

found together on the coast up to the last of the migration would seem to imply that their breeding ranges cannot be far separated. It may be ascertained that typical *clarkii*, with its small size and weak bill, only occurs in summer well up on the North-west Coast, and that the coast districts of California, Oregon, and perhaps Washington Territory furnish the intermediate specimens.

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ON THE RELATIONSHIP OF *HELMINTHOPHAGA LEUCOBRONCHIALIS*, BREWSTER, AND *HELMINTHOPHAGA LAWRENCEI*, HERRICK; WITH SOME CONJECTURES RESPECTING CERTAIN OTHER NORTH AMERICAN BIRDS.

BY WILLIAM BREWSTER.

Since my original description of the White-throated Warbler (*Helminthophaga leucobronchialis*) appeared, specimens have slowly multiplied until, including the two announced by Dr. Fisher in the present number of the Bulletin,\* there are now no less than twelve known examples. Until recently there has been no apparent reason for doubting the validity of the species, which has been generally accepted, and even heartily endorsed by several prominent ornithologists. But not long since Dr. Edgar A. Mearns and Mr. Eugene P. Bicknell sent me some puzzling specimens which, at the time, I was obliged to consider aberrant individuals of *H. pinus* and *H. chrysoptera*, but which nevertheless raised certain suspicions affecting *H. leucobronchialis* and *H. lawrencei*. These suspicions are now confirmed by the examination of a fine series, belonging to Dr. A. K. Fisher, which throws a flood of light on the whole subject. I am indebted to Dr. Fisher's kindness for permission to make use of this material in the present investigation.

Before entering into the details of the evidence before me it may be well to emphasize some of the prominent characters which respectively distinguish *H. pinus*, *H. chrysoptera*, *H. leucobronchialis*, and *H. lawrencei*.

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[\* See beyond, under "General Notes."—EDD.]

*H. pinus*. Above yellowish-olive; wing-bands white; lores and post-ocular spot black; cheeks, throat, and under parts generally, rich yellow.

*H. chrysoptera*. Above bluish-ash; wing-bands yellow; throat, with a broad head-stripe, embracing the lores, cheeks, and auriculars, black (ashy in the female). Under parts white tinged with ashy on the sides.

*H. leucobronchialis*. Upper surface, including wing-bars, as in *chrysoptera*, but with the back and wings tinged with olive-green; head-stripe restricted as in *pinus*; throat, cheeks, and under parts silky-white, unlike either *pinus* or *chrysoptera*; breast more or less strongly washed with yellow.

*H. lawrencei*. Throat and head-stripes black, the latter embracing the cheeks and auriculars, as in *chrysoptera*; wing-bands white, and general coloring yellow or olive-green, as in *pinus*.

From the above summary it will appear that neither *leucobronchialis* nor *lawrencei* possesses any important *original* characters. The former borrows its ashy back and yellow wing-bars from *chrysoptera*; its restricted eye-stripe from *pinus*; — while the differential value of its white throat and under parts is materially affected by the usual presence of more or less yellow on the breast. *Lawrencei* has absolutely no peculiar markings or coloration; it simply unites the black throat and broad head-stripes of *chrysoptera* with the white wing-bands and general coloring of *pinus*. In either case there is simply a peculiar combination of borrowed characters. Let us see how constant these combinations are.

No. 1,208 (Dr. Fisher's collection, ♀? Sing Sing, New York, July 24, 1881) is in every way similar to the type of *leucobronchialis* save that the lores are more broadly black and the black of the post-ocular spot spreads backward and downward, embracing nearly the whole of the auricular region.

No. 1,235 (Dr. Fisher's collection, ♂, Sing Sing, August 3, 1881) differs from the type of *leucobronchialis* only in having a broad patch of pale yellow on the breast. A large proportion of the specimens previously reported have also exhibited this same peculiarity.

No. 605 (Dr. Fisher's collection, ♂, Sing Sing, August 24, 1879) exhibits a faint wash of lemon-yellow on the throat, while a broad space across the breast is deep gamboge-yellow, and the wing-bands are pure white.

No. 2,620 (author's collection, ♀? adult, Nyack, New Jersey, May, 1878; presented by Eugene P. Bicknell) has the chin decidedly yellow; the throat, cheeks, and a small space on the

abdomen white; the remainder of the lower parts gamboge-yellow; the wing-bands white; the nape ashy tinged with green; the occiput, back, and wings as purely olive-green as in *H. pinus*.

No. 1,210 (Dr. Fisher's collection, ♀ adult, Sing Sing, July 24, 1881) is entirely pale greenish-yellow beneath; the back is similar to that of *pinus* but the nape is decidedly ashy and the wing-bands as clearly yellow as in *chrysoptera*; the dusky brown eye-stripe is restricted to the lores and post-orbital spot.

Of the above specimens, No. 605 is perhaps the most important; with its white wing-bars, ashy back, and yellow breast and throat it very equally combines the respective characters of *leucobronchialis* and *pinus*. Nos. 2,620 and 1,210, approach *pinus* even more closely; but the former has the white throat and checks of *leucobronchialis*; and the latter an ashy nape, yellow wing-bands and generally pale coloring beneath. No. 1,208 shows a significant variation in the other direction, the extension of the black eye-stripe indicating an increased affinity with *chrysoptera*. No. 1,235 is apparently similar to Gibb's type of *H. "gunnii,"* afterwards referred to *leucobronchialis* by Mr. Ridgway (this Bull., IV, p. 233). Taken as a whole, the series perfectly connects *leucobronchialis* with *pinus*, as well as showing an extension of the former toward *chrysoptera*. This fact being established, the question immediately follows, How can these aberrant birds be accounted for? Before attempting to answer this let us take up *H. lawrencei* and examine a few more specimens.

I have before me a female *Helminthophaga* (No. 4,667, author's collection, Highland Falls, New York, July 7, 1879, presented by Dr. Mearns) which has the crown yellow; the back and wings dull ashy tinged with olive-green; the wing-bands yellow; the cheeks and throat ashy; the chin, sides of throat, and remainder of the under parts heavily washed with greenish-yellow. Making due allowance for the fact that its plumage is excessively worn and faded, this specimen presents nearly the relative characters that would be looked for in the female of *lawrencei*; the throat and cheek-markings are those of *chrysoptera* (female), while the remainder of the plumage is colored nearly as in *pinus*; the wing-bands however are yellow, instead of white, and the back is not purely olive-green: but these variations are closely parallel to those which occur in *leucobron-*

*chialis*, and, reasoning from that analogy, it seems quite as consistent to refer the present example with yellow wing-bands to *lawrencei* as the specimen No. 605, with white wing-bands, to *leucobronchialis*. Assuming this to be granted, we will next consider a young bird (No. 4,668, author's collection) of which the individual just described was ascertained to be the parent. Although in process of change, the fall plumage is fortunately sufficiently developed to afford some important points: the gray first plumage of the under parts is replaced across the breast and along the sides by patches of *bright yellow feathers*, while the sprouting second plumage of the throat is *pure white*; the lores are black, but the few second feathers which appear on the auriculars are, like those of the throat, *white*.\*

It may with confidence be stated that this individual would have developed a fall plumage characterized by black lores, white throat, and yellow breast and sides, a condition, in short, nearly similar to No. 605. Now the only way of accounting for the parentage of such an offspring is to assume that the female, No. 4,667, had mated with a male of either *H. pinus* or *H. chrysoptera*; for had the male been either *lawrencei* or *chrysoptera*, the black throat and cheek patches would inevitably have been reproduced.

A nice muddle, certainly! But let us see how all the facts in the several cases look when more closely associated. We have found: (1) That the prominent characters of *leucobronchialis* and *lawrencei* are not original, but are essentially borrowed from their allies, *H. pinus* and *chrysoptera*. (2) That the characters of *leucobronchialis* are inconstant, and that this supposed species intergrades with *pinus*. (3) That the characters of *lawrencei* are also inconstant, and that *lawrencei* interbreeds with some unknown ally—presumably *H. pinus*, producing offspring that resemble aberrant specimens of *leucobronchialis*.

The inference to be drawn from all this can scarcely be doubtful. Race affinities will not explain the peculiar characters of either *leucobronchialis* or *lawrencei*, for the region over which all the known specimens have occurred is everywhere occupied by either one or both of the species to which they are most intimately related. Nor can they be considered as either immature

\* Specimens of young *chrysoptera*, in precisely the same stage, have the throat and cheek-patches distinctly indicated by black or ashy pin-feathers, according to sex.

or abnormal examples; the former hypothesis being decidedly negated by the fact that all the early plumages of both of their affines are known to be widely different; while the latter is made untenable by the number of essentially similar specimens that have come under our notice. Only one possible solution remains:— that they are *hybrids* between *Helminthophaga pinus* and *H. chrysoptera*. And in support of this view an additional fact may be pointed out; viz., that nearly all the known specimens have been taken within an area where *both these species breed, either together, or in close proximity*. The very different combinations of markings and coloring in the two hybrid forms, as restricted, is unquestionably due to a reversal of the parents in each case. That is, one of them is produced by the union of *H. pinus* ♂ with *H. chrysoptera* ♀; the other by that of *H. chrysoptera* ♂ with *H. pinus* ♀. Just which combination produces either must for the present remain a matter of conjecture. The logical inference is, perhaps, that "*leucobronchialis*" is the offspring of *H. pinus* ♂ with *H. chrysoptera* ♀, for in the case of No. 4,668 we have seen that the black throat and cheek-patches, characterizing *lawrencei* equally with *chrysoptera*, were eliminated by an assumed cross with the male of *pinus*. But additional facts must be forthcoming before this part of the question can be regarded as settled.\*

Before leaving the Golden-winged Warblers it may be well to dwell a moment on the general bearings of the facts adduced, for it must be evident to all that they have a wider significance than simply showing that *pinus* and *chrysoptera* interbreed, producing so-called "*leucobronchialis*" and "*lawrencei*." They also show that these hybrid offspring—at least the females, as in

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\*On a former occasion (this Bulletin, Vol. II, pp. 66-68) I bestowed a compound specific name on a hybrid Grouse, thereby adopting a custom followed by certain European ornithologists, notably Mr. Robert Collett of Christiana, Norway. Since that time, however, correspondence with my friend Mr. Ridgway has convinced me of the inadequacy of this form of nomenclature. As Mr. Ridgway pointed out, the hybrid in question was derived from parents of different *genera*, and hence a due regard for accuracy would have demanded the compounding of the *generic* as well as specific titles: the result, it is needless to say, would be an absurdly cumbersome title. As this objection will frequently be met with, and, moreover, in view of the fact that such specimens are in the majority of cases of exceptional and abnormal significance, I fully agree with Mr. Ridgway that a distinctive name is not called for. The Smithsonian specimens of hybrid origin are labeled with the names of both parents connected by the sign †, a method that fully meets the requirements of such cases.

the case of No. 4,667 — reproduce with at least one, and probably either of the parent species; if not — as is by no means impossible — with each other. But the case is not without precedent. As long ago as 1847, Dr. Samuel George Morton, in the course of an essay on the subject of hybridity\* cited several well-authenticated instances of the interbreeding — often in a wild state — of various European Finches. A yet more remote alliance, given on the authority of M. Vieillot, was that of a Canary and a Nightingale, the single egg resulting from their union proving, however, unfertile. Among his conclusions the following are especially pertinent to the above connection:

“1. A latent power of hybridity exists in many animals in the wild state, in which state, also, hybrids are sometimes produced.

“2. Hybridity occurs not only among different species, but among different genera; and the cross-breeds have been prolific in both cases.

“3. Domestication does not cause this faculty, but merely evolves it.”

The Rev. John Bachman subsequently took the matter up† and supported the negative side of the question, but while he severely criticised Dr. Morton's views we find him admitting (p. 169), “That in a very few species a progeny has been produced that was incapable of propagating with the half-breeds, — in other words, that the hybrid male was physically incapable of having offspring with a hybrid female; hence the latter had to resort to the full blood of either species, and thus the intermediate breed returned to one or the other of the original species.”

In the latter fact we doubtless have the explanation of such aberrant specimens as Nos. 1,210 and 2,620, which unmistakably exhibit a slight and otherwise unaccountable trace of hybrid parentage; and similarly it is not unlikely that the yellow breast of occasional specimens of *chrysoptera* may be due to a taint of *pinus* blood. The impaired sexual vitality — granting, for the

\* “Hybridity in Animals and Plants considered in reference to the Question of the Unity of the Human Species.” American Journal of Science and Arts, 2d Ser., Vol. III, 1847, pp. 203-211.

† An Investigation of the Cases of Hybridity in Animals on Record, considered in reference to the Unity of the Human Species. Am. Journ. Sci. and Arts, 2d Ser., Vol. V, 1848, pp. 168-197.

sake of argument, that it is always impaired in such cases — of the original hybrids, would soon be restored by this breeding back into one of the parent stocks, and the descendants would hence stand a good chance of being numerous, while it would certainly require the succession of many generations to wholly eliminate the traces of their mixed ancestry. And if this state of affairs exists in one genus of birds, why may it not be looked for in others? There are some puzzling instances of the occasional cropping out of respective characters among allied but apparently perfectly distinct species which cannot be explained by any of the known laws of geographical variation. The possibilities opened by this field are bewildering, but for the present we are safer to lay them aside and apply the direct analogy furnished by the case of the *Helminthophagæ* to a few obviously similar ones.

Until very recently there was not a single established example of hybridity among North American *Passeres*, and many of our leading ornithologists were incredulous as to its occurrence in a state of nature save among the Grouse and some of the Swimming Birds, while no one seems to have considered the possibility of its explaining some of the standard puzzles\* that have been handed down to us by Audubon and other of the earlier ornithologists. But Mr. Trotter's hybrid Swallow (described in Vol. III, pp. 135, 136 of this Bulletin) gave us an undoubted instance, and now we have startling evidence that some of the *Helminthophagæ*† have been regularly contracting misalliances under the very noses of the scientists who were insisting that such things could not be. Who can say where this entirely irregular state of affairs will be found to end? Cuvier's Kinglet, with its *vermillion* crown-patch bordered by *black stripes*, its *black eye-stripe* and *white wing-*

\* From a review in a recent number of "Nature" I learn that Mr. Seebohm in his late work on the *Turdidæ*, forming Vol. V, of the "Catalogue of the Birds of the British Museum," has lately recognized hybridity as accounting for certain obscure Old World species; but up to the time of placing the present article in the printer's hands I have been unable to obtain a copy of his book or to ascertain the precise nature of his investigations.

† Mr. Ridgway has lately shown (this Bulletin, Vol. V, p. 237) that *Helminthophaga cincinnatiensis*, Langdon (originally described in Jour. Cin. Soc. Nat. Hist., July, 1880, pp. 119, 120, Pl. VI — description and plate reproduced in this Bulletin, Vol. V, pp. 208-210, Pl. IV) perfectly combines the characters of *Helminthophaga pinus* with those of *Oporornis formosa*. If, as seems highly probable, he is right in considering it a hybrid between these species, it affords another striking example of the tendency of *H. pinus* to seek alien connections.

bands, very closely reproduces the prominent characters of *Regulus calendula* and *R. satrapa*; the Carbonated Warbler similarly combines the *black crown, streaked back* and *double wing-bands* of *Dendroica striata* with the general coloring of *Perisoglossa tigrina*, and possesses no individual characters which might not have been derived from such a parentage; *Ægiothus brewsteri* is very nearly intermediate between *Æ. linaria* and *Chrysomitris pinus*; and there are still others among the doubtful or "lost" species which show strong traces of a hybrid origin. But for the present we rest the case here: the bars are down; the gate stands open; "he who runs may read."

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PRELIMINARY LIST OF BIRDS ASCERTAINED TO  
OCCUR IN THE ADIRONDACK REGION, NORTH-  
EASTERN NEW YORK.

BY C. HART MERRIAM, M.D.

THE present "List" includes only such species as are positively known to occur within the limits of the region of which it treats. It is of necessity incomplete, and many species, especially among the Waders and Swimmers, will be hereafter added to it. One object of its publication at this time is to call forth supplemental information, and the author hopes that any one knowing of the occurrence of a species not herein mentioned, in the Adirondack region, will communicate the fact to him at once in order that it may be incorporated in a more complete paper which will appear at no distant day.

One point in the present list requires explanation. The terms "common," "abundant," etc., do not have the same signification as in a treatise on the birds of Southern New England for example. Birds of all kinds are rare in the dense evergreen forests of the Canadian Fauna. One may travel hours, and sometimes a whole day, among these lonely mountains and scarcely see a single bird. Therefore these terms, as here employed, have a relative significance only. They have the same meaning that they must