

# The Presence of Pseudo-Aristotle's *De Coloribus* in Color Theory as Presented on the *Commentarii Collegii Conimbricensis Societatis Iesu* (1598) and the Present Day

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## Abstract

It is our intent to demonstrate to what extent the Aristotelian and Pseudo-Aristotelian theoretical *corpus* on vision and color have, over the centuries and up to the present moment, contributed toward the production of works that have become foundational to study and research on the multidisciplinary domain of color, light, and sight. We will illustrate this intent by drawing on the oeuvres of Manuel de Góis, Simon Portius, and Goethe.

## Keywords

Light, Sight, Color, Color Theory, Natural Philosophy, Pseudo-Aristotle, Aristotelianism, Manuel de Góis, Simon Portius, Goethe

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## 1. Introduction

The Aristotelian description of visibility and sight places emphasis on the role of the external senses, especially sight, as a privileged gateway to human knowledge on things, inaugurating a tradition in the study of optics and related disciplines that extends into the present day. Hence its staying power regarding the western approach to the subject of color. To a significant number of authors, what's essential about the description of color and the surface of things that constitute objects of sight presents unquestionable affinities with the doctrine of the Stagirate and his school. We are referring above all to the role of the observer, the one who sees, describes and interprets what he or she sees. This inevitably takes them through the identification of color, as well as objects' contour and surfaces. There were several followers and commentators of Aristotle in the study of col-

or, such as Alhazen (Lindberg, 1976)<sup>1</sup>, Avicenna<sup>2</sup>, Albert the Great<sup>3</sup>, John Buridan<sup>4</sup>, among others.

As a guidepost for this essay of ours we look to the Pseudo-Aristotelian book, *De Coloribus*, which enjoyed unprecedented success from the 16<sup>th</sup> century onward. Although the perspective on color acquires an autonomy of its own therein, color is still viewed through an Aristotelian lens as sensory data ascribed to sight, the boundary that allows one to tell one object from another by circumscribing the contours of things, giving them an identity, setting them apart; whether in their finite nature by establishing separation, or their infinity when limitation is absent, as is the case with color extending along the depth of field; or the erroneous perception they can bring to the observer's sight when one superimposes visible, translucent layers, or colors derived from an observer affected by medical conditions of the eye.

From the 16<sup>th</sup> century onward, *De Coloribus* would reach an ever-expanding

<sup>1</sup>David Lindberg, *Theories of Vision from Al-Kindi to Kepler*, Chicago London: The University of Chicago Press, 1976, p.71.

<sup>2</sup>*De naturalibus*, liber 6, "...lumen autem est qualitas primi membri divisionis, ex hoc sit est. Paries enim non permittit lucidum illuminare aliquid quod post ipsum est, nec est ipse ex seipso lucens, qui est corpus coloratum in potentia; color enim in effectu non accidit nisi ex causa luminis. Lumen enim cum illustrat aliquod corpus, accidit in eo albedo in effectu aut nigredo aut viriditas et cetera huiusmodi; si vero non illustrat, est nigrum tantum fuscum, sed in potentia est coloratum, si voluerimus dicere colorem in effectu hoc quod est albedo aut nigredo aut rubor aut pallor aut his similia. Non enim albedo est albedo Nec rubedo est rubedo, nisi secundum hoc quod videmus; non autem fit hoc ut videamus nisi fuerit illustratum. (...) Et omnino non est nisi privatio luminis ab eo quod solet illuminari, scilicet quod aliquando videtur: lumen enim visibile est, et id in quo lumine est visibile. Translucens autem non est visibile ullo modo; obscuritas autem est in subiecto luminis et utrumque est in corpore quod non est translucens. Ergo corpus cuius color solet videri, cum non fuerit illuminatum, fiet obscurum, et tunc non erit certissime in eo colore in effectu. Quod autem putantur ibi colores esse, sed occulti, hoc nihil est: aer enim non tegit eos, quamvis sit obscurus, cum colores fuerint in effectu. Si autem homo appellat colores aptitudines diversas quae, cum illuminantur, una earum est albedo et alia rubedo, hoc potest esse, sed fiet propter aequivocationem nominis: albedo etenim certissime non est nisi cuius est proprium videri, et hoc non habet esse cum est inter se et ipsam aliquid privium quod provehit visum, ipsa tamen non videtur."

<sup>3</sup>*De natura et origine animae*, tract I c. 5, Est autem videre in illo, quod in medio visus sensibile visus, quod est color, est secundum esse spirituale. Cui conveniunt tria, quorum unum est subito et non in tempore transire ad visum per medium; secundum est universaliter in medio visibile generari, quocumque extenditur reta linea; tertium autem est medium non afficere qualitate et figura ipsius: non enim possumus dicere aerem esse trigonum vel album, eo quod album trigonum videtur per ipsum. Ex his autem tribus convincitur perspicuum, quod est medium in visu, in quo sicut in medio fiunt visibilia, non esse materiam subiectam visibilibus nec se ad visibilia habere sicut potentiam materiae. Esse enim spirituale, quod subito fit in medio materiae et in extremo, et esse ubique in materia subito et non infici vel informari nunquam convenit materiae ex aliqua forma quae est in materia. Amplius, perspicuum et color sunt eiusdem naturae, quia color est esse quodam perspicui in corpore terminante visum et terminato per opacum, sicut ostendimus in libro de sensu et sensato. Materia autem et forma nunquam sunt eiusdem naturae, et ideo potius perspicuum ad visibilia se habet sicut locus connaturalis eorum, ad quem moventur et in quo connaturalitatem habent, et ubique in ipso existunt, secundum quod esse habent sensibile. Cum autem oculus secundum naturam non habeat nisi perspicui compositionem, erit eadem ratio de oculo quae est de perspicuo medio secundum illam comparisonem qua se habet oculus ad visibilia. Determinatum est autem a nobis in scientia De Anima, quod perspicuum non convenit elementis ex hoc quod elementa sunt, sed potius ex hoc quod Comentario unicant cum corpore superiori, quod est perpetuum et caeleste."

<sup>4</sup>*In Primum Aristotelis "De Anima"*, L. II, 9, 17, ed B, Patar, p. 602: "Ad rationes dicendum est quod simile est de istis: color est visibilis et homo est risibilis quantum ad hoc quod utraque est per se, sed non quantum ad hoc quod utraque sit de primo."

and more diverse readership, both qualitatively and quantitatively. We can confidently state that the seeds of its doctrine, in the wake of Aristotle's work on sight and the visible, have appeared in successive incursions into the study of color up to the present. As should be obvious, we do not allude to the study of color conducted by present-day physics, chemistry, astronomy or even medicine. We focus instead on multiple approaches of a philosophical, psychological, semiotic, anthropological, or religious approaches that concern people's cultural lives in their relationship to the world and the cosmos. We will single out a few examples—but a few, out of necessity, given the number of scholars, manuscripts and published works that deal with this subject matter, that we may corroborate what we claimed above. Thus, we will pay extra attention to the color theory expounded by the Jesuit Manuel de Góis, pondering its systematic and comprehensive nature, as well as the importance he ascribes to *De Coloribus* throughout his work. It should not go unsaid that this theory precedes Goethe's widely known color theory by three centuries or so. The two present unquestionable similarities. Such similarities owe, in our opinion, to the fact that they share a precursor, *De Coloribus*, cited by both writers. We will also engage in a brief discussion of Simon Portius, who translated *De Coloribus* and, in order to demonstrated the extent to which the terminology bequeathed us by naturalists has spread throughout space and time, we will mark the existence of a corpus of manuscripts from Brazil, dated to the 18<sup>th</sup> century, including philosophical texts that deal with the subject of color. Finally, we will comment sparingly on present-day description of color, basing that commentary on a work by Antonio Spadaro, in an attempt to illustrate the importance of tradition where the study of color is concerned, especially from a Jesuit standpoint. This omnipresent theme in Western culture, from physics to metaphysics, is crucial since the history of color cannot be written without resorting to *De coloribus*. In this work we will only address the typology of true and false colors, according to *De coloribus*. This classification was crucial especially from the 16<sup>th</sup> century onwards. Therefore, we point out relevant examples of its presence mainly in the studies of Manuel de Góis, Simon Portius and Goethe. Previous studies comparing the color typologies of Manuel de Góis and Goethe: *Cor, Natureza e Conhecimento no Curso Aristotélico Jesuíta Conimbricense (1592-1606)*, (da Conceição Camps & de Carvalho, 2016)<sup>5</sup> *Do visível ao invisível—a teoria da visão no comentário aos três livros 'Da Alma' do Curso Jesuíta Conimbricense*. (da Conceição Camps, 2012)<sup>6</sup>

## 2. The Diffusion of *De Coloribus*, Beginning with the 16<sup>th</sup> Century

Three main reasons have driven the reach of, and interest in *De Coloribus*,

<sup>5</sup>CAMPS, Maria da Conceição, and CARVALHO, Mário Santiago de, *Cor, Natureza e Conhecimento no Curso Aristotélico Jesuíta Conimbricense (1592-1606)*, Coimbra: Imprensa da Universidade de Coimbra, 2016.

<sup>6</sup>CAMPS, Maria da Conceição, *Do visível ao invisível - a teoria da visão no comentário aos três livros 'Da Alma' do Curso Jesuíta Conimbricense*, 2012, <https://repositorio-aberto.up.pt/handle/10216/75356> (in 8/7/2024).

among other works on light and color that enjoyed a measure of success from the Renaissance onward.

The first reason. The novelty factor presented by recent translations of Aristotle.<sup>7</sup> The invention of the printing press made it possible (with ease hitherto inconceivable) to divulge authors who, regardless of their antiquity, seemed new or even contemporary to their readers. It bears mentioning that in 1542, in Paris, people began teaching Aristotle in Greek. In fact, between the invention of the printing press and the year 1600, three to four thousand editions of Aristotle saw the light of day. Other than Aristotle, many other authors were resurrected by the printed page: Alexander of Aphrodisias, Apuleius, Cicero, Diogenes Laertius, Isidore of Seville, Plotinus, Pliny, Galen, Augustine, Ptolemy, Seneca, Theophrastus, Philoponus, Pythagoras, Lucretius, and many more. (*vide António Manuel Martins, 1989*)<sup>8</sup>

<sup>7</sup>Up to the early 13<sup>th</sup> century the Latin world was only aware of Aristotle's works on Logic. More specifically, until 1120 readers only had access to *The Categories* and *De Interpretatione*, a translation by Boethius in the 6<sup>th</sup> century which, along with Porphyry's *Isagoge*, were incorporated into the so-called *Logica Vetus*. In 1120, the remainder of Boethius' translation work was discovered: *Prior Analytics*, *Topics*, and *Sophistical Refutations*. Between 1125 and 1150, James of Venice would translate the *Posterior Analytics*, completing the *Logics*. Also between 1125 and 1150, James would produce a Latin translation of Aristotle's *On the Soul*, then followed by Michael Scot's translation sometime between 1220 and 1235 and William of Moerbeke's around 1268. From the 13<sup>th</sup> century on, Aristotle would be popularized in Europe in no small way by the Arabic renditions then flowing into Europe. So, and as a mere attempt to provide examples rather than a comprehensive list, we single out a few works of natural philosophy made known to this historical period: *Physics*, translated by James of Venice between 1125 and 1150; an anonymous translation published that same century; one other by Gerard of Cremona before 1187 and also Michael Scot's translation produced between 1220 and 1235. *On the Heavens*, translated by Gerard of Cremona, again, before 1187. Michael Scot would produce his own between 1220 and 1235, and Robert Grosseteste would deliver another around the year 1247. Michael Scot translated Averroes' *Long Commentary on De Caelo* from Arabic between 1220 and 1235. The first Latin translation of *On Generation and Corruption* would appear during the 12<sup>th</sup> century, penned anonymously, but another by Gerard of Cremona would follow before 1187 and yet another by William of Moerbeke before 1274. Henry Aristippus would translate the fourth book of the *Meteorologica*, before 1162, whereas Gerard of Cremona would translate books I, II, and III before 1187. William of Moerbeke would follow suit around 1260. Michael Scot would translate book IV of Averroes' *Middle Commentary on De Caelo* between 1220 and 1235. *On Sensation* would see an anonymous translation in the 12<sup>th</sup> century, another by William of Moerbeke between 1260 and 1270. Michael Scot would produce a translation from the Arabic of Averroes' *Epitome* between 1220 and 1235. In turn, an anonymous author would translate Pseudo-Aristotle's *On Colors* during the 13<sup>th</sup> century. Bartholomew of Messina would translate the same work, 1258-66, followed by William of Moerbeke, 1260-70. Most of these works were rendered in Latin adopting a literalist, word-to-word style that shaped medieval translation and would be superseded by the humanist approach of subsequent centuries, proceeding in a more interpretive, paraphrastic and freer direction, *ad sententiam* rather than *ad verba*, although some translators would preserve the older, medieval style. One such would be fifteenth-century translator George of Trebizond, who worked within the *ad verba* paradigm throughout his rendition of the treatise *On the Soul*. During the Renaissance, *On the Soul* would find unprecedented publicity, no small thanks to its relevance to the new readings and rediscovery of human nature that the times called for; not to mention the miracle facilitated by the spread of the written work ushered in by the invention of the printing press and, just as importantly, the inflow of Greek translators to the west after the fall of Constantinople, throwing the doors ajar to the dissemination of the Greek language. In the 15<sup>th</sup> century, George of Trebizond and John Argyropoulos would produce new, humanist translations of *On the Soul* from the original Greek. Throughout the following century the same treatise would be translated five times into Latin and twice into Italian, respectively: Pietro Alcionio (1st edition, 1542), Gentian Hervet (1544), Joachim Périon (1549), Michael Sophianus (1562) and Giulio Pace (1596), as to Latin renditions, and Francesco Sansovino (1511) and Antonio Brucioli (1559), where Italian translations are concerned. The Aldine version, *Aristotelis Opera Omnia* (1495-8), which includes the Greek text, would also grace this period, *Aristotelis Stagiritae, philosophorum omnium facile principis, opera quae in hunc usque diem extant omnia, Latinitate partim antea, partim nunc primum a viris doctissimis donata, et Graecum ad exemplar diligenter recognita*, Basileae: Johann Oporin, 1542. One must likewise mention the Giuntina edition, *Aristotelis De Anima Libri Tres, cum Averrois Commentariis et Antiqua translatione suae integritati restituta*. His accessit eorundem librorum Aristotelis nova translatio, ad Graeci exemplaris veritatem, et scholarum usum accommodata, Michaele Sophiano interprete, in *Aristotelis Opera cum Averrois Commentariis*, Vol. VI, Venetiis: Apud Junctas, 1562, anastatic facsimile: Frankfurt am Main (1962), and the Basel edition, *Aristotelis Stagiritae, philosophorum omnium facile principis, opera quae in hunc usque diem extant omnia, Latinitate partim antea, partim nunc primum a viris doctissimis donata, et Graecum ad exemplar diligenter recognita*, Basileae: Johann Oporin, 1542. *On the Soul* was reprinted eight times during the 16<sup>th</sup> century. The same impulse gained momentum thanks to renewed interest in Greek commentaries among intellectual circles, an interest nourished by the printing press. Authors like Themistius, Alexander of Aphrodisias, Simplicius and Philoponus were in vogue during the Renaissance.

<sup>8</sup>On this topic, *vide* António Manuel Martins, "Conimbricenses" in *Logos. Enciclopédia Luso-Brasileira de Filosofia*, vol. 1, Lisbon: Editorial Verbo, 1989, pp. 1112-1126.

Second reason. The Renaissance rediscovery of nature in all its facets. Colors as physical phenomenon and beauty captured through the pleasure of the senses elicit ever more interest and awe. Likewise with the development of medicine as Galen's readership increased thanks to efforts by Arabs and Jews, which led to more detailed study of the ocular system and the phenomenon of sight. As such, optics would evolve its every aspect, namely from the contribution of the philosophers of perspective. Never had the study of lenses and sight-amplifying instruments garnered so many disciples. It was thanks to the forward thrust of optics beginning in the 13<sup>th</sup> century, in Europe, that made possible such discoveries in physics as would later allow the development of nautical and navigation sciences, the study of the skies and of the heavenly bodies. This period is influenced by a perception of nature's autonomy, evincing the importance of efficient causes in any explanation of natural phenomena. The main Aristotelian loci that describe the colors of things and their components are often visited and revisited. The explanation of color based on elements, atmospheric phenomena and natural beings, which recurs throughout *De Coloribus*, will provide the fertile soil where a terminology thrives and blossoms that shall, later on, embraced and spread far and wide by naturalists, specifically: true color, apparent color, false color, artificial color, and more. This terminology will take root and remain in use throughout modernity.

Third reason. Renaissance painters suddenly express an interest in the creation of new colors and pigments. Artists from the east come to the west after the fall of Constantinople to the Turks, which increased the appetite for painting and boosted the manufacture of new colors and materials. Color begins to differentiate itself from its substrates, which leads to the study of color in itself, of its nature and composition. While to Aristotle and the general masses of his day color was defined mostly as surface, a coating, inseparable from the object that presented itself to human sight (and many colors were named after the object that displayed them), they had come into the process of being perceived as autonomous and demanding individuated study. Hence the emphasis on telling true from apparent or false color, natural from artificial. Aristotle does not in fact use this terminology. However, *De Coloribus*, after *De Anima*, *De sensu et sensibili*, *De Caelo* and *Meteororum*, will continue a work where color is studied in its variants, attempting a comprehensive description of the phenomenon grounded in its nature and substrates, which explains why Natural Philosophy takes an interest in this work, as well as the emergence of new terminology pertaining to color.

### **3. True and False Color. The Importance of This Classification. Simon Portius, Manuel de Góis. Notice of 18<sup>th</sup>-Century Manuscript Collection**

The 17<sup>th</sup> century and subsequent ones will bring to the fore the classification of true and false color.<sup>9</sup> It arises from a new reading of *De Coloribus* by naturalists.

<sup>9</sup>Based on the Aristotelian text, true color in Simon Portius' and Manuel de Góis' readings is simple color (791 a1) and composite color (328b23). False color arises from the juxtaposition of true color resulting from optical illusion (445b; 446 a19), as well as reflection and refraction phenomena (442 a 20 and 438 a 8). On the colors of the sky *vide* 370 a 16 and 419 b 29.

We will analyze especially Manuel de Góis' doctrinal stance (Mariz, 1958; Olisipone, 1593a; Olisipone, 1593b; Mariz, 1597)<sup>10</sup> as it approaches a line of reading that posterity will grant more importance to, owing greatly to Goethe's work on the matter, which has until the present day enjoyed unmistakable popularity and remarkable dissemination. This point of view analyzes colors through the lens of Natural Physics, seeking to know their origin, as well as the way observers perceive them. Simon Portius' work, although conceding these aspects are relevant, stands out above all because it is at once a translation from the Greek source and a work of commentary, playing an undeniably meaningful role as an instrument for work and diffusion. It emphasizes, based on page count, the study of artificial color, namely the manufacture of color, as well as observation of color in nature and its respective mutations. We point out a few scarce yet meaningful examples relating to the productivity of color terminology birthed by Aristotelian works, namely that of Simon Portius, especially given the numerous translations of *De Coloribus*. Here, the author comments on the work and highlights a few aspects that will gain traction as pertinent, beginning with that period. Taking for our starting point *De Coloribus Libellus, A Simone Portio Neapolitano Latinitate Donatus & Commentarius Illustratus...*, the 1548 translation,<sup>11</sup> we come to understand that this work foregrounds natural and artificial color, devoting special attention to the creation of color from a variety of substrates.

Praefatio in Libellum De Coloribus De Natura Coloris (pp. 5-21);

Cap. I—De Coloribus Simplicibus (pp. 23-50);

Cap. II—De Coloribus Mediis Sive Mixtis (pp. 50-74);

Cap. III—De Colorum Infinitate (pp. 74-99);

Cap. IIII—De Coloribus Artificialibus (pp. 99-108);

Cap. V—De Mutatione Colorum Ex Concoctione (pp. 108-150);

Cap. VI—De Colore Pilorum, Pennatum Et Cutum. (pp. 151-197).

The commentary is comprehensive, reviewing the main loci where Aristotle devotes himself to the study of color. We note the concern with the description of how nature, through its processes, generates color. The same holds true for the composition of each color, either natural or artificial, resulting from manufacturing

<sup>10</sup>*Commentarii Collegii Conimbricensis Societatis Iesu, In tres libros de Anima Aristotelis Stagiritae, Conimbricae, A. Mariz, 1598 (An); Commentarii Collegii Conimbricensis Societatis Iesu, In quatuor libros de Coelo Aristotelis Stagiritae, Olisipone, S. Lopes, 1593 (Coel); Commentarii Collegii Conimbricensis Societatis Iesu, In libros Meteororum Aristotelis Stagiritae, Olisipone, S. Lopes, 1593 (Met); Commentarii Collegii Conimbricensis Societatis Iesu, In duos libros De Generatione et Corruptione Aristotelis Stagiritae, Conimbricae, A. Mariz, 1597 (Gc).* On the genesis of the Jesuit Course of Coimbra, its importance and vitality, vide CARVALHO, Mário Santiago de, "Introdução Geral à Tradução, Apêndices e Bibliografia», in *Comentários do Colégio Conimbricense da Companhia de Jesus Sobre os Três Livros Da Alma de Aristóteles Estagirita. (Commentarii Collegii Conimbricensis Societatis Iesu, In tres libros de Anima Aristotelis Stagiritae.)* Translation of the Latin original by Maria da Conceição Camps, Lisbon: Edições Silabo, 2010, pp. 7-157; -----, *O Curso Aristotélico Jesuíta Conimbricense*, Imprensa da Universidade de Coimbra, 2018.

<sup>11</sup>*De Coloribus Libellus, a Simon Portio Neapolitano Latinitate donatus & commentarius illustratus: una cum eiusdem praepatione, qua Coloris naturam declarat, Florientiae, Ex officina Laurentii Torrentini, MDXLVIII.* Another edition would follow immediately afterward: *Aristotelis, vel Theophrasti de Coloribus Libellus, a Simon Portio Neapolitano Latinitate donatus & Commentarius Illustratus; una cum eiusdem praefatione, qua coloris naturam declarat, Parisiis, MDXLIX.*

processes once the elements of nature which produce color, or where they are present, become known. This matter is of paramount interest to manufacturers of pigments. The colors of natural elements also provide indicators of nature's workings, as expressed on Chapter VI. Noted is the distinction between true and apparent color, based on the substrate from which color arises, per Aristotle's teachings.

Manuel de Góis (1598) (da Conceição Camps, 2015) (da Conceição Camps & de Carvalho, 2016)<sup>12</sup>, thanks to exemplary rationality tempered by in-depth knowledge of the Aristotelian text, studies on optics and their authors since antiquity—not forgetting the impactful Arabic contribution, or that of the philosophers of perspective—constructed a theory imbued with undeniable productivity. On chapter VII, book two of the commentary on Aristotle's *De Anima*, Manuel de Góis addresses the nature of light, wondering whether it is akin to that of color. He confronts arguments by authors who've claimed that color and light possess a shared nature: Plato, Virgil, Avicenna, Albertus Magnus, and others that go unnamed. Let us note Manuel de Góis' knowledge of Plato's color theory as expounded in Plato's *Timaeus*. Newly-translated Plato drew passionate interest from all of the philosophical community.<sup>13</sup> Before he would impugn the opinions of the authors above, Manuel de Góis would analyze several types of color, by which we mean what he termed apparent, and true colors. Apparent color is, in some way or another, impermanent. Mutable, it deceives sight as it offers a variable vision. Such is the case with the colors of rainbows, on pigeons' heads, peacock's tails, even the colors of sea and sky. On his Commentary *In Libros Meteororum*, Manuel de Góis states there are two kinds of color. Some originate with the mixture and combination of the four primary qualities, witnessed in a single, discrete body, and are deemed true, expressed colors. Others originate with reflected light (*lumen*), are apparent and fictitious, and swiftly fade from view. The variety of apparent colors may arise from conditions affecting the organs of sight<sup>14</sup>, states of matter whereon the light shines, the varying aspect of the luminous body, the quality of the medium through which light travels, the visible species carried to one's sight, or light's waxing and waning<sup>15</sup>.

<sup>12</sup>On color in Manuel de Góis *vide* CAMPS, "The Pleasures of Seeing according to Manuel de Góis' Coimbra Jesuit Commentary on 'De Anima' (1598", *Quaestio* 15 (2015), pp. 817-826; CAMPS, Maria da Conceição, and CARVALHO, Mário Santiago de, *Cor, Natureza e Conhecimento no Curso Aristotélico Jesuíta Conimbricense (1592-1606)*, Coimbra: Imprensa da Universidade de Coimbra, 2016.

<sup>13</sup>We must note here that Plato had been known to the Middle Ages through Calcidius' commentary and translation of a part of *Timaeus*, including the part of the text that deals with sight, but excluding discussion of color, although Calcidius' own commentary retains mentions of color. On this matter and a few others, the Coimbra Jesuit Collegium evinces knowledge of Marsilio Ficino's translation.

<sup>14</sup>Bear in mind what causes the color in question to manifest—conditions of the eye, which points to the kind of situation that Goëthe will include in his genesis of so-called pathological colors.

<sup>15</sup>*Commentarii Collegii Conimbricensis Societatis Iesu, In libros Meteororum ... Met4c3p38-39*: "...colorum duo sunt genera, alii ex quatuor primarum qualitatum ad mixtionem et temperie obveniunt et in solo corpore mixto ac terminato cernuntur ut docet Aristoteles lib. De sensu et sensilibus; et hi expressi ac vere colores iudicantur: alii oriuntur ex reflexione luminis qui adumbrati duntaxat et apparentes sunt, proindeque celeriter intercidunt (...). Eorum materia qui videlicet inexistunt est vapor vel exhalatio vel aere addensatus, vel etiam aqua: praesertim quae in maiorem raritatem attenuata fit locus, ubi se sepe spectandos exhibent, est potissimum aerae regionis interstitium. Eorum forma est lux varie modificata: nec enim diversam ab ea naturam fortiuntur, ut in libris De Anima ostendemus. (...) Communis finis est pueritudo universi. Oritur istius modi colorum varietas (ut de affectionibus organi visorii nichil dicamus) partim ex diversitate affectionum materiae in quam lux incidit: partim ex diverso aspectu luminosi: partim ex qualitate mediae, per quod lux transmittitur aut species visibiles ad oculos feruntur: partim denique ex alia et alia intensione vel remissione luminis." E. Gilson (*Index Scholastico-carthésien*, Paris 1913, p. 59) draws a parallel between this passage of the Coimbra commentary and Descartes' discourse on color (AT VI, 335, 8-11), where the distinction between true and apparent color is concerned.

True color, distinguishable from light, arises from the combination of primary qualities<sup>16</sup> and the variety of elements; so with the whiteness of swans and the blackness of ravens. Apparent colors are light, as they vary as a function of distance, place, observers' point of view and the light cast on the body observed. True color possesses a nature distinct from that of light, as it is fixed and permanent. Whereas false color is light.<sup>17</sup>

The first conclusion we may extract from the debate above is that, for Manuel de Góis, there is but one kind of color, to wit: true color, as apparent color is only termed so by analogy. Permanent or fixed color, which does not vary in its primary quality, would represent, to Manuel de Góis, color proper, distinct from light by virtue of its nature, and it is about these one might claim they do not actualize the diaphanous though they move it. These conclusions raise a few issues with regard to the Aristotelian text itself, as we do not find a dichotomy thus framed on either *De Anima* or *De Sensu et Sensibili*. Aristotle draws our attention to the fact that colors appearing in air or water manifest differently in the observer's eye according to their proximity to the air or water they observe. On the other hand, color found in certain bodies remains fixed as long as there is no variation in outside light.<sup>18</sup> Yet he concludes that what receives color in either case is the transparent, which is present in everybody in greater or lesser measure<sup>19</sup>, even on those bodies where a near-total deprivation subsists, conducive to opacity. Ultimately, taking this position to its logical conclusion, black, the most opaque of all colors, would be invisible if it were totally opaque, due to the ab-

<sup>16</sup>On what primary qualities are, *vide Commentarii Collegii Conimbricensis Societatis Iesu, In duos libros De Generatione et Corruptione ...*, GcIIC3q3a1-4, pp. 380-384.

<sup>17</sup>Arguments brought for the separate natures of color and light rely on Aristotle: because if true color were indistinguishable from light it would not remain fixed, but would vary in accordance with changes in light (AnIIc7q2a2p169); as light is a heavenly quality without an opposite, considering that nature has subtracted the qualities contrary to those of heavenly bodies. Were color light, then black, deprived of light as it is, would be no more than the absence of light; it would follow that the colors white, green, purple, yellow, as well as all the shades, tints, and hues, should be contained within a single, minute specimen, which is far from the truth (AnIIc7q2a2p170); because light does not change as colors do (AnIIc7q2a2p170); and color moves the diaphanous when it manifests, but the manifestation of the diaphanous is light. Manuel de Góis judges against color being light, in the following manner: to the argument that colors such as the color of the ocean, the clouds, on the heads of pigeons and peacock's tails change as light does, therefore their nature is identical with that of light, he replies that only apparent color is light (AnIIc7q2a2p170). To the argument that eyes grow fatigued when they gaze upon white but are reinvigorated by green because whiteness possesses a great deal of light and green, a harmonious measure of light, he poses that the reason why some colors obstruct sight more than others must be sought in Aristotle (*Problemata*, sect 31, q. 20) and, although among true colors some tend more toward white and others black, that does not establish they have the same nature as light, because there is no convenience in the species (AnIIc7q2a2p170). To the argument founded on Aristotle's statement that all bodies possess color and that color moves the transparent *in actu*, and that this latter definition concerns both light and color, which are the objects of sight, and that there is an object adequate to sight that is color and light, posing that it is a function of color to move the transparent *in actu*, but not to make it an actuality. That is a function solely proprietary to light. (AnIIc7q2a2p170). Finally, to the argument claiming there is no color without light and light is the form and materialization of color, Manuel de Góis responds that, although colors are only visible in the light, they are present even in darkness. Light and color are separate species.

<sup>18</sup>Aristóteles 1952, *De Sensu et Sensibili*, 439 a 5.

<sup>19</sup>Id. *ibidem*.

sence of the diaphanous. Which is to say that Aristotle does not call into question the existence of color in either case, though he does recognize that colors vary according to their presence in determinate or indeterminate bodies; whereas in determinate bodies the appearance of color is normally defined and in indeterminate bodies it may or may not be, though it will not be for very long.<sup>20</sup> True colors are fixed as long as the primary qualities that constitute them do not change. They are the product of a given admixture; true colors can be extreme (black and white) or intermediate, according to the elements of their makeup.<sup>21</sup>

Apparent colors are formally light, and do not remain for long. They change as light, place, angle of viewing and other factors change. They too are distinct as to their determinate or indeterminate substrates.<sup>22</sup> Apparent color in a determinate body arises from true color in opposition to light. Exposed to luminous rays, true colors emit reflections that are no more than fictitious colors. Meaning that on the same body true, fixed or permanent, and apparent color can coexist, varying in duration and taking on several hues according to changes in the light striking that body. With regard to fictitious color, he adds that for an indeterminate body the same colors arise from the radiation of light and are changed by the varying complexion of the luminous, as one observes when sunlight or moonlight cut through steam or when they pass through certain many-faceted glass bodies. When we look up we observe an incredible variety and distinction in that kind of color, not without great enchantment of the gaze and delectation of the soul. Likewise, when an indeterminate and transparent body joins an opaque one—for example, when the rays of the sun pass through a green glass, they seem to spill out in grass-like verdancy.<sup>23</sup>

However, both true and fictitious color are “real things” (*verae res*)<sup>24</sup>. Apparent color is so called by analogy with true color. It does not possess the same nature as color though it does possess a true and manifested entity.<sup>25</sup> We do indeed witness colors and work under the empirical notion that there are color-possessing bodies of all shapes, that color varies according to light, that certain colors seem to have no fixed substrate, shifting as light shifts and waxes and wanes, as the observers standpoint and eyes move, such as when more or less atypical phenomena manifest: say the white object that appears red when viewed through a tinted glass, or the colors witnessed on a pigeon’s neck. For Manuel de Góis, the criterion for distinction is founded above all on the differentiation of substrate, their admixtures and makeup, regardless of the existence or non-existence of a cause adequate to its production. Variations in light, the qualities of the bodies it strikes and their greater or lesser opacity, conditions affecting the eye of the beholder and the way all these reflect light, these lie at the root of a system whereby color is classified true or false. We should highlight

<sup>20</sup>In this acception *vide* Ronald Polansky, *Aristotle’s De Anima*, Cambridge 2007, p. 268.

<sup>21</sup>AnIIc7q3a1p171.

<sup>22</sup>AnIIc7q3a1pp171-2.

<sup>23</sup>AnIIc7q3a1p172.

<sup>24</sup>AnIIc7q3a1p171.

<sup>25</sup>*Ibidem*.

that, for Manuel de Góis, the notion of “true” is synonymous with fix, unchangeable, and inextricable from determinate bodies. True colors exist in the dark, on the surface of bodies. False color only exists in the light. Fictitious colors are termed colors only because they give rise to that visual sensation in the observer’s eye, but they have no real existence as colors, merely as light, and they can issue from determinate bodies where the light strikes, or indeterminate ones, arising from a mixture of light itself, as is the case with colors in the sky or on the ocean. They arise mostly from the superposition of transparency layers and the play of light. Therefore, it makes no sense for Manuel de Góis to claim a distinction between the kind of color one witnesses on a pigeon’s neck or the rainbow or that on waves and clouds. They are all false. One must praise the efficacy of these distinctive minutiae when he describes how kinds of color originate, to wit: those that rely on fixed and determinate substrates, arising from the combination of primary qualities; those arising from the superposition of transparent surfaces and refractive phenomena, more or less lasting; those originating with conditions of the observer’s eye; those stemming from the manner in which light strikes determinate bodies and is reflected, creating in the observer’s eye the perception that bodies have other colors. Finally, we must point out a coincidence between this description and the classification proposed a few centuries later by Goethe when he pointed out the existence of chemical, physical, pathological, and physiological color (pathological constituting a variant of physiological), a classification still widely known, having entered common parlance, which we will discuss in further detail below. (Goethe, 1945)<sup>26</sup>

In actuality, the classifications that naturalists would propose from the 16<sup>th</sup> century on would become so popular they would reach an increasingly wider audience across time and space. While researching the manuscript collection of the Municipal Public Library of the City of Oporto<sup>27</sup>, we found three Brazilian Franciscan manuscripts, produced at the *Colégio Serenense, vulgo Matto Grosso, de Fr. Emanuele ab Angelis (Ms. 380), iniciado em 25 de novembro de 1756, constituído por três partes. [Begun 25 November 1756, comprised of three parts.] A primeira contém a Lógica, e termina louvando Nossa Senhora, São Francisco e Santo António, patrono do Colégio. [The first contains Logic, and concludes with praise to Our Lady, St. Francis, and St. Anthony, patron of the Collegium.] A segunda contém a Física. [The second contains Physics.] A terceira contém os três livros de anima: [The third contains the three books of De Anima:] “ALUNUS PROVINCIAE NOSTRAE IN NOSTRO COLEGIO SERENENSE, VULGO MATTO GROSSO, INCEPTUM DIE 25 NOVEMBRIS DE 1756 A. ACCEPTUM A FR. EMANUELE AB ANGELIS INIPSA PROVINCIA ACTUALIS COLEGA”.*

Ms. 936, including the Logics treatise PHIAË PERIPATETICAE INTEGER CURSUS AD MENTEM SUBTILISSIMI D. JOANIS DUNS SCOTI ELABORATUS A FRATRE EMMANUELE A S.TA ANNA ARTIUM LECTORE

<sup>26</sup>J. W. Goethe, *Teoria de los Colores*. Transl., Buenos Aires, 1945, pp. 11-246.

<sup>27</sup>Municipal Public Library of Oporto, Oporto, Portugal.

ACCEPTUS A FRATRE ANTONIO A JESU IN HOC DIVI ANTONII SERENESE CENOBIO AB ANNO 1759 USQUE AD ANNUM 1762.

Ms. 930—TRACTATUS PRIMUS DE PHISICA GENERALI, continuing the manuscript above and penned by the same author, 1761-1762.

On folio 573 of this manuscript the author inquires what color is, and explains peripathetic philosophy on the matter. Folio 574 outlines a distinction between true and apparent color, presenting the definition given by the philosophers alluded to above, namely that of Manuel de Góis, which demonstrates the popularity of this classification, arising in 18<sup>th</sup>-century, South American philosophical courses, marking the longevity of colonial scholastics, at least where the more widespread theories on the classification of colors are concerned.

#### 4. Bridges to Modernity. Goethe's Theory of Color (1810)

Locke Eastlake states that it was Goethe's intention (von Goethe, 1810)<sup>28</sup> to paraphrase Pseudo-Aristotle's *De Coloribus* (Goethe, 1840: p. 379)<sup>29</sup>, per the posthumous work Goethe's Theory of Colors. (Goethe, 1840: p. 380)<sup>30</sup> He also mentions Simon Portius' 1537 translation (Naples) and its subsequent edition in 1548 (Florence), indicating that Goethe might have acquainted himself with the work of Pseudo-Aristotle through Portius. Eastlake adds other sixteenth-century editions exist, namely, one by Emanuel Marguinus of Padua and another by Antonio Vidi Scarmiglione of Fuligno in Marburg, 1591. He notes parallels between the work of Leonardo da Vinci and Aristotle that may have been important to Goethe, but he ignores and omits the theoretical contribution of Manuel de Góis (Goethe, 1840: p. 381, 389)<sup>31</sup>. While it is certain that Goethe draws on those sources and especially from Pseudo-Aristotle<sup>32</sup>, it is nevertheless curious that Goethe's analysis shares positions so close to, and a typology so like that of Manuel de Góis' framework. Having demonstrated great theoretical vigor, this does in some way revitalizes the fertility of the neo-scholastic, Aristotelian tradition concerning the classification of colors. Especially when Goethe states that colors can be a part of sight and arise from it, which happens with physiological colors. Likewise, when he points out that colors can exist as a phenomenon arising from colorless media, to explain physical color, or they can be a component of objects, as is the case with chemical color.<sup>33</sup> Physiological colors are produced by the visual organs of an observer possessed of healthy sight. Should the observer's faculties be affected by conditions that impact color perception, observed colors shall be termed pathological. Physical colors are produced in the retina by color-

<sup>28</sup>Johann Wolfgang von Goethe, *Zur Farbenlehre*, John Murry, 1st edition, 1810.

<sup>29</sup>J.W. Goethe, *Goethe's Theory of Colors*. Transl. with Notes by Ch. Lock Eastlake, London, 1840, p. 379.

<sup>30</sup>*Ibidem*, p. 380.

<sup>31</sup>*Ibidem*, pp. 381, 389.

<sup>32</sup>Goethe claims (*Teoria de los Colores*, Spanish translation, p. 21) that, until his day, there had only been two attempts to enumerate and classify chromatic phenomena: one by Theophrastus and another by Boyle. Further on he demonstrates knowledge of the tradition whereby colors are labeled apparent or true.

<sup>33</sup>Goethe, *Teoria de los Colores*, p. 21.

less, transparent, translucent or opaque media, enjoying a measure of objectivity, as they exist outside the eye, are transient, and cannot be fixed. So they were, in Goethe's words, called apparent, fictitious, or false, among other names, by the ancient naturalists.<sup>34</sup> Chemical colors are those we can fix upon determinate bodies and compose to a greater or lesser degree and they remain fixed (see **Tables 1-3**).

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**Table 1.** True colors and apparent colors.

True Colors	Apparent Colors
<ul style="list-style-type: none"> <li>• They are fixed as long as primary qualities remain unchanged.</li> <li>• They can be extreme (white or black) or intermediate, according to the elements they are comprised of.</li> <li>• They exist independently of light. (Even in the dark.)</li> <li>• Examples: the raven's blackness, the swan's whiteness.</li> </ul>	<ul style="list-style-type: none"> <li>• They do not persist for long, changing according to light, place, and viewing angle.</li> <li>• They may have determinate or indeterminate substrates, as happens with the rainbow, the colors on clouds and the ocean, or on pigeon's heads. <b>(objective)</b></li> <li>• They can arise from normal sight or sight affected by illness, as would happen with a white wall that appears red when viewed through a red glass, or considering the case of colorblindness. The possibility of so-called 'optical illusion.' <b>(subjective)</b></li> <li>• They are formally light.</li> </ul>

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**Table 2.** Typology of color.

Typology of Color
<ul style="list-style-type: none"> <li>• Chemical colors: resulting from the makeup of bodies. They remain fixed and constant.</li> <li>• Physical colors: mutable, though they may last awhile, and stem from variations of light as it passes through transparent, translucent or suchlike substrates.</li> <li>• Physiological colors: they stem from the beholder's eye provided his or her sight be normal. When sight is affected by illness or disease, they take on the designation of 'pathological colors.' They come from substrates where light, conjugated with greater or lesser opacity of bodies, gives the appearance of a color dispossessed of any cause leading to its objective existence. Study of what some term optical illusions.</li> </ul>

**Table 3.** Equivalence between the nomenclature of color types.

Manuel de Góis, 16 <sup>th</sup> century	Goethe, 19 <sup>th</sup> century
<ul style="list-style-type: none"> <li>• True Colors</li> <li>• Apparent colors (objective)</li> <li>• Apparent colors (subjective)</li> <li>• Normal sight</li> <li>• Sight impaired by conditions of the eye</li> </ul>	<ul style="list-style-type: none"> <li>• Chemical colors</li> <li>• Physical colors</li> <li>• Physiological colors (subjective)</li> <li>• Physiological colors</li> <li>• Pathological colors</li> </ul>

<sup>34</sup>*Ibidem*, p.61.

## 5. Conclusion

The book *De Coloribus* played a decisive role in the theoretical construction of the main treatises that informed the study of color in the European West between the 16<sup>th</sup> and 19<sup>th</sup> centuries. This much is evinced by Manuel de Góis' Jesuit Course of Coimbra, 1598. Some of these works have preserved remarkable productivity, such as those penned by Simon Portius and especially by Goethe.

This rise is in turn founded on Aristotle's theory of vision and color. It is the root of interpretation for the genesis of color and its substrates, the relationship between the sensed and the sensible, *i.e.*, interaction between the observer, the subject that experiences the visual process, and the object observed, especially in the detection of conditions and pathologies of the visual/ocular apparatus. Nevertheless, the most salient point in the ongoing transmission of doctrine from work to work is, on the one hand, the perennial presence of the Aristotelian corpus concerning the faculty of sight, continuously added to and perfected, without altering the essentials of its theoretical framework. Instead, it accommodated one update after another, new layers, superpositions and aggregations, which allows us to state that the Aristotelian legacy within natural philosophy continues to stimulate a certain kind of reading in the present day, offering nomenclatures that can be used, if not by the physical and medical sciences, at least by aesthetics and some of the trades and applied arts.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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