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Sulzer and the orderliness of nature

Adam Drozdek

Abstract

Sulzer, who is known mainly for his theory of art, was an ordained minister, which is seldom mentioned in the discussion of his work. However, his theological leanings had major impact on his work. The article presents his discussion of physico-theology and its importance for proper upbringing of children. Also, his views on the nature of God are delineated. Sulzer was adamant about his theological views, however, he presented them in a nonconfessional manner, thereby reaching in his times a rather large readership.

Key words

Sulzer, physico-theology, theology, education

Johann Georg Sulzer (1720–1779) was known in his times as he is today primarily for his theory of art which he presented mainly in two volumes of his *General theory of fine arts* that he wrote in the form of a lexicon. A pedagogue, researcher, and scholar, a member of the Berlin Academy of Sciences, he was also a minister ordained in 1739 in the Reformed church by the Zürich Synod and served briefly as a vicar in the village of Maschwanden near Knonau.¹

Sulzer loved gardening from his early years which he continued to the rest of his days. In Maschwanden, he enjoyed the study and the investigation of nature. As a fruit of his walks and observations of nature there were his reflections on the beauty and harmony of nature; as he was a vicar then, and thus these reflections included spiritual aspect of his observations.²

1 Nature

The observation of nature is a constant source of wonder. No one gets tired of contemplating the beauty of nature (U 6);³ there is no way to be bored by it since every morning is like seeing it for the first time (7); its inexhaustible variety guarantees it: so many sounds, so many smells (13); just investigating the growth of plants can bring enough pleasure for the entire life (104). Orderliness can be found at every step. Different kinds of animals and proportionality of their parts (21); the same with plants (22). Nature contains many forms that are interrelated and change or removal of one part distorts harmony of the whole (26). There are entire worlds that can be seen only under magnification (52). All kinds of animals form a chain, each link differing only very little from the next (27). In fact, there are very narrow differences between works of nature, so, it is difficult to see clearly the borderline between inanimate nature and plants (152) and between plants and animals (153). Sulzer carried this continuous gradation of beings beyond the physical world by speaking about an infinite number of levels of spiritual beings. Sulzer, a follower of Leibniz, used here implicitly Leibniz' principle of continuity.⁴

Human technical accomplishments, impressive as they may be, are dwarfed at every step by complexity and sophistication of the makeup of nature. "Every single plant, every single insect will show you more inventiveness than in all that you've known" (U 39). Consider Vaucanson's mechanical duck which is laughable when compared to the real

1 Johann Georg Sulzer, *Lebensbeschreibung von ihm selbst aufgesetzt*, Berlin und Stettin 1809, pp. 17–18.

2 Sulzer, *Lebensbeschreibung*, pp. 12, 19, 20.

3 The following references to Sulzer's works will be used:

U - *Unterredungen über die Schönheit der Natur*, Berlin: Haude und Spener 1770² [1750]; it also includes *Versuch einiger moralischen Betrachtungen über die Werke der Natur*, Berlin: Ambrosius Haude 1745.

V - *Vermischte philosophische Schriften*, Leipzig: Weidmanns Erbe und Reich 1781–1782 [1773], vols. 1–2.

4 Adam Drozdek, Leibniz: struggles with infinity, in: H. Świączkowska (ed.), *On Leibniz's philosophical legacy*, Białystok: Białystok University Press 1997, pp. 59–69. The idea of the chain of beings will soon be developed by Jean-Baptiste Robinet in his 4-volume work *De la nature* (1761–1766) and by Charles Bonnet in his *Palingénésie philosophique* (1769), cf. Peter J. Bowle, *Evolution: the history of an idea*, Berkeley: University of California Press 1989, pp. 62–63.

duck (40). Even a soul would not make the wooden duck more agile. “The real duck was made with incomparably more art” than the wooden one. One can see in nature “perfect and so infinitely more different machines.” Artificial machines need external power to move, but natural machines move by themselves; artificial machines are easily damaged, but natural machines repair themselves (42), and they self-destruct when they are not needed anymore. The more precisely human machines are analyzed, the more imperfect they appear to be; however, the more precisely natural machines are scrutinized, the more perfect they seem to be (44). By such analysis of human machines we come to the level of raw material, but not in natural machines. “A plant is such a wonderful machine as none of human inventions (45).” A flower, for instance, is made out of thousands of machines (46).

Can that order in nature be the result of randomness, as many claim? Impossible, said Sulzer. His simple test was a throw of three stones into air, whereby there is an infinite number of possible triangles they can form after they fall to the ground (U 81). What would we think about someone saying that after a definite number of tries the triangle will be equilateral, worse yet, of a particular size? Plants contain many tubes through which nutrients are circulated through these plants. Can a handful of dust thrown into air form just one such tube? (83) How about the many well-aligned tubes that constitute a plant? (84)⁵ Only someone devoid of reason would say that a plant arose entirely by accident, said Sulzer (85).

The variety of nature is maintained by specialization. For instance, animals are divided into three classes according to their main food: carnivores, herbivores, and feeding on inanimate nature. In the first category, some eat only 4-legged animals, some only birds, some only fish, etc. (U 174). Some herbivores eat only leaves, some roots, etc. (175–176). By this variety of kinds, all animals will be satisfied and seldom they will compete with one another (178).

Seeing some apparent disorder in nature is the result of not seeing the larger picture. Some may view a lot of uninhabited land around the poles as a waste (U 204). So many think about mountains as a waste (204). However, with a uniform climate, the variety of fauna and flora would be destroyed (206). If there were the same temperature in all parts of the earth and no wind, this would be fatal for life (207). If earth were all flat, there would be no rivers, many plants would disappear, the sea would stink, and many useful rocks would be no more (208). Also, mountains are a storage from which water is distributed.⁶

Sulzer also gave a version of the anthropic principle: certain factors in the world are just right for life to exist. One more degree of universal warmth would kill life (U 64). If it were colder, it would also be dangerous. The earth is directly connected to the sun (65). The same is with air pressure (66).

5 Sulzer also used an example of several spheres thrown to the ground expecting that they would form a straight line, Johann George Sulzer, *Allgemeine Theorie der schönen Künste*, Leipzig: M. G. Weidemanns Erben und Reich 1771–1774, p. 854b.

6 Johan George Sulzer, *Tagebuch einer von Berlin nach den mittäglichen Ländern von Europa in den Jahren 1775 und 1776 gethanen Reise und Rückreise*, Leipzig: Weidmanns Erbe und Reich 1780, p. 376.

2 God

All this incomprehensibly complicated and harmonious order of nature can lead only to one conclusion, that namely there is a plan behind it, and thereby a planner, a planner of a different order than nature itself. This is because “we find it grounded in our nature that where we see arising order and beauty, we conclude that there is someone there who works it out” (U 128).

Any proof of the existence of an eternal Being is based on experience: something exists, and on the principle: nothing comes from nothing. This experience gained from the observation of nature, and these principles allow Sulzer to say that “there is a Being which created and maintains all that exists outside of it.” This Being is one of its kind and has attributes that matter cannot have (V 1.379). This being is effective and endowed with active power/energy through which it exists (381). This Being cannot be destroyed; it is immutable (384) and has no parts (385); it is the real infinity, with no limit for any of its attributes. The infinity of number, for instance, is not true since this infinity can be broken at any point (386). On the other hand, the true infinity is not divisible. It is eternity different from the succession of years; it is an absolute duration whose parts cannot be measured (387).

Wisdom and goodness are discovered in the order of nature and in the government of the world (V 1.301) which brings people to “the elevated idea of an infinitely perfect Being which indisputably is the Author of the order of this immense whole” (302). This realization leads Sulzer to the exclamation: “What intelligence [is there] in the plan of only one plant! And what is it compared with the entire nature! It appears to me not as a corporeal [entity]; I see the realm of truth. Infinite discovery, plans, rules.... Oh! You, how should I call you, the Infinite, the incomprehensible Maker of nature, the Creator of so many wonders! You also created spirits that can grasp the greatness of your works!” (U 48). And again, “I can see that the creation follows a perfect plan that was outlined by the most high Wisdom and executed with perfect skill. Oh You, whose greatness or eternal spirit grasp so little just as the hand cannot hold the waters of might sea. ... Nature is a harp made out of millions of strings tuned by your almighty hand and on it you express your eternal divine thoughts” (68).

Nature points to God as Providence who cares for nature and for the well-being of people: God cares about a worm just as He cares about a seraph (U 199). “From you comes all this beauty, you, the Source of loveliness (Herrlichkeit). The first and the highest Being! ... The world is a thought of yours which your omnipotence has made visible, and you, infinite goodness, wanted that the rational beings that you created with sensitivity to beauty and goodness should be happy in this world” (126). What happiness to know that our fate for the entire eternity is in the hands of such a Being (129). People have experienced this care since the beginning of the world. Noah, for instance, understood that “God is the true father of men, whose care has their wellbeing as the goal. He thus watches with his fixed eye over them so that even the smallest event does not happen without his will. The Being whose goodness shows also in that no good deed remains without reward, no bad [deed] without experiencing a corrective chastisement.

The Being who never acts out of caprice or willfulness but always according to the rules of what is right.”⁷

God does not create anything in vain,⁸ although in many – even most – cases we are unable to penetrate divine reasons for the existence of particular elements of His creation. For example, in his scholarly treatise on comets Sulzer also included a teleological reflection stating that “we cannot say anything with sufficient probability about the use of comets.” One possibility is related to the fact that water is part of nourishment of minerals, plants, and animals, whereby water turns into solid material, and thus, eventually, there would be no water, but, according to Newton, water is supplied by comets (24). In fact, today astronomers say that four billion years ago, water was brought to earth by asteroids. Also, when comets fall to the sun, it gets a supply for heat and light by acquiring new material (28). By acquiring new material, the sun maintains its mass and thus the planets don’t slow down (30). Otherwise, the planets would move closer and closer to the sun endangering their existence. Should it become a real prospect, good God will find the means preventing the possibility that the earth can also fall into the sun; however, “if it were pleasing to him [to proceed] differently, we should be satisfied with that” (31). If the earthly orbit became closer and closer to the sun, the year would become shorter and shorter. Should it happen, this would be the judgment day mentioned in the Scripture, when the earth falls into the sun (32).⁹

The beauty and order of nature do speak about God’s care and goodness. If so, whence evil? There is no evil! In the post-Voltairian age, Sulzer wholeheartedly embraced Leibnizian theodicy considering this world to be the best creation free of evil and created for the best well-being of humans. In his view, “the grand Creator of all things” chose the best way to create the world.¹⁰ “Nature is the highest wisdom itself that reaches everywhere its goal most perfectly, action of which is right without exception and wholly perfect. Therefore, in its works everything is purposeful, everything is good, everything is simple and not forced, there is no superabundance nor lack in it”¹¹; and again, “with more and more certainty we can say about the great book of nature that what we understand about it is perfectly good and what it obligates us to believe that what now is not yet readable will turn out to be the same” (V 2.77). To defend this claim, Sulzer was apparently ready to sacrifice God’s omniscience. In his view, God did not foresee with perfect certainty all consequences of concepts, moods, decisions, and actions of each thinking being, although each being with all its limitations is His work. The presence of these limitations does mean that what we call evil indicates the lack of power, goodness,

7 [Johann] G[eorg] S[ulzer], *Gedanken von dem vorzüglichen Werth der epischen Gedichte des Herrn Bodmers*, Berlin 1754, p. 24.

8 [Johan Georg Sulzer], *Gespräch von den Cometen*, [Zürich: David Gessner] 1742, p. 23.

9 Such a mechanism for the judgment day was also envisioned by an Anglican theologian, William Wall, [Tobias] Swinden, *Recherches sur la nature de feu et de l’enfer, et du lieu où il est situé*, Leiden: Adrianus Bonte 1733, p. 221.

10 Joh[ann] Georg Sulzer, *Beschreibung einiger Merckwürdigkeiten, welche er in einer Ao. 1742. gemachten Berg-Reise durch einige Oerter der Schweiz beobachtet hat*, Zürich: David Geßner 1747, p. 4.

11 Sulzer, *Allgemeine Theorie*, p. 809b.

or wisdom of the highest Being. If it is assumed that each thinking being aims at its own happiness the quickest way, then evil cannot come from evil will or the lack of power of the highest Being; thereby, evil is removed from creation and it must be stated that “evil is but a lower level of goodness and the most evil being is differentiated from a good [being] by a smaller level of goodness.” Sulzer admitted that this opinion is contrary to general opinion, but he expressed his hope that it would be accepted as indubitable truth.¹²

In his views about evil Sulzer was inspired by Augustine. Augustine’s position is summarized in the statement that evil is the absence of good (*Enchiridion* 11); that is, there is no evil, evil is nonexistence, or the lack of presence of goodness. However, this was not an everything-or-nothing proposition, since he also stated that good can be diminished and can be in the process of corruption (12); that is, there are levels of corruption and thus of evil, and this is very likely the cue used in Sulzer’s take on theodicy. However, it is possible to consider Sulzer’s solution to be merely of a terminological nature: evil is the name unenlightened humans give to lesser good, whereby evil is allowed to exist only through human misconception, terminological confusion, and considering evil what otherwise is good if only of a lesser level of perfection. This is clear from his frequent references to evil when they can hardly be seen as just lesser goodness. Evil is present in all human lives, Sulzer may say, by necessity since humans are limited and thus imperfect beings and hence affected by lesser goodness, thus, by evil.

If for finite creations the path to happiness leads through the thorns of evil, then the highest Being cannot be considered evil when we want to ascribe to it the first/original permission for evil. The only way to avoid any evil would be for the Creator not to create any world at all. If evil in the world is as essential as the extension is to the body, then we have to ascribe it to the essence of the world only and neither the cause nor permission for it can be looked for outside of it.¹³

Human passions cause so much evil (U 212). What if passions were removed from people? Many good things would also disappear. To use a parable of “the greatest teacher of the world” about salt losing its flavor (214). With self-love a drive for action would also vanish (215), there would be no Leibniz, the greatest spirit Germany has seen, no Pope, the greatest poet. If lust disappears, so does the drive for procreation (216). The envious elevated an enemy, vice sold Joseph to Egypt which leads to saving a nation from hunger, vice brought Moses to the Egyptian court and to manifestations of God’s power, the Savior of the world was killed for the redemption of mankind, the martyrs abolished thrones, spread religion. Vices thus serve the perfection of the whole (217). What in separation is imperfect, it is a perfection in the connection with the whole. Everything is created for the best (218). We should thus stop complaining (219) and be satisfied with the existing makeup of the world (210). Therefore, it appears that the perception of evil stems from the finitude of created beings and imperfection of their knowledge. For example, botched births are also part of plan, but to see it we’d have to see the overall plan of the Creator (U 89).

12 [Johann Georg Sulzer], Anmerkungen, in: David Hume, *Philosophische Versuche über die menschliche Erkenntnis*, Hamburg: Georg Christian Grund und Adam Heinrich Holle 1755, pp. 236–237.

13 Sulzer, Anmerkungen, pp. 238–239.

3 Education

The observation of nature has, in Sulzer's mind, far reaching pedagogical consequences. It should be a cornerstone of self-improvement and also of education of children and youth since through nature God speaks to people.

If someone sees beauty in nature, he will much more easily see moral beauty or goodness that has the same source. Seeing that God likes order in nature will lead to the desire to maintain an order in oneself (U 134). Through Eukrates, Sulzer said: "I'll try to accomplish the goals of the Lord of the world who wants me to be perfect. This will be my main occupation. I will not rest while working on myself as long as I am aware of an inner disorder. In this way, I advance the work of the Creator and contribute to the perfection of the whole. Then my fate is assured by the infinite goodness of such a Creator. Then, without fail, I will follow the straight path according to his final purpose, which can be nothing else than the incomprehensible happiness" (135–136). It is a blessing to be in the service of this universal *Weltgeist* (140). The observation of nature thus should lead people to perfecting themselves and should show them the care of God that has eschatological dimension by being extended into the hereafter. As a mysterious voice whispered to Eukrates' ear: "these captivating beauties [of nature] are the lowest of the rays of spiritual outflow of this original beauty by the sights of which your spirit one day will be animated" (14).

Teaching science to children is an essential part of their education since knowing the foundations of natural things is a means of human happiness.¹⁴ This, however, should be interlocked with religious education since the most important foundation of honesty is religion. At home, children should always have in mind the principles of religion. There are two points which should always be on our minds, the image (*Vorstellung*) of God's government of the world and the future life. These two truths should be presented to children every day.¹⁵ Children between 6 and 10 years old (221) should be taught about God's essence, and that the order in the world is God's creation: the sun, the change of seasons, the growth of plants, and benefits of all of it for people, and that God by His infinite goodness created things for our use and that God seeks only our wellbeing; therefore, all that is hurtful to people is displeasing to God (231). God partially created the order of things, partially allowed it and all that happens by necessity is useful for people. From this follows a moral statement that people should not grumble about their fate but be always satisfied and should not despair when misfortune comes since God holds the helm of the world (232). Children between years 11 and 14 (240) should be taught the true foundations of natural and revealed religion, true concepts of God as the Creator, Maintainer and Benefactor of people; their duties toward God should be explained to them (247) such as worship, love, gratitude, total submission to His will, and first trust

14 [Johann Georg Sulzer], *Versuch von der Erziehung und Unterweisung der Kinder*, Zürich: Conrad Orell und Comp. 1748, p. 57.

15 Johann Georg Sulzer, *Anweisung zu Erziehung seiner Töchter*, Zürich: Joh. Caspar Füeßli, Sohn 1781, p. 60.

in His care. This should be explained from the makeup of nature by showing that this makeup indicates God's wisdom, care, and goodness toward people (248).

4 Christianity

Sulzer's ardent promotion of science was done for its own right, and he himself contributed some scholarly research in archaeology and geology. However, he was also a pastor even if he exercised pastoral duties only briefly. Belief in God was never far from his scientific research, and, in fact, this belief was a motivation for this research as a means to appreciate God's work and to see better His majesty in His creation. This creation testified, in his mind, very clearly about God, His greatness and goodness, in which Sulzer continued the work of physico-theologians. He knew and referred to the works of Derham,¹⁶ Ray, Burnet, and Pluche,¹⁷ but the physico-theological sentiments were not far from other philosophers and scientists whose names appear on the pages of his books. His physico-theological investigations were so important to Sulzer that he lashed against religious people who denied the importance of such investigations: woe to religious people who don't want to recognize the greatness of God in nature (U 197).

From a letter of his friend we learn that "he expressed true and sincere reverence for Christ and his religion."¹⁸ However, although theological and religious spirit permeates all his writings, it is interesting that, a pastor that he was, there is almost complete absence of specificity of Christian religion in his work. There are somewhat general references made to sane Christian teaching.¹⁹ He spoke about divine provenance of Christianity and said that "there is nothing more pleasant and more desirable for our original nature and all our needs than the true principles of Christian religion."²⁰ When delineating topics to be covered by teachers in his project of a gymnasium in Mitau in Curland he saw a professor of theology to teach about the New Testament (V 2.199), some Old Testament books in the original, the early history of Christianity, some teachings of councils, never mind heresies (200), also teaching practical Christianity, and in detail the teaching of "his church" with no disparaging of other churches (201). This confessional

16 Sulzer even used Derham's data in his orogenic investigations, *Untersuchung* 8; he also referred to orogenic views of Burnet and Ray, among others, pp. 10, 13.

17 He includes a long quotation about beavers from *The spectacle of nature*, not mentioning the name of Pluche (U 118–122). The phrase "Schauplatz der Natur" appears to be an allusion to Pluche (V 1.172). Also, a brief review of vol. 8 was published in his (and Karl Wilhelm Ramler's) *Critische Nachrichten aus dem Reiche der Gelehrsamkeit*, Berlin: Haude und Spener 1750, pp. 132–133. It is suggested that Pluche was Sulzer's guide to his own presentation of physico-theology in which Sulzer surpassed Pluche, [Hans Caspar] Hirzel, *Hirzel an Gleim über Sulzer den Weltweisen*, Zürich: J.C Fuebli 1779, vol. 1, p. 36.

18 Letter of Spalding to Lavater, in: Johann Georg Sulzer, *Theorie und Praktik der Beredsamkeit*, München: Joseph Lentner 1786, p. 22.

19 Sulzer, *Gespräch von den Cometen*, p. 35.

20 [Johann Georg Sulzer], Vorrede des Übersetzers, in: Gilbert West, *Anmerungen und Betrachtungen über die Geschichte der Auferstehung Jesu Christi, und derselben Zeugnisse*, Berlin: Haude und Spener 1748, pp. 2ob, 6.

neutrality apparently stemmed from his conviction that no church is without error and thus none should claim to possess all truths.²¹

Christ is mostly mentioned in theologically inconsequential phrases (e.g., when referring to times before Christ). He mentioned once the Savior of the world (U 217), the need to accustom children to following the teaching of the Savior to do to others what they want them do to them,²² and the Resurrection of Jesus.²³ In one book review there is a mention of “our Savior”,²⁴ an oblique reference to Christ is made when mentioning the parable of “the greatest teacher of the world” [an oblique reference to Jesus] about salt losing its flavor (U 214). The Holy Spirit is never mentioned and the Trinity possibly once by quoting a poem of Haller that speaks about “threefold/thrice grand God!” (“dreimal grosser Gott,” U 197).²⁵ Also, Scriptures are very seldom mentioned, but when they are, they are treated with greatest reverence. He said that theology is based on the true meaning of the Scriptures (212); from them all theological truths have to be derived²⁶ and the Sacred Scripture gives us the best representation of the relation of all things to our happiness and goes even further than the intellect; this thus gives strong foundation of virtue.²⁷ He also used a few Biblical accounts in his scholarly work. He said that the earth once did not rotate, which follows directly from Moses’ statement: the earth was already there before change of days and nights that was caused by rotation. Also, he spoke about multiple inundations of the earth, one of them being the flood described by Moses.²⁸

A nonconfessional theological interest permeates all of Sulzer’s work, beginning with physico-theological books as a fruit of his walks as a young vicar to his late years when he was preoccupied with the theory of art. He said that few people can understand metaphysical arguments about God, but everyone can grasp the proofs of nature (U 131) and Sulzer was a good example of this sentiment. He discovered in his walks the power of physico-theological argument and that, in fact, led him to his serious interest in hard sciences to see better through them the presence of God in nature. However, this

21 [Johann] G[eorg] Sulzer, *Kurzer Begriff aller Wissenschaften und andern Theile der Gelehrsamkeit*, Frankfurt 1778⁵ [1745], p. 222.

22 Sulzer, *Anweisung*, p. 64.

23 Sulzer, Vorrede des Übersetzers, p. 60b.

24 Sulzer, Ramler, *Critische Nachrichten*, p. 153. For Sulzer and like-minded pedagogues, “Christ is a guide and model of virtue and almost only in this sense also the Savior,” Maximilian Dähne, *Johann Georg Sulzer als Pädagoge und sein Verhältnis zu den pädagogischen Hauptströmungen seiner Zeit*. Königsee: Selmar von Ende 1902, pp. 165–166.

25 The phrase “dreimal grosser Gott” was used in old church hymns.

26 Sulzer, *Kurzer Begriff*, pp. 212, 214.

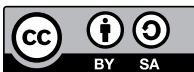
27 Sulzer, *Versuch von der Erziehung*, p. 136/109.

28 Johann Georg Sulzer, *Untersuchung von dem Ursprung der Berge, und andrer damit verknüpften Dinge*, Zürich: David Geßner 1746, pp. 25, 16, 40. Cf. Marguerite Carozzi, Albert V. Carozzi, Sulzer’s antediluvialist and catastrophic theories on the origin of mountains, *Archives des Sciences* 40 (1987), no. 2, p. 118. To be sure, such an “anxious leaning on the Bible in secular branches of knowledge” met with criticism by commentators of Sulzer blaming for it the spirit of times, Georg Lobmeier, *Johann Georg Sulzer in seinem Verhältnis zur physikalischen Geographie*, Borna-Leipzig: Buchdruckerei Robert Noske 1907, pp. 11, 61.

presence extended to all creation, to all humans, and thus it was very intimate, very personal. Unfashionably claiming that nature is perfect, that evil is an illusion, he promoted Leibniz' theodicy. His conviction of this world being the best is all the more remarkable considering misfortunes that he experienced himself, the death of wife and daughter and his own long, debilitating, and eventually fatal sickness.

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