

Fish, volcanoes and the art of brains

Review of:

John Onians, *European Art: A Neuroarthistory*. New Haven and London: Yale University Press, 2016. 320 pages. ISBN-10: 0300212798. ISBN-13: 978-0300212792. £40.50.

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What bearing should considerations of human nature have on the study of art? Many might disagree with the basic premise of this question. There is no such thing as 'human nature,' they might state, for we are shaped by multiple social, cultural and linguistic determinations. This rules out the very possibility of talking about human nature in the first place. As Hannah Arendt suggested in a much discussed argument, when stripped of the 'external' predicates of culture and society, what is revealed is not the *essence* of human being, but something that is hardly human at all, what Giorgio Agamben has since referred to as 'bare life.'¹

Yet the matter is not so easily resolved. Arendt and other promoters of constructionist theories of the self are, after all, offering a thesis about human nature (that it is socially constructed). Moreover, there are many aspects of human being that would hardly be disputed. We are the outcome, it is generally agreed, of biological evolution. The details may remain areas for disagreement and refinement, but the consensus is that our biological character is the result of the processes of natural and sexual selection, that we are endowed with characteristics that conferred some kind of competitive advantage. The disappearance of Neanderthal humanoids, for example, is usually attributed to the fact that they were unable to compete with modern humans for resources, once the latter, with superior cognitive powers and forms of social organization, started encroaching on the same European territory. With the exception of a small number of modern day Cartesians, it is also widely accepted that human mental activity is intimately connected with human physiology. Cognition does not operate somewhere *outside* of the body. Analysis of the relation between brain functions and mental activity has thrown up remarkable findings; correlations between the two enable scientists to localize a wide range of cognitive functions in the brain.

Given such consensus, it seems a small logical step to then wonder how our understanding of art could be informed by our view of it as the product of an evolved biological organism with a brain that permits operations of almost unimaginable complexity. A growing number of commentators have explored the possibilities of such an approach. The prominent aesthetician Noel Carroll, for example, has argued that the sheer ubiquity of art objects throughout human history

¹ Hannah Arendt, *The Origins of Totalitarianism*, Orlando: Harcourt Brace, 1958, 302. Giorgio Agamben, *Homo Sacer: Sovereign Power and Bare Life*, translated by Daniel Heller Roazen, Stanford: Stanford University Press, 1998.

and prehistory suggests it is implausible to think of art diffusing from a single source as a cultural product. Instead, it is more likely to be grounded, in ways still to be determined, in basic features of human nature. Against those who would emphasise the social specificity of art practices, to the extent of denying the cross-cultural validity of the category of art, Carroll argues that 'we have an inbred capacity to detect the expressive behavior of our conspecifics as it is inscribed in the sensuous media of the traditional arts. We may not know what a tribal decoration means, but we know that, by means of it, its maker intends to communicate something special, something that is worth remarking on.'² The capacity for making and appreciating art may well be a universal feature of human nature.

A growing number of luminaries in art history have followed this kind of argument, focusing on the brain. Assuming the supervenience of the brain and the mind, it is reasoned, the science of the brain should therefore be able to cast some light on art, as the product of intentional activity.³ John Onians's *European Art: A Neuroarthistory* is the latest example of this phenomenon. It follows on from his earlier book *Neuroarthistory: From Aristotle and Pliny to Baxandall and Zeki*, in which he sought to lay down the intellectual genealogy of this new field of study.⁴ What are we to make of this emerging discourse? What claims does it make? Do they stand up to scrutiny? What insights into art does it offer that are not available from existing methods of analysis? Before answering these questions, it may be helpful to outline some basic ideas put forward not only in Onians's book but in other examples of the literature.

Neuroarthistory is predicated on the view that the brain and the mind are indistinguishable. The argument is therefore that when we talk about human intentional behaviour, including making art, we are talking about brains. This view is apparently legitimised by the fact that functional magnetic resonance image (fMRI) scans of the brains of individuals viewing art reveal differences in brain activity in response to varied stimuli. A significant discovery in this context was the identification of mirror neurons in the brain, cortical connections that seemed to operate in exactly the same way whether one was performing an action or observing another performing the same action. As a result, Onians notes, 'just by mirroring the outward signs of an emotion in someone else we will come to share it' (p. 14). Observing another in pain, for example, activates the same neuronal mechanisms that would be activated if one were experiencing the pain oneself.

² Noel Carroll, 'Art and Human Nature,' *Journal of Aesthetics and Art Criticism*, 62.2 (2004), 96.

³ David Freedberg, Freedberg, David and Gallese, Vittorio. 'Motion, Emotion and Empathy in Esthetic Experience,' *Trends in Cognitive Sciences*, 11.5, 2007, 198; Vittorio Gallese and David Freedberg, 'Mirror and Canonical Neurons are Crucial Elements in Esthetic Response,' *Trends in Cognitive Sciences*, 11.10, 2007, 411; Beatrice Sbriscia-Foretti, Cristina Berchio, David Freedberg, Vittorio Gallese and Alessandra Maria Umiltà, 'ERP Modulation during Observation of Abstract Paintings by Franz Kline,' *Plos One*, 8.10, 2013, 1-12.

Harry Francis Mallgrave, *The Architect's Brain: Neuroscience, Creativity and Architecture*, Oxford: Blackwell, 2010 and Mallgrave, *Architecture and Embodiment: The Implications of the New Sciences and Humanities for Design*, London: Routledge, 2013.

⁴ John Onians, *Neuroarthistory: From Aristotle and Pliny to Baxandall and Zeki*, New Haven and London: Yale University Press, 2008.

Mirror neurons provide the neuroscientific explanation for the much discussed phenomenon of aesthetic empathy and, crucially, it appears that this applies, too, when we view *images* of actions; exactly the same neuronal connections are fired regardless of whether we are observing someone perform an action or a representation of someone performing that action. This spills over into the neurology of our response to the indices of an action; as David Freedberg has argued, when we view the paintings of Franz Kline (or indeed any other gestural painting), portions of our brains behave as if we were ourselves moving the brush across the canvas.⁵ Aesthetic experience and artistic creativity can therefore be traced to very specific operations of the brain.

A further issue of interest for neuroarthistory is the phenomenon of brain plasticity. It has long been a truism that the organisation and constitution of the brain is not fixed but is, rather, dynamic.⁶ Most obviously, as children grow so do their brains, not merely in terms of size, but also in terms of complexity. New neural pathways are laid down, their density increases; linguistic and cultural learning are intimately connected to brain development. This process does not cease once adulthood is reached; the brain remains plastic, and there is a wealth of scientific data on, for example, adult victims of brain trauma whose brains reconfigure damaged connections and manage to restore impaired cognitive functions. This idea has been popularised by numerous writers, and it has been taken up by neuroarthistory because it offers, at first sight, a possible way of accounting for the historically and geographically variable nature of artistic practice, which might seem to stand at variance with the universality of human biology. Of particular interest to exponents of neuroarthistory is the conclusion that recognition of the plasticity of the brain allows us to speak of the neurological significance of environmental influences.

There are some obvious and basic errors in these views. Take, for example, the argument about mirroring. As Gilbert Ryle famously illustrated with the example of contracting eyelids, an identical observable action may be interpreted as one of many possible gestures, each of which should, one assumes, be traced back to a specific neurological state.⁷ It may be a matter of mere blinking, or it may be an involuntary twitch. Equally, however, contraction of the eyelid may be a wink, but then this may have numerous different possible meanings; it may be a patronising gesture, or it may be a conspiratorial sign, or it may have some other significance according to some agreed code. In short, an observable behaviour may have one of many meanings and we might assume that each of the different *intended* meanings of the gesture is the expression of a distinct neuronal pathway. Ryle's original argument was a critique of behaviourism, but it also highlights the behaviourist

⁵ Beatrice Sbriscia-Foretti, Cristina Berchio, David Freedberg, Vittorio Gallese and Maria Allesandra Umiltà, 'ERP Modulation during Observation of Abstract Paintings by Franz Kline,' *Plos One* 8.10, 2013, 1-12.

⁶ See, for example, Gerald Edelman, *Consciousness: How Matter Becomes Imagination*, Harmondsworth: Penguin, 2001; Anthony Damasio, *Self Comes to Mind: Constructing the Conscious Brain*, New York: Vintage, 2012.

⁷ Gilbert Ryle, 'The Thinking of Thoughts: What is Le Penseur Doing?' in Ryle, *Collected Essays 1929-1968*, London: Routledge, 2009, 494-510.

presuppositions underpinning the argument about mirror neurons. The latter appears rest on the idea that there is a univocal connection between an observable behaviour and a specific neurological state (a thought or emotion), but Ryle's example casts that into doubt since it suggests that a single observable action may be the result of one of any number of different neurological states. Simply *observing* an action and repeating it cannot be a guarantee that one's own brain replicates the brain state that underlay the original performance, since one first has to interpret *which* performance one is observing. One might always misinterpret the meaning of the gesture, and yet the observable gesture would be exactly the same.

Furthermore, viewing a gestural painting by someone such as Franz Kline cannot possibly involve a reactivation of the same neurons that were involved in the original production of the work because one has first to *infer* (regardless of whether correctly or incorrectly) the gestures that went into its making, and inferring is already a different cognitive act, involving a different set of neurons, from simply picking up the brush and applying paint to the canvas. In other words, observing and repeating an action (actually or in the imagination) involves *two* separate actions; inferring and imitating it.

This issue therefore also runs up against the familiar philosophical problem of *discernment* explored by Arthur Danto, in other words, the argument that visibly indiscernible artworks may still have vastly different meanings, each of which would, according to the neurological argument, stimulate a distinct set of neurons.⁸ Indeed one could go further back in time and draw on Kendall Walton's theory of categories, to the effect that aesthetic perception is dependent on *how* an art object is categorised (as a painting rather than a surface with paint on it, as a bust rather than as an incomplete statue, as a drawing rather than as an inadequate monochrome depiction).⁹ In other words, one is never simply looking at an aesthetic artefact, but also making a decision about the *kind* of artefact it is, which involves reference to non-visible concepts. Except for strong aesthetic empiricists, the it is generally accepted that aesthetic cognition involves *more* than the merely observable; hence the argument about mirror neurons has limited relevance to the understanding of art, if any at all.

Such reservations have obviously had little impact on the book under review, for which mirror neurons explain why art even emerged. Indeed, mirror neurons show our shared biological heritage, for animals - dolphins and gorillas - have been observed to imitate human actions. The mimetic urge is a deep one. Meng, a gorilla in the London Zoo in the 1940s even traced his shadow on the wall of his cage. For Onians the significance is clear:

We cannot know the exact neural mechanisms involved, but again we can attempt their reconstruction. It is, thus, easy to see the shape-detecting mechanisms in Meng's visual cortex could have been activated by the sharp silhouette of the shadow; how the correspondence of this shape with that of a member of his own species, which inborn neural resources, reinforced by

⁸ Arthur Danto, 'Works of Art and Mere Real Things,' in *The Transfiguration of the Commonplace: A Philosophy of Art*, Cambridge, MA: Harvard University Press, 1981, 1-32.

⁹ Kendall Walton, 'Categories of Art,' *Philosophical Review* 79.3, 1970, 334-67.

plasticity, had forcefully embedded in his memory, would have charged it with considerable significance; how the bounding line of the silhouette's periphery would have reminded him of lines he had made with his own finger, whether, when wet, on a dry surface, or, when dry, on a dusty or dirty one; and how this memory, perhaps associated with the memory of the importance of the tactile grooming essential to the wellbeing of his species, encouraged the activation of his own finger (p. 22)

I have quoted this passage at length not only because it illustrates the basic idea but also because it makes clear the calibre of the argument. There is a mimetic impulse that drives gorillas and, by extension, humans, to imitate due to the way that visual perception triggers certain associations, the perception of correspondences, the memory of other associated activities. This explains, too, it is alleged, the emergence of figurative art in Palaeolithic Europe; seeing bears, lions, bison and horses compelled imitative actions in our ancestors. Such imitative actions *might* have been voluntary, Onians suggests, but 'neuroscience tells us that the response could have been completely unconscious ... it is easy to see how the sight of the marks made by a bear's claw could have activated the pre-motor cortex of the humans who entered Chauvet [cave] and that, in some individuals, at least, this would have caused the firing of the relevant motor neurons, leading to the marking of a similar mark' (p. 27). Just as dolphins imitate humans, so our ancestors imitated bears. Presumably our prehistoric ancestors were also unconsciously driven to search first for a medium with which such images could be made, to test the various different media available to establish which was best suited to the surface in question, and to devise an appropriate instrument for applying the medium. Ironically, the account of Meng has nothing to do with neuroscience; it is a phenomenological description in which the inclusion of reference to the brain is external noise that makes no contribution to the argument. The use of the conditional, which is a recurrent feature of the book, highlights a further problem, namely, the reliance on wholly ungrounded speculation as to what *might* have been the case.

Why, then, with the relevant neural systems having been initially activated, did our ancestors continue to paint and draw likenesses afterwards? The answer is that it was a source of pleasure. Or, to put it in neuroarthistorical terminology, 'each enhancement of the correspondence between the image and the visual memory was accompanied in the brain by the release of one of the neurotransmitters that drive all the actions that are vital for our survival' (p. 31). The pleasure felt was due to a chemical feedback in the brain, a kind of reward mechanism for achievement of goals that furthered the survival of the individual and, by extension, the species. The justification for this assertion is that the alternative explanation, that the presence of complex figurative imagery in the caves of Spain and south-west France, is not supported by other material evidence. This may be true, although prehistoric archaeologists would probably argue the contrary, but even if it were the case, it would not warrant the conclusions Onians reaches, since absence of evidence is simply that, and not evidence for an alternative explanation that is based on even less to support it.

Here, in sum, is the conceptual framework of the argument: neurologically driven mimesis, reward mechanisms and neural plasticity. It accounts for the

origins of architecture, for example; early humans, envious of the fur skins of the animals, killed and skinned them in imitation, and then later hung them over branches in the first rudimentary steps towards architecture. The first prehistoric architects also sought to imitate the robustness of mammoths, because of 'the impact on their neural networks of the intense visual attention that they gave to the mammoths and their neural based empathy with the animals' general properties ...' (p. 47). The prehistoric stone figurines of Lepenski Vir in Serbia apparently look like fish, and this was because of the intense visual experience of seeing fish that might have led their makers to conflate them with humans (p. 59). Exposure to 'intense' visual experiences reshapes the brain, although it is not clear how intense an experience would have to be to have such an effect, nor indeed is it clear why the inhabitants of Neolithic Serbia had so intense an encounter with fish as to confuse them with human beings.

The neuroarthistorical account also provides for some novel, albeit unusual, analyses of Greek art. The exposure of Greeks to a rocky landscape shaped their brains such that they were predisposed to hard forms and materials; hence the preference for marble as a building medium, the development of the phalanx as a military formation and for the geometries of the Greek temple. A Sappho poem expressing admiration for an army of soldiers is explicable because the 'release of dopamine in the nucleus accumbens prompted in most people by a visceral interest in sexual contact becomes prompted, in the Greek male, by another visceral interest, that in physical survival. Neural resources that should be serving the selection of the best lover serve instead the selection of the best military configuration ...' (p. 72). This is misconceived in every possible way, starting with Sappho's sex (she was a woman, not a man), and the fact that in the ancient Greek world sexuality was profoundly intertwined with martial prowess. Same-sex couples, such as those in the Sacred Band of Thebes, were regarded to be the bedrock of loyalty, morale and strength in battle.

Crude environmental explanations abound in this book; the Pantheon and the Roman building of domes with oculi is due to the prevalence of volcanoes in Italy, which caused the Romans' brains to be predisposed to replicate their visual experience, especially because landscape and architecture are processed by the same area of the brain (p. 125). More generally, while the Greeks were 'angular' the Romans were 'rounded' (hence the invention of the arch), although this does not explain the Roman fondness for straight roads or for the grid as a basic principle of urban planning. Later, in the twelfth century, it becomes apparent that the structure of St. Denis cannot be understood without an understanding of Abbot Suger's brain. Due to his journeys around Europe Suger had acquired considerable 'neural resources' (p. 178) and as a result he was in a unique position to integrate the writings of Hugh de St. Victor, St. Augustine of Hippo, Dionysus the Areopagite and others, because their ideas could be 'fed into [neural] pathways he already possessed.' Indeed, the church offers a remarkable image of the brain of Suger, for 'integration of plan, elevation, spatial organisation, lighting, metalwork, glass and stone-sculpture depend on the integration of the parts of his brain with which he conceived them' (p. 179). Moving forward in time, we learn that Canaletto was popular amongst English visitors on the Grand Tour thanks to their 'neurally based preferences' (p 283). The reason was the prevalence in England of Palladian

architecture with its 'clarity, linearity and angularity.' As a final indicative example, the reader is informed that Cézanne's repeated exposure to Mont Sainte Victoire 'would have endowed him with neural networks that had much in common with those shaped by an exposure to architecture, especially southern architecture, and that would have necessarily increased his preference for faceted volumes' (p. 309). This is probably enough to convey a sense of the tenor of the discussion.

In methodological terms the basic difficulty with this approach is that it lacks a means of articulating the relation between, on the one hand, the generalized categories of the brain and its functions and, on the other, the individuated historical artistic and cultural practices it purports to explain. The result is that every historical case discussed boils down to the same thing: the impact of environment (particularly visual environment) on the brain and the suggestion that this therefore determines the aesthetic preferences of members of specific cultures. Taken as a crude materialism – Onians approvingly cites Hippolyte Taine – this hardly stands up to scrutiny, for it is based on the assumption that a culture is the product of a singular natural and geographical environment (the volcanoes of southern Italy, the rocky outcrops of the Balkan peninsula) which, apart from any methodological quibbles, is historically incorrect. But there are other problems with neuroarthistory as Onians conceives it. For all that it mentions the brain, neural networks, processes and 'resources' (whatever they might be), and we are provided with a beginner's guide to neuroscience in the Introduction, this book says nothing about the brain or its role in shaping art. The brain hovers around in the background but nothing more. For example, the reader is told that 'The practice of Christianity thus required the formation of specific new neural pathways in the posterior hippocampus and recognising this helps us to understand the process by which those practices became ever more deeply embedded in the Christian brain' (p. 135). This is, as with most of the book, mere assertion, and not an argument. More importantly, it is completely uninformative. *Why* did Christianity require new neural pathways? Why did the old ones not suffice? Could they not be combined in new ways? Given the massive artistic, cultural and philosophical debt of Christianity to the classical world it is not improbable that the 'classical' brain was eminently serviceable for the new religion. But even if we do accept the basic claim, *which* pathways were no longer used? What were the new neural pathways? What did they enable? One could go on in this vein, because the questions mount up. It could be that the defender of the neuroarthistorical model might reply that we have simply not been able *yet* to determine the answers, that this remains the subject for further work, although it is difficult to imagine how one might proceed, since there are no classical and early Christian brains to compare. Even if we concede this point, however, it highlights the fact that Onians is making a set of assertions (and this example is typical of his general approach) that have yet to find any evidence to support them. At best, they are premature. At worst, and this is the position to which this reviewer tends, they offer empty generalities.

An alternative way of assessing the value of neuroarthistory might be to consider how the book would differ if we removed all reference to the brain. I suspect that the basic readings of cultures and individual works of art and architecture would be unchanged, since they consist of little more than platitudes about the formative influence of environment. But this is a charitable reading of the

book. A more critical evaluation might express astonishment at the vacuous, incorrect, bizarre and laughable nature of many of the claims. Medieval art can be explained by virtue of the fact that in the Middle Ages 'everyone was paying less attention to the world around them' (p. 16). Turner's painterly style was a consequence of the fact that he grew up in smoke-filled London and was thus neurally programmed to have a 'greater interest in smoke' (p. 297). The geometries of Malevich's Suprematism were due to the effect on his neural system of the intense visual experience of seeing aeroplanes (p. 329 ff). It helps, too, that Malevich was a neuroarthistorian *avant la lettre*.

Not being a neuroscientist, it is difficult to decide whether the claims about the neural pathways of early Christians, Cézanne or Abbot Suger are correct. They offer, however, a depressing image of human agency, in which the artist is programmed, in a deterministic manner, to act out the dictates of the neurological system. An undeclared political vision lurks close to the surface of these assertions. It is therefore heartening to note, therefore, that some of the fiercest critics of this kind of enterprise have been those from the neuroscientific community, who have pointed out the simplistic and often false understanding of brain science that is mobilised in such accounts.¹⁰

There are other serious philosophical problems, including the impossibility of determining the truth value of Onians's assertions. For there is nothing that could count as evidence either to deny or support his claims about the neural structure of the ancient Greek brain. Moreover, given Onians's insistence on the plasticity of the brain, it is entirely plausible to state that the brains of the inhabitants of the classical Mediterranean world, or of Neolithic Serbia, or of Palaeolithic France were so differently 'wired' from those of present day humans that we cannot legitimately make *any* inferences about the distant past from experiments on present-day subjects. This has to be entertained as a possibility. There is thus a radical undecidability about the neuroarthistorical project.

When interpretations are evaluated, however, we do not only make judgements about their truth value. As Gregory Currie has argued, 'an important determinant of our choices between interpretations is their potential for engaging with our value-concerns, a potential I shall call their value-relevance. Through imaginative involvement with the actions, sufferings and personalities of the characters of the story as we interpret it, we may come closer to desiring what we value, we may vary the degree of our desiring, focus more clearly on salient values, shift or extend the ranking of our value alternatives. We may even change our values.'¹¹ Currie was concerned with the interpretation of literary works, but the point applies to art history, too. What is the value-relevance of neuroarthistory? It has none. The major innovations in the history of art consisted not only in the devising of new methods of analysis, but also in the contestation of the values underpinning the discipline. Riegl's idea of the *Kunstwollen* was intimately

¹⁰ See, for example, Raymond Tallis, *Aping Mankind: Neuromania, Darwinitis and the Misrepresentation of Humanity*, London: Acumen, 2011; Paolo Legrenzi and Carlo Umiltà, *Neuromania*, translated by Frances Anderson, Oxford: Oxford University Press, 2011.

¹¹ Gregory Currie, 'Interpretation and Objectivity,' *Mind* 102, 1993, 425.

connected with his attempt to displace classical aesthetics; Panofsky's iconological programme was linked to an ideologically charged championing of humanistic culture; Marxism, feminism and post-colonialism questioned the construction of the canon (even the idea of a canon) and the tacit values determining object choice in art history. Neuroarthistory has nothing to contribute in this regard, indeed offers no grounds for why we should attend to any one object over another. This is why Onians's study is utterly predictable in its choice of artworks, adhering closely to the humanistic canon of art. It is not that this is in itself a problem; he might have constructed a rationale for doing so. But it seems more likely that lacking any relevant theoretical 'resource,' he has unquestioningly fallen back on to the traditional art historical canon.

A recent collection of essays edited by Supana Choudury and Jan Slaby has explored the ways that neuroscientific insights can be combined in a critical way with cultural theory and the social sciences.¹² Yet it approaches the question from an entirely different perspective, including recognition that the brain is itself a cultural artefact. One can speak of 'local biologies' and 'cultural biologies,' they argue, which means that the brain is socially situated. This relates not only to material factors, including the impact of diet on the brain, but also to the way in which prevailing cultural norms can affect neural functioning; the neural bases of emotions, for example, may vary from one culture to another depending on the cultural values attached to emotional display. There is a reciprocity between the brain and culture that Onians's reductive materialism completely overlooks. There could, therefore, be a neuroarthistory that took into account such considerations, but it would be rather different from the book under discussion. One should accept the possibility that neuroscience may have something to offer to art history, but based on the evidence of *European Art: A Neuroarthistory*, we are some way from identifying what that might be. Its value as a work of art history is questionable.

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¹² Supana Choudury and Jan Slaby, *Critical Neuroscience: A Handbook of the Social and Cultural Contexts of Neuroscience*, Chichester: Wiley Blackwell, 2012.