

ARGUMENTS AGAINST THE BANNER MARK
THEORY.

BY ABBOTT H. THAYER.

THE following paper is an attempt to show that the Directive Coloration theory is largely a mistake, and that so-called 'banner marks' belong to the greater class of protection patterns and protective colorations. And, secondly, that in many cases they do not serve even in a minor degree as 'banner marks.'

Of course, to any one who feels the inevitability of Natural Selection, it is obvious that each organ or structural detail, and likewise each quality of organic forms, *owes its existence to the sum of all its uses*, so that while it is sustained at a certain stage of development mainly by the value of its principal function, this is only to the degree to which it can perform this without hostility to the other requirements of the organism, each one of the latter modifying it in proportion to its own importance. So that when one says an animal's markings are for this purpose or for that, he speaks inaccurately. Whenever we can know the relative importance of mutual recognition as compared to concealment, and then how much markings help recognition, and how much they help concealment, we shall be in the right track, though still ignoring many factors.

The so-called 'banner marks,' or, as Mr. Thompson has termed them, "*directive coloration marks*" of birds and mammals,¹ have never seemed to me satisfactorily explained by the theory that they exist mainly to aid other animals, both of the same species and of others, both friendly and hostile, to recognize the bearer of the 'banner marks.' Such means seem to me far too crude to play a prominent part in aiding the recognition powers of a class of beings who do so obviously inter-communicate, in many cases by means infinitely more subtle and much more akin to such instinctive methods as guide even the Indian and to some extent the white hunter in the chase. These men could not possibly

¹ *Auk*, Vol. XIV. pp. 395, 396, pl. iv.

impart or explain the more instinctive half of their wood craft, any more than a man can tell you how he recognizes his wife or child a mile off. It is not necessarily by any detail that he does so, but by the effect of all the combined attributes of the distant figure. It is, as it were, by the chord struck in his brain by the sum of the personal notes revealed in the pose and action of the figure.

When one reflects that even a human being, if he be a student of birds or quadrupeds, can grow to know a great many species so well as to recognize them when they are mere specks in the distance, precisely because each one's every motion in flight or running is such as only that particular species could make, is it not absurd to doubt that creatures infinitely more dependent on such recognition must have developed a corresponding power, and out of all comparison beyond a man's, and consequently have, as to recognition purposes, too little use for the small aid of these markings to keep them in their present high state of development? And while the accepted explanation of these markings seems so feeble, there is another so ample, that, to me at least, it takes possession of the field at a bound. It is Dr. C. Hart Merriam's. His theory is that top and rear markings coöperate with protective gradation in a most striking way for the preservation of the wearer when pursued. Since these bright patterns, such as the white stern and uplifted tail of deer or rabbit, or the white wing-and-tail-bars of many birds, establish, of course, a strong image on the pursuer's retina, so that when, too closely pressed, the quarry, changes tactics, and taking to cover, *closes suddenly his 'banner marks'* (which deer and hares do by dropping their tails and birds by folding wings and tail), he vanishes like magic from his enemy, who is left for just an essential moment staring wildly about to recover the sight of the bright pattern he was chasing, while its possessor is slipping off to still safer cover, enveloped in a cloud of invisibility more than doubled in power by its contrast to the previous conspicuousness. This seems true of deer, hares, and in fact of most creatures that are the *regular prey of others*. Bay-winged Buntings, Robins, Mockingbirds, Rose-breasted Grosbeaks, Towhees, Redstarts, and most War-

blers, Shrikes, Meadowlarks and Nuthatches, are a few American examples of birds which show in flight more or less additional white or bright pattern on their upper sides, which disappears when they close tail and wings. Of course the irregular motion of flight or running brings also into the light the borders of their white underside (which, contrary to Mr. Thompson, is an essential part of their protective coloration when at rest, unless they are squatting), making it aid, for the moment, their conspicuousness.

Now, as to the patterns on the *under* side of wings of soaring birds, and of such species as Plover, which hold their wings stretched upward after alighting; the theory that they are first of all for mutual recognition seems disproved by the foregoing arguments, and we should seek other explanations of their existence in cases where, as I have pointed out, any good observer can recognize the species by its whole 'cut' at a far greater height than one could see the pattern, and if this be true of even human observers, how *can* birds need them for the recognition of each other? Also, as to Plover, it does not seem probable that after being visible and recognizable in flight they should so elaborately raise their wings after alighting for no other reason than the small added recognition-aid they thereby give to their neighbors, especially since their under wing pattern is of course invisible to this neighbor (unless Plovers' eyes be something quite beyond our imagination) until they are so near each other that mutual recognition is inevitable without aid of badges. All these under-wing patterns, without any exception that I can recall, belong to birds that live among backgrounds of similar patterns. They are found on birds that live more or less amidst vegetation, which is the same as saying *where their background abounds in the nearly parallel lines of grass, reed, or tree stems.* They are most lacking on ocean birds which have no such background, passing their lives between bare ocean and bare cliffs. These patterns, crossing the main form as they do, belong in appearance to the great class of cross-markings, which in the tiger and many smaller cats, in the zebra, and in many snakes, as well as on many female birds, especially of the Gallinæ, such as the Capercaillie, Blackcock and Prairie-Hen and countless other members of the animal kingdom, unmistakably cooperate

with protective gradation to carry the aspect of the vertical stems, etc., right across the animal, so as to help him disappear.

To sum up: The pattern on the wings of Hawks and Owls, the world over, varies to a surprisingly small degree, which could not be the case if its main object were the distinguishing of the species from each other. Surely no one imagines that it has developed to help show to the rest of the animal kingdom that its wearer is not a Duck, and it shows no propensity to try to distinguish such nearly allied forms as could need it. For instance, even human beings know at a glance the long sharp wing of a Falcon from the broad round one of an Accipiter, long before they are near enough to see the pattern, yet the different species within each of these genera have almost identical under wing patterns. The tail of the American Sparrow Hawk, especially that of the male, is certainly an exception.

Unquestionably Grouse, etc., know an Accipiter from a Buteo without looking for what Mr. Thompson called, by a slip of the mind, the "wrist-mark," and still more obviously must this be the case between the Hawks themselves, for whose benefit alone this pattern could exist, if recognition were its object. In short, if these markings were mainly for identification of one Cooper's Hawk to another, they would avoid the Sharpshin's pattern, while if they were meant to announce the wearer to a Grouse they would hurt his hunting-chances, and we should see, in the Accipiter's wing, signs of imitating the pattern of some harmless Hawk. In other words the advocate of the "banner mark" theory in the case of the under pattern of Hawks' and Owls' wings must face the fact that these birds live mainly in woods or smaller vegetation, and wear, even on the *underside of their wings*, the very patterns nature furnishes to a vast number of vegetation-dwellers, both of birds and mammals; while these patterns are nowhere, or as good as nowhere, found on any species that live wholly away from vegetation. Then, if he still believes that what difference there is, is for recognition, well and good; only, were recognition the *main* use, why do even their under wings retain the twig pattern which tends to *efface* the wing by its resemblance to the twigs and parallel distant tree-trunks, which in the woods form its background, and thus make it harder to distinguish,

while a plain black or white wing, or one with any kind of strong pattern on an empty ground, would serve to distinguish it far better, in the woods? On the other hand, while Gulls have pretty good "banner marks" on their primaries, they miss a great opportunity for immensely greater self-differentiation in powerful under-wing patterns, and if my theory be correct, this they are *prevented from having by the greater importance of coalition in appearance with their blank ocean and cloud back-grounds.*

In short, both the barred wings of wood-dwelling Raptores and the unmarked wings of ocean birds confirm the impression that nature finds it worth while to paint on most animals an imitation of their normal background, even when, as in the case of the under sides of wings, and where such under-sides are habitually exposed to view, there would seem to be small use in it, and her finding this worth while, suggests that we have still much to learn about their home habits.

It is also significant that among our native Raptores, for instance, the three species that wear on their under wings the least amount of cross-barring are those that spend the most of their time *out of the woods* in fields and marshes. They are the Marsh Hawk, Rough-leg and Short-eared Owl.

The deep-wood-dwelling Long-ear has the Short-ear's wing *with some forest pattern added.* Mr. Thompson in his plate of under patterns has wholly omitted the Goshawk's cross-bars, which are like those of the two smaller Accipiters, only fainter. He has also given the Red-shoulder much too strong under-tail bars. Otherwise his diagrams are pretty just, only they give an impression that these patterns are far more visible at a distance than is the case.

I am far from denying that every visible distinction *helps* recognition (though I believe that the uses of the recognition are still very hazily conceived), and have mainly attempted to show what *other* forces are at work upon animals' colors. Unmistakably, nature regards *concealment*, both of the hunter and hunted, as of paramount importance.

One other point: Granting that these under wing barrings make, mainly by their different degrees of local darkness, etc. different patterns, at a distance, at least in different genera,

would it not be still stranger if they did not, or if different, species, with their different habits, were still more alike? Surely this difference of pattern does not clamor for explanation.

Still another argument to show that *protection* is, somehow, the main object of the cross-bars lies in the fact that young birds in many cases are more barred than the adults of the same species just as nature keeps the young of many *ungraded* species graded for protection like their mother.

DESCRIPTIONS OF THREE NEW BIRDS FROM ALASKA.

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IN STUDYING the collection of birds secured in Alaska during the summer of 1899 by the party from the Biological Survey, of which I was a member, thanks to the kind invitation of Dr. Merriam, Chief of the Survey, I have found that three Alaskan birds differ sufficiently from the same species from other parts of the country to deserve description as subspecies, and that two subspecies already described — *Parus hudsonicus evura* Coues and *Hylocichla ustulata almæ* Oberholser — in the light of more material seem to merit recognition.

Parus hudsonicus from Alaska is certainly subspecifically distinct from *P. hudsonicus* from New Brunswick, and so far as I have been able to study them *hudsonicus* from Ungava, Labrador, and New Brunswick appear the same, but as I have not seen birds from the type locality of *hudsonicus*, or from Ungava in nestling and early fall plumage, I can only hope to throw a little light on the races of this puzzling species.

To the gentlemen in charge of the collections of the Biological Survey, the U. S. National Museum, the American Museum of Natural History, and the private collection of Mr. Brewster, I wish to express my thanks for the privilege of studying large series of these species and for much assistance received, and to Mr. Outram Bangs, Dr. Jonathan Dwight, Jr., and Mr. Homer L. Bigelow for kindly loaning me specimens for comparison.