

Review of Eastern and Spotted Towhee Taxa Based on Possible Spotted Towhee in Central Park, NYC 29 April 2001

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While birding the Tanner Spring area of Central Park in New York City on Sunday 22 Apr 2001 at about 1:00 PM, Michael Stubblefield (MS) noticed a male towhee with very marked white spotting on the wings and mantle. He quickly pointed the bird out to his birding partners Jeff Novick and Ann Aukward. The towhee exhibited considerable tameness and soon came in to bathe not 15 feet from where they were. As luck would have it, MS was armed with a Canon EOS 1v Camera mounted to a Canon 600mm f4.0 image stabilized auto-focus lens and a 1.4x teleconverter, and several frames of the towhee bathing were exposed. The bird then flew to a tree ten feet behind the spring and preened for about five minutes before flying off to the north. This extraordinary cooperation on the part of the towhee allowed the taking of nearly three 36-exposure rolls of film!!!

The bird was observed again at about 5:00 PM the same day by Sandy and Lloyd Spitalnik, and Deborah Allen. Deborah Allen obtained several more excellent images of the bird. The towhee could not be relocated thereafter.

MS' initial impression of this bird was that it exhibited many characteristics of the Spotted Towhees (*Pipilo maculatus*) he had observed hundreds of times in California. Several Spotted Towhees had also been seen by MS in the Rio Grande Valley of Texas just four months earlier. The singular rarity of such a find in New York State called for caution, but hopefully at least a few good and diagnostic images of the bird had been captured on film.

A few of these images are presented here (Figures 1-3).. Color images can be found on the Internet at www.linnaeansociety.org. Note that the bird is a male towhee. Note the marked white spotting on the mantle, scapulars, tertials, and tips of both the median and greater coverts. The spotting on the median and greater coverts forms a pair of somewhat broken wing bars. It is a first year bird as evidenced by molt limits on the tail and wings. The outer rectrices are adult-type while the inner rectrices are brownish and worn. A molt limit, a retained brown greater covert, is visible on the wing. These worn brown feathers are remnants of the juvenile plumage the towhee had held the previous summer (Pyle 1997, Greenlaw 1996). Rusty-brown feathers are visible on the rump, and the edges of some of the secondaries, tertials, and scapulars. The overall color of the rump is grayish-black with a slight olive tinge. The eye is bright red. Other notable characteristics include the extensive white visible on the outer rectrix and, importantly, at the base of the primaries.

We would like to say unequivocally that this bird is a Spotted Towhee. Unfortunately, reference to multiple contemporary field guides precludes making such a statement with certainty. The third edition of the National Geographic Field Guide to the Birds of North America (NGS3 1999), for instance, comments that



Figure 1

Figure 2



Figs. 1, 2 and 3

*22 Apr 2001, Tanner Springs,
Central Park ,NYC*

*Figs. 1 &2 show white spotting
on mantle, scapulars, tertials,
median coverts and greater coverts,
and extensive white patch at the
base of the primaries.*

*Fig. 3 shows extensive white
on outer rectrices.*

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Figure 3

the Spotted Towhee is distinguished from the similar Eastern Towhee (*Pipilo erythrophthalmus*) (Figure 4) “by white spotting on the back and scapulars; also on tips of median and greater coverts, which forms white wing bars.” No mention is made under the Spotted Towhee treatment of white at the base of the primaries. NGS3 also notes that the Eastern Towhee has a distinct white patch at the base of the primaries as well as distinct white tertial edges. The white tertial edges are not only illustrated on the Eastern Towhee but on each of the Spotted Towhee subspecies (though reduced in *oregonus*) as well and seem to be of little importance in separating the two species. Treatment of Eastern Towhee, Rising (1996) notes, “Spotted Towhee lacks the white bases to the primaries.” Sibley (2000) similarly states that Spotted Towhees should have primaries that are black to the base while Eastern Towhees should have a white patch at the base of the primaries. Sibley also notes that hybrids occur regularly in a limited area of range overlap and that it is “possible for apparently pure Eastern birds to show white spots on scapulars and for Spotted to show limited white at base of primaries.” This confusing statement does not clarify whether or not a bird showing characteristics of both Eastern and Spotted Towhee should be considered a hybrid or if it is simply exhibiting the natural range of variation inherent in the species.

The question of hybridization in the “Rufous-sided” Towhee complex has been subject to discussion for some years. Both the Eastern Towhee and the Spotted Towhee were originally described as full species. Linnaeus named what is now the Eastern Towhee, *Fringilla erythrophthalma*, in his 10th edition of *Systema Naturae*, on the basis of Mark Catesby’s description of the “towhee-bird” in his *The Natural History of Carolina, Florida and the Bahama Islands*. The British ornithologist, William Swainson named the Spotted Towhee *Pipilo maculata* in 1827 on basis of specimens sent to him from Hidalgo, Mexico, by William Bullock and his son.

These two towhees were considered to be separate species until the 5th Edition of The A.O.U. Check-List of North American Birds (1957) in which the two were “lumped” into a single species (*P. erythrophthalmus*), because of putative widespread hybridization between the two in the Great Plains as documented by Charles Sibley and his students (29th Supplement of The A.O.U Check-List of North American Birds, Auk 71:310-312, 1954). In 1995, the A.O.U. changed its

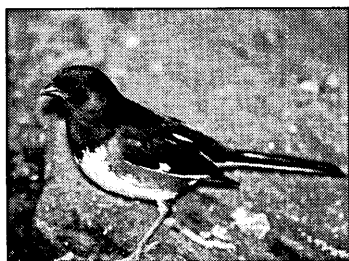


Fig. 4 – Oct 2000 - male Eastern Towhee- note lack of spotting on back and wings and white patch at the base of the primaries.
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opinion, writing “These two wide-ranging forms [*P. erythrophthalmus* and *P. maculatus*] differ conspicuously in vocalizations, dorsal plumage pattern, and nature and degree of sexual dimorphism. Along a narrow hybrid zone in the central Great Plains, 56% of individuals were of one or the other pure parental types (Sibley and West 1959). The percentage of pure parents at 28 localities in the hybrid zone averaged 60%. Even in the short stretch of the Platte River where hybrids dominate, 20% of individuals were pure parental types. These data strongly suggest assortative mating. Moreover, Ball and Avise (1992) [Auk 109:626-636]

found no shared mitochondrial haplotypes between populations of *maculatus* and *erythrophthalmus*. The mean sequence divergence between these two forms was much higher than that among conspecific populations of other birds, and even exceeded that between several known species pairs."

It seems clear that the bird photographed in Central Park is either an Eastern Towhee, a Spotted Towhee, or a hybrid. An accurate description and analysis of the bird would be incomplete without an attempt to classify it to the subspecific level. The subspecies recognized in the Eastern and particularly the Spotted Towhees are very complex and poorly understood. Fortunately the photographs of the Central Park Towhee clearly show the underside of the tail as well as the upper tail coverts. The white patch on outer tail feather (r6 or sixth rectrix) is one of the major characteristics used by banders to classify both Eastern Towhees and Spotted Towhees to subspecies. Among Eastern Towhees, the subspecies breakdown includes: *Pe. erythrophthalmus* (27-53mm long at r6), *Pe. canaster* (19-41mm long at r6), *Pe. rileyi* (18-35mm long at r6), *Pe. alleni* (7-24mm long at r6). Among Spotted Towhees this character is most prominent in *Pm. montanus* (25-40mm long at r6), *Pm. arcticus* (27-42mm long at r6), and *Pm. gaigei* (24-40mm long at r6) (Pyle 1997). A good illustration of this character can be found on p. 399 of NGS3.

While there is much overlap in the linear measurement of the amount of white at r6 on the various subspecies of Eastern Towhees and Spotted Towhees, it is useful when at an extreme. In the Central Park towhee the photographs clearly show this characteristic to be extensive. In fact, the white extends the entire length of r6 at least to where it meets the tail coverts. A side view measured with calipers on an original image of the bird bathing shows this character to be 11mm. An estimate of the bird's length on the same image is 35mm. The white on the base of r6, therefore is roughly 30% of the birds length. If one assumes a length of 170-205 mm for Eastern Towhees (Rising, 1996) with males being slightly larger than females, the white at the base of r6 on the Central Park towhee would be 51 to 61.5mm in linear extent.

This estimate places the amount of white on r6 to be just outside the published limits for both species. It seems likely, therefore, that it is one of the subspecies with the tendency to show this character most extensively which would be *erythrophthalmus* for the Eastern Towhees, and *arcticus* for the Spotted Towhees. The greenish tinge on the rump is also useful since it is consistent with the *arcticus* subspecies of Spotted Towhee (Pyle, 1997)

Buckley after examining the only NJ specimen, an immature female, collected in Metuchen, Somerset Co. on 23 Dec. 1952 by James Baird (USFWS 421001) and published as *montanus* (Baird 1957), determined that specimen, as well as the two New York specimens he collected, to be *arcticus* (Buckley 1959), which is the only subspecies ever taken anywhere in eastern North America. Apart from the 1957 and 1958 specimens, the age and subspecies of the other New York Spotted Towhees are unknown, although it is most likely all were immature *arcticus*.

Based on the extent of white on r6, the green tinge to the rump, the history of Spotted Towhees in New York State, and, as discussed later, the fact that hybridization between Eastern Towhees and Spotted Towhees is between the

erythrophthalmus and *arcticus* races, it is likely that the Central Park towhee, is a Spotted Towhee of the *arcticus* subspecies. If it is an Eastern Towhee, it is of the *erythrophthalmus* subspecies.

Confusion about exactly what constitutes an Eastern versus a Spotted Towhee stems from a large zone of hybridization in the North American central Great Plains. This zone includes southeastern Saskatchewan, southwestern Manitoba, eastern Montana, North Dakota, South Dakota, Nebraska, western Minnesota, western Iowa, and northeastern Colorado. Rivers and their associated riparian habitat that run generally east-west through this region form natural bridges of vegetation from the Rockies to the Missouri River. In addition, roads, towns, parks, and other human innovations provide additional breaks to the usual prairie and grassland habitat of this region. It is along these corridors that towhees, and many other species that had been reproductively isolated by the great glaciers of the Pleistocene era which began some 1.8 million years ago, began to come into contact again as the glaciers receded about 12,000 years ago. It is believed that species that did not diverge sufficiently in some character or characters that would preclude their interbreeding during this several thousand years of isolation can form hybrids within the hybrid zone. Moreover, the stability of such a hybrid zone, i.e. whether it contracts, is stable, or expands, is determined by selective pressure on the hybrids relative to the parent-types (Rising, 1983).

The major work on the hybridization issue for Eastern and Spotted members of the Rufous-sided Towhee complex was done by Sibley and West between 1953 and 1957 (Sibley and West, 1959). During this period they collected 515 adult specimens of what they considered to be the *erythrophthalmus* and *arcticus* races of Rufous-sided Towhee within the Great Plains hybrid zone. For each of the specimens they assigned a number from "0" to "4" based on the characteristics of the bird:

- "0"=unspotted coverts, scapulars and interscapulars, but with a large white patch at base of primaries as in typical *P. e. erythrophthalmus*.
- "1"=trace of spotting on feathers mentioned above; white patch at base of primaries reduced.
- "2"=spotting abundant; white in primary bases about half of maximum.
- "3"=only slightly less spotted than typical *P. e. arcticus*; white in primary bases only a trace.
- "4"=fully spotted as *P. e. arcticus*; no white at base of primaries.

For females an additional score for head and back color was given.

Sibley and West concluded that there was a gradient in the amount of spotting (and female color characteristics) from east to west. They called this situation "one of normal geographic variation in which the area of contact between the eastern and western groups of races is restricted to the narrow riparian strips of habitat. Selection against alien genes helps to prevent marked introgression in both directions." They noted that the degree of white dorsal spotting appears to be an adaptive trait; the western spotted race, which is spotted dorsally and tends to live in more arid areas, occupies "chaparral" type vegetation. This spotting allows

the bird to remain cryptic in the “sun-dappled” light that reaches the ground where the bird forages and nests. The eastern race, however, tends to occupy the understory of the eastern deciduous woodlands which is generally thick shrubbery that does not allow light to reach the ground. In this situation the lack of spotting would help protect against predation. A reevaluation of the Sibley and West data from the Great Plains hybrid zone led to the elevation of Eastern Towhee and Spotted Towhee populations to species rank by the A.O.U. in 1995 (Greenlaw 1996).

What is interesting in the Sibley and West data is that 223 of the 515 specimens taken or 43% were scored as a “1”, “2”, or “3”. That is, they had, as in the Central Park bird, a mixture of dorsal spotting and white at the base of the primaries.

To further clarify this issue MS examined the 61 specimens of *arcticus* Spotted Towhees available at the American Museum of Natural History in New York City. Of the 61 specimens, 3 were juveniles, and one was labeled “hybrid” between *arcticus* and *erythrophthalmus* (Figures 5-8). One of the specimens, a female, was a rare New York State specimen collected by P. A. Buckley in the Bronx Zoological Gardens, NYC 23 Dec 1958 (Figure 9). The earliest specimen was collected by J. J. Audubon, 22 Jun 1843. The majority of specimens were collected by J. Dwight, Jr. in Texas during winter and early spring. All the information available on individual specimen labels was recorded in a computer spreadsheet and three types of measurement were taken.

- 1) A linear measurement of the extent of visible white at the base of the primaries to either its termination or where it was thought to narrow significantly. It was measured on the primary that would produce the longest measurement. In many of the birds the white narrowed and then extended as a thin line along the length of the entire primary. This measurement was made from both wings with calipers to the nearest millimeter.
- 2) A “Sibley” score as described above.
- 3) A mantle score as follows:
 - “0” no spotting on the mantle
 - “1” minimal spotting or streaking on the mantle
 - “2” moderate spotting on the mantle
 - “3” extensive spotting on the mantle

One had to be careful to ignore the extent of spotting on the scapulars as this can give a false impression of a more heavily spotted mantle. It should be noted that in addition to the linear extent of visible white at the base of the primaries, the width of the white mark at the base of the primaries contributed significantly to one’s perception of the extent of the bird’s “wing patch”. The width varied from 0 to about 2 mm. and included one to several of the primary feathers but was not formally recorded in this study due to limitations of time and equipment.

The tabular results from the skins at the American Museum of Natural

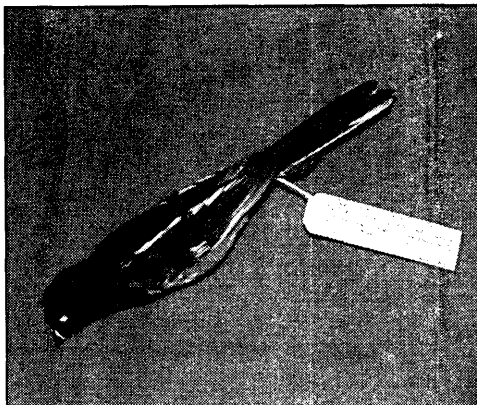


Fig. 5

Eastern x Spotted Towhee hybrid from AMNH collection, taken by L.L. Short, Jr., near the Platte R., Logan Co., CO. Note white patch at base of primaries and white on scapulars and tertials. White is lacking on mantle, median coverts and greater coverts.

Fig. 6
Eastern x Spotted Towhee hybrid (second from left) with Spotted Towhees from AMNH collection. Note lack of spotting on the mantle of the hybrid compared to the other towhees.

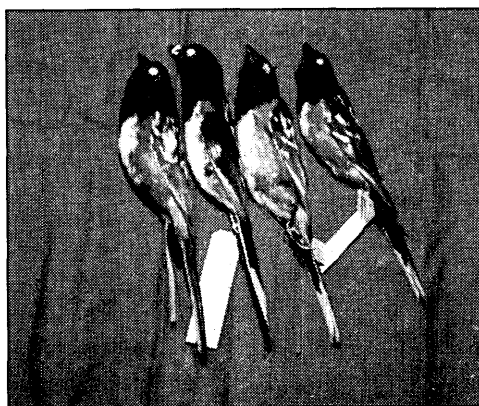
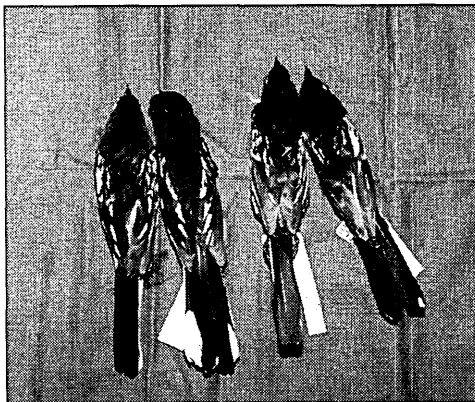


Fig. 7

Eastern x Spotted Towhee hybrid (second from left) with Spotted Towhees from the AMNH collection. Note white at base of primaries in all these specimens. The Spotted Towhees show white on the mantle, scapulars, tertials, median coverts and greater coverts, while the hybrid shows white only on the scapulars and tertials.

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Fig. 8
A collection of Spotted Towhee skins from the AMNH collection, showing the range of mantle spotting possible, with the three birds on the right showing extensive spotting, those in the middle showing moderate spotting, and the three birds on the left exhibit minimal spotting. The specimen at the bottom is an Eastern x Spotted Towhee hybrid which has no mantle spotting.

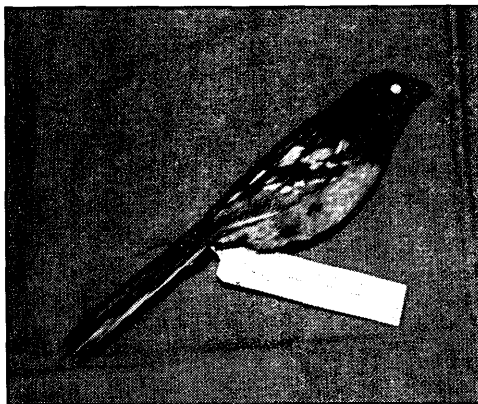
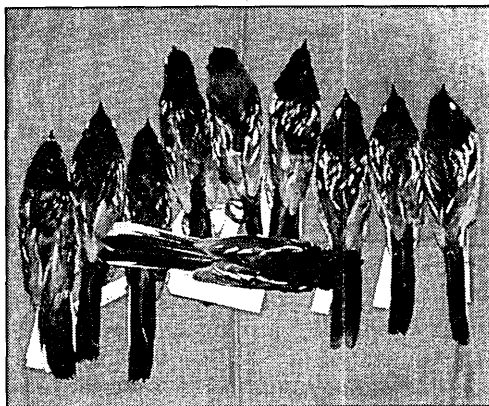
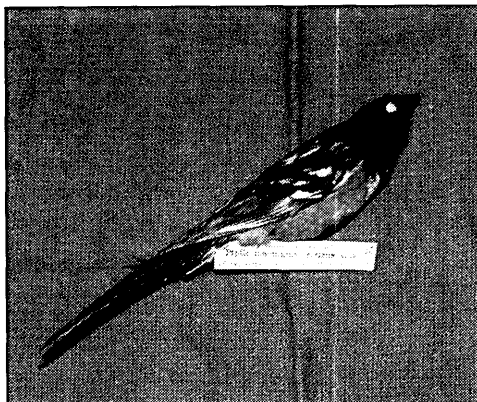


Fig. 9
Female Spotted Towhee collected by P.A. Buckley 23 Dec 1958 at Bronx Zoological Gardens, NYC. Note white spotting on coverts and the lack of white at the base of the primaries.

Fig. 10
Eastern x Spotted Towhee hybrid. This skin is from a tray of Eastern Towhee skins and is labeled *Pipilo maculatus arcticus*. Note the combination of the white patch at the base of the primaries and the spotting on the coverts.



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History are presented (Table 1). Of the 58 adult towhees labeled "*arcticus*" (including the "hybrid") 22 (or 38%) demonstrated at least some white at the base of the primaries. The white was most extensive on an adult "hybrid" taken 21 Jun 1963 by L. L. Short Jr. in Logan County, Colorado. This bird had a 8mm long white patch on the left and a 10mm long white patch on the right. Interestingly, the most extensive white patch, 11mm on the left and 10mm on the right, was found on a juvenile taken at Fort Union, Montana (an area thought to be west of the hybrid zone) and not counted in the above figures. The four adult birds taken at the Fort Union, Montana locale also had extensive white at the base of the primaries and low mantle scores. Several of the birds with extensive white at the base of the primaries were taken in Texas in winter. The three birds taken from Walsh, Alberta, a region that should be well out of the hybrid zone but firmly *arcticus*, demonstrated considerable white at the base of the primaries and marked dorsal spotting.

Seven of the skins were taken in summer in regions of Arizona or New Mexico that are populated not by *arcticus* but rather by the *montanus* subspecies of Spotted Towhee (Greenlaw, 1996), and possibly incorrectly identified as to subspecies. Interestingly one of these skins, a male taken 12 Jun 1893 in the Huachuca Mts. of Arizona had 5mm of white on the left and 2mm of white on the right primary bases. It's mantle scored a "2". Were these birds excluded from the *arcticus* Spotted Towhees, the percentage of *arcticus* with white at the base of the primaries would increase to 41%.

Importantly it should be noted that while there was a tendency for birds with the most white at the base of the primaries to exhibit low mantle scores and for the birds with the least white at the base of the primaries to exhibit the highest mantle scores, these associations were not universally present. In fact, when an attempt was made to assign a Sibley score to each bird, it was quickly apparent that this was not feasible for all skins and so I included a "?" for that category. For a bird to have a Sibley score of "4" it should have a mantle score of "3". Conversely, for a bird to have a Sibley score of "0" it should have an extensive white patch at the base of the primaries and a mantle score of "0". There were many instances where a skin had both generous spotting on the scapulars and an extensive white patch at the base of the primaries. There were also several birds with both minimal white at the base of the primaries and minimal spotting on the mantle.

By the above scoring system the Central Park towhee would demonstrate a very extensive white patch at the base of the primaries estimated to measure about 15mm in linear extent. It's mantle, however, would grade at least a "2". It could not be assigned a Sibley score.

While the degree of mantle spotting and extent of white at the base of the primaries seem to vary widely among the 58 adult *arcticus* Spotted Towhee skins examined, each of them, with the exception of the individual labeled "hybrid" was easily recognized as a Spotted Towhee. Why is this? The spotting on the "hybrid" was confined to the scapulars. It did not involve either the mantle or the coverts and so did not form wing bars. All of the other skins did have varying amounts of usually extensive spotting on the coverts as well as well as the scapulars even if absent from the mantle.

The junior author (JR) examined the 46 adult skins of *arcticus* Spotted Towhees available at the University of Ontario. The majority of these skins were half skins originally collected in May and June of 1970. They were scored according to the same parameters MS used for the skins at the AMNH. The tabular results are presented (Table 2). Of the 46 birds available, 16 (or 35%) demonstrated at least some white at the base of the primaries. The white was most extensive, 19mm, on the left primary base, on a male collected 13 Jun 1970 at Estuary Saskatchewan by JR. The tendency for birds with most white at the base of the primaries to demonstrate a low mantle score and, conversely, for birds with the least white at the base of the primaries to demonstrate the highest mantle score seems to hold. There are still many exceptions to this tendency. While many of the Sibley scores given to these birds do not seem consistent for the reasons discussed above, no effort was made to "correct" them and assign a "?" to the ambiguous birds as done for the AMNH specimens.

In addition to the *arcticus* Spotted Towhees, MS also examined each of the 305 skins labeled as *erythrophthalmus* from the AMNH collection. While the amount of white at the base of the primaries on these birds tended to be considerably more extensive than on *arcticus*, the mantle, scapulars, and coverts were, with one exception, always completely unspotted. The only exception to this was a singular bird taken 28 Dec 1887 at Giddings Texas (Figure 10). While it was labeled *erythrophthalmus*, "?arcticus" was handwritten on the label. This bird had reduced but noticeable spotting on the scapulars and coverts. It also had some white-fringed feathers on the crown and chest which were not noticed on any of the other specimens and which raises the question of genetic aberrancy.

It would seem from the skins examined and the available literature that the Central Park towhee is a Spotted Towhee of the *arcticus* subspecies. This conclusion is based on the extensive spotting on the mantle, scapulars and coverts. The white at the base of the primaries is present to some degree in 41% of the *arcticus* Spotted Towhee skins in the American Museum of Natural History as well as 35% of the *arcticus* Spotted Towhee skins in the University of Ontario and does not seem to preclude assignment of a bird to the Spotted Towhee species. While the sample size is small, the skins are varied both temporally and geographically. The Central Park towhee seems to have more extensive white at the base of the primaries (estimated to be 15mm) than the other birds in the AMNH collection, but has less than the 19mm measured from a bird in the University of Ontario collection. It is likely that both the Central Park and University of Ontario birds simply represent one extreme of the natural variation possible in *arcticus* Spotted Towhees. White at the base of the primaries does not seem to be a good characteristic for differentiating Spotted from Eastern towhees although the patch is generally more extensive in Eastern Towhees. White spotting on the scapulars and coverts may be sufficient to call a bird a Spotted Towhee. Mantle spotting does not seem to occur on Eastern Towhees.

It should be noted that while Sibley and West shot and collected towhees within the Great Plains hybrid zone, they did not comment on their mating behavior. When the AOU chose to split the Rufous-sided Towhee into Spotted Towhee and Eastern Towhee, their decision was based largely on the fact that "widespread occurrence of pure parental types of one species or the other in hybrid zone, even

along the Platte River where hybrids dominate, suggests assortative mating (Greenlaw, 1996)." "Assortative mating," means that Eastern Towhees mate with Eastern Towhees and Spotted Towhees mate with Spotted Towhees. There is, to our knowledge, no published literature or accounts describing a nest or young tended by an Eastern Towhee and a Spotted Towhee parent.

The authors are submitting this paper to the New York State Avian Records Committee (NYSARC) to support their identification of this Central Park towhee as a Spotted Towhee (*P. maculatus*). If accepted by that committee, the record will be the eighth for the state and the first for a spring season.

Acknowledgment

We thank Tony Leukering for his comments upon critical reading of this paper.

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Table 1 - American Museum of Natural History Spotted Towhee Specimens

Museum Number	Date Collected	Location Collected	Collector	Sex	Left/Right Primary Patch Length	Sibley Score	Mantle Score
41660	6/22/1843	Fort Union, Montana	J.J. Audubon	M	5/6	2	2
41662	?	Fort Union, Montana	Lawrence	?	6/5	2	1
41663	6/18/1835	Fort Union, Montana	Lawrence	M	5/3	2	1
41664	?	Fort Union, Montana	Lawrence	M	5/5	2	1
41666	?	Fort Union, Montana	Lawrence	Juv.	11/10	N/A	N/A
61281	5/27/1894	Corral Draw, So. Dakota	W.W. Granger	M	9/6	2	1
69206	12/27/1892	Fort Clark, Texas	Dr. E.A. Mearns	M	0/0	?	2
69207	2/25/1893	Fort Clark, Texas	Dr. E.A. Mearns	F	0/0	?	1
69208	12/27/1892	Fort Clark, Texas	Dr. E.A. Mearns	M	8/8	2	2
69209	11/17/1892	Fort Clark, Texas	Dr. E.A. Mearns	M	3/2	3	1
69210	1/9/1893	Fort Clark, Texas	Dr. E.A. Mearns	F	0/0	?	1
84185	3/30/1886	Giddings, Texas	G.B. Sennett	M	5/7	2	1
84186	2/18/1885	Dallas, Texas G.B.	Sennett	M	5/3	2	1
84187	4/5/1880	Rio Grande City, Texas	G.B. Sennett	F	5/2	2	2
368157	6/12/1893	Huachuca Mts., Arizona	J. Dwight, Jr.	M	5/2	3	2
368158	6/11/1904	Huachuca Mts., Arizona	J. Dwight, Jr.	M	0/0	4	3
368166	6/11/1907	Whetstone Mts., Arizona	J. Dwight, Jr.	M	0/0	?	1
368172	12/3/1892	Morrison, Colorado	J. Dwight, Jr.	F	0/0	?	2
368176	5/7/1919	Cloudcroft, New Mexico	Austin Paul Smith	F	0/0	4	3
368181	4/29/1918	Menard, Texas	Austin Paul Smith	F	0/0	4	3
368182	5/2/1918	Menard, Texas	Austin Paul Smith	F	0/0	?	2
368184	12/5/1914	Ingram, Texas	J. Dwight, Jr.	M	9/6	2	2
368185	12/6/1914	Ingram, Texas J.	Dwight, Jr.	M	0/0	4	3
368186	1/28/1915	Ingram, Texas J.	Dwight, Jr.	M	6/6	?	3
368187	1/30/1915	Ingram, Texas	J. Dwight, Jr.	M	5/5	3	1
368188	2/2/1915	Ingram, Texas	J. Dwight, Jr.	M	0/0	?	1
368189	2/2/1915	Ingram, Texas	J. Dwight, Jr.	M	0/0	4	3
368191	3/25/1915	Ingram, Texas	J. Dwight, Jr.	M	0/0	?	1
368192	3/28/1915	Ingram, Texas J.	Dwight, Jr.	M	0/0	4	3
368193	4/20/1915	Ingram, Texas	J. Dwight, Jr.	M	2/2	?	3
368194	12/2/1914	Ingram, Texas	J. Dwight, Jr.	F	0/0	?	1
368195	12/10/1914	Ingram, Texas	J. Dwight, Jr.	F	0/0	?	1
368196	1/20/1915	Ingram, Texas	J. Dwight, Jr.	F	0/0	?	2
368197	2/2/1915	Ingram, Texas	J. Dwight, Jr.	F	0/0	?	1
368198	2/2/1915	Ingram, Texas	J. Dwight, Jr.	F	0/0	?	2
368199	2/7/1915	Ingram, Texas	J. Dwight, Jr.	F	0/0	?	1

Table 1 - American Museum of Natural History Spotted Towhee Specimens (cont.)

Museum Number	Date Collected	Location Collected	Collector	Sex	Left/Right Primary Patch Length	Sibley Score	Mantle Score
368200	3/17/1915	Ingram, Texas	J. Dwight, Jr.	F	0/0	?	1
368202	4/6/1915	Ingram, Texas	J. Dwight, Jr.	F	0/0	?	1
368204	4/30/1915	Ingram, Texas	J. Dwight, Jr.	F	0/0	?	2
368205	5/31/1904	Brook Co., Wyoming	J. Dwight, Jr.	M	/0	?	1
368206	5/3/1891	Douglas, Wyoming	J. Dwight, Jr.	M	3/5	2	2
368207	9/14/1893	Douglas, Wyoming	J. Dwight, Jr.	M	2/2	?	0
368208	5/18/1894	Douglas, Wyoming	J. Dwight, Jr.	M	0/0	?	2
368209	7/11/1906	Walsh, Alberta	J. Dwight, Jr.	M	3/8	?	3
368210	7/11/1906	Walsh, Alberta	J. Dwight, Jr.	M	7/4	2	1
368211	7/12/1906	Walsh, Alberta	J. Dwight, Jr.	M	6/8	2	2
368212	5/7/1898	Okanagan, B.C.	J. Dwight, Jr.	M	0/0	?	2
368220	7/5/1906	Maple Creek, Saskatchewan	J. Dwight, Jr.	M	7/9	2	2
368221	7/5/1905	Maple Creek, Saskatchewan	J. Dwight, Jr.	M	0/0	?	1
368223	4/29/1918	Menard, Texas	Austin Paul Smith	M	0/0	?	2
368226	6/4/1918	Taos, New Mexico	Austin Paul Smith	M	0/0	?	2
368227	7/5/1906	Maple Creek, Saskatchewan	J. Dwight, Jr.	F	0/0	?	1
368228	6/4/1918	Taos, New Mexico	Austin Paul Smith	M	0/0	?	2
368278	7/19/1917	Okanagan, B.C.	J. Dwight, Jr.	F	0/0	?	2
519495	12/3/1895	Huachuca Mts., Arizona	H. Kimball	F	0/0	?	2
707778	12/23/58	Bronx Zoo, NYC, NY	P.A. Buckley	F	0/0	?	2
761869	2/2/1915	Kerrville, Texas	Dr. L.C. Sanford	M	0/0	?	2
768791	6/21/1963	Crook, Colorado	L.L. Short, Jr.	M	8/10	1	0

Table 2 - Royal Museum of Toronto, Canada Spotted Towhee Specimens

Museum Number	Date Collected	Location Collected	Collector	Sex	Left/Right Primary Patch Length	Sibley Score	Mantle Score
33144	7/30/1939	Ft. Carlton, Saskatchewan	F. Mowat	F	4/0	2	1
33264	6/5/1939	White Mud, Dollard, SK	P.M. Holmes	M	0/6	3	3
58873	5/28/1917	Eastend, SK	H.H. Mitchell	M	2/2	3	1
58881	5/10/1905	Crook Co., Wyoming	P.B. Peabody	M	0/0	3	1
58882	5/13/1902	Ft. Logan, Colorado	A.H. Felger	M	0/0	4	3
58883	5/19/1929	Cherry Co., New Brunswick	F.M. Dille	M	9/5	3	2
58885	7/11/1922	Willow Bunch, Saskatchewan	H.H. Mitchell	M	0/0	3	3
70827	6/19/1906	High River, Alberta	W.E. Saunders	M	4/5	3	1
75307	5/25/1937	Dundurn, Saskatchewan	F. Mowat	M	0/0	2	0
101454	6/15/1968	Walsh, Alberta	J.A. Dick	M	0/0	4	3
104211	6/5/1970	Shelby, Montana	F.W. Schueler	M	0/-	4	3

Table 2 - Royal Museum of Toronto, Canada Spotted Towhee Specimens (cont.)

Museum Number	Date Collected	Location Collected	Collector	Sex	Left/Right Primary Patch Length	Sibley Score	Mantle Score
106781	6/11/1970	Eston, Saskatchewan	J. Rising	M	-/2	3	2
106782	6/5/1970	Shelby, Montana	F.W. Schueler	M	-/2	4	2
106783	6/10/1970	Eston, Saskatchewan	F.W. Schueler	M	-/2	3	3
106784	6/10/1970	Eston, Saskatchewan	J. Rising	M	-/0	3	1
106785	6/13/1970	Estuary, Saskatchewan	J. Rising	F	-/0	4	3
106786	6/11/1970	Eston, Saskatchewan	J. Rising	M	-/5	2	1
106787	6/13/1970	Estuary, Saskatchewan	J. Rising	M	-/0	4	3
106788	6/4/1970	Shelby, Montana	F.W. Schueler	M	0/-	4	2
106789	6/14/1970	Estuary, Saskatchewan	P.L. McLaren	M	0/-	4	3
106790	6/13/1970	Estuary, Saskatchewan	J. Rising	M	0/-	2	1
106791	6/27/1970	Estuary, Saskatchewan	F.W. Schueler	M	-/4	2	1
106792	6/8/1970	Lancer Fy., Saskatchewan	F.W. Schueler	M	0/-	4	3
106793	6/2/1070	Shelby, Montana	F.W. Schueler	M	0/-	4	3
106794	6/4/1970	Shelby, Montana	F.W. Schueler	F	-/0	2	0
106795	5/31/1970	Writing-on-Stone Prov. Pk., AB	P.L. McLaren	M	5/-	3	1
106796	6/11/1970	Eston, Saskatchewan	J. Rising	M	-/0	2	1
106797	5/21/1970	River Hurst, Saskatchewan	J. Rising	M	1/-	4	3
106798	6/13/1970	Estuary, Saskatchewan	J. Rising	M	-/0	4	2
106799	6/14/1970	Estuary, Saskatchewan	P.L. McLaren	M	4/-	3	3
106800	6/27/1970	Estuary, Saskatchewan	F.W. Schueler	F	0/-	4	3
106801	6/10/1970	Eston, Saskatchewan	F.W. Schueler	M	0/-	4	3
106802	6/10/1970	Eston, Saskatchewan	F.W. Schueler	M	-/3	2	2
106803	6/27/1970	Estuary, Saskatchewan	F.W. Schueler	M	0/-	3	3
107190	6/10/1970	Eston, Saskatchewan	J. Rising	F	-/0	4	1
107191	6/13/1970	Estuary, Saskatchewan	J. Rising	M	19/-	2	1
107192	6/3/1970	Shelby, Montana	F.W. Schueler	M	-/0	4	1
107193	6/14/1970	Estuary, Saskatchewan	P.L. McLaren	M	-/0	4	3
107194	5/28/1970	Writing-on-Stone Prov. Pk., AB	J. Rising	M	-/0	3	1
107212	6/9/1970	Eston, Saskatchewan	J. Rising	M	0/-	4	2
107214	6/27/1970	Estuary, Saskatchewan	F.W. Schueler	M	-/9	3	1
107215	6/12/1970	Estuary, Saskatchewan P.L.	McLaren	F	0/-	3	1
107216	6/14/1970	Estuary, Saskatchewan	F.W. Schueler	M	0/-	3	2
107217	5/29/1070	Writing-on-Stone Prov. Pk., AB	F.W. Schueler	M	-/0	4	3
107218	6/13/1970	Estuary, Saskatchewan	J. Rising	M	0/-	3	0
143392	7/8/1958	Buffalo, Alberta	J.D. Soper	F	0/0	4	3