

Jean-Michel Basquiat, Charles Darwin, T. H. Huxley, the Origin of Cotton, and Gregor Mendel (Inventor of X-rays)

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Abstract

The drawing, *Untitled (Charles Darwin)*, 1983 by the late Jean-Michel Basquiat incorporates portraits of biologists, geneticists, and genetical terms. What follows is a personal reflection on how the text and symbolism of *Untitled* affected us, as plant breeders, causing us to pause and reflect on our own work and that of our field. We learn how art speaks to the spectator differently from direct conversation allowing for subtler, but perhaps more effective, criticism and a unique opportunity for public peer review. By employing emotion and invoking empathy, art places scientists in the depths of the ethical, socio-political, and historical contexts where our work unfolds urging us to see more fully.

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Introduction

The drawing *Untitled (Charles Darwin)*, 1983 appears in *Jean-Michel Basquiat: The Radiant Child* [1] for three seconds starting at minute 33:47. There is a strong flash of yellow and Gregor Mendel's head floating in a box. Darwin, depicted twice, is well tanned with a bad comb over and what looks like an eye patch. One Darwin is gray-bearded and one has a brown beard and looks sort of tired. Under the brown-bearded Darwin are words disguised by scribbled out letters. The phrase "INVENTOR OF X-RAYS" followed by a copyright sign is written below Mendel's name. T.H. Huxley's face is crossed out with black, almost fully obscured. The star "WOLF 359" and others are written between the faces of Darwin and Mendel below what is viewable of Huxley and three of his partially crossed out names, one with a copyright sign. A box with looping arrows is above tired Darwin and below "~~ORIGIN OF COTTON~~". There are three numbers in the box: 11, 14 and 27.

In those three seconds of the film the brilliant yellow catches the eyes' attention then, to biologists at least, the unmistakable bearded mug of Darwin, then quickly: Is that Mendel? And: What? He invented X-rays? OK, maybe. The origin of cotton? Yeah, Darwin and Huxley talked about cotton. And then the images are lost as the film transitions immediately to another frame.

At first glance the complexity of images and symbolism is overwhelming; Basquiat sidesteps our rational driven cerebrums and we know, before we know, uncomfortably without the evidence we normally require, the significance of *Untitled*. Basquiat links Darwin, Huxley, and Mendel, identifies the number of chromosomes for cotton, 52, and establishes the notion of science for

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sale long before it was a concern on college campuses. With that first quick glimpse of *Untitled* even the references to Wolf 359 and X-rays begin to make sense.

So with the intellectual naiveté that two self-proclaimed culture-crossing geneticists (who had just read C.P. Snow and Stephen Jay Gould on our presumed strictly defined and enforced culture) could muster, we plunge in to decipher the drawing. Out come the uncomfortable realization of our tendency towards simplified explanations and a stifling acceptance of how easy this will be to screw up, layer by layer—for what do we know about art? We start with the obvious preconceived juxtapositions of artist versus scientist and real world versus academia only to realize the lines are both obscure, drawing us closer together than expected, yet accurate, as we cannot be more different. Can two geneticists (actually, plant breeders) stationed (actually, holed up) in the rural Pacific Northwest understand Basquiat without pissing off a whole raft of people who stare at chromosomes or art for a living?

In the end we learn from Basquiat beyond the convergence and divergence of art and science. For what we were never taught and were re-educated away from, embedded in the biophysical scientific realm of purely analytical thought, is that the interpretation of art is a reflection of self. Art is emotive, forcing questions of social science, ethics, politics, economics, and history that genetics and biology cannot adequately address. Could we adjust fully to, as Gould advises, “...such central artistic concepts as beauty and passion [that] cannot be accessed without awarding prominence to these intrinsically unscientific factors [2]?”

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Here we attempt first to interpret the drawing for scientific accuracy. We end at another level as Basquiat forces our attention to the social complications of our science with his phrase “~~ORIGIN OF COTTON.~~” It is the origin of cotton not as we first view it in terms of genomes and chromosomes, but as the haunting phrase that so rightfully appears in Basquiat’s art.

The Trifecta

The first jolts of *Untitled* are historical portraits of evolution and genetics: Darwin the evolutionary theorist, Huxley the promoter of the idea, and Mendel the one who showed how it all works. As we gaze at Basquiat’s drawing, our interpretations only unspoken language, we ask: What is Basquiat revealing about Mendel, Darwin, and Huxley? Mendel’s face is the only one that escapes marring and our attention goes first to Darwin and Huxley for the answers.

In 1982 Basquiat spent time in Germany and Italy [3]. It was the 100th anniversary of the death of Darwin (he wrote the date out three times on the drawing) and all of Europe was celebrating. It makes sense that Huxley comes along for the ride with Darwin as the two are often linked in retrospectives of evolutionary thought.

Darwin was, as Basquiat might have written, of the BOOSH-WAH-ZEE. He descended from a long line of physicians and scientific thinkers, well placed in Victorian society. He had the leisure time for the careful observation, contemplation, and study that bore his revolutionary theories and the upbringing that placed him within the scientific establishment. Still, he broke scientific and religious orthodoxy of his time. For this he suffered, exemplifying that suffering, as he and Huxley would describe, “the struggle for existence,” is common to all, independent of socio-economic position.

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The life of a genius and revolutionary, of carrying deep secrets, is one of isolation, anxiety, depression, and infinite yearning to wake up the world. Basquiat certainly lived this life. Darwin and Huxley knew there were social implications to revealing the “bestial” monogenic origin of humans and nature’s process of evolution. What would happen to the Church, society, and their personal relationships when the wider community learned of these theories? Could selection and the “cosmic process” be applied to society to advance “the welfare of mankind”? Even as an abolitionist and scientist, Darwin’s work was influenced by his biases, evident in writing such as *The Descent of Man* [4]; his definition of fit and his ranking of humans by race, class, ability, and gender was shaped by his placement in Victorian society [5] as a white gentleman. Huxley, born without economic privilege and a strong advocate of the democratization of science and education, was still in agreement with Darwin that white men emerged at the top of a self-proclaimed natural hierarchy [6]. Huxley contemplated the incompatibility between the processes of nature and human ethics and the resulting impossibility of a utopia [7] his grandson, Aldous Huxley, would re-envision in *Brave New World* [8].

We can overlook Darwin and Huxley’s hierarchical rankings as products of the time, or as Basquiat might have preferred, recognize their penetrance and impact on science and society. Social Darwinism, a term contorted by numerous social and political movements and shifting in meaning, intensified over time. Basquiat’s New York of the early 80s was awash in the policies of Regonomics—Social Darwinism served on the half shell.

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With the publishing of *Hereditary Genius* in 1869 [9], Darwin's cousin Francis Galton became father of the global eugenic movement—the goal to breed better humans. Darwin's son, Leonard, later led the British eugenics movement. From mutual aid, anarchism and socialism, to the survival of the fittest and capitalism, to breeding better humans for an exclusionary vision of ideal society, scientists and non-scientists alike used Darwinism inaccurately as scientific justification to further ideological causes. Scientists, even elite scientists [10], are people and carry biases, consciously and unconsciously. What was missing during Darwin and Huxley's time, and for the movements that extrapolated their claims, was an objective method of study that moved beyond the naturalist's method of observation and free interpretation. Gregor Mendel, there all along, would satisfy this need.

Mendel was different. He was born poor and professed voluntary poverty under religious vows as an Augustinian friar [11]. He suffered deeply turning to the order in Brno to escape serfdom and forced poverty, what he himself named his “bitter struggle for existence” growing up the son of peasant farmers in the former Austrian Empire [12]. Embedded among his community, Mendel spent time as a friar teaching, studying, and conducting the hybridization studies that led to his discovery of the laws and units of inheritance [13].

Mendel pursued his questions through methodological experimentation, applying his knowledge in physics and mathematics to his research and thereby discovering what naturalists before him could not. Like Darwin, the results of Mendel's work challenged ideologies of the time. But Mendel was in good company at the religious order among friars, many radicals for their time [14]. Evolution was well studied and discussed within the order and community, however

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Mendel's work did not reach the greater scientific establishment. It would take almost half a century for science to catch up and rediscover his work.

Yes, Mendel invented genetics not X-rays. Basquiat knew this as well as we do. But Mendel's obituary, if written, would not have credited him with his discoveries [15]. Darwin's work was recognized, even if not broadly accepted. Huxley lobbied the church for Darwin to be buried at Westminster Abbey [16]; his obituaries, during his time, and there were hundreds, covered his work in great detail. Mendel read and filled with notes the margins of books and essays written by Huxley and Darwin; neither Huxley nor Darwin read Mendel's work [17]. Mendel, the unknown discoverer of inheritance, would have been at home on a bench in the Washington Square of Basquiat counting seeds, at times escaping to find solace in his greenhouse. We can picture Huxley who was born above a butcher shop in London [18] and rose to make a very public life of commentary as the busker in front of the fountain reciting, loudly, the 11,409 word obituary [19] he wrote for Darwin. Most likely Darwin would have been steered clear of the Square in his Town Car taking notes as he passed by.

Darwin is partially covered by Basquiat's brush strokes; Huxley's face is entirely covered. Basquiat's two elite scientists, Darwin and Huxley, the two Basquiat draws our attention to, the two Fellows of the Royal Society, were the two scientists partially blinded. We go back to the fact that the only face in the drawing to not be defaced was the Friar Mendel's. However, even Mendel's genetics, revealed by scientific method, fell prey to eugenicists.

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Three white men, the trifecta of evolution: What does Basquiat reveal? Science? Scientism [20]? The exclusivity of science [21]? The subjectivity of a presumed objective science? The potential for all science to be abused? No, neither X-rays nor genes can reveal that truth. To simply ask Why? seems more important than trying to answer, as the question is surely the point.

WOLF 359

Basquiat often worked with two televisions running at once. Talk, paint, party, whatever, the TVs were on. In the early 80s what did one watch? There were few channels and few shows. One of the most common was *The Outer Limits*, like the *Twilight Zone*, but creepier.

Season two, episode eight, of *The Outer Limits* was “Wolf 359” [22]. The show is black and white with lots of cigarettes, cocktails, narrow ties, a 60s housewife, a weak guy, a guy’s guy sort of guy, sleeplessness, days being counted by an increasingly obvious unshaven face, interesting mood music, a poorly animated ghostly-floaty thing that looked like someone trying to escape from under an army surplus rubber bed sheet, and of course, evolution. Lots of evolution.

The show’s scientists recreate evolution on a miniature planet housed in a sealed room. Peter Lawford plays the scientist for hire, a classic too-into-his-work-type. Halfway through, before things go bad and the rubber sheet escapes, Lawford blurts out “we can watch evolution at work!” They are overly optimistic of their abilities to uncover worldly truths with scientific protocols ignoring the wisdom of culture, spirituality, and silenced histories of the oppressed, including women (of course Ethel’s warnings to her husband went ignored as emotional, and

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therefore not worthy of consideration by a true scientist). They get what they were asking for: The scary (sort of) ghost forces them to destroy their miniature planet. Like a slap in the face, Basquiat inserts “WOLF 359”, a public reflection on misdirected science below Huxley and between Mendel and Darwin.

Interlude

Words below brown-bearded Darwin deciphered: “SCOPES MONKEY TRIAL” “CLARANCE (corrected to CLARENCE) DARROW” “LEOPOLD AND LOEB” “LEOPOLD. CT” “LINDBERGH KIDNAPPING” “ASCENT FROM THE APE” “ROSENBERG, JULIUS + ETHEL” “SACCO AD. VANZETTI.” “HOLLYWOOD BLACKLIST” “MARTYRS”.

Did Basquiat read *A Civic Biology* [23]? (Who can we trust?)

ORIGIN OF COTTON & X-rays & Meiotic Restitution

This is the origin of cotton using the language of the geneticist: The most widely cultivated and economically important species of cotton is *Gossypium hirsutum*. *G. hirsutum* is an allotetraploid with 52 chromosomes ($2n=4x=52$, AADD). Trans-oceanic dispersal of the A genome progenitor from Africa to the Americas 5-10 million years ago resulted in geographic isolation of the species and its divergence into the D genome progenitor. Interspecific hybridization occurred 1-2 million years after another trans-oceanic migration event brought the two species into geographic proximity. Chromosome doubling resulted in formation of the modern allopolyploid. [24]

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It is satisfying and astonishing as scientists to discover this history using quantitative data generated through molecular tools and comparative evolutionary studies; scientific methodology supports this story and we conclude it as true. Basquiat's drawing shows us more: It reveals to the scientist, or at least these two scientists, that the reductionist approach we so depend upon for our work excludes another truth. *Untitled* exposes the concealed history lacking in the genetical origin of cotton.

Basquiat points to Darwin, Huxley, and Mendel while he seems to diagram the origin of cotton using chromosome numbers (11, 14, 27) that add to 52. He did use numbers often of course and maybe this was coincidence, but as folks who count things for a living it caught our eye. This origin, the one of numbers, the one we as scientists are so familiar with, is the one he crosses out. Mendel identified the units and laws of inheritance, now "the code for life." Are we just a manifestation of the expression of our genes? Is the origin of cotton merely the story of dispersal, hybridization, and polyploidization that can be solved with genetics like a puzzle? Yes, certainly, and no, with equal certainty.

Basquiat challenges X-rays, genes, and a solely scientific pursuit. He employs emotion, something scientific language does not allow us to do by design. *Untitled* provokes us with the dark history of the origin of cotton, one that X-rays and genes cannot capture lost in the magnification of detail and obscured reality, isolated from the world beyond the field of vision.

Contemplating *Untitled*, our origin of cotton enlarges to the story of people and the land. Genes and chromosome numbers redirect our attention away from the atrocities that allowed for the origin of cotton and the global cotton industry (an industry that funds and benefits from genetic

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research)—colonization of the Americas, historic precedent for western gain from indigenous genetic resources, forced trans-oceanic migration of African people and their enslavement, plantation agriculture and consolidation of small farms, the rise of an elite power class (planters), and the origin of a new more brutal slavery, plantation slavery [25]. It is a history that cannot be separated from emotion, yet the pain of these acts is true and remains visible today; these acts are not erased with time or silence. The Industry continues a course of exploitation to secure the elite power class at the expense of water, land, wildlife, spirituality, and human rights. It is much the same people suffering today who suffered when cotton had its agricultural origins and when Darwin formulated natural selection, Huxley contemplated Utopia, and Mendel discovered genes.

(Why did Basquiat not copyright the phrase “~~ORIGIN OF COTTON~~”?)

As plant breeders who work with wheat, Basquiat causes us to pause: How is the origin of wheat different from the origin of cotton? We blind ourselves by necessary strict scientific protocol, objectivity, and reductionism from the great sociological, ethical, and environmental problems of our time. Are we reductionists because the world is too hard to bear? The environmental catastrophe upon us, human inequality and suffering, war: Can we identify the source of the problem and the solution using genetics alone? Mendel turned to the scientific method from a place of suffering. He invented a new science, but still we suffer today.

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GENETICS

With Mendel's genetics we see into people and living things like an X-ray image—reading the film we look for a broken bone as the cause of pain, like genes, invisible to the naked eye. Both are used in an attempt to answer questions we cannot answer: What is the origin of life? Why do we suffer? How do we fix it? We forget that something caused that broken bone, something that neither X-rays nor genes can reveal. Can art?

The puzzle is not one of genes, but instead genetics is one piece in a 35,000 piece set, a puzzle within a greater puzzle. Reducing our vision to focus we fall into a false peaceful state and lose sight of the other pieces. The complexity is too overwhelming when our full vision returns. Too easily we become enraptured by the simplicity of positivism and practice scientism instead of science; the potential of the biophysical sciences to benefit society becomes exaggerated. Can we ask the right questions, freed from bias and ideology, apply appropriate scientific methodology, include a diversity of people and thought, and be sure all of the pieces fit together, including the social sciences, ethics, politics, economics, history, equality, spirituality, and hundreds of other necessary complications to develop appropriate action? Who then interprets this as right or wrong, fair or unjust? Who protects science from abuse and co-option for ideological gain? (As scientists who do we serve?)

(Silence.)

Art can lead scientists to observe the world in a way that is different from and outside the profession's well-defined paths. It can do so in a way that our workplace language cannot incite

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on its own by employing emotion and empathy to instill a desire to seek greater and different truths. It may reveal our biases. It may be unflattering. Perhaps that is when we need it most, to un-obscure our vision so we can finally see.

Basquiat so obviously knew this.

References

1. *Jean-Michel Basquiat: The Radiant Child*, DVD, T. Davis (New York, Los Angeles: ArtHouse Films, 2010).
2. Ibid, p. 237.
3. *Jean-Michel Basquiat: The Radiant Child* [1] and “One Person Shows,” <http://basquiatbiography.com/basquiat-exhibitions/>.
4. C. Darwin, *The Descent of Man, and Selection in Relation to Race*, 2nd ed. (1879; London: Penguin Books, 2004).
5. J. Moore and A. Desmond, Introduction, Ibid.
6. T.H. Huxley, *Science and Education* (New York: D. Appleton & Co., 1896).
7. T.H. Huxley, “The Struggle for Existence in Human Society [1888]” and “Prolegomena [1894] to ‘Evolution and Ethics [1893]’” In *Evolution & Ethics and Other Essays* (London: Macmillan & Co., 1895), pp. 195-236 and pp. 1-45.
8. A. Huxley, *Brave New World* (1932; New York, London: HarperCollins, 2005).
9. F. Galton, *Hereditary Genius: An Inquiry into its Laws and Consequences* (London: Macmillan & Co., 1869).
10. For example, ‘greater’ and ‘lesser’ scientists in J.H. Leuba, *The Belief in God and Immortality: A Psychological, Anthropological and Statistical Study* (Boston: Sherman,

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French & Company, 1916), p. 248; E.J. Larson and L. Witham, “Leading Scientists Still Reject God,” *Nature* 394, p. 313 (1998).

11. S. Mawer, *Gregor Mendel: Planting the Seeds of Genetics* (New York: Abrams, 2006), p. 29.

12. A. Iltis, “Gregor Mendel’s Autobiography,” *J Hered* 45, pp. 231-234 (1954).

13. V. Orel and R.J. Wood, “Empirical Genetic Laws Published in Brno Before Mendel was Born,” *J Hered* 89, pp. 79-82 (1998).

14. M.H. Peaslee and V. Orel, “The Evolutionary Ideas of F.M. (Ladimir) Klacel, Teacher of Gregor Mendel,” *Biomed Pap Med Fac Univ Palacky Olomouc Czech Republic* 151, pp. 151-156 (2007).

15. A. Gustafsson, “The Life of Gregor Johann Mendel—Tragic or Not?” *Hereditas* 62, pp. 239-258 (1969).

16. J. Browne, *Charles Darwin: The Power of Place*, vol. 2 (Princeton: Random House, 2002), p. 496.

17. M.H. Peaslee and V. Orel [14] and A. Gustaffson [15].

18. T.H. Huxley, *T.H. Huxley on Education: A Selection from his Writings* (Cambridge: Cambridge University Press, 1971), p. 1.

19. T. H. Huxley, “Obituary Notices of Fellows Deceased,” *Proc R Soc London* 44 (1888): pp. i-xxv.

20. Defined, although not originated, by R. Lewontin and R. Levins, *Biology Under the Influence* (New York: Monthly Review Press, 2007), p. 9.

21. E.C. Hayden, “Racial Bias Continues to Haunt NIH Grants,” *Nature* 527, pp. 286-287 (2015).

22. “Wolf 359,” *The Outer Limits*, season 2 episode 8, TV series, L. Benedek (Hollywood: Daystar Productions, 1964).

23. G.W. Hunter, *A Civic Biology: Presented in Problems* (New York: American Book Co., 1914).

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24. J.F. Wendel and R.C. Cronn, "Polyploidy and the Evolutionary History of Cotton," *Adv Agron* 78, pp. 139-185 (2003).

25. D.L. Noel, ed., *The Origins of American Slavery and Racism* (Columbus, Ohio: Charles E. Merrill Publishing Co., 1972).

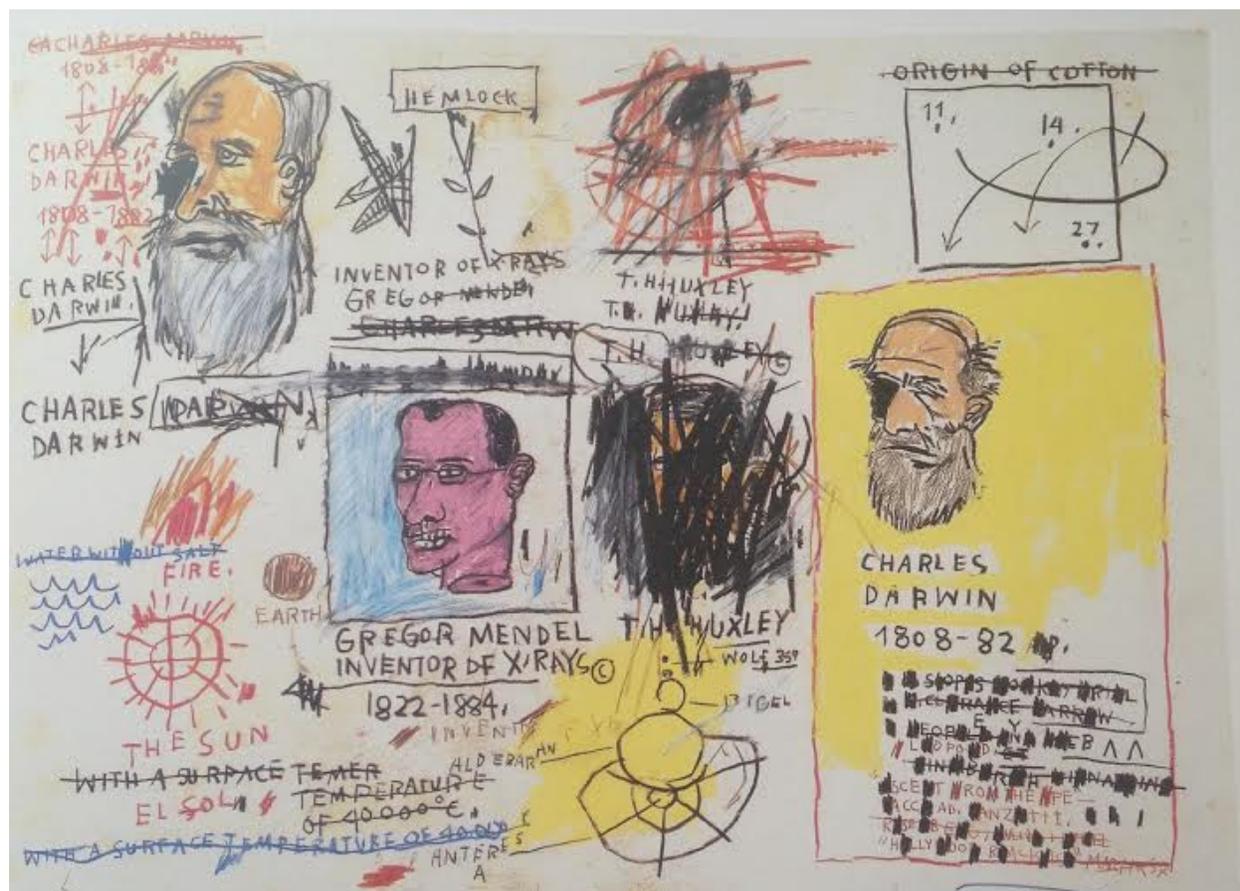


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