua commoda, tuum honorem, quaeris peritura, vanitatem vanitatum.”