Turdus migratorius phillipsi Bangs

Turdus migratorius phillipsi O. Bangs, *Proc. Biol. Soc. Wash.*, 37:125, 1915 (Las Vigas, Vera Cruz).

Similar to *propinquus*, but darker and often browner dorsally; a brighter hue of ochraceous and often less reddish ventrally; averaging blacker on the throat; and with fewer white flecks ventrally. As compared with *caurinus*, more ochraceous, less ruddy ventrally.

The population of Jalisco and Michoacán approaches *propinquus* in that it averages paler dorsally and duller ventrally than that of eastern Mexico and Guerrero. A few of the specimens from eastern Mexico (Hidalgo, Vera Cruz, etc.) are perhaps slightly ruddier, less ochraceous ventrally than any comparable ones from southwestern Mexico (Guerrero), but the tendency is difficult to discern and in my opinion does not even approach the order of a subspecific distinction. In other words, I regard *T. m. permixtus* Griscom as a synonym of *phillipsi*.

Range: (based on specimens examined) Resident from Jalisco, Michoacán, and Nuevo Leon south to Guerrero and Oaxaca.

Mexican Specimens Examined.—Sixteen specimens are unidentifiable to race because of lack of sexing, or questionable sexing, in conjunction with worn plumage. Spotted juveniles are not included. Migrant and wintering specimens are included.

T. m. migratorius—Yucatán 1, Vera Cruz 1, Nuevo Leon 2.

T. m. propinquus—Guerrero 6, Michoacán 1, state of Mexico 1, Guanajuato 1, Zacatecas 14, Durango 6, Chihuahua 13, Sonora 4.

T. m. phillipsi—Jalisco 17, Michoacán 11, Nuevo Leon 1, state of Mexico 3, Hidalgo 1, Federal District 1, Puebla 1, Vera Cruz 2, Oaxaca 1, Guerrero 76.

J. DAN WEBSTER, *Hanover College, Hanover, Indiana,* and *California Academy of Sciences, San Francisco, February 27, 1959.*

Octaves and kilocycles in bird songs.—In recent years physicists have discovered a means of recording sounds in visible marks. This is by machines such as the audiospectrograph (Kellogg and Stein, 1953) and the vibralyzer (Borror and Reese, 1953). The markings produced in this way are similar to those that I have made representing sounds heard by ear, in that time is represented horizontally and pitch vertically. There are other differences, however, that need explanation so that we may understand both kinds of records.

In the mechanical records pitch is measured in kilocycles. When I first studied the physics of sound the term used was vibration. Brand (1935) used the term frequency. Although technically different terms, cycle, vibration, and frequency have been used by different authors to represent the same attribute of bird song.

In the methods I have used in recording bird songs the pitch is measured in octaves. The octave differs from the kilocycle in that each octave contains twice as many cycles as the previous one (or half as many as the following one). To put it mathematically, in the kilocycle the cycles increase in an arithmetical progression, but in the octave in a geometrical progression. Therefore, the first kilocycle, from 0 to 1000 cycles, begins below the limit of man's hearing and contains all of the octaves up to just below C_5, as Brand (1935) designates it. This is C'' in the method I (1951) used in the Guide to Bird Songs. C'' contains 1024 cycles. The next kilocycle is almost coincident with the next octave, which extends from 1024 to 2048 cycles. After that, the two octaves from C''' to C''''', the place where the songs of most of small bird singers are pitched, contains no less than six kilocycles.

A division of the octave is a tone. We cannot say just how many cycles a tone contains because that depends on just where it is in the musical scale. For example, the difference in pitch of the two notes in the "phoebe" whistle of the Black-capped Chickadee (*Parus atricapillus*) is not always on the same pitch, for an individual bird may sing it from B to A, and then change and sing it from A to G. I do not mean to imply that the pitch of the bird note is exactly what musicians refer to as concert pitch, but I do mean that if the bird's A is a few cycles off concert pitch, its G is also off enough to make the interval a perfect tone.

A great many of our bird songs contain intervals based on tones and their multiples: thirds, fourths, fifths, and octaves. The most common form of the song of the White-throated Sparrow (*Zonotrichia albicollis*), for example, has a perfect fourth between the first and second notes (Saunders, 1951:269, Fig. 159, No. 1). It is as if the bird sang its *Old Sam* on the notes "sol do." In the song of the Ruby-crowned Kinglet (*Regulus calendula*) the interval between the first and second parts is frequently, but not always, an exact octave (Saunders, 1951:153, Fig. 80). Natural music of both man and birds has been that way since long before man invented our present system of writing music. Chords and harmonies are recognized without realization of what it is that makes them such. Some people may not appreciate this due to a lack of musical "ear." Others, who are naturally musical, but not trained to know just what it means, may appreciate such things. When a group of men and women sing together some familiar air, the men actually sing one octave lower than the women without realizing it. They could not possibly sing one kilocycle lower. Those who have no musical "ear" should not attempt to describe bird songs, nor to criticize those who do so, any more than a color-blind person should attempt to describe birds' plumages.

The mechanical method of recording, because it relies on kilocycles, rather than octaves, seems to hide the music in bird songs. On the other hand it does show things that recording by ear cannot. In the study of the Wood Thrush (*Hylocichla mustelina*) songs (Borror and Reese, 1956), it shows that the bird can sing three notes at the same time. This is a matter that I once noted in a Cardinal (*Richmondena cardinalis*) when a bird sang two distinct songs at once, and I could hardly believe my ears (Saunders, 1923), so I am glad to have my experience corroborated.

In the matter of time, especially in very short notes or songs, the mechanical recordings are much more accurate than the stop-watch. The shortest time registered by a stop-watch is ⅕ of a second. Very short songs such as that of Henslow's Sparrow (*Passerherbulus henslowii*), or a single *chebec* of the Least Flycatcher (*Empidonax minimus*) cannot be timed shorter than this with a stop-watch, but the mechanical recordings show that the songs can be much shorter (Borror and Reese, 1954), and that in the Henslow's Sparrow a song that sounds like two notes may be as many as five.

Bird songs are characters of living birds that have just as much to do with distinctions between species as do the characters that are retained in bird skins. The audio-spectrograph has shown that two different kinds of Traill's Flycatcher (*Empidonax traillii*) occur in central New York, and photography shows that they build distinctly different nests (Kellogg and Stein, 1953). This would seem to be good evidence that they are different forms, but the taxonomists have not indicated at what taxonomic level.

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ARETAS A. SAUNDERS, *P. O. Box 141, Canaan, Connecticut, May 8, 1959.*

Early and elaborate nests of the Killdeer in Hancock County, Ohio.—The beginning of the nesting season for the Killdeer (*Charadrius vociferus*) in Ohio is usually given as "April," although it sometimes begins in March. On March 31, 1946, I found a Killdeer nest containing four eggs in front of the clubhouse of the Skeet Club, two miles southeast of Findlay, Ohio. On March 24, 1945, I found a nest containing three eggs in a stone quarry in Findlay. A fourth egg was laid on March 26.

The Killdeer may build a nest more often than is popularly supposed. Of 10 nests found in recent years, two have been elaborately constructed. One of these was found between two rows of plants in a soybean field on June 30, 1948. It contained four eggs. This nest was built in a slight depression, the bottom of which was paved with small pebbles. These stones were flat and about half an inch wide.

The other elaborately constructed nest was the March 24 nest mentioned above. This nest was four inches in diameter, placed in a slight depression, and surrounded by a rough circle of eight pieces of limestone, averaging two inches in height. The area between these rocks had been paved with approximately 180 flat pieces of limestone and coal. The paving material toward the center of the nest averaged one-fourth inch in diameter. The outer edge of the nest was higher than the center and consisted of larger pieces of stone and coal averaging one-half inch in diameter. The four eggs in this nest hatched before 9:00 a.m. on April 19.—RICHARD STUART PHILLIPS, *834 Liberty Street, Findlay, Ohio, February 11, 1959.*

A hybrid White-crowned × White-throated Sparrow.—On several occasions at Fort Belvoir, Fairfax County, Virginia, in December, 1957, and January, 1958, several people, including P. A. DuMont, Donald Lamm, and I, had excellent views of what were thought to be at least three adult Gambel's Sparrows (*Zonotrichia leucophrys gambelii*). The birds were in a mixed flock of sparrows, including nine or 10 White-crowned Sparrows (*Z. l. leucophrys*). I collected one of the three supposedly Gambel's Sparrows on January 5, 1958, at Fort Belvoir. The specimen was prepared as no. 468554 (U. S. National Museum).

The specimen was not prepared until mid-May but was then compared carefully to specimens of the genus *Zonotrichia* in the USNM. In the opinions of Dr. Alexander Wetmore, Dr. John Aldrich, Dr. H. Friedmann, and Mr. H. G. Diegnan, specimen no. 468554 is a hybrid between White-crowned and White-throated (*Z. albicollis*) Sparrows, and not an example of Gambel's Sparrow.

The two most convincing characteristics which led to this conclusion are: (1) The very broad and large white loral area corresponding exactly in size and shape with that area in *Z. albicollis* (which is yellow in adults of that species). This same area in every specimen of *Z. l. gambelii* at the USNM is much narrower and more confined. (2) The coloration