Ontology and Experience – Rodrigo de Arriaga and Christoph Haunold on the "Species sensibiles"

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Within the framework of Aristotelian scholastic philosophy in the early modern age and its philosophical penetration of sensory perception, the images of perception (*species sensibiles*) have a twofold function: They explain the stimulation of the sensory organ by a distant object, and they guarantee the objective correctness of sensory perception, since they are immaterial, formal, or representative images of the object.[1] As immaterial and intentional images, they cannot be perceived as such according to the common opinion.[2] At least since William of Occam, however, the necessity of such *species* has been questioned for certain senses or altogether. This discussion enters a new stage in the vicinity of Cartesian debates in the Society of Jesus. Even the prohibition in the thesis "*Nullae dantur species, ne intelligibiles quidem*" by

1 Cf. Sorabij, R., Intentionality and Physiological Processes: Aristotle's Theory of Sense-Perception. In: Nussbaum, M. C. – Rorty, A. O. (eds.), *Essays on Aristotle's "De anima"*. Oxford, Clarendon 1992, p. 195–225; Maier, A., *Ausgehendes Mittelalter. Gesammelte Aufsätze zur Geistesgeschichte des 14. Jahrhunderts*. Vol. 2. Roma, Storia e letteratura 1967, p. 419–451; Park, K., The Organic Soul. In: Schmitt, Ch. (ed.), *The Cambridge History of Renaissance Philosophy*. Cambridge, Cambridge University Press 1988, p. 464–483, here p. 471–472, 481; Castellote Cubells, S., *Die Anthropologie des Suarez. Beiträge zur spanischen Anthropologie des XVI. und XVII. Jahrhunderts*. Freiburg i. Br.–München, Alber 1962, p. 111–118; Clemenson, D. L., *Seventeenth-Century Scholastic Philosophy of Cognition and Descartes' Causal Proof of God's Existence*. Diss. Harvard University. Ann Arbor, University Microfilms 1991, p. 174–176; Leinsle, U. G., *Dilinganae Disputationes. Der Lehrinhalt der gedruckten Disputationen an der Philosophischen Fakultät der Universität Dillingen 1555–1648*. Regensburg, Schnell & Steiner 2006, p. 387–392. – For the translation I thank Mr. Martin Blay, Dipl.-Theol., University of Regensburg.

2 Cf. Castellote Cubells, S., *Die Anthropologie des Suarez*, op. cit., p. 112; Clemenson, D. L., *Seventeenth-Century Scholastic Philosophy of Cognition and Descartes' Causal Proof of God's Existence*, op. cit., p. 175–176. With exception of Julius Caesar Scaliger, *Exotericarum exercitationum Liber XV. Adversus Hieronymum Cardanum*. Frankfurt, Wechel 1576, ex. 298 n. 14, p. 881–882.

general Francesco Picciolomini in 1651 permits a denial of *species sensibiles*, although it does not approve it.[3]

In 1645, Christoph Haunold (1610–1689),[4] a self-confident young professor of philosophy at the Jesuit University of Dillingen and former student of Juan de Lugo (1583–1660) at Rome, who later became a famous theologian at the University of Ingolstadt, starts to intervene in the ongoing debate. In his extensive disputation *Philosophia de anima sensitiva*,[5] he attacks the arguments of his Prague colleague Rodrigo de Arriaga (1592–1667)[6]. In the following, I am going to examine this controversy by referring to Arriaga's *Cursus philosophicus*, which offers the identical text concerning this question from 1632 to 1653, [7] and the revised *Cursus* from 1669.[8] Both authors do not treat the *species* among the particular senses, but in an own chapter, which is Haunold's first chapter and includes lengthy examinations of optic experiments and empirical facts.[9] Therefore, the debate between Arriaga, Haunold, and other authors of the Society of Jesus may serve as an impressive prime example of the relationship between ontology, common sense, and experimental experience. At least, Arriaga and Haunold agree in their assumption of *species* for the visual sense,[10] but not in further points, namely the divisibility and intensification of *species*, their visibility and function, the necessity of *species* for hearing, the perceptibility of location in space by the *sensus communis* and the existence of *species* within the inner sense, which are not derived from perception. According to Arriaga, the *species* is a certain quality brought forth by objects, which contributes to their percep-

3 Pachtler, G. M. (ed.), *Ratio Studiorum et Institutiones Scholasticae Societatis Iesu per Germaniam olim vigentes*, vol. 3. Repr. Osnabrück, Biblio 1968, p. 93; cf. Clemenson, D., Descartes and his Jesuit Contemporaries on Intentional Representation. In: Čemus, P. (ed.), *Bohemia Jesuitica 1556–2006*. Praha, Karolinum 2010, p. 491–496.

4 For Haunold see Boehm, L. et al. (eds.), *Biographisches Lexikon der Ludwig-Maximilians-Universität München. Teil I: Ingolstadt-Landshut 1472–1826*. Berlin, Duncker & Humblot 1998, p.169–170; Leinsle, U. G., *Dilinganae Disputationes*, op. cit., Register.

5 Haunold, Ch., *Philosophia de anima sensitiva disputata pro doctoratu philosophico in celebri et catholica Universitate Diligana*. Dilingen, Typis Academicis 1645 (hereinafter referred to as *Philosophia*).

6 Cf. Sousedík, S., Rodericus de Arriaga: Leben und Werk. In: Saxlová, T. – Sousedík, S. (eds.), *Rodrigo de Arriaga. Philosoph und Theologe. Prag 25.–28. Juni 1996*. Praha, Karolinum 1988, p. 9–18. For his sensation theory: Sousedík, S., La obra filosófica de Rodrigo de Arriaga. *Ibero-Americana Pragensia*, 16, 1951, p. 103–146, here p. 123–126.

7 Arriaga, R., *Cursus philosophicus*. Antwerpen, Moreti 1632; Paris, Durand 1637; Paris, Quesnel 1639; Paris, Piot 1647; Lyon, Prost 1653. Here I use the edition Paris, Durand 1637.

8 Arriaga, R., *Cursus philosophicus, iam noviter maxima ex parte auctus*. Lyon, Huguetan & Barbier 1669 (hereinafter referred to as *Cursus* 1637).

9 Arriaga, R., *Cursus* 1637, De Anima disp. 4, p. 596–630; Haunold, Ch., *Philosophia*, c. 1: De specibus impressis, p. 5–30.

10 Arriaga, R., *Cursus* 1637, De Anima disp. 4 n. 3, p. 596; Haunold, Ch., *Philosophia*, c. 1 a. 1, p. 5–6.

tion instead of the objects themselves.[11] Hence, the senses, which use the *species*, do not directly perceive the objects, but only mediated through these representative qualities.

1. Divisibility and Intensification of *Species*

The function of *species* becomes most obvious in case of the visual sense. Apparently, Arriaga is unimpressed by Johannes Kepler's[12] and Christoph Schreiner's[13] research results and still follows Aristotle, when he assumes the *humor chrystallinus*, the lens, as its organ.[14] In contrast, Haunold follows Schreiner and clearly assumes that the *retina* is the visual organ by pointing to experimental evidence with the help of a telescope (reversal of pictures, visual angle).[15] Arriaga's brief examination of intensification and weakening of *species sensibiles* mostly follows traditional paths and only mentions greater production by the object and luminous intensity as causes.[16] Instead, Haunold, who is well-versed in dioptrics and catoptrics, extensively discusses the divisibility of *species* regarding their representative function and intensity (decrease through greater distance, intensification through reflection and refraction). Several times, he refers to his theses on *de generatione et corruptione*[17] and optic experiments, e.g. with the *camera obscura*, and the *species* are already closely tied up with the quality of reflected or refracted

11 Arriaga, R., *Cursus* 1637, De Anima disp. 4 n. 1, p. 596: Nomine speciei impressae intelligimus in praesenti qualitatem quamdam productam ab obiectis, ut eorum loco ad cognitionem eorundem concurrat.

12 Kepler, J., *Ad Vitellionem paralipomena*. Frankfurt, Marnius 1604; cf. Lindberg, D.C., *Auge und Licht im Mittelalter. Die Entwicklung der Optik von Alkindi bis Kepler*. Transl. M. Althoff. Frankfurt a. Main, Suhrkamp 1987, p. 312–359.

13 Scheiner, Ch., *Oculus, hoc est fundamentum opticum*. Innsbruck, Agricola 1619; cf. Daxecker, F., Christoph Scheiner's Eye studies. *Documenta ophthalmologica,* 81, 1992, p. 27–35; Idem, Further studies by Christoph Scheiner concerning the Optics of the Eye. Ibid., 86, 1994, p. 153–161.

14 Arriaga, R., *Cursus* 1637, De Anima disp. 5 n. 42, p. 653. For the early modern theories of vision see also Koelbing, H. M., Ocular Physiology in the Seventeenth Century and its Acceptance by the Medical Profession. In: Scherz, G. (ed.), *Steno and Brian Research in the Seventeenth Century. Proceedings of the International Historical Symposium on Nicolaus Steno and Brain Research in the Seventeenth Century held in Copenhagen 18–20 August 1965*. Oxford, Pergamon Press 1968, p. 219–224; Koelbing, H. M., *Renaissance der Augenheilkunde 1540–1630*. Bern–Stuttgart, Huber 1967, p. 19–80; Crombie, A. C., The Mechanistic Hypothesis and the Scientific Study of Vision: Some Optical Ideas as Background to the Invention of the Microscope. In: Bradbury, S. – Turner, G. (eds.), *Historical Aspects of Microscopy. Papers read at a One-day Conference held by The Royal Microscopical Society at Oxford, 18 March 1966*. Cambrige, Heffer 1967, p. 3–112.

15 Haunold, Ch., *Philosophia*, c. 2 a. 2, p. 34–37.

16 Arriaga, R., *Cursus* 1637, De Anima disp. 4 n. 207, p. 624.

17 Haunold, Ch., *De Ortu et Interitu Theoremata Physica Mathematicis permixta*. Dillingen, Formis Academicis 1645, Theorema Mathematicum 3, p. 16–20.

beams of light.[18] However, according to Haunold, this intensification of light and *species* is not a qualitative intensification in the proper sense, as in case of warmth and coldness with heterogeneous degrees, but only regarding the intensification of their common effect. This is so, because crossing beams of light spread across their own lines again after their intersection point.[19] These difficulties are increased by the assumption of an atomization of the intensification, so that only all indivisible degrees of intensity together determine the intensity of the *species*. Otherwise, the weakening of the intension could not be explained.[20] If there was only one *indivisibile* of white colour without any intensification in the visual field, it could only bring forth a *species* at the immediately neighbouring point of the surrounding air, but it could not decrease, according to the principle "ubi nulla erit intensio, ibi nulla erit sphaera activitatis".[21] If, in turn, God sustained this unique *indivisibile* in its existence, the *species* would represent this colour indeed, but not clear and without intensity. The smallest change of intensity would change the whole *species* then and produce a new one.[22] In the 1669 edition, Arriaga does not respond to these arguments, but keeps the text from 1632.[23]

2. Visibility of "Species"

Arriaga denies the visibility of *species* together with the *opinio communis* in 1632. They represent the object, but they are not of the same kind, do not terminate the act of seeing, and, thus, are not objects of the visual sense on their own.[24] This applies to the case of seeing one's own face in a mirror as well as to seeing objects through the incidence of light in a *camera obscura* or in a room. In this case, only the shadows of the objects are seen, but not the objects themselves.[25] But even if colours are seen through the incidence of light, e.g. on a paper, this is not brought about by the *species*, but thanks to reflection. Because of their nature, *species* are not suitable to replace the objects themselves, but rather to represent them at the place of reflection[26] – a clear victory of ontology over experiment.

18 Haunold, Ch., *Philosophia*, c. 1 a. 1 n. 20-21, p. 18–19.
19 Ibid., n. 22-23, p. 19–21.
20 Ibid., n. 13-14, p. 14–15.
21 Ibid., n. 16, p. 16.
22 Ibid., n. 17-18, p. 16–17.
23 Arriaga, R., *Cursus* 1669, De Anima disp. 6 sect. 5, p. 826.
24 Arriaga, R., *Cursus* 1637, De Anima disp. 4 n. 120-122, p. 612–613.
25 Ibid., n. 122, p. 613.
26 Ibid., n. 123, p. 613.

For Haunold, the question of the visibility of *species* has newly arisen through Christoph Schreiner's experiments with convex mirrors.[27] The question is, whether the *species*, which have fallen upon it (as *terminatae et ordinatae*), can really count as the object of seeing, or only cause the perception, but cannot be perceived on their own.[28] Haunold affirms the seeing of *species* in the sense that the act of seeing is terminated through it, but not in the sense of seeing external objects.[29] Following Haunold, Arriaga's comparison with a paper is not valid, since there is no reflection on a paper as such, whereas in case of a mirror the shape always appears behind the surface of the mirror and the emergent angle of the reflection is equal to the angle of incidence.[30] A more imperfect reflection on the paper, as assumed by Arriaga,[31] does not solve the problem either, because the *species* arrive at exactly the same final point on the mirror as on the paper.[32] Arriaga's objection that in this case the whole shape represented by the *species* would have to be given at every point of the paper[33] is not valid, since experiments with the *camera obscura* and its reversal of pictures, prove the opposite.[34] Furthermore, Haunold accuses his Prague colleague of a wrong use of language, when he adds that the *species* of red objects is not red itself as an argument against seeing *species*. Therefore, colours, not *species* are seen on the paper.[35] Only a *color intentionalis* and not real colour has to be assumed for the *species*.[36] As elsewhere, Arriaga does not feel prompted to correct his text because of Haunold's criticism in 1669.[37]

3. "Species" of Sound

Concerning the question of a propagation of sound, opinions differ sharply in the seventeenth century between the *species* theory, which assumes a merely intentional dispersion until the hearing organ, and the real spreading of sound, which has been described as wavelike by Albertus Magnus.[38] Arriaga

27 Cf. Scheiner, Ch., *Oculus, hoc est fundamentum opticum*, op. cit., lib. 3 c. 25-26, p. 190–193.
28 Haunold, Ch., *Philosophia*, c. 1 a. 3 n. 30, p. 25.
29 Ibid., n. 31, p. 25–26.
30 Ibid., n. 33-34, p. 27–28.
31 Arriaga, R., *Cursus* 1637, De Anima disp. 4 n. 132, p. 614.
32 Haunold, Ch., *Philosophia*, c. 1 a. 3 n. 35, p. 28.
33 Arriaga, R., *Cursus* 1637, De Anima disp. 4 n. 123, p. 613.
34 Haunold, Ch., *Philosophia*, c. 1 a.3 n. 36, p. 28–29.
35 Arriaga, R., *Cursus* 1637, De Anima disp. 4 n. 125, p. 613.
36 Haunold, Ch., *Philosophia*, c. 1 a. 3 n. 37, p. 29.
37 Arriaga, R., *Cursus* 1669, De Anima disp. 6 sect. 3 subs. 1-3, p. 815–818, identical text 1637, p. 612–615.
38 Cf. Hunt, F. V., *Origins in Acoustics. The Science of Sound from Antiquity to the Age of Newton*. New Haven – London, Yale University Press 1978, p. 60–82; Leinsle, U. G., *Dilinganae Disputationes*, op. cit., p. 398–402.

is among the fervent defenders of *species* for sound perception and tries to support this with new arguments.[39] As in case of seeing, he argues a priori with the absence of the object of perception and the necessity of a transmitter following from it.[40] Parallel to seeing, he wants to provide experiential evidence for the *species* with the reflection of sound in the echo. A real, identical propagation of the produced sound, which he illustrates with the help of the *impetus* theory,[41] is impossible for him, since the little amount of air in front of the mouth is not preserved long enough while uttering noises, until the echo might possibly be heard several times. However, if this air *impetus* produced another one, which moved on further, we would never hear the originally produced sound while listening to music.[42] Furthermore, and this is the most important argument for Arriaga, it could never be perceived then, from which direction the sound came. Much more, it would always only be perceived as something immediate to the ear, especially since the sound here would not represent a sound further away, because both would be two distinct objects.[43] But why then would a deaf man need a funnel-shaped pipe for hearing?[44]

For Haunold, the assumption of *species* faces great empirical difficulties. They would always deceive the sense, since they moved it at a point of time, at which the sound itself had already vanished.[45] Furthermore, they could neither belong to themselves nor to the sound as efficacious centre in their propagation. In the former case, I could not hear the sound at the same time, when something is hit immediately, which is contrary to all experience. In the latter case, they could only spread in a linear or reflected way (as the optic lines). However, in my study, I hear the noise of the floor downstairs, even if the doors are closed. I can hear it more clearly, if the doors are open, but neither in a linear nor in a reflected way.[46] If *species* existed, they would also differ in their sound and they could only be intensified this way. However, while listening to an organ concert, we hear those chords which are played with more keys for a longer time.[47] Moreover, we would have to assume a

39 Arriaga, R., *Cursus* 1637, De Anima disp. 4 sect. 1 subs. 3-4, p. 599–603; Ibid., n. 26, p. 600.
40 Ibid., n. 27, p. 600.
41 Cf. Maier, A., *Die Vorläufer Galileis im 14. Jahrhundert. Studien zur Naturphilosophie der Spätscholastik*. Roma, Storia e letteratura 1949, p. 132–154; Idem, *Zwischen Philosophie und Mechanik. Studien zur Naturphilosophie der Spätscholastik*. Roma, Storia e letteratura 1958. p. 341–373; Wolff, M., *Geschichte der Impetustheorie: Untersuchungen zum Ursprung der klassischen Mechanik*. Frankfurt, Suhrkamp 1978, p. 249–312.
42 Arriaga, R., *Cursus* 1669, De Anima disp. 6 n. 28, p. 600.
43 Ibid., n. 29-30, p. 600.
44 Ibid., n. 30, p. 600–601.
45 Haunold, Ch., *Philosophia*, c. 3 a. 1 n. 2, p. 43–44.
46 Ibid., n. 3, p. 44–45.
47 Ibid., n. 4, p. 45.

linear spreading, but this is not the case, since we hear better, if the wind is suitable and we stand in wind direction or if we turn our ear to somebody, when he is calling us.[48] However, an immediate impingement of sound upon the ear through local motion of the transmitter does even lead into greater difficulties, since at least the particular transmitting piece of air would have to move then and to pass the impulse on the neighbouring piece of air.[49]

Therefore, Haunold assumes an immediate self-spreading of sound without *species*. This self-spreading is not tied up with the local motion of the medium, but depends on the impulse (as *virtus impressa*). This impulse dilutes the immediate transmitter (e.g. air), so that no vacuum arises, solidifies the surrounding air, and propagates itself further on this way. In this process, the dilution of the preceding stage decreases and, so, the impulse vanishes. Therefore, I do not hear the sound any longer, when somebody else hears it in far distance. This may well be illustrated with the example of waves, when a stone is thrown into water. However, in case of sound there are no contrary movements of the air, but different parts of air are respectively diluted and solidified. For such a dilution and solidification of air through different insolation, Haunold refers to Athanasius Kircher's experiments at Rome.[50] For Haunold, this also explains, why sound propagates itself through most solid walls: The more solid an object is, the more impulse can be received by it, as it can be shown by throwing a stone and a feather. The mutual strengthening of sounds also happens through a strengthening of the impulse.[51] In order to measure the distance of sound, one does not have to assume *species*, as Arriaga thinks, especially since they never indicate the distance. Moreover, only the distance defined by a two place *ubicatio* between myself and the sound is necessary here. According to Juan de Lugo, I can also recognize this distance through experience without *species* at the point of time, where it impinges upon the ear canals by distinguishing between clear and hollow sounds.[52]

In 1669, Arriaga responds to the objections against his theory of sound with an especially introduced *subsectio*, although he does not refer to Haunold in particular. Primarily, he deals with the Jesuits Francisco de Oviedo (1602–1651) and Richard Lynch (Lyncaeus, 1610–1676).[53] It is of special impor-

48 Ibid., n. 5, p. 45.
49 Ibid., n. 5, p. 45.
50 Ibid., n. 7-9, p. 47–49; cf. Kircher, A., *Ars magna lucis et umbrae*. Roma, Scheus 1646, lib. 1 pars 3 c. 3, p. 71–72.
51 Haunold, Ch., *Philosophia*, c. 3 a. 1 n. 10, p. 49–50.
52 Ibid., n. 11, p. 50–51; cf. Lugo, J. de, *Disputationes scholasticae et morales; Tractatus de Eucharistia,* disp. 5 n. 88. Paris, Vivès 1869, vol. 3, p. 574.
53 Arriaga, R., *Cursus* 1669, De Anima disp. 6 sect. 1 subs. 5, p. 796–798; Oviedo, F. de, *Cursus Philosophicus*. Lyon, Prost 1640; Lynch, R., *Universa philosophia scholastica*. Lyon, Prost 1638.

tance for our purpose that he repeats the claim of higher probability for the spreading of sound through *species* instead of a linear spreading through the medium, as Oviedo proposes.[54] From his point of view, the argument that *species* do not represent themselves, but the object at the hearing organ, and, therefore, do not deceive anybody, also refutes Haunold. So, I also perceive bell-ringing from the outside in my room, because *species* neither render themselves nor their own location, but that of the produced sound.[55]

4. Perceptibility of Location in Space

Arriaga extensively discusses the perceptibility of *sensibilia communia* (location in space, figure, number, duration, rest, motion), which are perceived by several senses at the same time. It is clear for him that we see, for instance, where a white object or my hand is, although the location in space is not part of the primary visual objects light and colour.[56] In contrast, he rejects distinct *species* for shape, number, motion, and rest, because these properties can be dissolved into the connection and separation of particular *ubicationes* or, in the case of shape, into the negation or privation of superfluous parts, e.g. of a sphere.[57] However, the question remains whether the location in space, which is not a *modus*, but a real distinctive property from the thing and the location itself for Arriaga, is directly perceived with the help of an own *species*.[58] For Arriaga, it is an undoubted experiential fact that we perceive the location of objects in space by seeing, hearing, and other sensual activities, because otherwise we could not distinguish where the corresponding object is. Furthermore, shape and quantity could not be formed by the corresponding *ubicationes*.[59] The *ubicatio* is neither perceived through heterogeneously incident *species* nor formed through intellectual discourse, since the intellect is fundamentally dependent on the senses.[60] This is also the difference from the perception of motion and rest, which is formed by the intellect through particular perceptions of location.[61] Duration is also

54 Arriaga, R., *Cursus* 1669, De Anima disp. 6 n. 36, p. 797.
55 Ibid., n. 37, p. 797.
56 Arriaga, R., *Cursus* 1637, De Anima disp. 4 n. 63-66, p. 604–605.
57 Ibid., n. 67-68, p. 605.
58 Arriaga, R., *Cursus* 1637, Physica disp. 14 sect. 2 subs. 1, p. 372–373; subs. 7., p. 379–381; Metaphysica disp. 5 n. 43, p. 781; cf. Leinsle, U. G., Rodrigo de Arriaga im Streit um modale Entitäten. In: Beneš, J. – Glombíček, P. – Urbánek, V. (eds.), *Bene scripsisti ... . Filosofie od strědověku k novověku. Sborník k sedmdesátinám Stanislava Sousedíka*. Praha, Filosofia 2002, p. 161–189, here p. 177.
59 Arriaga, R., *Cursus* 1637, De Anima disp. 4 n. 70-71, p. 605.
60 Ibid., n. 72-73, p. 605–606.
61 Ibid., n. 74, p. 606.

not perceived directly, but only mediated through the *species* of the object, as it, above all, becomes visible in case of sound, which we do not hear at the location of its production, but at the place of its perception, when it has already vanished at the place of its production.[62] However, Arriaga does not bring about a proper proof of the immediate perception of the location in space through an own *species* here.

For Haunold, the location of the object in space is a *modus*[63] and, together with Gabriel Vázquez and his teacher Juan de Lugo and against Arriaga, he categorically denies its formal perceptibility through any sense. Additionally, we would also have to perceive the location of our own eye in space then. Furthermore, it is possible, for instance, that one does not perceive a change of the own location on an entirely closed ship.[64] Hence, when we perceive an object at a place, the phrase "at a place" does not refer to a relation to the object, but to our seeing, to which the location of the object in space does only contribute as a condition, depending on the concrete angle of incidence of the optic lines and the size of the perceived object. This becomes a fact of experience through frequently repeated perception, because then we remember that this has also been the case in former instances – a translation of an Aristotelian element of "experience" into the early modern context indeed.[65]

Haunold confirms his view with the help of the telescope, which e.g. allows us to see objects ten times nearer and bigger. The opponents have to explain this through the refraction of *species* as well. Haunold receives a second confirmation from the perspective painting of his age, in which coloured elements are arranged in a certain way, so that they seem to be nearer or further away depending on the visual angle, whereas the opponents can always only assume the same distance from the eye, but not of the particular elements from each other.[66]

Furthermore, the opponents also concede that the tactile sense does not perceive the *ubicatio*, but the object itself. If another body is moved unto

62 Ibid., n. 75-76, p. 606.

63 Haunold, Ch., *Ius peripateticum ratione subnixum, authoritate firmatum modorum physicorum*. Dillingen, Formis Academicis 1644, n. 38-41, p. 9–10.

64 Haunold, Ch., *Philosophia*, c. 5 n. 1, p. 60; cf. Vázquez, G., *Commentarii et disputationes in Tertiam Sancti Thomae Aquinatis*. Lyon, Cardon 1631, disp. 191 c. 2 n. 15, p. 195–196; Lugo, J. de, *Tractatus de Eucharistia*, op. cit., disp. 5 n. 86-113, p. 573–579.

65 Haunold, Ch., *Philosophia*, c. 5 n. 2, p. 60–61.

66 Ibid., n. 3-4, p. 61–62; for the theory and the effects of the telescope cf. Hamou, Ph., *La mutation du visible. Essai sur la portée épistémologique des instruments d'optique au XVII^e siècle*. Villeneuf d'Ascq, Septentrion 1999, vol. 1, p. 129–133; Kutschmann, W., *Der Naturwissenschaftler und sein Körper. Die Rolle der ‚inneren Natur' in der experimentellen Naturwissenschaft der frühen Neuzeit*. Frankfurt, Suhrkamp 1986, p. 176–184. For the theory for arts cf. Lindberg, D.C., *Auge und Licht im Mittelalter*, op. cit., p. 262–296.

my own body, then I perceive the motion with the tactile sense as well as with the eye. The motion is seen through the particularly different impression in the eye, and then we conclude from our own "experience" again that we have to do it with motion here as in the past. The number is perceived through multiple impressions on the retina, which makes multiple perceptions possible as well.[67] The question why a blind-born man, who receives his eye-sight through divine intervention and sees a paper on the table in front of himself for the first time, exactly grabs at this location, can only be explained with natural instinct, according to Haunold, through which we know that an object is there, where it is effective, corresponding to the angle of incidence of optic lines.[68]

In his revised edition of the *Cursus* from 1669, Arriaga responds to these and similar arguments at length, although he does not mention Haunold directly. Much more, he argues against Haunold's teacher, Juan de Lugo, and the Carmelite friar Franciscus Bonae Spei (François Crespin, 1617–1677).[69] However, Haunold may be found among the *aliqui Recentiores*, who strictly deny a perceptibility of the *ubicatio*. In turn, Arriaga primarily points to the fact that the assumption of *species sensibiles communes* is more widespread among Thomists and Scotists. Despite certain differences, they agree that colour and light are the primary objects of the visual sense, but, in a secondary sense, also the location of the object.[70] Arriaga also adds an *a priori* proof here: Since standing, lying, and being here or there is nothing else than an *ubicatio* and since nobody can deny that he sees an individual (Peter) standing or lying here and there with his own eyes, he, therefore, sees the location in space. The latter formally causes the being here and there etc., as well as I perceive white colour when I see that Peter is white. Arriaga is astonished at his opponents, who do not think about accepting *species* of real *ubicationes* despite this fact.[71]

In order to answer further objections, Arriaga adds a new *subsectio*, in which he briefly summarizes[72] the extensive discussion within the doctrine on the Eucharist.[73] However, if we only disclose the location of an object through the different impulse within the eye, as the unmentioned Descartes thought, animals could never recognize, where an object, e.g. a wolf, is,

67 Haunold, Ch., *Philosophia*, c. 5 n. 5, p. 62.
68 Ibid., n. 6. p. 62–63.
69 Franciscus Bonae Spei (François Crespin), *Commentarii tres in Aristotelis philosophiam.* 3 vols. Bruxelles, Vivien 1652.
70 Arriaga, R., *Cursus* 1669, disp. 6 sect. 1 n. 65-66, p. 801.
71 Ibid., n. 72-73, p. 802–803.
72 Arriaga, R., *Disputationes theologicae in tertiam partem D. Thomae,* tom. 7. Antwerpen, Moreti 1655, disp. 33 n. 5-11, p. 348–351 against Juan de Lugo.
73 Arriaga, R., *Cursus* 1669, disp. 6 sect. 1 subs. 9, p. 803–805.

which has been seen by them, since they are unable to draw conclusions. Much more, I can see, for instance, Peter standing directly right and Paul directly left from me at school.[74] Of course, the following argument shows that Arriaga has not kept touch with developments in optics: If I open my eyes and see the church here, the river there, the houses here, towers there etc., how should I correctly distinguish between so many impulses lying tightly upon each other in my pupil then? For instance, I see the tower always at the same place, although the visual angle is different for a standing person and for a person in a stooped position. Furthermore, immaterial *species* cannot initiate an impulse on the pupil, because otherwise the tactile sense of the pupil itself would have to be equipped with the capability of visual perception, which is not the case with all other parts of the body.[75] Moreover, it is not the intellect or the imagination (*phantasia*) as inner sense, which discloses the location in space from the perception of objects. For then, one could claim that white colour is derived from the perception of the location in space with the same right. However, the location of whiteness in space does not send any *species* to the imagination, but to the eyes. Additionally, in case of a reflexion on flat mirrors, the object is not seen at its own location, but the *species* are also reflected on the surface of the mirror. Furthermore, the authors cannot explain how the objects can send *species* to the imagination and, so, foster the denial of *species*. Moreover, they abolish the intuitive perception of my own self as a human being standing here.[76] As already mentioned above, Arriaga also retains the perception of the location in space for the hearing sense and all other senses. Against Oviedo, he clearly distinguishes between the location of perception and the perception of the location of the object.[77]

For Arriaga, the question remains whether own *species* are necessary for the perception of the location, as proposed by the Scotists, or whether, together with Aquinas and the *Conimbricenses*, the *species* of the object is sufficient,[78] since not even through divine omnipotence an object could be without any location in space. Although the latter option seems to be preferable regarding the principle of economy, Arriaga finds serious difficulties here, because then a *species* with an each time adjusted *modus superadditus*

74 Ibid., n. 77-78, p. 803; cf. Descartes, R., Dioptrique. In: *Oeuvres de Descartes*. Éd. Ch. Adam – P. Tannery, Paris 1897–1913; repr. Paris 1966, vol. 6, p. 88–106; Clasen, U., *Die Sehtheorien von René Descartes und George Berkeley im Spiegel der Geschichte der physiologischen Optik*. Diss. Aachen 1977, p. 79–84. 97–102; Spruit, L., *Species intelligibilis. From Perception to Cognition*, vol. 2. Leiden, Brill 1995, p. 358–365.

75 Arriaga, R., *Cursus* 1669, disp. 6 n. 79, p. 803–804.

76 Ibid., n. 80-84, p. 804.

77 Ibid., n. 86-87, p. 805.

78 Ibid., subs. 10 n. 89, p. 805.

(*ubicatio*) would have to be produced for a moved object. Therefore, Arriaga pleads for a single, indivisible *species* at every place in this case, which is transmitted through the air and leads to an atomisation of the perception of the locality in space. Thus, this *species* represents e.g. white colour and place at the same time and appears as an atomic colour pixel – a concept which has also influenced Arriaga's theory of art.[79] Hence, there is no need of a *modus superadditus* of any kind, especially since that would lead to two *species*. Much more, every *species* is essentially different from the other and, so, also the perception of one pixel from that of the other. If divine omnipotence caused me to see white colour without any location in space, this would abolish the certainty of intuitive perception indeed. However, it does not contain any manifest contradiction for Arriaga and, therefore, has to be accepted as possible for God's omnipotence.[80]

5. "Species" of the Inner Sense

Within Aristotelian tradition, it is undisputed that there also is inner sensual perception apart from the outer senses. However, there are discussions about number and distinction of these inner senses, which were already determined in different ways by Aristotle.[81] According to Suárez, only one singular inner sense with different functions should be assumed.[82] This opinion is also shared by Arriaga[83] and Haunold[84]. Most often, the origin of *species* of the inner sense is explained with *species expressa* of the outer sense: The outer senses pass them on to the inner sense as images, which can be saved in memory and, if necessary, can be remembered, combined to new figures through fantasy (e.g. a golden mountain), or judged in the *aestimatio*.

79 Cf. Knebel, S. K., Die Kunst in der "Barockscholastik". Zur Ontologie der forma artificialis bei Rodrigo de Arriaga SJ (1592–1667). In: Mulsow, M. (ed.), *Spätrenaissance-Philosophie in Deutschland 1570-1650. Entwürfe zwischen Humanismus und Konfessionalisierung, okkulten Traditionen und Schulmetaphysik*. Tübingen, Niemeyer 2009, p. 281–291, here p. 286–287.

80 Arriaga, R., *Cursus* 1669, De Anima disp. 6 sec. 1 n. 90-91, p. 805–806.

81 Cf. Schofield, M., Aristotle on Imagination. In: Nussbaum, M. C. – Rorty, A. O. (eds.), *Essays on Aristotle's "De anima"*, op. cit., p. 249–277; Frede, D., The Cognitive Role of Phantasia in Aristotle. In: Ibid., p. 279–295; Annas, J., Aristotle on Memory and the Self. In: Ibid., p. 297–311.

82 Cf. Leinsle, U. G., *Dilinganae Disputationes*, op. cit., p. 406–409; Castellote Cubells, S., *Die Anthropologie des Suarez*, op. cit., p. 137–140; Lundberg, M., *Jesuitische Anthropologie und Erziehungslehre in der Frühzeit des Ordens (ca. 1540– ca. 1650)*. Uppsala, Almqvist & Wilsell 1966, p. 88–91; Ludwig, J., *Das akausale Zusammenwirken (sympathia) der Seelenvermögen in der Erkenntnislehre des Suarez*. München, Ludwig 1929, p. 40–52; Clemenson, D. L., *Seventeenth-Century Scholastic Philosophy of Cognition and Descartes' Causal Proof of God's Existence,* op. cit., p. 17–22; Rinaldi, T., *Francisco Suarez. Cognitio singularis materialis: De Anima*. Bari, Levante 1988, p. 139–161.

83 Arriaga, R., *Cursus* 1637, De Anima disp. 5 sect. 6, p. 638.

84 Haunold, Ch., *Philosophia*, c. 6 a. 1, p. 64–65.

Arriaga does not only assume *species* of the outer sense in the inner sense (also of the tactile sense and of taste), but also of the location in space.[85] Things are more difficult in case of motion, for which he has not assumed any *species*. However, since also animals clearly recognize motion and shape, but do not have any additional intellectual capabilities, Arriaga has to accept *species* of motion, shape, and negations (e.g. shadows) within the inner sense for animals, for they recognize, where more light or less water is, e.g. when they try to cross a river.[86] Additionally, he assumes *species insensatae* for animals, which they do not receive from the outer senses, e.g. of hostility, when a sheep sees a wolf, or of health with regard to herbs etc. The objection is that this could be derived from the outer senses, e.g. that something appears as nice to see or pleasant to hear. But this deduction does not suffice for Arriaga's analytic method, because he atomises pleasant music as well as nice shape in its perceived parts, for which, again, the privation or negation of superfluous or disturbing parts, e.g. of a too long nose, is necessary. However, precisely this absence of the superfluous is not perceived in the act of seeing, but it also cannot be disclosed by animals. Therefore, such *species insensatae* of the useful and harmful have to be assumed for animals according to Arriaga.[87]

Why is it that animals run away from the shadow of a human being? According to Arriaga, the explanation with black colour and shape is not sufficient, because then animals would have to form *entia rationis*, e.g. of blackness or darkness. How can animals proceed from seeing a shadow to forming the notion "blackness", where shadow is seen as pure ontological nothingness and, thus, cannot be perceived immediately? Otherwise, the ability to perceive the absence of a thing immediately (*carentia*) would have to be ascribed to animals. If a wall is covered with a black cloth from above to the ground, a dog will not try to run through this wall. However, if a piece in the middle or on the ground remains uncovered, he will try it, because he does not presume a solid object here. A bear, who wants to throw stones upon a man, knows whether their size is big or small. However, in a formal sense smallness means the absence of bigness and it is only this smallness, which *formalissime* makes things small. But the animals know this, because a small dog will not fight against a big dog. However, if the animals realize this absence of bigness or objects through the inner sense, from where do they take *species* then? Should the capability of reflection through inner sensual perception be ascribed to animals for that reason,

85 Arriaga, R., *Cursus* 1637, De Anima disp. 4 sect. 1 n. 78, p. 606.
86 Ibid., n. 79, p. 606.
87 Ibid., n. 80-82, p. 606–607; cf. Arriaga, R., *Cursus* 1637, Physica disp. 8 sect. 6 subs. 2, p. 315–316.

so that they recognize negations on this way and e.g. see light here and not there? Indeed, animals formally recognize their own sensual perceptions, e.g. pain at this or that patch. But then discursive capability would have to be ascribed to animals, and, furthermore, they would also have to be able to recognize their own substance, i.e. to have first-person-experiences: I do not see anything here, I have pain etc. Moreover, it remains unexplained how animals can form *species* of negations: Here is nothing, there it is open. Nevertheless, this opinion seems possible for Arriaga, although it remains unclear to him whether animals really perceive their outer acts.[88]

Regarding undeniable facts of experience, the *species insensatae*, which are directly given by God, are the better solution for him: Animals recognize open doors, windows etc., because they only see the corresponding brightness and colour through their senses. But then God gives them the *species insensatae*, through which they are able to receive negative perceptions: Here is no colour, there is no sun under the tree, where the shadow is. Regarding the more extensive recourses of other authors, Arriaga is not especially worried about this recourse to God. However, these *species* are only activated at the occasion of a perception of positive objects. So, a dog, for instance, can compare his own size with that of another dog. However, that a dog runs out through the open door does by no means contain a common insight, e.g. of colours or even nothingness (in the sense of a positive judgment "Nihil est ibi"). That there is no colour here can be seen because of the extension of the coloured object, whereas the perception of the shadow follows from the extension of light, which does not reach any further. Animals recognize that nothing is here, e.g. in case of a crack or a hole, in a similarly unclear way as children, who also do not negate the particular objects or properties yet. According to Arriaga, this is the best available explanation of animal perception.[89]

In 1645, Haunold deals with the insight in *species insensatae*, unperceived objects, and negations within the inner sense, which he regards as impossible, while continuously examining Arriaga's view.[90] If the lamb flees from the wolf as its enemy, this does not happen because of formal insight (in a concept of the enemy), but because of natural antipathy, as it has even been given to the elements by the *Author naturae*. For the very same reason, they eat e.g. herbs, which serve as purgative. Similarly, animals do not have negative insight, e.g. that there is no colour or nothing here, because this would be a formal, discursive insight. If the dog runs out through an open door, this

88 Arriaga, R., *Cursus* 1637, de Anima disp. 5 sect. 5 n. 72-77, p. 639.
89 Ibid., n. 78-83, p. 639–640.
90 Haunold, Ch., *Philosophia*, c. 6 a. 2, p. 66–70.

does not happen, because he formally recognizes the negation of an obstacle, but because he perceives that there is no obstacle (according to Oviedo).[91] Therefore, he also looks for a way out everywhere in a closed room, similar to a bird, when the window is closed. It is only through natural instinct that calves, which are still blind, search for the mother's breast. When animals are startled by a shadow, this is not the case, because they recognize a negation of light here, but because the shadow has a shape, which they naturally fear.[92]

In his 1669 edition, Arriaga extensively deals with new questions concerning his doctrine. First of all, he defends the necessity of real own *species* of the inner sense against Crespin, whereas the latter assumes an equipment with the *species* of all (infinitely) possible things for the inner sense of human beings and animals in order to avoid the continuous production of new *species* by God. Apart from difficulties in Crespin's thesis itself, Arriaga especially sees the danger of a Cartesian denial of *species* of the outer sense as well.[93] Oviedo denies *species* of the inner sense, while assuming that outer sense perceptions have an immediate effect on the inner sense, e.g. pain in the leg on the inner sense in the brain. However, for Arriaga this is doubtful because of the immense size of some animals. Regarding such a comprehensive causal connection, one would also have to assume that the coldness in Norway would let me freeze in Prague. Moreover, the part of the soul in the remotest feather of an eagle would have to contribute something to its visual sense. If it gets lost, this would have an impact on it.[94] Furthermore, the question arises, whether these *species* are immediately derived from the outer objects or whether they are *species* of outer sense perception themselves. When we listen to music, we also perceive this with the inner sense, so that one could assume that *species* of the outer objects are immediately passed on to the inner sense as well. On the other hand, it is clear that e.g. hearing also produces a *species* of this process of hearing and transmits it to the inner sense in the brain, through which we can remember what we have heard. If *species* of the outer object were immediately passed on to the inner sense, the outer senses would be superfluous in principle. Much more, *species* of particular acts of perception have to be assumed by necessity, but the inner sense does not always perceive that as reflected in the act of the

91 Ibid., n. 10, p. 68; cf. Oviedo, Cursus, de anima controv. 4 pt. 5; II, p. 70–71; for Aristotle see Sorabij, R., *Animal Minds and Human Morals. The Origins of the Western Debate*. Ithaca, N. Y., Cornell University Press 1993, p. 12–20; for the medieval debate cf. Köhler, Th. W., *Homo animal nobilissimum. Konturen des spezifisch Menschlichen in der naturphilosophischen Aristoteleskommentierung des dreizehnten Jahrhunderts*. Leiden–Boston, Brill 2014, p. 370–391.

92 Haunold, Ch., *Philosophia*, c. 6 a. 2 n. 11-12, p. 69–70.

93 Arriaga, R., *Cursus* 1669, De Anima disp. 6 sect. 1 n. 92-97, p. 806–807.

94 Ibid., n. 97-101, p. 807.

outer sense. Therefore, both *species* are necessary, those of the outer object and those of the act of perception, but the *species* of the act of perception remains primarily directed towards the insight in the object in the inner sense. The perception itself is only recognized in case of especially intensive impressions.[95] Against Oviedo, Arriaga retains that also *species* of motion are given in the inner sense, because the dog perceives that the hare runs away, even if this motion itself includes negations, because these are recognizable for the dog.[96] However, the objects themselves are not directly recognizable through *species* of the inner sense, but only indirectly. Despite all criticism, to which he does not respond any further, Arriaga retains *species insensatae* as well as the insight in negations by animals here.[97]

SUMMARY

In 1645, Christoph Haunold (1610–1689), a young professor of philosophy at the University of Dillingen, harshly attacks the arguments of his Prague colleague Rodrigo de Arriaga (1592–1667) concerning the *species sensibiles* in his *Philosophia de anima* sensitiva. At least in case of the visual sense, Arriaga and Haunold agree in the assumption of species, but not in further points, namely the divisibility and the intensification of species, their visibility and function, the necessity of species for hearing, the perceptibility of the location in space through the sensus communis and the existence of species within the inner sense, which are not derived from perception. Because of its comprehensive recourse on experience and experiment, this subtle debate becomes an impressive prime example of the relation between ontology, common sense, and experimental experience.

Keywords: species sensibiles, optics, sound, common sense, inner sense

95 Ibid., n. 102-103, p. 807-808.
96 Ibid., n. 102-103, p. 807–808.
97 Ibid., n. 105-110, p. 808–809; disp. 7 sect. 10, p. 847–848 (identical with 1637 disp. 5 sect. 5).