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Neuroarthistory: Several Notes on Historical Sources

Abstract: In his proposal for a new methodological approach to the history of art, *neuroarthistory*, art historian John Onians based his argument in philosophy and art theory ranging from Aristotle to Leonardo, and from Reynolds to Zeki, and *neuroaesthetics*. However, he omitted from his overview the late Renaissance and Baroque traditions in which one can easily find writings on human cognitive ability (on intellect, senses, and imagination) and its bearings on art. In this preliminary note, we point to several 16th-century humanists, such as Gianfrancesco Pico della Mirandola, Baldassare Castiglione, Benedetto Varchi, and artist and theorist Federico Zuccari, in whose treatments of human cognitive ability we find the application of Aristotelian tradition. Their writings further illuminate the rich and exciting insights into the nature, workings, and results of human cognition.

Keywords: neuroarthistory; John Onians; 16th-century cognitive theory; Gianfrancesco Pico della Mirandola; Baldassare Castiglione; Benedetto Varchi; Federico Zuccari.

In his *Neuroarthistory: From Aristotle and Pliny to Baxandall and Zeki,* John Onians[1] proposed a new methodological approach for the history of art – *neuroarthistory* – noting that there is a strong reason for someone working in the humanities to look somewhere else for intellectual support.[2] Stimulated by the research of art historians (such as Gombrich, Baxandall, Belting, Wolheim, Bryson, Freedberg), as much as by the potential of the transdisciplinary research in the expanding field of neuroaesthetics, Onians based the proposed methodology on several historical sources, starting his overview of individual contributions to neuroarthistory with Artistotle, to whom he attributed the first suggestion that art has not only biological, but neurobiological, basis.[3]

[1] John Onians, *Neuroarthistory: From Aristotle and Pliny to Baxandall and Zeki* (New Haven: Yale University Press, 2007); Adam Zeman, Matthew MacKisak and John Onians, "The Eye's Mind – Visual Imagination, Neuroscience and the Humanities," *Cortex* 105 (August 2018): 1–3.

[2] Ibid., xi.

[3] Ibid., 18.

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This was not a novel idea, as in his earlier attempt at applying neuropsychology to the study of art historical phenomena, that is to the study of local national styles in Renaissance Florence and Venice,[4] Onians presented three predispositions of neuropsychology which are "uncontentious and which have a clear importance for the history of art".[5] These, he asserts, are cultural constructs and they represent specific evolutionary adaptations, classifying them as: 1. the tendency of the brain's neural structures dealing with sense data to develop differently in different environments; 2. the tendency of the brain to attend selectively to its surroundings, looking for particular features or objects, and especially under the influence of the emotions to overinterpret incomplete data and imagine such features or objects even when they are absent; 3. the tendency of innate mental templates to affect visual preferences. These three neuropsychological traits, notes Onians,

> constitute a limited selection from among the adaptations of our visual cortex, but they are distinctive enough and have a clear enough potential relevance to the history of art to form the starting point for an enquiry into the biological basis of Renaissance aesthetics.[6]

Onians limited the scope of his inquiry to examples ranging from Aristotle to Leonardo, i.e., to Michelangelo,[7] to continue his analysis with Joshua Reynolds, omitting the whole theoretical tradition between the beginning of the 16th and the middle of the 18th century. In his early examples, he noted a tendency, more or less explicit, to describe the biological, neurally-embeded, determination of creativity, of intellectual and sense experience. His starting points are Aristotle's works (*On the Soul*, *Poetics*, *Metaphysics, On Dreams*) in which the philosopher investigated psychological phenomena, perception, mimesis, the relationship between soul and body, affects, and similar.[8] Onians proceeded to Pliny the Elder's subtle speculations on plasticity in nature and art, on human faculty of association, biological predispositions of artists, proceeding to the psychology of perception and the notion of mimesis found in Apollonius of Tyana, to whom Onians ascribed an anticipation of modern neuroscience and perceptual psychology, the faculty of association, and the formation of mental images in the mind. Onians could not exclude the rhetorical tradition – in this case only a mention of Quintillian's *Institutio Oratoria* who, in the spirit of Aristotle and Horace, suggested that a speaker will be more persuasive when addressing his audience

[4] John Onians, "The Biological Basis of Renaissance Aesthetics," in *Concepts of Beauty in Renaissance Art*, ed. by Frances Ames-Lewis and Mary Rogers (Aldershot: Ashgate, 1998), 12–14. The notion of local styles was not novel; it was already present in art theory from antiquity on.

[5] Ibid., 13.

[6] Ibid., 13-14.

[7] Onians, *Neuroarthistory*, 18-53; John Onians, "Art, the Visual Imagination and Neuroscience: The Chauvet Cave, Mona Lisa's Smile and Michelangelo's Terribilità," *Cortex* 105 (August 2018): 182–88.

[8] Onians, *Neuroarthistory*, 18–29, disregarding Plato. See Enrico Crivellato and Domenico Ribatti, "History of Neuroscience. Soul, Mind, Brain: Greek Philosophy and the Birth of Neuroscience," *Brain Research Bulletin* 71 (2007): 327–36.

if he himself imagines what he is describing,[9] thus acknowledging the way in which imagination, the emotions, and the body are linked – the connections confirmed by modern neuroscience.[10] These discussions would not be complete without an insight into the results of anatomical demonstrations, based on the ancient Greek medical tradition, performed by Alhazen who in his *Book of Optics* provided the first elaborate account of the mental activity associated with the process of perception (*seeing*), describing the role of the brain in interpreting "what it receives from the eyes via the optic nerve is the first coherent attempt to develop a psychology of perception".[11] Two prominent Florentines, a humanist and a painter, Leon Battista Alberti and Leonardo da Vinci, in their codification and basing of the language of art in sciences, reflected on all of the above-mentioned phenomena of the relations between art and nature, on senses and sense perception, affects, psychology of vision, association, imagination, etc., bringing the whole early history of the psychology of art to a close.[12] Albeit, he also took into account Michelangelo's *terribilità*, the power of fear, and fear-driven imaginative transformations of conventional details in his artworks,[13] leaving aside Michelangelo's poetry replete with neuropsychological potential.[14]

Numerous authors contributed to the problem of perception and imagination, the relationship between the imagination and the realization of art works, basing their research on the experiences of linguistics, neurolinguistics, neuroaesthetics, psychology, medicine, etc., expanding the fields of neuropsychology and neuroaesthetics, aiming to locate the physical reception of the works of art.[15] Neuroarthistory, to our knowledge, remained confined within the above-mentioned scope of research. We believe that it may be expanded, and that the gap of more than two centuries between Leonardo and Joshua Reynolds may be filled with the examples of authors, humanists,

[9] Aristotle, *Poetics* (New York: Dover Publications, Inc., 1997): 32–33, summarized in the famous Horace's *Ars Poetica* verses: *Si vis me flere, dolendum est primum ipsi tibi*.

[10] Onians, *Neuroarthistory*, 30–37. "[...] those who look at works of painting also need a mimetic faculty. For no one would appreciate a painting of a horse or bull unless they formed mental image of the animal represented." Onians, *Neuroarthistory*, 36.

[11] Ibid., 38.

[12] Ibid., 42–53. Despite his undisputable contribution to psychology and physiology of vision, Leonardo left deeper speculations to scientists and theologians.

[13] Onians, "Art, the Visual Imagination and Neuroscience," 184–86.

[14] Sonnets such as "Non ha l'ottimo artista", "Gli occhi mie' vaghi delle cose belle", "Non vider gli occhi miei cosa mortale", "Si come nella ponna e nell' inchiosto". James M. Saslow, ed., *The Poetry of Michelangelo: An Annotated Translation* (Yale University Press: New Haven, 1991).

[15] Eg. Enrico Crivellato and Domenico Ribatti, "History of Neuroscience. Soul, Mind, Brain: Greek Philosophy and the Birth of Neuroscience," *Brain Research Bulletin* 71 (2007): 327–36; Matthew MacKisack, "Painter and Scribe: from Model of Mind to Cognitive Strategy," *Cortex* 105 (August 2018): 118–24; Gyöngvér Horváth, "Visual imagination and the narrative image. Parallelisms between Art History and Neuroscience," *Cortex* 105 (August 2018): 144–54; Chiara Cappelletto, *Neuroestetica. L'arte del cervello* (Roma, Editori Laterza, 2014); Anjan Chatterjee, *The Aesthetic Brain. How We Evolved to Desire Beauty and Enjoy Art* (Oxford: Oxford University Press, 2014); Romana K. Schuler, "The Experiments of Perception in Science and Art by Ernst Mach, Dan Graham and Peter Weibel," in *Art Theory as Visual Epistemology*, ed. by Harald Klinke (Newcastle: Cambridge Scholars Publishing, 2014), 125–44; Olivier Walusinski, "Marin Cureau de la Chambre (1594–1669), a 17th-Century Pioneer in Neuropsychology," *Revue Neurologique* 174, 10 (2018): 680–88.

and art theorists alike, who worked in the post-Leonardo era, and in whose writings Onians might have not recognized sufficient cultural or theoretical constructs regarding perception.[16]

We are advocating neither for nor against the concept of neuroarthistory.[17] The history of art theory is as old as the creation of images (mental as much as material) striving to explain their nature and origin, and the nature of human perception. After Leonardo, i.e., after the practical challenges were overcome in the visual arts, humanists writing on art as well as art theorists who laid greater emphasis on theoretical legitimacy and systematization of the accumulated knowledge (e.g., Vasari, Lomazzo, Zuccari, Comanini, Dolce).[18] In 1501 there appeared, in Latin, a book on imagination and the cognitive power of the soul by Giovanni Francesco Pico della Mirandola, *Liber de imaginazione*, in which the author relied on Aristotle, and treated imagination as a decisive factor of the cognitive processes.[19] In this speculative (Aristotelian as much as scholastic) work, Pico placed imagination between the senses and the intellect, and further interpreted it as the dependence of human actions on the suggestions of images: the imagination can present to the soul an absent object as an object of desire. According to Pico, the image bears the cognitive potential as well as the capacity to move the body in the process of setting in motion the soul's sensitive power for the achievement of a "desired thing".[20]

Baldassare Castiglione followed the same train of thought. In The Fourth Book of his widely read *Courtier* (1528), he also showed himself as an Aristotelian when writing on cognitive ability, i.e., on intellect, senses, and imagination. For him, imagination is merely a corporeal (organic) faculty that "has no perception except through

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[16] Eg. French Baroque theory, Charles le Brun, *Méthode pour apprendre à dessiner les passions*, 1698; Rensselaer W. Lee, *Ut Pictura Poesis: The Humanistic Theory of Painting* (New York: Norton & Norton, 1967); Heather Hunter-Crawley and Erica O'Brien, eds, *The Multi-Sensory Image from Antiquity to the Renaissance* (New York: Routledge, 2019).

[17] Cf. Matthew Rampley, "Fish, volcanoes and the art of brains: John Onians, *European Art: A Neuroarthistory*. New Haven and London: Yale University Press, 2016. 320 pages," *Journal of Art Historiography* 15 (2016); Matthew Rampley, *The Seductions of Darwin: Art, Evolution, Neuroscience*, University Park: The Pennsylvania State University, 2017.

[18] David Zagoury, "Minerva in the Forge of Vulcan: Ingegno, Fatica, and Imagination in Early Florentine Art Theory," in *Image, Imagination, and Cognition: Medieval and Early Modern Theory and Practice*, ed. by Christoph Lüthy et al. (Leiden: Brill, 2018), 61–93; Rens Bod, *A New History of the Humanities: The Search for Principles and Patterns from Antiqiuty to the Present* (Oxford: Oxford University Press, 2013), 211–39; Dorothea Frede, "The Cognitive Role of Phantasia in Aristotle," in *Essays on Aristotle's De Anima,* ed. M.C. Nussbaum and A.O. Rorty (Oxford: Clarendon Press, 1995), 279–95.

[19] Giovanni Francesco Pico della Mirandola, *Liber de imaginazione* (Venezia: Aldo Manvtio, 1501), available to me in French edition: *Traitte de l'imagination*, Paris, 1557). Martin Kemp, "From Mimesis to Fantasia: The Quattrocento Vocabulary of Creation, Inspiration and Genius in the Visual Arts," *Viator* 8 (1977): 347–98; Krzysztof Wawrzonkowski, "On Paths of Imagination: Pico's Way towards Understanding of Man," *Ruch Filozoficzny* LXXI, 4 (2015): 171–88.

[20] Giovanni Francesco Pico della Mirandola, *Traitte de l'imagination*, 10–14, 40–44, analysed the role of imagination in Christian faith, describing it as a human faculty to produce representations, mental images, which, in addition, plays an important role in all cognitive processes (relating them, though, to moral issues).

the means furnished it by the senses".[21] Castiglione asserts that one "desires" only what one "knows" (recognizes) from the sensory experience:

> [...] nature has so ordained that to every faculty of perception there is joined a certain faculty of appetite; and since in our soul there are three modes of perceiving, that is, by sense, by reason, and by intellect: from sense springs appetite, which we have in common with the brutes; from reason springs choice, which is peculiar to man; to the intellect by which man is able to commune with the angels, springs will. Thus, just as sense perceives only things that are perceptible by the senses, appetite desires the same only.[22]

Ingegno (and its cognitive potential) was also a subject of Benedetto Varchi's *Due lezioni* (1550).[23] The term appeared much earlier, in Boccaccio's *Decameron*, in which the poet interpreted *ingegno* as a *gift of wit*, as well as a certain modality of cognition, which contributed to the notion of *ingegno* in later Florentine discussions.[24] Varchi's *Lezione*, in which he analysed Michelangelo's sonnet "Non ha l'ottimo artista", represents one of the most significant discussions of *ingegno* in the 16th-century art theory, in which he assimilated *ingegno* with *imagination*.[25] Varchi constructed his argument on the opposition of labor (skill, *fatica*) and artistic genius (inborn talent, *ingenium*):

> All arts could tentatively be divided on the whole in the following way: in some arts one seeks and values more the *ingegno* than the *fatica*, and in others, on the contrary, one values and seeks more *fatica* then *ingegno*; furthermore, in some *ingegno* and *fatica* are on a par, while in others one needs nothing but *fatica*.[26]

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[21] Baldassare Castiglione, *The Book of the Courtier (1528)*, trans. by Leonard Eckstein Opdycke (New York: Charles Scribner's Sons, 1901), 303 (see 301–304).

[22] Castiglione, *The Book of the Courtier*, 288–89.

[23] Benedetto Varchi, *Due lezzioni, sulla prima delle quali si dichiara un sonetto di M. Michelangelo Buonarotti. Nella seconda si disputa quale sia più nobile arte, la scultura o la pittura, con una lettera d'esso Michelagnolo e più altri eccellentissimi pittori e scultori la questione sopradetta* (Fiorenza: Lorenzo Torrentino, MDXLIX).

[24] Zagoury, "Minerva in the Forge of Vulcan," 61–62. According to Zagoury, the first work in Italian specifically dedicated to *ingegno* may have appeared in 1576: Antonio Persio, *Trattato dell'ingegno dell'huomo* (Venezia: Aldo Manvtio, MDLXXVI). It is concurrent with the branch of Mannerist art theory concerned with more speculative problems of perception and imagination, providing a review of ancient and early Christian mythological, philosophical and medical concerns from Plato and Aristotle, through Cicero, Galen, and Boetius.

[25] Varchi, *Due lezzioni*, 17–34. Another source of the meaning of *ingegno* is Giovan Battista Gelli (1498–1563), who, considering what is "peculiar to man, and according to his nature", alluded to the very etymology of *ingenium* as *ingenium*, that which is *inborn*, "genetic", natural (Zagoury, "Minerva in the Forge of Vulcan," 62, 65–66).

[26] Ibid., 171–72. The translation is by Zagoury, "Minerva in the Forge of Vulcan," 63. In his early letters, written before 1537, young Giorgio Vasari also insisted on *faticha* and *ingegno (invenzione)*, witnessing the change that has already happened in art theory.

Varchi's attitude toward labor may be understood in the light of the Aristotelian faculty psychology and its hierarchy among the internal senses, based on the philosopher's tradition, according to which life is structured like an ascending chain of the intertwined *matter* and *form*, with the inanimate matter at the bottom and the agent intellect at the top, the idea also presented in Varchi's lecture on Michelangelo's sonnet.[27]

It is interesting to note that not many artists wrote during the early 16th century. If they did, those were mainly shorter writings of advice to other artists, letters concerning commissions, and similar. Towards the middle of the century, they started to express their ideas more freely, advocating the unique nature of art, embodied in skill and creativity alike, attaching the artist's idea to intellect and, finally, introducing the power of imagination to the process of shaping of images, often borrowing Platonic vocabulary, but more often than not immersed in Aristotle – among them the painter and theorist Federico Zuccari.[28] In his famous *L'Idea de' pittori, scultori ed architetti, divisa in due libri*, first published in 1609, Zuccari speculated on the artistic idea, the inner design, which precedes the execution of a work of art. According to him, the idea is engendered in the human mind because man is granted this ability by God – man's idea is only a spark of the divine mind (*scintilla della divinità*). However, before Zuccari took to describe the cognitive process, that is the process of creation of artistic idea, the human *disegno*, in mind, adopting the basically Aristotelian hierarchy (often taking a complicated form of a melange with neo-platonism and scholasticism, which was not altogether new in the context of the late 16th-century theory) of *divine*, *angelic* and *human* realms, defined by the quality of *inner design* (*disegno interno*; a concept formed in the mind), asserting that human *disegno* differs from the two other because it originates from the external senses.[29] Zuccari defined the *inner design* as a *form, idea, order, rule, end* and *object of the intellect*, in which are expressed the known, understood, things, and that is a *form in the intellect* which is *represented distinctively*.[30] Zuccari explained that if one wishes to paint something, it is necessary to form in one's mind (intellect) some *design* of that "something", the *inner design*, or intellectual design (*disegno intellettivo*) which is a "formal cause that moves the practical intellect to act". It is the cause and the "genitor of the arts" formed in the course of many acts of the practical intellect: one learns from numerous examples, Zuccari made sure, with reference to Aristotle, and one acts through common sense, fantasy, cognition, and memory, using the "corporeal instruments: eyes, ears, nose, tongue and other members, because this is the way the sensitive soul works."[31]

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[27] Varchi, *Due lezzioni*, 34. (Zagoury's splendid analysis of Varchi in *Minerva in the Forge of Vulcan*, 71–72.)

[28] Federico Zuccari, *L'Idea de' pittori, scultori ed architetti, divisa in due libri* (Roma: Marco Pagliarini, MDCCLXVIII; first published in 1609); Cf. Erwin Panofsky, *Idea: A Concept in Art Theory* (New York: Harper & Row Publishers, 1968), 85–93; Angelina Milosavljević, "On Proto-Modernist Traits in Early Modern Art Theory," *AM Journal of Art and Media Studies* 16 (2018): 19–28.

[29] Zuccari, *Idea*, Cap. VII, 18–19.

[30] Zuccari, *Idea*, Cap. III, IV, 8–10.

[31] Zuccari, *Idea*, Cap. X, 26.

In its *inner actions*, in the process of understanding, in particular, the practical intellect needs corporeal things (that is, the spiritual species which represent these corporeal things) – it cannot understand and operate without them, as one cannot understand without senses, reminds Zuccari. In this, he made a reference to Aristotle, who,

> knowing this, said that our soul is not complete in accordance with all of its parts, or virtues, but in accordance with higher intellect, a that it is the origin and the place of the spiritual forms that represent all things. However, in its creation, it does not acquire these forms by itself, but through the senses.[32]

Zuccari goes on to describe the way in which this *disegno interno* is formed in us, "according to Aristotle's doctrine, who in this particular thing exceeded all ancient philosophers,"[33] but first he strove to clarify, using the philosopher's doctrine, the quality of the four *internal senses* necessary for the formation of this *inner, intellectual, design*, and then to define how many kinds of intellect are there in us, and how they differ from one another.

The first inner sense, the *common sense* (*senso comune*), Zuccari explains, "has its own organ in the first part of our head", which receives and contains (it is "the beginning and the center") other five external senses, to which belong certain nerves ("as anatomists know") that end in common sense, through which pass the spiritual forms of things. These are known to the common sense, which knows through the species acquired by the external senses, and furthermore knows the differences between these senses, their objects and their operations regarding these objects, as their guide. The second inner sense is called *phantasy* (*fantasia*) and it "has its own organ in the second part of our head near the common sense". It acquires the same species that are first formed by the five external senses and then recognized by common sense, and by cognition, judgment, and comparison between these species, it receives and conserves them. Here are kept *precious things*, which then form new species that represent new things.[34] The third sense is called *cognition* (*cogitativa*), and it is higher than all other senses, as, upon recognizing all the spiritual species that are kept in phantasy, and which moreover forms new, even more spiritual, species that represent insensate things, and those known by the senses as the spiritual forms,[35] in animals, it is called estimation (*estimativa*), and in man, it is called cognition (*cogitativa*); and this moves animals to love, hatred, escape or some other act with no other discourse;

[32] Zuccari, *Idea*, Cap. XI, 30–31. Chapter XI (pp. 29–35) is, to us, one of the most important chapters in *Idea*, in which Zuccari explained how the *inner design* (both speculative and practical) is formed. However, further discussion of the content of this chapter exceeds the scope of this paper.

[33] Zuccari, *Idea*, Cap. XI, 32.

[34] Ibid., 33.

[35] "[...] such as if the eye and fantasia have recognized a dog and a wolf, the imagination through these species knows further the fidelity of a dog, the voraciousness of a wolf..." Zuccari, *Idea*, Cap. XI, 34.

and in man, with previous discourse, or reason. The organ of the final, fourth, sense is placed in the final part of the head and is called *memory* (memoria), which acts as a treasury (*guardaroba*) of the sense.

These cannot operate by themselves, says Zuccari, as they need the agent intellect, which illuminates both sensate and insensate species (both those that originate from the senses and those that do not originate from them), so that they may appear before the eye of the intellect. This agent intellect used to be called, Zuccari reminds us, *possible intellect* (*intelletto possibile*), because it has a potential to understand or not, and later on it was called *active intellect*, the one in the act of knowing (*intelletto in atto scienziato*). Be that as it may, this is how, according to Zuccari, the *intellective design* (*disegno intellettivo*) is formed in us, as the reason for all our understanding, of science and practice alike.[36] And this is the intellective design that originates from the senses and that is the source, the fount, of artistic idea as well.

If we accept that there may exist a new art history, neuroarthistory, with its own methodology, we should widen the scope of research in the history of the understanding of the cognitive processes and their bearing on art, in philosophy as much as in art theory. Naturally, this entails investigations concurrent with contemporary trends in transdisciplinary research. Especially in neuroscience, and the advanced field of neuroaesthetics.

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[36] Ibid., 34–35.

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