

ON THE REVEALING AND CONCEALING COLORATION OF BIRDS:  
AN UNPUBLISHED LETTER BY THEODORE ROOSEVELT

THE OUTLOOK  
287 Fourth Avenue  
New York

Office of  
Theodore Roosevelt

February 2nd, 1911

My dear Mr. Kofoid:

I have read Mr. Tracy's pamphlet with great interest. He seems to me to have made his case very clear.\* There is one point, however, which I would like to suggest to you and to him. This is where he speaks of the dark colors of the crows, saying (that such) [the] coloration "can exist largely because of their size and aggressiveness and therefore of their immunity from reptatorial [sic] birds," and added that seed-eating birds of delicate flesh and harmless disposition could not have developed black plumage like that of the raven, because (they) [it] would have become extinct for lack of protective coloration. Now it seems to me that this is negated by the fact that cow-buntings are numerous. Indeed, I might go further and say that the abundance of purple and rusty grackles, yellow-headed grackles and red-winged blackbirds, not to speak of bobolinks, is proof to the contrary. With some of these birds, the black plumage only exists in the male during the breeding season; but the grackles are (always) quite as conspicuous except in point of size as are ravens, and the cow-buntings which are very plentiful are almost as conspicuous—the cocks quite as much, and the hens not *much* less. From my piazza here in the Summer I can watch close by both grasshopper sparrows and cow-buntings. The grasshopper sparrows behave just as Mr. Tracy described. They try to hide, and I have not a doubt that their coloration has a concealing or protective value both when they crouch and when they skulk through the grass. But the cow-buntings, as they stalk about over the grass, make not the slightest effort to hide, and they are just as conspicuous as little crows or ravens would be. Their coloration has not the smallest protective or concealing quality. They are not big; they are not aggressive; their flesh is delicate; and yet they are very common, and are striking examples of an instance where the concealing coloration theory completely breaks down.

In my criticisms of Mr. Thayer's article, I have been very careful not to criticize the general theory of concealing or protective coloration. That it (applies) [exists] in multitudes of cases, I have no question. There are multitudes of other cases where I do not think that, as yet, we are able to say with definiteness one way or the other (as to its application) [on the matter]. There remain very large numbers of cases where his theory is certainly without even the smallest foundation of fact.† The comparison I made with Agassiz and some of the other ultra-glacialists is applicable. In the Northern continents the discovery of the effects of glacial action was of enormous importance, but

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\* I am not certain about "sky pattern". My experience is that colors show as conspicuously against the sky as against any other background. A white gull or pigeon is (quite) [as] visible [as] against the sky.

† In the immense class of humming birds there is not one species in a score to which his theory, as he states it, can apply. See what Hudson says about this. It does not apply to swallows; the brilliantly colored species, usually exhibit concealing coloration, are infinitely more numerous than those to which the theory could by any possibility apply—the bank swallows (the swifts).

it was a simple absurdity to try to explain phenomena in South America, and in Africa—in the Amazon Valley, for instance—on the theory that the land had been subjected to glacial action. It is similarly a wild absurdity for Mr. Thayer to make such sweeping announcements as he does where he says, in speaking of the nuptial dress of birds, that even this dress is protective. But we can go much further than this. There are unquestionably large numbers of species of both mammals and birds as to which Mr. Thayer's theory has not the smallest particle of justification. Indeed merely reading his own book shows such a fantastic quality of mind on his part that it is a matter of very real surprise to me that any scientific observer, in commenting on the book, no matter how much credit he may give to Mr. Thayer for certain discoveries and theories, should fail to enter the most emphatic protest against the utter looseness and wildness of his theorising. Think of being required seriously to consider the theory that flamingoes are colored red so that fishes (or oysters for that matter—there is no absurdity of which Mr. Thayer could not be capable) would mistake them for the sunset! This is only an extreme example of the literally countless follies of which Mr. Thayer is guilty. I think that serious scientific men, when they come to discuss Mr. Thayer, should first of all and in the most emphatic way repudiate the ludicrous part of his theory, the part in which he pushes it to extremes.\* There then will remain much matter for serious discussion. But there can be no serious discussion of the theory as a whole until such eliminations have been made. Our first business is to see whether, as he says, the law is one of universal (and practically inclusive) potency, or whether it is one of many laws, all of which (are limited by others, and) act with various effects. Of course you are familiar with Allen's pamphlet on *The Influence of Physical Conditions in the Genesis of Species*, and also of course you are familiar with Nelson's very interesting discussion on *Directive Coloration in the Southern Jack Rabbit Group*.

What I would like to get is a serious study by a competent scientific man who will first of all try to distinguish between cases where the coloration is concealing, or protective, and the cases where it is not. At this moment here on the Sound there are two kinds of ducks found in far greater abundance than any others. These are the surf ducks or scoters, and the long-tailed ducks or old squaws. The former are black, or in the case of young birds so dark a brown that the effect at a distance is the same. They are as conspicuous as ravens. They can be seen on the water as far as it is possible to see anything. Their coloration is not only not concealing or protective, but it is in the highest degree advertising. The old squaws have a broken pattern of coloration, and while they are conspicuous birds they are very much less conspicuous in coloration than the scoters; but they are the most noisy and restless of any ducks. They can be heard long before they are seen, and they are almost always moving. I do not believe that they ever escape observation from any possible foe (owing) [thanks] to their color. Now as to these ducks—the most numerous ducks round here, the most successful in other words—Mr. Thayer's theory certainly does not apply. It is just the same with land birds. The soaring hen hawks and the (bigger) true falcons alike are always conspicuous even to human eyes. It simply is not possible, as far as I can see, that they are helped by their coloration in catching prey. If they are, the fact must certainly be shown by a totally different series of experiments from anything that Mr. Thayer has even attempted.

So with a number of our smaller birds. Blue birds, Baltimore orioles, scarlet tanagers, red-winged blackbirds, grackles, (swallows, indigo buntings, towhees,) and

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\* To discuss the effects of glacial action, for instance, would be absurd without the statement that it was potent only in boreal realms [and] or at high elevations.

many others are either all of the time, or at certain important seasons, colored in a manner most calculated to strike the attention.\* Even as regards warblers, I think that the nuptial coloration of certain species must have an advertising rather than a concealing value; and with some I should say that this would apply at other seasons also. The mourning warbler, the Kentucky warbler, the Maryland yellowthroat, the black-burnian, the black-throated green, the blue-winged yellow—I might almost indefinitely extend the list—are colored so that (at certain seasons, or at all seasons,) they attract the eye under normal conditions. The only reason that they do not attract the eye more is that their size and the leafy (cover) [coloring] in which they dwell offset the effect of their brilliant and highly non-protective (non-concealing) special coloration.

The utter breakdown of the theory as regards most big game I have elsewhere discussed. Giraffes, zebras, buffaloes, oryx, gnu, hartebeeste, owe nothing to concealing coloration; they have none. Moreover, where a number of different species utterly differently colored exist with equal success, two things are sure; first, that if one of them is protectively colored, the others are not; and second, that this protective coloration must be of very small consequence compared with other features in enabling the animal to thrive. If a chipmunk's stripes are concealing, then the uniform tint of a weasel or a red squirrel is not concealing; or vice versa. In fact, as regards a great multitude of mammals, large and small, I think there is need of far more thorough examination than has yet been made before we can say just how far counter-shading, for instance, is of real protective value. It is an interesting discovery about color; but its value in effecting concealment as regards many mammals, snakes, birds etc, is enormously exaggerated.

I look forward to seeing your museum. As you know, I have presented it an elephant.

Sincerely yours,

THEODORE ROOSEVELT.

Professor Charles A. Kofoid,  
University of California,  
Berkeley, Calif.

In Egypt, on the edge of the desert, there are sand chats which are protectively colored above and which try to escape notice by crouching; and there are black and white chats, whose coloration is advertising; they never try to escape notice, and are as conspicuous as if they were little crows.

*Note.*—This letter, dated February 2, 1911, was written in response to the receipt of an article by Mr. H. C. Tracy, then a graduate student in the Department of Zoology of the University of California, entitled "The Significance of the White Markings in Birds of the Order Passeriformes" (published in *Univ. Calif. Publ. Zool.*, vol. 6, 1910, no. 13). Its chronological relations are so illuminating in the development and expression of Mr. Roosevelt's ideas on the significances of animal coloration that it seems fitting to publish the letter and establish its place in his contributions to this much discussed subject.

The letter is here reproduced as nearly as may be, as it was written. The original is typewritten, but corrected, interpolated and interlined, and nearly all the pages have extensive footnotes in the characteristic broad-lined, condensed chirography of the writer. The footnotes follow at once after their indicating asterisks in the reproduced letter while the interlineations and interpolations are in parentheses, and the crossed-

\*This is true of thousands of [large] kinds of larger birds (like all the white egrets and glossy or dark ibises, pied storks, coots, water hens, etc.) as of brilliantly colored birds in the tropics.

# The Outlook

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how far counter-shading, for instance, is of real protective value. <sup>It is an interesting discovery about birds, but its value in affecting concealment as regards mammals is very small, and is very common in mammals.</sup> I look forward to seeing your museum. As you know, I have presented it an elephant.

Sincerely yours,

Theodore Roosevelt,  
*In Egypt, on the edge of the desert - there are sand clats which are protectively colored above and which try to escape notice by crowding; and there are black and white clats, whose coloration is advertising; and as a consequence as if they are little crows.*

Professor Charles A. Kofoid,  
University of California,  
Berkeley, Calif.

Fig. 38. LAST PAGE OF THE ROOSEVELT LETTER, REPRODUCED FACSIMILE.

out words and phrases are put in square brackets. In a few instances the interpretation of the handwriting is most perplexing, but the reading has been made in the light of the context.

This letter followed shortly after the writing and publication of his "African Game Trails" (New York, Scribners, 1910) in which Appendix E is entitled "Protective Coloration". The appendices of the work are dated (p. 575) Khartoum, March 15, 1910.

This early discussion is, however, devoted almost wholly, insofar as his own contributions are concerned, to his recent observations on the mammals of Africa. His references to birds are few. He opens (p. 553) his criticisms of Mr. G. H. Thayer's "Concealing Coloration in the Animal Kingdom" in this appendix by admitting the value of the concealing coloration in "the night hawk, certain partridges and grouse, and numerous other birds", but vigorously attacks Thayer's idea as to the concealing value of the coloration of the blue jay. The "exceptional situations" and "misleading surroundings" in which the peacock and male wood-duck are portrayed in Thayer's

book lead Mr. Roosevelt to comment (p. 558) that "many of the markings of the mammals, just as is the case with birds, must be wholly independent of any benefit they give to their possessors in the way of concealment".

On page 566 he reverts to birds again as follows: "To say that white herons, and pelicans and roseate-colored flamingoes and spoon-bills are helped by their coloration, when other birds that live exactly in the same fashion and just as successfully, are black, or brown, or black and white, or gray, or green, or blue, certainly represents mere presumption, as yet unaccompanied by a vestige of proof, and probably represents error".

On this page he also attacks Thayer's sweeping conclusions as to the concealing effectiveness of nuptial colors and cites the cock bobolink and breeding cock tanager in refutation, and follows (p. 567) with a most vigorous defense of the advertising coloration of "multitudes of birds, of the red-winged blackbird, of the yellow-headed grackle, of the wood-duck, of the spruce grouse, of birds which could be mentioned off-hand by the hundred, and probably, after a little study, by the thousand". It is noteworthy that in this appendix Mr. Roosevelt refers wholly to birds occurring in America and not to any of his African ornithological experiences.

These references are continued, supplemented and expanded in the letter here published and form the core of his later contribution on the subject, namely, his article entitled "Revealing and Concealing Coloration in Birds and Mammals" (Bull. Amer. Mus. Natural History, New York, vol. 30, article 8). The author's edition bears the date of August 23, 1911. In an appendix to this article he replies to the criticisms of his "extraordinary tirade" by Mr. A. H. Thayer in the Popular Science Monthly for July, 1911. His comments on birds in his Bulletin article are included in the main in his discussion of the theme "Concealment due mainly to cover and habits" (pp. 134-160) which readers will find reminiscent of the letter here published. From these comparisons and from the chronology, it is evident that this letter was written during the time in which the observant and disputatious mind of this versatile naturalist was occupied with the elaboration of his Bulletin article. The capacity of this eminent statesman-naturalist for concentration of thought in the midst of the most diversified activities is strikingly illustrated by this letter and the Bulletin article, which were elaborated during associate editorship of the Outlook and the political turmoil of the incipient Presidential campaign of 1912.

CHARLES A. KOFOID.

*University of California, Berkeley, February 26, 1924.*

## A LIST OF THE LAND BIRDS OF THE GRASS VALLEY DISTRICT, CALIFORNIA

By E. B. RICHARDS

NEVADA COUNTY is located in the north-central portion of California. It is a long, narrow county, seventy-five miles in length and from ten to twenty miles wide. The southwestern end of the county is about 600 feet above sea level, while at the eastern end are found elevations of from 8000 to 9000 feet. Grass Valley, the largest gold-mining town in the state, and Nevada City, the county seat, four miles distant, are located in the south-central part of the county. From vantage points near these towns one may watch the reflected sunset upon the rivers of the Sacramento Valley, then facing about, view the perpetual snows of the Sierra Nevada.

The Grass Valley district, as herein designated, has no sharply defined geographic boundaries, but the entire district may be confined within an imaginary circle of a ten-mile radius of which the city of Grass Valley is the center. It is in the Sierran foot-hills and is mostly in the Upper Sonoran life zone, passing into Transition on the east. Considering the settled condition of the district, the flora and fauna are fairly well represented, though of the birds, resident species are comparatively few.