Smithsonian American Art Museum

June 2012

Copperhead Snake on Dead Leaves, study for book Concealing Coloration in the Animal Kingdom
ca. 1910-1915
Abbott Handerson Thayer
Born: Boston, Massachusetts 1849
Died: Monadnock, New Hampshire 1921
watercolor on cardboard mounted on wood panel
sight 9 1/2 x 15/1/2 in. (24.1 x 39.3 cm)
Smithsonian American Art Museum
Gift of the heirs of Abbott Handerson Thayer
1950.2.15
Not currently on view

Collections Webpage and High Resolution Image

The Smithsonian American Art Museum owns eighty-seven works of art and studies by the artist Abbott Handerson Thayer made as illustrations for his book* Concealing Coloration in the Animal Kingdom. *Researcher Liz wanted to learn more about Thayer's ideas on animal coloration and whether these were accepted by modern biologists.

What did Thayer believe about animal coloration and its function?

Abbott Handerson Thayer was an artist but had a lifelong fascination with animals and nature. He was a member of the American Ornithologists' Union in whose publication, *The Auk*, his coloration studies were first published in 1896. Thayer and his son, Gerald Handerson Thayer, collaborated on the writing and illustrations for their 1909 book, *Concealing-Coloration in the Animal Kingdom; an Exposition of the Laws of Disguise through Color and Pattern: Being a Summary of Abbott H. Thayer's Discoveries.* Several of these original watercolors and oil paintings are on view in the Luce Foundation Center, including *Blue Jays in Winter*, *Male Wood Duck in a Forest Pool*, *Red Flamingoes*, *Sunrise or Sunset*, *Roseate Spoonbill*, and *Roseate Spoonbills*. *Copperhead Snake on Dead Leaves* illustrates Thayer's contention that some animals have "ground-picturing" patterns that mimic the appearance of their surroundings. Animals such

as the Copperhead snake have what Thayer called “[dis]ruptive coloration”: the pattern on the serpent’s body help dissolve its outline into the background in order to conceal it from predators.

Another central principle of Thayer’s book is countershading. Thayer observed that, “Animals are painted by Nature darkest on those parts which tend to be the most lighted by the sky’s light, and *vice versa*” (Thayer, 14). I looked no further than my own living room for a living example of both countershading and disruptive coloration: my tabby cat, Miss Kitty. Like many tabbies, she has a black dorsal stripe on top and a buff-colored belly underneath. Her spots and stripes would help her blend into a wooded background.

Do modern scientists accept Thayer’s theories on animal camouflage?

During Thayer’s lifetime many scientists accepted the ideas presented in *Concealing Coloration*, although some, such as President Theodore Roosevelt, believed that Thayer went too far. Roosevelt, an amateur naturalist himself, blasted Thayer in a scathing response published in the *Bulletin of the American Museum of Natural History* (Roosevelt, 1911). He criticized Thayer’s assertion that animals develop disruptive coloration patterns through natural selection.

I wondered if modern biologists saw any validity in Thayer’s observations. I contacted Kevin DeQuieroz, a herpetologist at the National Museum of Natural History, who confirmed that all color patterns in animals evolve through natural selection but that "different animals exhibit different degrees of disruptive coloration (including none at all)." DeQuieroz suggested that I contact Martin Stevens, a zoologist at the University of Cambridge in England, who has published extensively on protective coloration in animals. Through searching the online databases Biological Abstracts and Zoological Records I was able to find several articles by Stevens, including an article co-authored with Sami Merilaita, "Defining Disruptive Coloration and Distinguishing Its Functions” (2009).

I emailed Stevens and received a prompt reply. Stevens remarked upon Thayer’s influence on his own research and cited disruptive coloration as his most successful idea which has been reinforced by many recent scientific studies. Where Thayer went wrong, Stevens continued, was in placing too much emphasis on the protective function of animal coloration. An animal’s color and surface patterns can serve many purposes besides camouflage, including attracting a mate, thermal regulation, and protection from ultraviolet rays. Biologist Hannah Rowland addressed

some of these alternative reasons for coloration in her study, "From Abbott Thayer to the Present Day: What Have We Learned about the Function of Countershading?" (2009).

Did Thayer draw the snake from a specimen, photograph, or from life?

Thayer and his collaborators (including his wife and children) drew most of the animals in the book from dead, stuffed specimens. Thayer mentions on page ix of his preface to *Concealing Coloration* that he borrowed a live Copperhead snake as a model from Raymond Ditmars, the Curator of Reptiles and Mammals at the New York Zoological Society or Bronx Zoo.

Realizing that overhunting and industrial development were driving many wild animals to extinction, sportsmen and conservationists rallied together to found the New York Zoological Society in the still-rural Bronx borough north of Manhattan as a refuge for endangered species. One of the Zoo's early triumphs was director William T. Hornaday's work with the American Bison Society to establish a breeding program at the Zoo for the endangered American bison which had been hunted into near oblivion by white bounty hunters and frontiersmen. Twenty-nine bison from the Bronx Zoo were shipped to game preserves in Oklahoma Territory and the Black Hills of South Dakota (Bridges, 257-70) in the first two decades of the twentieth century. Thanks to the Zoo's intervention, the bison bred and grew in population, although the Great Plains would never again see the massive herds that Native Americans hunted and artists such as George Catlin and John Mix Stanley painted.

Raymond Ditmars was the Zoo's first Curator of Reptiles, a position which he held from 1899 to 1942. Ditmars' reptile-collecting trips sent him worldwide in the pursuit of venomous snakes. Ditmars was among the first individuals to collect snake venom for use in making antivenins (antidotes to poisonous snake bites) (Wood, 86-94, 138-140). Through WorldCat, I found a biography on Ditmars as well as two histories of the Bronx Zoo. **How did Thayer know Ditmars and why did the curator entrust the artist with a poisonous snake?**

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