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A Monster Among Images: Analyzing "Cretaceous Life of New Jersey" with W. J. T. Mitchell's Image Science

ABSTRACT

I analyze Benjamin Waterhouse Hawkins' oil painting *Cretaceous Life of New Jersey* (1877) using the framework provided by W. J. T. Mitchell's book *Image Science* (2015). Two of my driving questions are: Is the painting *Cretaceous Life of New Jersey* itself a monster? Is the painting extinct? These questions may not be intelligible to the reader at first, but will become intelligible (and answerable) by the end of the paper.

Cretaceous Life of New Jersey was commissioned by Princeton University as part of a collection of 17 paintings that would display prehistoric earth. The commissioned artist was the Englishman Benjamin Waterhouse Hawkins (1807-1894), known already in 1877 for his various artistic and scientific works depicting both prehistoric and contemporary animals. *Cretaceous Life of New Jersey* is one of Hawkins' last major works, and I will argue, a work of continuing importance today.

My primary methodology for analyzing *Cretaceous Life of New Jersey* and its effects on the viewer, both in 1877 and now, is the "image science" advanced by W. J. T. Mitchell in his book *Image Science: Iconology, Visual Culture, and Media Aesthetics.* This model of image science helps me identify and analyze what images are, what they do, and how they produce meaning. In other words, Mitchell's image science helps me investigate two "sites": the observed and the observer.

Apart from my two driving questions (Is this painting a monster? Is it extinct?) I will briefly explore with the reader several related questions, including but not limited to: What can an artwork teach us? How does the value of an artwork change if the science within it becomes outmoded? How should we interpret potentially clashing worldview-driven epistemologies (Christian theism, evolutionary biology, and folk history) co-existing within the same image—and within our lives today?

LITERATURE REVIEW

I reviewed literature in three directions. First I searched for analytical tools that would help me interpret Benjamin Waterhouse Hawkins' 1877 painting *Cretaceous Life of New Jersey* and its effects and social meaning, both in the 1870s and now. I also sought to understand this painting within context of being part of a collection of 17 paintings for Princeton University. The most helpful resource for these investigations was the 2015 book *Image Science: Iconology, Visual Culture, and Media Aesthetics* by W.

J. T. Mitchell. Mitchell's image science is comprised of three interconnected disciplines: first, *iconology*, "the study of images across media" and the relationship between visual representation and language; it "opens the border to the image" (6). Second, *visual culture*, "the study of visual perception and representation, especially the social construction of the field of visibility and…the visual construction of the social field;" "visual culture opens the border to the specific sensory channel through which the 'visual arts' necessarily operate." (6-7) Image science's final ingredient, *media aesthetics*, "aims to bridge the gaps between technical, social, and artistic dispositions of media" (6) and "opens the border on the relation of the arts to mass media" (7). In summary, the image science advanced by Mitchell helped me pay "as much attention to the observer as to the observed." (220) Here are three sample investigations which are facilitated by the ingredients of image science: for iconology, where else have visual tropes from this painting (such as monsters, evolution, and the Garden of Eden) appeared? For visual culture, what is the effect of naming the painting *Cretaceous Life of* New Jersey (emphasis mine)? For media studies, how is our perception of the painting's content shaped by its appearance at Princeton University? We will explore all of these questions in the argument section below.

In my second branch of literature review, I found scholarly writing on the history and practice of "paleoart," the larger genre within which *Cretaceous Life of New Jersey* falls. (Paleoart refers to visual artworks of the prehistoric past.) The most fruitful sources on paleoart were *The Last Dinosaur Book* by the previously mentioned W. J. T. Mitchell, and *Paleoart: Visions of the Prehistoric Past* by Zoë Lescaze. *A History of Paleontology Illustration* by Jane P. Davidson provided a few key details about Hawkins' dinosaur drawings, and both *Paleoart* and *Recreating an Age of Reptiles* by Mark P. Witton offered reflections on an important question: Is outmoded paleoart—that is, paleoart which has been revealed to be inaccurate by subsequent scientific discovery—still worth our consideration? I will answer this question in the paper's conclusion.

The last branch of my literature review comprised primary and secondary sources on the artist Hawkins' life and work, seeking greater insight into some of the more ambiguous and mysterious content within *Cretaceous Life of New Jersey*. Important documents by Hawkins himself include "On Visual Education as Applied to Geology," *Comparative Anatomy as Applied to the Purposes of the Artist,* and *A Comparative View of the Human and Animal Frame.* These documents shed some light on Hawkins' view of "visual education" and the validity (or non-validity) of evolutionary theory—two important topics I will take up below. Also, two secondary sources *Crystal Palace Dinosaurs* and the aforementioned *A History of Paleontology Illustration* were important for locating Hawkins' awareness of various species that appear (or may appear, details on this mystery below) in *Cretaceous Life of New Jersey*. The last key text is *All in the Bones*, a 2008 biography of Hawkins by Valerie Bramwell and Robert M. Peck.

ARGUMENT

Introduction & Origins

We will explore two questions about Benjamin Waterhouse Hawkins' 1877 oil painting, *Cretaceous Life of New Jersey*: Is it a monster? Is it extinct? These questions may not be intelligible yet, but they will become so by the end of this paper. (Forgive me for the suspense; I believe it will pay off. Here's a hint: The painting contains a clash of dinosaurs *and* a clash of worldviews.) I will begin my argument with the social origins of the painting.

In 1877, one could be excused for thinking paleoartist and scientist Benjamin Waterhouse Hawkins to be extinct. He had not created a major public artwork in years, and his landmark dinosaur sculptures at the Crystal Palace exhibition were completed over 20 years before. Since then, he had seen an occasional artistic success, but at least as many project cancellations and failures.

Then came a surprisingly prestigious commission from Princeton University: An order for 17 oil paintings displaying prehistoric life (*Paleoart*, 68-69). This was to be the first major series of prehistoric oil paintings, ever, (*Paleoart*, 43), and at a prestigious university, no less.[i] In modern parlance, this was a comeback for Hawkins.

The 14 paintings which survive today are all interesting, but one is *most* interesting: *Cretaceous Life of New Jersey*. Here it is:

Cretaceous Life of New Jersey by Benjamin Waterhouse Hawkins, 1877
Oil on canvas, 81 x 221.6 cm (31 7/8 x 87 ¼ in.)
Princeton University, Department of Geosciences, Guyot Hall
Accessed October 23, 2017, http://artmuseum.princeton.edu/collections/objects/45415

This painting was designed to teach. Two things suggest that: The placement of this painting at a serious institution of learning (Princeton), and Hawkins' own avowed preference for creating art that achieves "visual education," which seems a constant in his artistic output throughout his career. (For

example, Zoë Lescaze titles her chapter on Hawkins' work "Paleoart to the People" [63].) Here is Hawkins writing on visual education in his work in the 1850s:

> [T]he attempt to apply the active principle of teaching *directly through the eye* that branch of the truths of creation upon which I have been engaged for the last year and a half… This direct teaching through the eye has been recognized as a principle and a facility of education for some years past… [M]y earnest anxiety to render my restorations *truthful and trustworthy lessons* has made me seek diligently for the truth." (*Dinosaur Papers*, 219, 222; emphasis mine).

This leads to a few questions: Did *Cretaceous Life of New Jersey* teach lessons in 1877? What did it teach? And does it teach today, or is this image extinct? We will answer these questions using the methodology of image science advanced by W. J. T. Mitchell in *Image Science: Iconology, Visual Culture, and Media Aesthetics.*

To summarize the methodology of image science (which I discuss at greater length in my literature review above), image science empowers me to study the observed and the observer (*Image Science*, 220), so image science is an apt toolbox for answering the questions about an image teaching its viewer. Image science also helps me answer my driving questions about whether this painting is a *monster* to viewers and whether this painting is, or should be, *extinct.*

Before I can answer these questions, I need to wrestle with the content in the painting. I will begin by observing the significance of the work's title. By invoking the visual culture aspect of Mitchell's image science, we discover that the full force of this painting's effects depend on its title, *Cretaceous Life of New Jersey*. "Cretaceous" is specialized scientific language that is all too easy to ignore or abstract[ii], but for any American viewer of this painting, "New Jersey" is inescapably concrete. For this painting's original viewers in 1877, the title said something in effect of, "These monsters lived in your backyard." This is an objective claim that viewers had to accept or reject (this returns us to Hawkins' theme of visual education), but I am more interested in the title's *emotional* effect. Might the painting's title have caused residents of New Jersey to reconsider their history or heritage? To get a sense of their reaction, substitute your state of residence and look at the painting again: *Cretaceous Life of* _____. For me in 2017, the state is Michigan. A painting titled *Cretaceous Life of Michigan* would grip me emotionally and force me to grapple with what I saw: Do I believe these creatures existed where I lived, or existed at all? Do I believe the other lessons that Hawkins' painting communicates?

These other lessons of the painting will help me answer the questions about being a monster and extinct. I will continue my inquiry by analyzing several of the painting's sections—"scenes" of related meaning.

Round One: A Menagerie of Monsters

"*Monsters inhabiting the land; Monsters of the vasty deep;*
Gigantic amphibious monsters of the old creation."
–From promotional materials about Hawkins' dinosaur sculptures at the Crystal Palace exhibition.
(*Crystal Palace Dinosaurs*, 45)

The entire *Cretaceous Life of New Jersey* is a menagerie of dinosaurs differently adapted for rulership of land, sea, and air. Some are in the act of killing, and more possess the tools of killing: Big teeth, powerful jaws, hooked claws, frightful bulk. I will leave the depicted violence for later sections, focusing for now on the *potential* for violence in the lower half of the painting.

Begin with the bottom-right of the painting. Dinosaur aficianados may recognize creatures resembling *Pterodactyl* and *Elasmosaurus*. I cannot with confidence call them a *Pterodactyl* and *Elasmosaurus*, they just look somewhat like those dinosaurs . . . and somewhat like the traditional descriptions of dragons and sea serpents.

The ambiguous display is puzzling: Why are *Elasmosaurus* and *Pterodactyl* so unrealistic, given Hawkins' knowledge? The strange *Pterodactyl* with its ghoulish, grinning, short brick of a skull is especially uncharacteristic of Hawkins. As early as 1854 Hawkins was drawing *Pterodactyl*'s skull more closely to its actual appearance, with a long, tapered, somewhat elegant beak (see *A History of Paleontology Illustration*, 73-75). And then there are the Elasmosaurs. Of the four in the painting, only the left-most one appears anything like the *Elasmosaurus* of history: Its long neck is balanced by a somewhat plump body. By contrast, the other three Elasmosaurs look like serpents with fins—sea-serpents. A viewer could be excused for interpreting these figures of the painting as sea serpents and a dragon, instead of dinosaurs. Davidson finds such an appearance surprising, describing her reaction to similar *Elasmosaurus* representations that Hawkins made in his sketchbook between about 1872 and 1878:

> *Elasmosaurus* seems to have come on shore and is just resting nearby. Did Hawkins not understand *Elasmosaurus* to be a marine animal? He should have, even if he had not yet seen the skeleton or [Edward Drinker] Cope's restorations. I think that when Hawkins drew this picture he did not know how *E. Platyurus* would have looked. However, in other representations of prehistoric life it is obvious that Hawkins took an artistic license.[iii] (*History of Paleontology Illustration*, 72)

In other words, even the experts are puzzled: Given Hawkins' knowledge of dinosaurs, why create such ambiguous and downright confusing representations that look like historical accounts of monsters?

It is possible that these puzzling representations are calling to mind this claim: All of mankind's monster stories about sea serpents to dragons are the result of an encounter with a dinosaur or its remains. Those sightings of the Loch Ness monster? Dinosaur. European myths of flying dragons? Dinosaurs. Sailor reports of sea serpents? Dinosaurs. I call this the monster thesis. Mitchell does not make this same point *per se*, but I would like quote his observation that "dinosaur facts are never entirely separate from fiction, that real fossil bones are inevitable occasions for imaginative projection and speculation" (*Last Dinosaur Book*, 91). It is not hard to imagine how just dinosaur *bones* could spur myths of monsters.

You may wonder if the monster thesis includes the two sea-bound creatures in the bottom-center of the image, the animals which boast crocodilian jaws and tails, walrus-like flippers, and the bulk of orcas—the creatures which are strategically positioned to resemble crocodiles, serpents and whales. Hawkins' biographers judges these animals Mosasaurs (*All in the Bones*, 88) but I am not convinced. (These animals share features of both the *Mosasaurus* and *Ichthyosaurus*; Hawkins was familiar with both of these species because he created versions of both for the earlier Crystal Palace exhibition.). I do think we should include these creatures in the monster thesis.[iv] This interpretation gives us a monstrous trifecta of Pterodactyl dragons, Elasmosaur sea serpents, and Mosasaur/Ichthyosaur leviathans.[v]

In summary, *Cretaceous Life of New Jersey* depict powerful, violent creatures that lived in our backyard and ruled land, sea, and air. The painting may assert that every human account of monsters is borne from an encounter with a dinosaur or its remains.

Round Two: Orderly Retreat or Evolution?

The painting becomes more puzzling as I turn my attention to the second scene, the flight of the Hadrosaurs in the center of the painting. Is this flight depicted as an orderly retreat, or evolution?

Here is the case for orderly retreat: The Hadrosaurs see one of their kind being killed by a Laelaps, so they take to escaping the violence by escaping into the water in single file, in a disciplined order, from youngest to oldest. This interpretation is not impossible.

Here is the case for evolution: The Hadrosaurs moving towards the water take on a different color—a ghostly color not present in the richly green first (dying) Hadrosaur. Moreover, they do not just become smaller, they actually begin to take on new features: a longer more flexible neck, and an ability to stand on four legs. (Pay special attention to the middle three land-bound fleeing Hadrosaurs, which represent a gradated development from clearly bipedal structure, to a newly-possible crouching posture, to a quadrupedal posture.) Further evidence for evolution comes from the Hadrosaurs' flight *into water*. The threshold of water and land is a major trope in evolution. Just think of the Darwin fish that appears on cars. And if you ruminate about evolution, you are likely to think about a fish-like or amphibious creature making its way onto land. In fact, another of Hawkins' paintings for Princeton includes this trope,

Triassic Life of Germany. (Access this at http://artmuseum.princeton.edu/collections/objects/45398.) So the iconology aspect of image science (e.g., where else does the image of evolution appear?) leads me to conclude, if evolution is in one of Hawkins' Princeton paintings, it is probably also in *Cretaceous Life of New Jersey* too. In this interpretation, the long, continued flight of Hadrosaurs into distant water invites viewers in 1877 and today to ask: What are they turning into now? Surely the evolution didn't stop when they hit the water?

But maybe a lot of viewers are not asking those questions. Mitchell's observation that the "field of visibility" is socially constructed (*Image Science*, 6) is important here. The 1877 viewers who did not know about or believe in evolution may not have even *seen* evolution in the painting—they may have just seen an orderly retreat of chivalrous Hadrosaurs, letting the children flee before the adults. On the other side of that coin, I see evolution represented here because I am aware of the theory (and not incidentally, I believe it exists in some form). Perhaps I want to see evolution there. I acknowledge there is some ambiguity in the representation, and I wonder if this was deliberate on Hawkins' account: Rather than alienate one half of his potential audience, why not make a scene acceptable to both evolutionists and literal 6-day creationists?

If I am correct that evolution is being represented, a second kind of temporality enters this painting. While the rest of the painting could theoretically represent a "snap-shot" of reality, the flight of the Hadrosaurs represents an entire *process* of time that advances not in seconds but in millions of years. This dual temporality will be important later when we answer the question, is this painting a monster?

Did Hawkins believe in evolution, and if so, what kind? It's a valid question for two reasons: (1) because I'm claiming that his Princeton paintings display evolution, and (2) because our answer has implications for how we view the efficacy of Hawkins' cherished "visual education." Unfortunately I cannot resolve this question through documentary evidence known to me. I spill much ink on Hawkins' documented views in an endnote,[vi] but let me summarize my conclusion from my research: we do not know if Hawkins believed in evolution, or what kind.[vii]

With a lack of persuasive documentary evidence, I conclude that the best evidence we have about Hawkins' view of evolution at the time of the Princeton paintings are the paintings themselves, namely *Triassic Life of Germany* and *Cretaceous Life of New Jersey*. Note the irony here related to Hawkins' optimism about "visual education"–when images are ambiguous, what kind of education is possible? Does the ambiguity in Hawkins' presentation of the flight of the Hadrosaurs reveal significant limits of visual education? Or has Hawkins deliberately created a commercial masterpiece of ambiguity, which neither clearly affirms nor denies evolution, but leaves the audience to construct their own socially meaningful interpretations?

In summary, I think the Flight of Hadrosaurs scene of this painting depicts evolution in an evocative style that leads us to consider humanity's place within creation. Even if I am wrong, the questions that arise from a close viewing of this scene make it interesting to viewers today.

Round Three: Pandemonium in Bizarro Eden

The last scene of the painting, in the upper left-hand corner, is also very interesting. I call this scene Pandemonium in Bizarro Eden.

Three aspects call the Garden of Eden to mind: the prominent tree, plus the fact that it is featured in its "fall" state (a visual pun?), and the representation of the reddish *Laelaps* that calls to mind Satan in the Garden of Edent painting from Heironymus Bosch's studio.[viii] (Access it here and see the left center: https://arthive.com/artists/69412~Anonymous_followers_of_Hieronymus_Bosch/works/404145~Garden_of_Eden_workshop_of_Hieronymus_Bosch.)

Of course, the painting from Bosch's studio features the serpent, Adam, and Eve, while Hawkins' painting features only three serpents. (That is why I call it Bizarro Eden.) One might interpret this as a claim about the Garden of Eden and beginning of humanity: Namely, that the Garden of Eden is just a myth and humans did not have a special, divine creation as told in the Bible's creation narrative.

There is ambiguity here, though. Again we come to Mitchell's concept that our social world constructs what we can see. If one looks to this scene for allusions to the Garden of Eden narrative, one surely finds them, as I have demonstrated that this painting is located in Western history of paintings of the Garden of Eden. However, if one is not alert to these allusions and history, one could conceivably miss the connections—that is, think it is possible to view *Cretaceous Life of New Jersey* without thinking of the Garden of Eden at all. Have I found another case of visual education's limits? Or has Hawkins created another commercially savvy scene which leaves hints for only those who are looking?

Round Four: Is This Image a Monster?

Is *Cretaceous Life of New Jersey* a monster? Yes, in two ways.

First, consider the definition of monster. "Technically, a 'monster' is not merely large, violent, or dangerous. It is a hybrid figure, a heterogeneous conjunction of incongruous parts in a single body." (*Last Dinosaur Book*, 68). For example, classical Western culture contained myths of the chimaera, a hybrid of lion, goat, and snake. Mitchell cites a later hybrid monster, the pope-ass (*Last Dinosaur Book*, 68).

Cretaceous Life of New Jersey fits this definition of hybrid monster in at least two ways: (1) it is a hybrid of *temporalities*. The two temporalities present are what I call *process* (e.g., evolution) and *instant* (the rest of the painting). Viewed metaphorically then, it is as if the painting has two "heads," rendering it monstrous. (2) The painting displays or at least strongly alludes two three different *epistemologies or*

worldviews, namely: *folk history* (see "A Menagerie of Monsters" above), *evolutionary biology* (see "Flight of the Hadrosaurs" above), and *religious narrative* (see "Pandemonium in Bizarro Eden" above). So metaphorically, this painting is a three-part chimaera. A third way the painting is a hybrid is that it may be both science and art at the same time. I will return to this point in the paper's conclusion.

The second way *Cretaceous Life of New Jersey* is a monster is that it fits the more popular conception of a monster as dangerous and frightening. I am not referring to the violent acts within the painting (though those may strike some young viewers as frightening). I am referring to the painting's frightening effects on the viewer.

Almost anyone in 1877 would have been frightened by this painting because it challenges the viewer's confidence in history, science, and religion—and by extension, the viewer's confidence in their entire worldview. I will break down these effects. First, history: The painting leaves the viewer wondering about the coherence of the history they have been taught. Did dinosaurs co-exist with humans at any point? How or when? How much credence should one give to monster sightings of folk history? This painting seems to suggest we should at least consider these sightings. Second, science: Depending on the viewer's preconceptions, the painting may leave the reader with only the evidence they are looking for: Either evolution is false, or evolution is true. Both of these conclusions are potentially frightening. If evolution is false, what is the 19th century viewer to make of science's recent embrace of evolution? If evolution is false, has science lost its way (or lost its mind)? What could set it back on track? On the other hand, if evolution is true, does that mean that higher mammals and humans descended from Hadrosaurs? (Is that what the painting's receding line of swimmers suggests?) Does this imply for the 19th century viewer that humans are not as special as we thought we were—that far from the height of creation, we are just part of an ongoing chain of evolution, that may leave humanity as we know it extinct and fossilized? What an irony: Humans are clever enough to discover this past, but that past confronts us with our own insignificance! And finally, religion: Any of the questions above could create a crisis of faith, but I will add further questions suggested by the painting: what if Adam and Eve never existed? What if the 19th century viewer cannot trust the way they have understood the biblical account of creation? Does that mean they cannot trust the Bible?

Cretaceous Life of New Jersey probably gave nightmares to children—but even more nightmares to adults. This painting is a metaphorical monster.

Round Five: Is This Image Extinct?

Is *Cretaceous Life of New Jersey* extinct? Yes and no.

I assume Hawkins created this painting (for Princeton!) in the same spirit as the Crystal Palace dinosaur sculptures. You may recall Hawkins' "earnest anxiety to render [his] restorations *truthful and*

trustworthy lessons [that made him seek] diligently for the truth." (*Dinosaur Papers*, 222, emphasis mine) Did *Cretaceous Life of New Jersey* offer "truthful and trustworthy" lessons on Cretaceous life? Perhaps. (I have argued above that Hawkins essentially used artistic license to "blur" some of the figures, to make them more ambiguous and therefore potentially more meaningful to viewers.) However, it is certain that the painting's creature depictions were made obsolete long before this writing in 2017.

Before we declare this painting extinct, is there other "living" value in it relevant to today's viewers? Mark Witton finds value in outmoded paleoart in general: "The fact paleoart dates is a feature, not a bug, of the trade" (*Recreating an Age of Reptiles*, 106). Witton continues, "We get to 'own' what our science said when we recorded it, and that adds character to our work that other generations can't have because their science will be different" (106). Walton Ford offers a complementary argument in the introduction to *Paleoart*:

> From a scientific point of view . . . works of antique paleoart are obsolete. New fossil discoveries have thrown not just their anatomical errors but their fanciful elements into stark relief. Ultimately, however, it is the imaginative nature of these works that make them wonderful. Rather than dismissing them as outdated, we should revel in their departures from reason. (20)

I restate Witton and Ford's ideas like this: Only Hawkins could have made *Cretaceous Life of New Jersey* like it is, with all of its puzzling and memorable scenes, and that makes it worth our consideration today.

However, I offer even more reasons why *Cretaceous Life of New Jersey* is worth our attention today. Many of these reasons are alluded to above in the section "Is This Image a Monster," but here is a distillation of my point: *Cretaceous Life of New Jersey* leads us to ask important questions (e.g., Who can we believe? Writers of history, practitioners of science, traditions of religion?). And instead of resolving these questions for us, the painting's somewhat ambiguous content and style lead viewers to investigate answers for themselves.

Here is one final provocation: Might the painting's major ambiguities be deliberate? What if Hawkins himself was questioning his beliefs about the reliability of history, science, and religion? Then *Cretaceous Life of New Jersey* is a masterful reflection and depiction of the artist's questions. Either way—ambiguity intended or not—this painting is fascinating.

CONCLUSION & RECOMMENDATIONS

This painting is scientifically obsolete but not culturally extinct. It deserves wide viewership and consideration today because it is a succinct, memorable provocation of questions every viewer should grapple with. (Where did people come from? Which meta-narratives are trustworthy? Who can we believe? Is the human condition precarious?) It poses questions so powerfully that it is potentially frightening—metaphorically monstrous.

Furthermore, the emotional effects of this painting on me are wonder, awe, frustration, fear, puzzlement, and curiosity. That makes *Cretaceous Life of New Jersey* a monster worth grappling with. I recommend you view this painting and consider its implications at length.

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[i] The painting's placement at Princeton is an important factor in the work's effect on the viewer. For proof, just imagine if these paintings were not commissioned by Princeton, but by a casino in Atlantic City. How would that change your perception of the painting's content? Different social contexts of perception (e.g., Ivy League university vs. casino) gives credence to Mitchell's observation that our social world influences what we see or how we interpret what we see; compare Mitchell's reference to "the social construction of the field of visibility" (*Image Science*, 7).

[ii] The Cretaceous period, lasting from about 145 to 66 million years ago, is the third of three ages in which dinosaurs are said to have "ruled" the earth: Triassic, Jurassic, and finally Cretaceous. Some of the

most popular dinosaurs today are creatures from the Cretaceous, such as *Tyrannosaurus Rex*. I find it interesting that Hawkins never knew of the *T. Rex* because it was not discovered until the early twentieth century.

[iii] Davidson describes a sketch from Hawkins' sketchbook, apparently intended as a design for a stained-glass window, which featured a dragon and Saint George flanked by two Pterodactyls (76).

[iv] Here are four other reasons Hawkins may have included these creatures in his painting, from least to most interesting for my purposes: (1) the best science available to Hawkins suggested these creatures lived in the waters near modern New Jersey; (2) placing creatures in this prominent place within the painting—they're nearly in the bottom-center of the painting—proved a pleasing composition to Hawkins by filling an otherwise potentially "blank" spot in his menagerie; (3) in a related reason, including these creatures adds more variety of species within the painting and therefore presumably increases the viewer's wonder at prehistoric life's diversity; (4) the creatures' placement *in* water, instead of adjacent to it (as in the case of the Elasmosaurs) strengthens the visual claim that dinosaurs *owned* or *ruled* the sea; this in turn strengthens the visual claim that dinosaurs ruled all of creation—sea, air, and land. This all-encompassing rulership portrays dinosaurs as a kind of double to contemporary humans. While it is commonly said that dinosaurs "ruled the earth," I am here indebted to W. J. T. Mitchell who suggests that people often view dinosaurs as rulers and human doubles: see pp. 32-39 of Mitchell's work *The Last Dinosaur Book*.

[v] Leviathan is a sea-bound monster mentioned several times in the Hebrew Scriptures, later interpreted variously as a sea serpent, crocodile, or whale. These references to leviathan were likely known to the Scripture-revering Hawkins. Not incidentally, the Christian Scriptures also mention a dragon. This could extend the validity of our monster thesis: essentially, Hawkins could be asserting that every mention of dragons, leviathans, and monsters *in the Bible* are related to human interactions with dinosaurs or their remains.

[vi] Did Hawkins believe in evolution, and what kind? We do not know. We do know that he believed a divine Creator was involved in designing life. For example, see the conclusion to Hawkins' 1860 book titled *A Comparative View of the Human and Animal Frame,* which describes how vertebrate skeletons display an "evident plan of construction," and the variation among vertebrates "add to the harmonious fitness of all animals for that place in Creation, which they were originally designed to fill." However, this passage is not a clear refutation of divinely-designed evolution. For example, the original appearance of "harmonious" in this passage is footnoted simply, "Teleology." The concept of teleology is invoked in religious discussions of intelligent design. So Hawkins' passage may be seen as harmonizing a divine Creator and evolution. The lack of clear evidence on Hawkins' views leads paleontologist Brian Switek to conclude in his 2011 article for *Wired* magazine,

> Hawkins may very well have been an evolutionist after [paleontologist Richard] Owen – one who preferred a guided or regulated process of stately becoming that maintained the natural and social [that is, Christian] order –but I have not yet been able to find any definite evidence of this view. Hawkins was vehemently anti-Darwinian [at least as late as 1871, as evidenced], but was he an anti-evolutionist? Did he perceive any genetic connections between the dinosaurs and fossil mammals he restored, or were they simply snapshots from an orderly and pre-ordained history? At this moment, I cannot say, but Hawkins' hope for a divine influence in nature certainly changes my perception of the prehistoric monsters he brought back to life. ("Divine Intervention, Dinosaurs, and Darwin's Descent")

I am not aware of any documents contemporaneous with the Princeton paintings that discuss Hawkins' view of evolution. I suspect this dearth of contemporaneous evidence is part of Switek's uncertainty about Hawkins' final views on evolution.

Switek's *Wired* article doesn't mention one other relevant text by Hawkins, titled *Comparative Anatomy as Applied to the Purposes of the Artist*. This text's original publication date is elusive—internal evidence leads me to date publication somewhere between 1868 and 1883. In this text Hawkins writes,

> Graphic illustrations must now be brought to the front to identify or contradict degrading theories in support of the fallacy of the Darwinian Paradox, by which Mr. Charles Darwin endeavoured to show that the 'Descent of Man originated from a BEAST.'
>
> For this repulsive hypothesis and negation of God and his Scriptures there is no immediate remedy but patience, faith, and common sense, with the aid of true artists who can see truly and draw truly…with diligent observation and comparison… [T]hose animals known as Birds, Beasts, and Fishes (called the Vertebrate Animals) do clearly exhibit a unity of plan and the supernatural power of design in the Creator competent to adapt the perfection of fitness to the purpose of ever living creature. (9-10)

[vii] I want to highlight that I disagree with Hawkins' biographers on this point. They do successfully trace Hawkins' documented belief in a divine designer and his belief that humans did not descend from apes (*All in the Bones*, 83-85), but I find these sources ambiguous on other points. It does not necessarily follow that Hawkins was anti-evolutionist; he was merely anti-Darwinian. The two should not be confused, but the explicating the difference is outside the scope of this paper.

[viii] I credit Mitchell for alerting me to this painting and the broader claim that Hawkins' depiction draws on historical depictions of Satan in the Garden of Eden (*Last Dinosaur Book*, 35-36).