Dear "Mulet" or "Meet" Notes of Buff-threatened Saltators really are hostile, this is a fact of some comparative interest. See also comments below.

Buff-threatened Saltators utter 2 types of Horse Notes. They utter Horse Notes which are apparently identical with those of studied Saltators. Captive individuals never heard to utter similar but shorter and (usually) much softer "whispered" notes during prolonged and violent disputes among themselves and with studied Saltators. These notes usually were uttered during contact fighting. Occasionally, they were uttered during brief "buzz" between fights (when the combatants were (v)exhausted) and/or immediately after a fight. In such cases, they were usually accompanied by gaping. In one case, they were also accompanied by Belly-fluttering and drooping of the wings (as below). They appeared to function as threat. They probably were purely hostile and were high intensity produced when both attack and escape tendencies were very strong. The attack and escape tendencies may have been approximately equal to one another. Contact, escape was not as predominant as in all or most "Meet" "Notes, but attacks may have been less predominant than in the Horse Horse Notes of many related species. Buff-threatened Saltators do not utter Horse Notes (considering all the Horse patterns as a unit) as frequently as do studied Saltators, CBT's, or GBS's. They utter other calls and notes in many of the social situations in which the latter species utter one or more types of Horse Notes. In this respect, Buff-threatened Saltators resemble Yellow-rumped Tanagers. It is possible, in fact, that the only two Horse Patterns of B's are structurally equivalent to the only two "pure" Horse patterns of Yellow-rumped Tanagers, produced by the same combinations of tonal, of similar strength and unisecuring the same function (6).

Wild Buff-threatened Saltators were not heard to utter the softer type of Horse Note—probably because contact fights are relatively rare in
under natural conditions. Where there is plenty of room in which to maneuver an attacked bird usually retreats from its attacker, at least temporarily.

Both wild and captive Buff-throated Saltators utter sharp "Tit" or "Fit" Notes very frequently. Sometimes these notes are uttered by themselves alone, i.e. not in close association with other types of vocal patterns (see also below). Sometimes they are uttered swiftly or repeated at relatively long (and irregular) intervals. Several individuals were heard to utter such patterns in ambiguous but probably largely hostile circumstances. It is possible that single "Tit" or "Fit" Notes are largely or completely homogeneous with the Short Hostile Notes of related species. They sound very much like the Short Hostile Notes of some populations of Silver-billed Tanager (Ramphocelus carbo) and Black-throated Tanagers (R. mysteriosus).

The typical Rattles of Buff-throated Saltators are more or less prolonged series of short, harsh notes uttered in more or less rapid succession, but they probably are shorter and slower in tempo on the average, than the typical Rattles of Yellow-rumped Tanagers or Adercephalus species. They usually begin abruptly. All or most of them could be transcribed as "tik tik tik tik..." or "fit fit fit fit...". Captive Buff-throated Saltators uttered Rattles most frequeintly during purely or predominantly hostile encounters, especially during chases. I think that the Rattles usually were uttered by the chasing birds rather than the birds being chased. In the wild, Rattles were heard to be uttered by individuals moving actively near other individuals who may have been either territorial rivals or potential mates. The individuals uttering Rattles in these circumstances sometimes performed overt hostile movements, and usually tended to advance toward their opponents or partners. On the other hand, an individual uttered many Rattles (without any other calls or notes) while it performed many supplanting attacks. Once another individual utt
Several times, wild birds were heard to utter unusually soft
but otherwise typical R's when joining other individu
als, females, or mates. These patterns were reminiscent of the "Huffat R's" of
some related species.

and many Rattles and many "Warble" (see below) while pursuing a (usu-
ally) territorial rival. Once, I or both birds of an apparently mated pair
uttered a few Rattles when the two birds landed to gather. (This is certainly
not, however, the only "greeting" pattern of the species — see below,) It seems
likely, therefore, that Rattles are at least partly hostile, and produced when the
rivaling to attack is at least slightly stronger than the tendency to escape.

It is highly likely that the Rattles of Buff-streaked Saltators are nothing
more than accelerated series of the "Hit" or "Fit" Notes; some times uttered
singly. Intermediate patterns occur occasionally. A bird may begin to utter single
"Hit" or "Fit" Notes at relatively long intervals, and then utter more notes of
the same type at progressively shorter intervals until the successive notes follow
one another as rapidly as in typical Rattles.

The most characteristic vocalizations of Buff-streaked Saltators
may be called "Warble." These are composed of Flourishes alone or (more fre-
quently) Flourishes and "Hit" or "Fit" Notes

Flourishes are clear, rather musical, bisyllabic or trisyllabic notes
of moderate length and (usually) moderate loudness. Typical Flourishes could
be transcribed as "Jsee-yoo", "Jaw-nee", "Jaw-see-yoo", "Jee-ba-who", and "J
sa-who-who." The different syllables of a single note are usually, or always
quite different in pitch. The basic form or outline of these patterns seems to
eventually identical with that of the Flourishes of Chlorocynthetes species an-
d Yellow-rumped Tanyagers (and their motivation may be equally similar —
see below). When they are uttered apart from "Hit" or "Fit" Notes, they ar
apparently always uttered in pairs or doublets. Usually the two Flourish-
es of a single doublet are very similar to one another, having the same num-
ber of syllables and similar changes in pitch.

In Warbles which include "Hit" or "Fit" Notes, the Flourishes ma
y be either single or double. In many Warbles, there is only one "Frit" or "Fit" note. In others, there may be two to six, uttered one right after the other in a tempo which is moderately rapid but noticeably slower than that of typical Rattles. Single notes and series of this type are usually or always uttered simultaneously before the first (or only) "Frounch" (s). In some series, all the notes are eventually similar in identical or pitch. In other series, one or more notes may be conspicuously higher or lower than the others. This variation is always irregular, series are never consistently ascending or descending throughout. (It is of course, the irregular variation of pitch, in combination with the moderately rapid rhythm that produces the actual warbling effect.)

Warbles are uttered by solitary or single Buff-striped Saltatoris in exactly the same range of circumstances, during the breeding season, and during the same periods of the day, as the Day Songs of Striped Saltatoris. They probably also are true songs. A solitary bird uttering Warbles is usually joined by its mate or a potential mate. Warbles also are uttered in a variety of possible or certainly hostile circumstances. They are common during disputes between territorial neighbors, and between individuals of the same sex in captivity. Some times they are combined with obviously hostile Bell-up Postures (see below). They may be uttered as a sort of "triumph ceremony" by the victor of a fight, after its opponent has fled. They may be uttered as "greetings" by mutually friendly when one joins the other or both land together. As far as I could tell, all types of Warbles are uttered in every one of these situations (although not in exactly with equal frequency). It seems likely that Hoopoes are at least partially sexual, as they are similar to Dawn Calling Notes in sound (see below). The "Frit" or "Fit" Notes are almost certainly at least partly social (as is indicated by their relationship to Rattles).
The Rattle may even affect the Howl and part of a Hurtle. The
Howl of one captive individual acquire a rattling under tone
when it uttered many Rattles and Howles during a prolonged dispute
called saltators, they are probably homologous with part of the latter. When
the two patterns are analyzed in detail, certain striking similarities in form are
apparent. The fluctuations of pitch in some Howl and a similar to that in the
Hurtle of Panamanian Studied Saltators. The grouping of Howles in double
notes is paralleled by the double Hurtle of the studied saltator studied in this
work. The "Jit" or "Hit" Notes occur before Howles in the same way that
the "Dub" Notes occur before Hurtle, and the rhythm of series of "Jit" or
"Hit" Notes is similar to that of series of "Dub" Notes.

The "songs" of Costa Rican Buff-throated Saltators, which include
Howles as "cheer, cheer, cheer" and "cheer to you" may be Howles like the
Howles of Panamanian birds. Hutchins says that those patterns usually are sung when
suspiciously by mate birds. He apparently did not hear them during obviously
hostile encounters. It is possible, however, that some of the groups of two individu-
als which he took to be sexual pairs were, in fact, territorial rivals or
opponents.

The Howles of Panamanian Buff-throated Saltators frequently occur
with typical Rattles. Rattles may be uttered immediately before and
after Rattles. The sequence of one Rattle followed by one Howle is by far the
most common. Many of the Howles following immediately after Rattles seem
to be composed of Howles alone, or of Howles and only one "Jit" or
"Hit" Note (the single "Jit" or "Hit" being separated from both the preced-
ing Rattle and the following Howle by very brief pauses). It seems possi-
ble that preceding Rattles tend to "alleviate" the usual slower series of "Jit"
or "Hit" Notes. The Rattle-Howle sequences seem to be essentially seen to
be essentially identical with the Rattle-Howle Song of Brown-capped Bush
-teenagers. Similarly, the Howle-Rattle sequences seem to be complete ho-
logous with the whole of the complete Ray Song of studied saltators. Ours
usually, Buff-throated Saltators utter one “Tsit” or “Fit” Note immediately before a Rattle-Howl sequence. These performances may be longer or complete homologues with the “Jzz Lect” Note-Then Rattle-Howl Howl patterns of Yellow-rumped Tanager and/or the “Fit”-Rattle-Howl patterns of Brown-capped Bush-tanagers. The whole Warble pattern with or without Rattles also is strikingly reminiscent of some warbling patterns of Allies tail and other bush finches.

Buff-throated Saltators seem to utter Rattle-Warble combinations in much the same range of circumstances as typical Rattles alone. There are some indications, however, that individuals uttering both Rattles and Warbles are somewhat less aggressive, on the average, than individuals uttering only Rattles. Combinations of Rattles and Warbles are among the most common “Greeting” patterns.

The Warble and Rattle-Warble sequences of individuals not actively engaged in chases or actual fights are combined with Bill-up Postures or, more frequently, minimalized upright sitting postures similar to the postures accompanying Brown Calling (see figures —).

Dawn Calling is probably the least distinctive vocal pattern of the species. It usually is uttered in the same range of circumstances as the Dawn Calling of Steeled Saltators and many other finches and tanagers. The individual Dawn Calling Notes are very similar to those of Steeled Saltators in tone. Some of them may also be identical in form; but most of them are longer and include more syllables, up to four or five in many cases. Buff-throated Saltators are particular able to utter two slightly different types of notes; one having one more syllable than the other, in near, regular alternation. Typical Dawn Calling series might be transcribed as “Whoo-ew Whee-ew Whee-ew Whee-ew Whoo-ew ...” and “Tee-a-ee-ee-yoo tee-a-ee-ee-yoo tee-a-ee-ee-yoo tee-a-ee-ee-yoo ...”
(Sketches view calls the dawn calling of Costa Rican Buff-threatened Saltators as "tralee-e-e, tralee-e-e-e..."). All dawn calling notes of this type by themselves alone, sound very much like "hoo" noises. The Dawn Calling of one captive individual included a few single, loud, harsh "Cheeewick" Notes (all or most of which had rattling cinderstones), interjected at irregular intervals among softer five-syllabled notes of the usual type. These "Cheeewick" Notes probably are related to the Rattles and semi-rattling notes in some Dawn Calling performances of Thick-billed Saltators and Crimson-capped Tanager. The Dawn Calling of Buff-threatened Saltators usually is not accompanied by special movements. But one captive bird (not the individual that uttered "Cheeewick") was observed to perform slight wing movements during one burst of Dawn Calling. It plunged its wings upward, a fraction of an inch, each time it uttered a note, and lowered them again (to its usual resting position) between notes. I think that the wings also were quivered very briefly, slightly, and rapidly, while they were raised. This was reminiscent of the more exaggerated "Upward Wing-Quiver" which accompanies the Dawn Calling of Brown-capped Flicker Tanagers (and at least one species of Antipetes).

The hostile repertoire of Buff-threatened Saltators includes both special movements and vocalized gestures, in addition to the calls and notes cited above. Among these are Gaping, "Crest-ruffling", "Bowling" (and Ponting), Head-lowered Postures, Bill-up Postures, Lateral Stuffing and Belly-ruffling. Bill-up Postures were observed to be performed by both captive and wild individuals. All the other patterns were seen only during disputes among captive individuals. Crest-raising may have been overlooked in the wild because it is inconspicuous. The remaining patterns probably are produced only when motivational conflicts are obvious. They were observed only during prolonged disputes between individuals in close proximity to one another. They may be performed
med relatively rarely in the wild simply because prolonged "cloe-range" disputes are rare under natural conditions (see above).

The Gapung seems to be basically similar to that of Striped Saltators in form. It is almost confined to actual fights. It may be silent or (less frequently) accompanied by Horrse Holes. It usually is not combined with other display components (except ordinary locomotor patterns), but once a bird was seen to perform buff Gapung while sitting on a smaller bunched picture with Crest-raising and Belly-ruffling at the end of a particularly prolonged dispute (see below). The Gapung of Buff-streaked Saltators may be slightly less aggressive than the corresponding pattern of war-related species. It often is performed by individuals which appear to be slightly on the defensive. It seems to function as threat.

Crest-raising is a simple erection of all the feathers of the crown (see figure – ). It is conspicuous because the crown feathers are not flattened. It is most frequently performed by itself alone, without any other display. I have seen individuals perform simple Crest-raising of this type as a reaction to the mere approach of other individuals. Occasionally, Crest-raising is accompanied by Belly-ruffling, Gaping, Bowing, Waddles and/or Rattles. Very rarely, there may be a slight trace of Crest-raising (partial erection of the crown feathers) superimposed upon Head-Lowered or Bell-up Postures. It is possible that the Crest-raising of Buff-streaked Saltators is primarily an expression of escape motivation, like the morphologically similar patterns of many related species.

The Head-Lowered Posture is not very exaggerated in form, and may be only slightly ritualized. The head is brought down to shoulder level, while the bill points straight forward. This is usually, but not always, accompanied by Lateral Fluffing (see figure – ). Head-Lowered Postures may
be combined with proroting, and may be used as the "low posture" during Bow- 
ing (see below). They obviously are aggressive. They are assumed most frequently 
by attacking birds immediately before attack.

In Lateral Huffing, all the feathers of the flank and sides are raised. This greatly increases the lateral dimensions of the bird, performing the patt ern. Such a bird looks very broad when viewed from the front or rear. In all 
or most Lateral Huffing, the feathers also are erected in such a way as to form 
two "tufts" or "peaks" on each side, rising diagonally upward to cover the lower 
edges of the wings. The anterior tufts may be large and conspicuous enough to 
look like "false wings." (This is difficult to describe in words, but it is illustrated 
in Figure...). Lateral Huffing is almost an integral part of the Head-Covered 
pattern. The only other postures with which it may be associated are some un- 
usual Bill-up patterns which probably are partly intermediate between typical 
Bill-up Postures and typical Head-Covered Postures.

In typical Bill-up Postures, the head and bill are pointed almost verti- 
cally upward, while the body and tail remain in a diagonal position or approxi-
ately horizontal (see Figure...). Most Bill-up Postures are accompanied by som e degree of Belly-ruffling. The wings are usually drooped, but not spread, ex-
cept when Lateral Huffing is also present. Bill-up Postures are usually silent.
They often serve as "high postures" during Bowing, and may be combined wi 
ith proroting. Occasionally, they are accompanied by Warbles, Rattles, and/or 
"Wheet" Notes. They obviously are less aggressive than Head-Covered Postures.

Bowing is a more or less rapid alternation of up and down movement.
A Bowing bird alternately stands with its head held high and with its be-
ad held low. Performances of this type are stereotyped enough to suggest that 
they have become slightly ritualized, but they are variable in some aspects of its
Sometimes the high postures are Bill-ups. Sometimes they are nothing more than ordinary, "alert-looking" upright postures. Sometimes the low postures are entire head-lowered Postures. More often they are less exaggerated. In many cases, the downward component of Bowing is nothing more than a brief downward "sleet" of the head and neck. The time spent in low and high phases is different in different Bowing performances, and may even vary within a single performance, presumably in accordance with the relative level of aggressiveness in the performing birds.

Pivoting is composed of lateral movements. A pivoting bird looks from side to side, usually swiveling the whole head, neck, and body together. This is much more irregular in form than Bowing, and probably is not ritualized per se. It may be combined with, or alternated with, or performed quite apart from Bowing. It obviously is the result of conflicting tendencies to advance and retreat. Both Bowing and pivoting, as well as being accompanied by Wing-stretching and Tail-slip, are movements and extreme Tail-sunning.

The Bill-up Postures, Bowing, and pivoting of Buff-crested Saltators are very reminiscent of Altiangoes and other bush-finders, many of which perform similar (or even more exaggerated) patterns in similar circumstances.

The Belly-ruffling of Buff-crested Saltators is a raising of all the feathers of the lower breast and belly. They usually, or always are raised in such a way that their tips are conspicuously separated from one another. A moderate degree of Belly-ruffling usually accompanies Bill-up Postures (see figure — ). The most intense Belly-ruffling observed was performed by an exhausted and defensive individual which had been already and attacked repeatedly, by another individual over a period of a half hour or more. This was combined with Neck-raising, Lateral Ruffling, and (Buff) Gapwing (see figure — ). The whole combination of patterns was very reminiscent of the Hu
Fled. Hunch "patterns of many related species.

Baffled saltators were not observed to perform copulatory patterns. Perhaps they tend to copulate in dense vegetation than do steeled saltators.

THE GRAY SALTATOR (S. coerulescens)

A few Gray Saltators were observed in the countryside near Iquitos, Peru, between December 14 and December 24, 1938. They were found along the edge of second growth forest and scrub and did not seem to be more gregarious than other species of the genus. According to Hellmayr (op. cit.), the Gray Saltator of this region belong to the subspecies coerulescens.

Some individuals (known or presumed males) uttered loud phrases which appeared to be dry songs whenever they found themselves alone. These phrases were composed of "Dulh" Notes and Whistles which sounded very much like the corresponding patterns of Streaked Saltators. The form of the phrases was somewhat variable. One individual, for instance, uttered some phrases which counted of four or five "Dulh" Notes followed by one long Whistle, and other phrases of one "Dulh" Note followed by two long Whistles followed by two more "Dulh" Notes followed by one more, rather short, Whistle. Most dry songs were uttered from the rather exaggerated, but not necessarily ritualized, upright posture illustrated in figure —.

Some of the same individuals also uttered much softer phrases composed of a few "Dulh" Notes followed by one Rattle. One individual (at least) uttered these soft phrases when it was "semi-violated", i.e., when there was another individual (possibly its mate) in the neighborhood but not close by.

Several individuals were heard to utter metallic (and possibly shrill) "Nutt" Notes.
Perhaps the most interesting vocal patterns were Hoarse Notes. They usually were uttered in series (sometimes very long series) which might be transcribed as "Kahk kahk kahk kahk ...". They were uttered most frequently as "Greeting" patterns, whenever one bird landed beside another (presumably its mate, in all the cases I observed). These performances were very reminiscent of the series of the dawn Hoarse Notes and "Chalk" Notes uttered by Green-billed Sparrows and Fledgling Saltators in similar circumstances. Unlike the latter species, however, the Gray Saltator also uttered many Hoarse Notes during "Duets" between mate birds quite apart from "Greetings" or landing. It was not uncommon to hear an individual utter a series of Hoarse Notes while it was sitting beside its mate, after the two birds had been close together, continuously, for some minutes. In most cases, the mate responded by uttering a similar series of Hoarse Notes. Usually, the responding bird began its Hoarse Notes only a few seconds after the first, and the series of the two birds overlapped very broadly. Sometimes one member of a pair would utter a few "Foot" notes and/or very long notes in addition to (perhaps even instead of) Hoarse Notes during a duet. Sometimes the members of a pair would "Duet" repeatedly at very short intervals. In most cases, it was impossible to identify the stimulus releasing duetting. Duetting birds usually did not perform overt hostile movements. In one peculiar case, a known male repeatedly began to utter very long notes while sitting close to a presumed female. Each time it did this, its partner responded by uttering a series of Hoarse Notes. As soon as this began, the male stopped its long song phrase and began to utter Hoarse Notes too. The Hoarse Notes obviously are very contagious.

One apparently successful copulation attempt was observed. The female performed elaborate displays beforehand, while the male was several yards away from her. Just as she uttered a few single notes that were both metallic and strident, the male began to utter a series of Hoarse Notes. This might be transcribed by something like "Kahk". Then she assu
neared a Bill-up Tail-up Posture, ruffled her bill feathers, and performed a wing-quivering with her wings held out and slightly drooped (see figure). At the same time she uttered neural Rovene Notes (probably) followed by one or two Rattle. After the copulation, one of both birds uttered more Rovene Notes.

THE BLACK-HEADED SALTATOR (S. atriceps)

Black-headed Saltators were studied in most of the same areas of central Panama, during the same period of time, as Buff-throated Saltators.
The Evolution of Song and Song-like Patterns in Some New-World Parakeets

I. Neotropical species, tanagers, honeycreepers. Present classification into families, sub-families, tribes, etc., not necessarily correct, but no doubt that all these groups closely related to one another.

II. Several vocal patterns present in some or all species of every group:

(a). Indefinite repetition of eventually similar notes throughout the day in some groups. Probably the primitive condition. Conformed to early morning in other groups. “Dawn Calling.” In 1957.


(c). Shrill, harsh, rattling notes. Hostile.

(d). Juvenile “rub-song.”

III. Definition of song:

Thorpe’s.

Muir.

IV. Evolution song-like patterns:

(a). Indefinite repetition single notes last in some species, confined to early morning in others — but otherwise very conservative in form. Why? Worthwhile to attract females of other species? Dangerous to alter form successful display.

(b). No “real” song some species. HN’s and PN’s update.

(c). One or more “real” songs other species. HN’s and
PN's circuit

(a) It is only on these species that DC has disappeared (?)
(b) In some cases WS has taken over song functions and place. Why?
(c) One of the advantages of sub-song is that it provides a "reservoir" of more or less "undifferentiated" sounds which can be drawn upon in case of need.
DISPLAY PATTERNS OF TROPICAL AMERICAN "NINE-PRIMARIED" SONGBIRDS

V. Saltator

M. Moynihan

This is the fifth in a series of papers on the ritualized, social signal, behavior patterns of some tropical American finches, tanagers, and honeycreepers. The preceding papers of the series were concerned with the genera Chlorospingus, Ramphocelus, and Arremonops (Moynihan, 1962b, 1962c, 1963, and 1965). The following account will include brief descriptions of some patterns of five species of Saltator, large "grosbeak" type finches. These species were not studied in detail, but enough of their behavior was seen to permit a partial evaluation of the comparative position of the genus.

THE STREAKED SALTATOR (S. albigollis)

Wild individuals of this species were observed in the Canal Zone and adjacent parts of the Republic of Panama at irregular intervals between March, 1958, and April, 1962. In addition, a few individuals were trapped in some of the same areas, and kept and studied in large aviaries on Barro Colorado Island. According to Hellmayr (1938), all these birds should have been representatives of the subspecies isthmicus.

Like all the other species of the genus with which I am familiar, Streaked Saltators seem to prefer "edge" habitats, especially the edges of second-growth vegetation, scrub and small trees. They seldom go very far inside dense scrub, and usually range from three to twenty-five feet above the ground, seldom or never coming down to the ground itself. Some aspects of their general social behavior in Panama are described in Moynihan (1962a). They are not very gregarious. They...
pairs or small family groups of parents with one brood of one or two young. They usually do not associate with mixed flocks or individuals of other species during either the breeding or non-breeding seasons.

The account in Skutch (1954) would suggest that the general social habits and habitat preferences of Streaked Saltators in Costa Rica and Colombia are much the same as in Panama.

There is nothing very distinctive about the locomotory movements or intention movements of Streaked Saltators or any other species of the genus with which I am familiar. They all perform ritualized Wing-flicking and Tail-flicking movements which are not significantly different, in form, from those of Ramphocelus species or the Green-backed Sparrow (Arremonops conirostris). As in the latter species, Tail-flicking is often accompanied by fanning of the tail feathers.

The unritualized and slightly ritualized hostile movements and postures of Streaked Saltators seem to be equally undistinguished in form, but comparatively very rare, under natural conditions. Single individuals and mated pairs of the species apparently maintain territories or exclusive home ranges. The same individuals are found in the same areas for (at least) months on end. But I never saw an actual fight, or even close contact, between presumably territorial neighbors in the wild. The most vigorous hostile reactions observed were performed by a captive individual during disputes with a Buff-throated Saltator. Its hostility took the form of Gapint (sometimes silent, sometimes accompanied by Hoarse Notes — see below) and "head forward threat" postures (sometimes with Gaping, more often without).

Most of the displays of Streaked Saltators are vocal. Among them are "Tsit" Notes, a variety of Hoarse Notes, Day Songs (including "Duh" Notes, Whistles, and Rattles), and Dawn Calling.

"Tsit" Notes are sharp, thin, and not very loud. They may be uttered singly or in irregular series. They are uttered in a variety of circumstances, when
several individuals are more or less close together. Sometimes they are accompanied by escape movements or intention movements. They may be "contact" or "call" notes or (alternatively) alarm notes. (These "Tsit" Notes may be the same as the "tseek" notes which Eisenmann, 1954, heard uttered by wild Streaked Saltators on Barro Colorado Island.)

The Hoarse Notes can be divided into three main types. An individual caught in a trap (or held in the hand) utters long, loud, urgent-sounding "Hoarse Screams," quite like those of many related species. These probably are purely hostile and high intensity, i.e. produced by very strong motivation. Similar but softer notes were uttered by the captive individual disputing with a Buff-throated Saltator. They were closely associated with overt attack movements, and presumably were aggressive and of moderate intensity. They appeared to be essentially identical with the "Harsh Hoarse Notes" of Green-backed Sparrows and Crimson-backed Tanagers (Ramphocelus dimidiatus). Both these types of Hoarse Notes seem to be much less common than the third type, which may (for want of a better name) be called "Chah" Notes. "Chah" Notes are usually or always uttered in short series. In many series, the successive notes become progressively shorter and lower in pitch; but all the notes of some series are slightly longer than the corresponding notes of other series. The longest "Chah" Notes may be slightly bisyllabic and could be transcribed as "Cha-ah". The shortest notes end very abruptly and might be transcribed as "Chak" (some are almost "Chuk"). Intermediates between the longest and shortest notes are common, i.e. the two extremes seem to intergrade completely. "Chah" Notes of all types are uttered most frequently when one individual joins another (its mate or another member of its own family group), and when two or more individuals are moving about in more or less close proximity to one another. Occasionally, they are uttered by apparently single individuals landing alone. Thus, they appear to be "greeting" or "landing" patterns like the "Medium Hoarse Notes" of Green-backed Sparrows. The longer "Chah" Notes also
sound very much like Medium Hoarse Notes. This would suggest that the two patterns are, in fact, closely related, perhaps even strictly homologous. The shorter "Chah" Notes sound somewhat intermediate between the other Hoarse Notes and the "Short Hostile Notes" of Green-backed Sparrows and some other finches and tanagers. They may be related to both. (This is not really surprising. Even in the case of the Green-backed Sparrow, and in other species such as the Yellow-rumped Tanager, Ramphocelus flammigerus ieronotus, there are indications that Hoarse Notes and Short Hostile Notes are related or linked to one another in some way.) It is possible that all the "Chah" Notes of Streaked Saltators, although occurring in ambivalent situations, are purely hostile (as the Medium Hoarse Notes of Green-backed Sparrows seem to be). The longer "Chah" Notes are not very different in sound from the Harsh Hoarse Notes. They may be more aggressive than the shorter "Chah" Notes. (The Short Hostile Notes of other species seem to be produced when the escape tendencies are at least slightly stronger than the attack tendencies.) All or most of the "Chah" Notes may be lower intensity, produced by weaker motivation, than the Harsh Hoarse Notes.

Skutch (op. cit.) mentions "qua qua qua..." notes uttered by Costa Rican Streaked Saltators in flight. These may be the same as, or closely related to, the notes called "Chah" above.

During the breeding season, isolated and apparently single birds, presumably unmated males or males separated from their mates*, perform Dawn Calling early in the morning. As in related species, the Dawn Calling takes the form of series of notes uttered at regular intervals. The length of the series is indeterminate, ranging from very brief to very long (I heard one bird utter Dawn Calling notes almost without interruption for over an hour). Most of the notes in the Dawn Calling of Streaked Saltators are clear in tone (but not whistling) and could be

*It is usually impossible to distinguish between male and female saltators (of any species) by appearance alone in the field.
transcribed as "Kew" or "Kioo". They sound very much like the most common notes in the Dawn Calling of Crimson-backed Tanagers (which are abundant in many of the same areas as Streaked Saltators). It is, in fact, sometimes impossible to tell which species is uttering the notes when the performing individual is not in sight. Most of the "Kew" or "Kioo" Notes uttered by Streaked Saltators are very uniform in pitch. Sometimes, however, single notes which are very much higher in pitch but otherwise similar to ordinary "Kew"s are interjected in the series at irregular intervals. All or most Dawn Calling performances also include single brief Rattles, or "Kew" Notes with a pronounced rattling "undertone", as well as the clear notes. These rattling notes may be uttered in regular alternation with typical "Kew" or "Kioo" Notes, or interjected less frequently and apparently at random. These performances are reminiscent of the Dawn Calling performances of Crimson-backed Tanagers in which single guttural or semi-rattling "Kraa" or "Kraanh" Notes are interjected among typical "Kew"s. It seems very likely that the Dawn Calling of Streaked Saltators, or at least their "Kew" or "Kioo" Notes, are also similar to the corresponding patterns of related species in being produced by (thwarted) sexual motivation and functioning as a signal to attract or summon mates or potential mates.

The dawn "song" of Streaked Saltators in Costa Rica which Skutch transcribes as "chip rrr chup chup chip rrr..." is probably Dawn Calling like that of the Panamanian birds.

Eisenmann transcribes what seems to be Dawn Calling by Streaked Saltators on Barro Colorado Island as "chee-oo, chee-oo, chee-oo, cheeeee-oo" etc.

The most characteristic vocalizations of Streaked Saltators in central Panama are Day Songs. These are series of extremely varied notes. The series are always brief, i.e. more or less determinate in length. A typical "complete" Day Song begins with two or three short and rather "colorless" notes, each of which might be transcribed by something like "Duh". When three of these notes are uttered, the interval between the first and second notes usually is longer than the interval between the second and third notes. The first note often is
slightly higher in pitch than the second (and third). These introductory notes are followed by a long, clear, loud, and rather melodious Whistle. A typical Whistle might be transcribed as "Wheeeeeeoooolo". It usually begins at a high pitch and then descends steadily, or begins moderately high, ascends briefly, and then descends. The Whistle is followed by a Rattle, usually or always longer than the Rattles during Dawn Calling. This ends the performance.

The whole series of notes can be represented in diagrammatic form as follows:

Performances of this type apparently are uttered only by single or isolated birds, unmated or separated from their mates, during the breeding season. They probably are "true" songs, as the term is used in this series of papers. They probably attract individuals of the opposite sex and repel other individuals of the same sex. I was not able to prove this conclusively (because there were no overt reactions between neighbors or rivals); but the evidence, such as it is, is highly suggestive. Certainly, a bird uttering these patterns is usually joined by its mate (or a potential mate) sooner or later. And the form of the various notes would suggest that the motivation of the performance as a whole is ambivalent in the way that would be expected of true song. Rattles appear to be purely or predominantly hostile in all related species in which it has been possible to analyze their motivation. The "Duh" Notes seem to be related to hostile patterns of Buff-throated Saltators (see below). The Whistles, on the other hand, may be largely or completely sexual. Almost all the patterns of related species which are equally clear in tone, without any hoarseness or harshness or any trace of rattling, are known to be produced by sexual and/or other "friendly" tendencies.

Streaked Saltators tend to utter these patterns most frequently during the middle part of the morning, after Dawn Calling has ceased, and may continue
them throughout the day. The temporal distribution of these patterns is very
reminiscent of the "Rattle - Flourish Day Songs" of Brown-capped Bush-tanagers
(Chlorospingus ophthalmicus).

Some of the probable relationships between the individual components of
Streaked Saltator Day Songs and vocalizations of other finches and tanagers
will be discussed in more detail below, after the corresponding patterns of other
saltators have been described.

The Day Songs of Streaked Saltators in central Panama are quite stereotyped
in form. Only two variations are common. Sometimes the terminal Rattle is
omitted. Sometimes an extra, fourth, introductory "Duh" Note is inserted before
the Whistle.

There may be considerable differences between the Songs of Streaked Saltators
in different regions. All the Song phrases of one individual studied near Cerro
Punta on the Volcan de Chiriqui in western Panama were composed of introductory
notes like those of the birds in central Panama, followed by one long Whistle,
followed by one short Whistle, followed by another "Duh" Note. The Whistles them-
selves had a faint rattling undertone, but there were no pure Rattles. The only pat-
tern of Costa Rican Streaked Saltators described by Skutch which might be closely
related to part of the Songs of the Panama birds is "a refrain of four or five
whistled syllables, forming an exquisitely modulated crescendo, and with the last
syllable the longest".

All Panamanian Streaked Saltators utter their Day Songs from largely or
completely unritualized erect sitting postures (see figures 1a and 1b).

The major vocal patterns (or groups of patterns) of Panamanian Streaked
Saltators are quite "discrete". They do not intergrade with one another to any
appreciable request. In this respect, Streaked Saltators resemble most other
finches and tanagers and are very different from Yellow-rumped Tanagers.

Three copulation attempts by Streaked Saltators were observed in central
Panama. Two of these began when the male flew straight on to the back of the
female, uttering "Chah" Notes in flight. One of these copulation attempts was apparently successful, the other obviously unsuccessful. In neither case was there any other display by either bird before, during, or immediately after the attempt. The third attempt was a little more elaborate. A female landed in a tree, uttering "Chah" Notes as she did so. Then she fell silent, but assumed a Bill-up Tail-up Posture, with her breast lowered and all the plumage of the lower breast and belly fluffed or ruffled. At the same time, she stretched her wings out horizontally, but apparently did not quiver them. Then a male, who had been perched quietly in a tree about twenty feet away, flew straight on to her back and began copulatory movements immediately. The copulation was apparently successful. There was no post-copulatory display, but the two birds eventually flew off together uttering "Chah" Notes.

THE BUFF-THROATED SALTATOR (S. maximus)

Wild individuals of this species were studied in the same areas of central Panama as Streaked Saltators between March, 1958, and April, 1962; and captive individuals also were kept in aviaries on Barro Colorado Island. According to Hellmayr (op. cit.), these birds should have been examples of the subspecies intermedius.

Buff-throated Saltators are larger than Streaked Saltators but somewhat more slender in build. They often occur along the edges of scrub and second-growth forest which is somewhat taller (and presumably older) on the average than the scrub preferred by Streaked Saltators; but the territories or home ranges of individuals of the two species may be broadly or completely overlapping in many areas. Individuals of both species sometimes occur in the same trees. They may even sit or feed in the same branches — but apparently never simultaneously. I have never seen (or heard) any overt, positive, reaction between individuals of the two species (but this does not necessarily mean that the
behavior of either one or both species is not influenced by the presence or proximity of the other).

The general social behavior of Panamanian Buff-throated Saltators is strikingly different from that of Panamanian Streaked Saltators in one important respect. The Buff-throated Saltators of this region are not openly very gregarious among themselves. Individuals of different pairs or family groups do not usually join or follow one another in a "friendly" manner, or associate with one another in flocks. But territorial neighbors do approach one another with some appreciable frequency. (This must be an "intrinsic" difference between the two species, as populations of the two species seem to be approximately equally dense in many areas of central Panama.) As far as I could tell, all or most of the encounters between neighboring Buff-throated Saltators are largely or completely hostile. Panamanian Buff-throated Saltators certainly perform many more overtly hostile behavior patterns than Streaked Saltators in the same areas. They seem to be particularly likely to perform many conspicuously aggressive patterns, such as supplanting attacks and chases.

The account of Costa Rican Buff-throated Saltators in Skutch (op. cit.) would suggest that their general social behavior is at least very similar to that of the Panamanian birds. But Skutch also says that Carriker and others found Buff-throated Saltators in small flocks in some parts of Central America. It is possible, therefore, that gregarious tendencies are among the factors that cause Panamanian Buff-throated Saltators to approach one another, even when the approaches are not obviously friendly.

Panamanian Buff-throated Saltators may be associated with individuals of other species, of other genera, somewhat more frequently than are Streaked Saltators (Moynihan, 1962a); but this may be largely due to the fact that other species, especially those species which form mixed flocks among themselves, are more common in the trees preferred by Buff-throated Saltators than in the lower vegetation preferred by Streaked Saltators.
The "Wheet" Notes (all or most of which might be equally well transcribed as "Tseet") are clear, fairly high pitched notes of moderate length. They may be uttered singly or in series, sometimes short, occasionally long. They are uttered in a great variety of more or less ambiguous situations. I have heard such notes uttered by apparently single birds in the wild, by one or both birds of pairs in the wild, and by captive birds in close association with both overtly hostile and overtly sexual patterns. They are uttered much more frequently by birds in flight, or hopping rapidly from perch to perch, than by birds sitting still. Thus, they could be purely locomotory "flight calls" and/or hostile signals and/or sexual signals. It may be significant, however, that the longest and most rapid series of such notes heard during the present study were uttered by captive individuals escaping from more aggressive individuals during particularly violent disputes. This would suggest that many, perhaps all, "Wheet" Notes are purely or predominantly hostile, and produced when the tendency to escape is stronger than the tendency to attack. They may be related to the "Tsit" Notes of Streaked Saltators, and subserve the same or similar functions. (In many, perhaps most, other tanagers and finches, vocalizations which include clear "ee" sounds are purely or predominantly sexual. The only known exceptions, among the neotropical forms with which I am familiar, are Chlorospingus species and Atlapetes and related genera. If the
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my infant. Infant leaves. Adult continues grooming herself
Then I see pair adults or sub-adults performing Allegro music
9 feet away. I go to join them. One of the latter 2 leaves
Adults groom the remaining one. All animals apparently
silent throughout.

See one mid. just sitting, half asleep, on low branch.

A couple of juveniles playing not far away. Chasing one
another. Quite silent.

10:27. Now see four inds. sitting very close together.

3 ads. or sub-ads., 1 juv. Lts. of miscellaneous Allegro
music. All silent.

Several juveniles playing silently. More or less gazing
at other group.

One mid. grooms a mids, successively.

Then see "mock fight." Play wrestling involving
1 juv. and apparently 1 adult! Silent.

Then there is sound of branch falling. Followed by
bursting of branches and branch. Then quiet again.

Then rest period over 10:34 a.m. Juveniles leave group.

Followed by adults!!!

10:43. Brief but obvious real fight between
juveniles. Wrestling and straining with hands. With a fall.

Then the 2 mids. separate. Fall silent. And one immediately
does silent jump! Obvious redirection!!

Then see juvenile, or old infant following closely behin
d parent. Glittering still's constantly. In quite rapid success
Another gnu comes down to get bread. Again (?) utters brief M-like notes while coming down. Also while climbing up, again afterwards. Surely this is very Actus-like?

Hear BB some distance away. Jew: near us "answer" immediately, with a single-note "BB.

Hill and. Another rest period. Ad. & grooms join. Seint. Note: Min probably is lactating. Probably has calf out. But infant is not around now.
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IV. SOME SPECIES OF SALTATOR.

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Fighting & escape
Japing & head forward
Alarm Notes
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Copulations

THE GRAY SALTATOR (S. coerulescens)

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Short/Soft Notes
HAC
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Copulation
Head forward & 33 Call
Eisenmann (1932) BCE

Hellways (1938)

Maguban
1962 a  Mixed Species
1962 b  Chlorophyrge
1962 c  Some species Pemphigus
1963  Green Linched Spider
1964  Yellow-nipped Spider

Shutei (1954)
Chloropogon
Pamphileus
Amenonops rumonoris
Additional Pamphileus
Saltator
Cattapetes
Prunus - Phenocetus - Pitius - Cyanolampa
Hiraminus
Tangara
Parnavii
Cerebrum
Euphoeas
Hoplus - Oryzoborus
Valatiria - Embryoides - Phryoglus - Cattancaria
May 14, 1758

Two species of fallatons around here, the Buff-throated and the Streaked. Buff-throated = maximus. Streaked = albicollis.

One of each species has a nest in the top of a large, fairly large tree, uttering distinct notes. Both sitting in quite erect postures, apparently unmutilated. The notes themselves were small, doublets "Whoo-whoo", the second part of each doublet often having a noticeable quaver. The voice of the Streaked seemed to be much clearer, a purer than that of the Buff-throated. Both birds occasionally uttered single notes instead of the doublets, and the Buff-throated (at least) occasionally uttered triplets.

Now one of the Buff-throats came back to the same tree, and in the same way, but uttered different sounds. More elaborate "Dub dub dub dub dub whooo-oo". Perhaps like this — — — — ?? - The first part very rapid, almost semi-R-like, the latter a nice clear whistling. The whole thing somehow reminiscent of the "WS's" of the Blue and Palm Tanagers — more or less the same type of song. I think I shall call it "WS too". After the bird landed, and uttered about 5 of these "WS's", another Buff-throated came and landed on a branch a few feet away. Also uttered a few "WS's". The first bird also uttered a few more "WS's" in the next minute or so, but there didn't seem to be any particular arrangement of the "WS's" of the two birds, i.e. they weren't "singing"
Saltator, Mar. 16, 1958

in any definitely synchronous or anti-phonal manner. Then the first bird flew away, and the second did not. A little later Was it a pair?

Both species look ratti-c Thrappes. Once, except for the fact that they sit very upright (i.e. more Cardinal or Blue black sparrow-like, like Titmice). Very little flickering of any kind. As far as I know, none of the birds I have seen today, including this afternoon, see below, I have done any WP’s. One of the streaked Saltators I saw this afternoon did a very few TP’s, all very slight, and apparently V-D. (This is particularly surprising in view of the fact that several birds I have watched have been apparent ‘nervous’ of me, looking at me intently, and flying off as soon as I move toward them.)

A streaked we flushed this afternoon, immediately flew to the top of a tall bare tree, landing with 3 or 4 “chuck” like CN’s which sounded quite remarkably like some of the “landing” CN’s of Palm Tanagers in some circumstances.

Saltator I.

March 17, 1958
K-6

Flurried another streaked from low shrubbery this afternoon, and the bird hopped around in the nearby brush, uttering quite a lot of sharp, thin, “Jit” “Notes” — chucking of CN’s. Eventually, the bird flew up into a nearby tree and uttered “chuck” “Notes” (like those described above, yesterday) as it came into level. The “Jit” and “chuck” “Notes” seemed
to be quite distinct morphologically, and didn't intergrade at all. It is possible that the "chuck" contain an appreciable escape component, but it is probably much less than in the "Trit". Q.E., the "chuck" of this species — and presumably the flycatcher tanager as well — are produced by slightly different motivation than the rather similar-sounding "chuck" of the Red-throated Ant-tanager — see today's notes on Habra.

Saltator I
March 27, 1958
K-G

= Black-headed Saltator = atriceps

Saw one of these birds this morning, sitting on top of tall bush tree, in the usual erect Saltator posture. Whistling rather than high-pitched "Wee-hee". Notes: Preliminary CN's also gave a few high-pitched "Sue-sue" (Ill.) Could their be the equivalent of "song"? They were certainly rather reminiscent of Yellow-footed Grosbeak!!

Saltator I
March 30, 1958
Bano Colorado

I managed to catch 2 Saltators in my nets at K-G, one beak and one Buff-throated (beak unbroken). I have been keeping them in a small cage, where they have shown a little behavior.

When I caught them in the net (and every time I peak...
one up in my hands) they fight and behave just like Ant-Tanagers. Lots of it for — apparently indistinguishable from that of the Ant-Tanager.

I have now seen a little more of the Hihihi. The WF's are certainly rare in both these Saltators (as compared with many other tanagers) and relatively slight. Apparently always coordinated with T's, and the WF movements themselves are moving very slight (straight) upward movements of the (folded) wings, with little or no spreading of the primaries. The T's are more conspicuous (and perhaps commoner?). Very different in the 2 species (at least the 2 individuals I have in the cage). The tail of the Streaked seems to be "loosely attached" to the body, it seems to sort of flop around. It is possible that this bird's tail was somewhat damaged during capture — but I am not so sure about this as I once was. Anyway the T's of the Streaked are much more conspicuous and extreme than those of the Buff-Throat. Usually V-D, with quite a pronounced lateral component. But these T's are certainly less extreme than those of the Sauge-de-Tortoises or Blue-backed Grassquits. The T's of this Buff-Throat are very slight and quick movements, very difficult to see, usually V-D. Then, with little or no lateral component.

Thus a capture bird have done quite a little bit of fighting. Buff face to face pulling blunts, when they happen to come too close to one another on a perch. Usually accompanied (preceded or followed) by distinctive silent G's, apparently the same in both birds. Sometimes, during the longest and most obvious violent disputes, also accompanied by a few-
HAC Notes. These sound just like brief, low-intensity versions of H & C. (This is also true of other species of course, and I am now fairly certain that "HAC" and "H & C" are really intensity extremes of an essentially single pattern.) This HAC is also accompanied by pronounced opening of the bill like G. This makes it difficult to tell which bird is giving the call, but I am sure that the Steepled has, and I think the Buff-throat has too. It is fairly obvious that the HAC is higher in intensity than the silent G in many cases at least. It is also my impression that the HAC may be relatively more aggressive than the G. I think the Steepled, at least, tends to give HAC's when it is pecking at the Buff-throat most vigorously.

This captive Steepled seems to give many more sharp G's (all or most of which are ALCN's) than the captive Buff-throat. It doesn't actually appear to be more alarmed than the Buff-throat — which would indicate that its ALCN's appear at lower intensities of motivation than those of the Buff-throat.

Neither of these captive blackbirds has a really distinctive pre-flight posture like that of the Sauque de Loro; but they certainly tend to hold the body fairly horizontal (i.e., in a position quite unlike their usual sitting posture) when they want to fly a long or very frequent distance. Twice let both the capture birds loose in the aviary, and each time they have quit scuttled off, or footed, into the shrubbery and stayed skulking. Is this significant? (I think no.)
Later this afternoon, after the birds became a little used to the avenue, they emerged and I got a better view of their TF's. It turns out that the Buff-throat can perform quite as extreme TF's as the Streaked when it is really highly motivated, i.e., wants to fly very badly but is also greatly inhibited. Both kinds may fan their tails a little, during a between TF's. The usual course of their tails during extreme TF's are also somewhat reminiscent of the Rhamphotheca tanganyicae.

Well! No sooner said than done! I have now seen both kinds perform still another type of TF, Extreme V-D, without any lateral component at all.

Saltator I

April 1, 1958

Pauco, Colorado

The escape or alarm behavior of these birds does really seem to be rather distinctive. They both worked in the slumber almost continually throughout the first day in the avenue. Then, yesterday, the Streaked emerged and spent most of its time flying nervously back and forth around the top of the avenue, taking off in alarm every time I made a movement, i.e., it began to behave like very "nervous" individuals of most of the other species I am studying. Finally, late today, the Buff-throat emerged and began to fly about nervously like the Streaked.
This behavior is certainly very aggressive. Much more so than the Buff-throat.

Every time the Buff-throat landed beside the streaked this afternoon, the latter would turn toward the Buff-throat, lower its head & stretch its neck forward (this looked rather like an unvitalized version of the Egg fluff of the Pico Gordo or the C of the Tanager de Atos — without any fluffing) and utter HAC notes (sometimes preceded by momentary G’s, and accompanied by jabbing peeling out sounds). These HAC notes were relatively low-intensity. Anyhow, they were slightly softer and much less urgent sounding than HSC notes.

Saltator. II

Saltator. I

April 2, 1958
Bano, Colorado

The Buff-throat has remained outside the ground chuck ley all day; so I guess it is settling down.

This bird has also turned out to be quite aggressive. Time and again it has pecked at the Yellow-rumped Tanager which it often perches beside. Some of these attacks have been real “pecking bouts”; the Buff-throat standing more or less erect and delivering a real hail of downward pecks upon the poor tanager (who usually retires fairly soon). The most surprising thing is that all these attacks & aggressive acts have been completely silent! No rorri of HSC!! (And there are certain the circumstances in which the streaked would be uttering many HSC notes.)
I caught another Buff-throat near K-5 the other day
Banded yellow left and let loose in the aviary
The other Buff-throat has been very hostile to the newcomer
Every time the newcomer comes near the old bird flies or sprints
toward it in a supplanting attack, and the newcomer retreats immediatly. All quite unritualized. No sounds.

Saltator, I

April 7, 1958

An apparent dispute between two Buff-throats near K-5 this morning. One bird advancing without hesitation, the other retreating the same way. No apparent ritualized postures or movements, but both birds uttering calls which I shall term "Battle-peeps" (RP) from time to time during the encounter. Each RP divided into 2 parts. First a series of short, high notes (most frequent 3, I think, but some times more), followed by a more or less plantlike, melancholic whistle-like note (also not very long, but much longer than any of the preceding notes)

This looked rather like a territorial-boundary dispute, as the pursuer eventually turned away and went back in the direct way he came from.

I wonder if this is a variant of the WS I heard on March 16?? I certainly think so.
A single (♂?) striker has also been around this morning, singing from bare twigs on the top of tall trees. Song itself is very simple. When complete, it seems to be in 2 parts - like so many vocalizations in this group. First 3 notes rather sharp, and then a longer, more plaintive and whistling-like note:

```
dub dub dub dub
whiwhiwhi
```

Sometimes abbreviated by dropping out one of the first 3 notes, sometimes cut off without the last note. Given from an erect sitting posture, apparently unritualized. Wings drooped, bent not spread. The whole wings lifted out from nearly a little roosting with each note. 

A few of the notes, including some of the notes of the first part and the last longer note also, were accompanied by a "rattle undertone", but this was definitely not present in most of the scrols most of the time.

This would certainly seem to be a WS, strictly comparable and homologous with those of the Buff-titmouse.

This afternoon, back on 8C7, I watched the captive Saltator for a little while. Not much - just one interesting fact about the Buff-titmouse. When I first put the second Buff-titmouse (yellow left) in the aviary a few days ago, it did not shirk in the underbrush. Flew back and forth very eventually near the roof, but gradually settled down rather well. But today it does seem to be remaining very low in the brush. Presumably due to the aggressiveness of the first Buff-titmouse, which is strong, dominant and still attacks yellow left
wherever the batte comes too near. Yellow-left has only touched on the top branches in the avy, this afternoon when the fruit
buid has been down feeding.

I think it is safe to say, as a result of my observat-
uos of captive birds and wild ones in several areas, that we
her the Yellow-left and Buff-throated Saltators have the slight-
ent trace of gregariousness — at least at the present time.

Saltator I

April 10, 1958
Napoles

I had a few brief chances to hear WS's by streaked near
the RR station this evening. Apparently 2 different birds involved
their WS's quite different.

One bird gave a WS comme ca:

\[\text{WS sound}\]

Julie the WS
described on Apr. 7, p. 7, but the last long note usually followed
by a soft rattle. This "rattle" is really the same thing as the
"rattle undertone" mentioned above — and in some of the WS's
of this bird, it seemed to begin, somehow, before the last-long
note was finished. (This soft rattle must be produced by
some very different mechanism than the pure notes). This bird
gave its WS's repeatedly, again and again, picked by itself alone in
the top of a tree, without apparently wishing any response by
any other bird. Finally flew away and disappeared.

The WS's which were apparently given by another bird
were as follows:
Two notes with a real rattling undertone instead of one pure note and one pure soft rattle. Several times this bird added another doublet to this phrase. And once it uttered a long very abnormal WS which was almost pure doublet, very rough.

more recurring out of the WS of the Buff-throat described on May 16, p. 1 of the WS of the Blue Jayager. All the WS's of the thrashings that I have seen were given from a picture like this:

Wings drooped.
Tail depressed a little with each note

Saltator, II

April 14, 1958
Saratoga

Today, I have watched a Buff-throat singing long phrase with the usual number of Saltator notes, but I could confirm the fact that there was no rattling undertone with any of the notes, or any substitution of rattles for the notes.

After a burst of WS's, this bird began to utter doublet CN's. Much like those described on May 10, but perhaps thinner, weaker, more whistlet-like.
I have been struck again and again by how much the “cluck” notes (— — —) given by the local saltatoris flying away from me or they come down to land another pack resemble the similar notes of Palm Tanagers in the same circumstances. Almost identical in fact.

I have now heard another streaked my repeatedly without a trace; Quartis or saltis undertone.

Several Buff-throats flying about near we have noticed and in a weak “Whist” notes either single, or when they fly up or off, a brief series (i.e., like some of the tanagers). These birds may have been a little nervous about my presence, so little “Whist” may have been either CN’s or AECN’s. I think they may at least have been CN’s like the “chuck” notes of the streaked.

(The rhythm was the same when they occurred in series, although the actual sound of the notes themselves was quite different.)

Saltator, I

April 23, 1958
Rio Chincanagua

There are a number of Buff-throats here who occasionally come near me when I am sitting down watching other birds. They usually utter the same weak “Whist” notes described above, April 17, with every sign of nervousness, as brought pre-flight picture and TF’s. I am now tending to the opinion that these must be at least a relative...
strong escape component in their notes

Some of the larks sometimes seem to utter very similar notes
which are quite a little sharper; and it is possible that there are even
more alarm calls, produced by a relating even stronger escape
drive.

One lark near me gave a few soft warbles (!) interspersed
among a lot of "Whoop" Notes of the less sharp type!!

Saltater, I

May 2, 1958

Francisco

A noise startled, sitting on a bare limb at the
top of a tree, gave WS after WS this afternoon while I was
waiting for the train. Each WS was eventually identical
with the one outlined on the top of page 11, Apr. 10.
Prominently the same bird. Some WS's were followed by
additional -- notes. Occasionally, WS's were repeated
without a break between phrases. Also occasionally the
bird uttered long series of notes came ca:

.......

June 27, 1958

Francisco

While I was watching quarrels and food-eaters this morning,
I noticed, vaguely, that a pair of stridulating Saltaters was flying
about excitedly. Uttering quite a lot of "Check" Notes (almost a
Saltator, June 29, 1958, I.

...used as a regular warning call. Then I looked up to find an apparently successful copulation attempt taking place!!! Almost too fast for me to follow, but I am fairly certain that there was no immediate pre-cop display nor anything in the way of a post-cop display (the 2 birds flew off immediately). The cop itself was quite silent, without ritualized postures. The only thing that was significant was the fact that the 9 bdd m.m. in her bill throughout the whole performance!!!

Saltator, I

June 30, 1958
Adolfo Miguel flash

Watching a few birds rattie casually here.

I can confirm that the W S's of the streaked Saltators here are essentially similar to those of birds near Aripo.

One of the birds here, however, often gave an abbreviated 3-syllable, unusually low-intent, version of a W S. Like this... more often! This is exactly similar to the brief W S's which my captive streaked Saltator gives - the only W S's it has ever given in captivity in fact. It is this tri-syllabic W S which is no reminiscent of the... "churr-churr" of the Rose-breasted Grosbeak Feeder.

I noticed that the pair of streaked Saltators nearest to me always gave a little series of "Churr" Notes whenever one bird came in to land beside another, or when the 2 birds landed together. Definitely a landing and acquaintance call. Quite reminiscent of the "HAC" Notes of the Green-tailed Sparrow.
There is a species of Saltator around here which seems to be colorless (= blue). A single looks like the illustration in Phelps, except that the under tail coverts are more strongly Rufous.

This Alt motivational. Tends to quit his WS's from far more concealed sites than any Saltator I have ever seen in Panama. Well hidden by leaves. This is probably a real specific or individual difference. I think it should be noted that almost all the birds around here are sligher than in Panama.

The WS's themselves are quite distinctive from those of the Panamanian forms with which I am familiar but still quite unmistakably Saltator-like. Usually 4 or 5 short notes followed by a longer one. Might be transcribed by something like "dub dub dub dub dub dub whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee whee
And he is apparently vocal. I was watching one bird sitting high on an exposed perch, preening itself, when its mate flew in. The flying bird started to give some rapid "Kaa kaa kaa kaa kaa kaa kaa..." or "Kauh kauh kauh kauh kauh..." Notes as it came in, starting at least 10 ft away. The perching bird started to give the same notes. The flying bird landed loudly the perching bird, and both continued to give more of the same notes, while they sat almost side by side. Their notes were small, rather hoarse in quality. I am almost certain that they are strictly homologous with the GHAC of the Green-backed Sparrow, and I shall call them by the same name. The perching bird gave them from absolutely unmutilated sitting postures. If the bill opening and closing in rhythm with the notes. Then they gradually relaxed, stopped calling, both started to quiver, and then they both flew off together.


Wings out and partly drooped during the A.
Head & bill nearly vertical. Tail diagonally raised to a very extreme degree. Probably not spread to any great extent. Breast lowered very far. Breast & especially bell feathers very very ruffled. Tail apparently not quivered at all. As the A went down into this posture, she uttered about 4 or 5 GHAC Notes, and then
I thinks, uttered a very soft r! Then shut up for a second, continuing the q in the extreme &. Then the q flew up from lower down in the tree (he must have been at least 10 ft. from the p when she started her soliciting). He immediately mounted the q without any preliminary display. The copulation was very short and apparently unsuccessful. The q continued to a Q. Scantling, Sitn, but the p slipped off immediately and flew at least several ft. away. One or both birds uttered a burst of GMAC as he slipped off and flew away. The p relieved her ft. and stopped q almost immediately afterwards and flew away too.

Saltator, I

December 17, 1958

Equites

I am beginning to think that the reactions between the q and q Saltator described above on Dec. 15 were actually pair formation or something very close to it. The same q, at least, was seen in the same area this morning, but he was much less conspicuous, sitting concealed in the shrubbery, most of the time, and uttered many fewer WS's. In other words, it looks as if his sex and/or pairing desire had been largely satisfied since I first began my observations of them.

Saltator, I

December 20, 1958

Equites

The breeding season of these gray Saltatars must be quite long.
I saw one pair of adults today with 2 fully fledged and well-flying young. Also another pair well-mated, but apparently no nest yet. This species is quite shy here, in the sense that it tends to fly away quite promptly when one approaches. But most of the birds seem quite still otherwise, sitting all but motionless for long periods of time when un-alarmed. Presumably correlated with this comparative lack of mobility is the fact that it utters remarkably few CN's. I have only heard one bird utter about 5 or 6 CN's, single notes at quite long intervals, generally a T, after WS-ing, before flying off. These CN's are not unlike those of the Rhynchochilus, bowerers here, but even more metallic, i.e. even more like the CN's of the Blue-black Grosbeak (although apparently never double). The T gives an WS's from much the same posture as the other Saltators, sitting very erect. In some cases, at least, he also tends to point the head & bill diagonally upward, to some extent, at an angle approximately like this. I am now fairly certain that mates tend to give GHAC whenever they join one another. I have heard 2 birds give repeated bursts of GHAC when they were just sitting (and or moving about very slightly) in the same tree only a few feet apart. Unfortunately, however, I never got a good view of the birds doing this this morning, so I don't know if it is usually accompanied by particular movements or postures or not.

One juvenile sitting near an adult this morning reacted to the adult in a rather peculiar way which may have been begging. From time to time, especially when the adult turned toward it, it would open its bill and utter a 33 call. This 33 consisted of a
with rows of soft, hoarse, wheezy notes, each of which might be transcribed as "Kho-ko" or "Kho-ko-ko". The call was kept wide open throughout a single series of several notes, and the bird tended to assume a low-forward posture during the call. The most peculiar feature of its performance was that it didn't include the slightest trace of a.

Saltator, I  December 23, 1958
2 quitos

Watching a pair of these grey saltators moving around from tree to tree together did lots of mutual displaying. Coming into a perch, the bird in the lead would usually give about 3 "HHAC's" as it landed. Then would stand a second until the second bird landed beside it. Then both would do a burst of "HHAC. It apparently, evolutionarily, projected sitting exactly as usual, head & bill apparently raised obliquely upward a little. (They also did a lot of nervous looking up to side turning of its head during this, but these movements might have been provoked by my presence.) Then they would sit quietly near (about 10 " apart) one another for a second or so, they still sitting together, they would do another burst of mutual display, "HHAC" (and NWs - see below), fall silent again. Then do another burst of mutual display, "HHAC" etc, while they still sat together, then fall silent again etc, etc, etc, until finally one bird would fly off to another perch, the second would follow, and the whole process would be repeated again.

During some of these bursts of what I presume were mutual "HHAC" one or both birds uttered a few CWS of the usual mettalic type. It is even
It is apparent now that this species uses its GHAC even more frequently than the green-backed sparrow. Not only a greeting but a display when the mate are more or less stationary together. I am sure that stationary green-backed sparrows do GHAC much less frequently.

One of the birds during some of these mutual display performances (presumably the $\xi$) without a few abbreviated WS phrases, between the GHAC-CN performances, in spite of the fact that its mate was present!

One of the birds was perched in a tree near me and adopted a most extreme, apparently pre-flight, posture, with drooping wings.

The $\xi$ of this species seems to have another WS pattern in addition to the one I have described before. Soft, and difficult to determine exactly who is doing it and where it is coming from, but it tends to occur in connection with the ordinary WS (which I shall call LWS, from now on), although may LWS's occur without it, and I think that it is usually quickly followed by $\xi$ when these $\xi$'s are not too far away. Might be translated as "Dub dub whirrrrrrrrrr." Apparently given from its usual unstationary sitting posture.

This "whirrrrrrr" is vaguely related to the main note of the Saltator at BC.
I shall call this type of WS the "SWS", as it is relatively soft.
The "Whirrrrrrrr" is much softer than the "Whooshooooo" of the ordinary LWS, to which it is probably closely related, and even the preliminary "Dub" is probably softer than those of the LWS.

The SWS may well be a very low-intensity and possibly inhibited version of the LWS. In this connection, I should mention that what appears to be a very low-intensity ordinary LWS, the initial LWS's long before mating, also included only 2 preliminary notes, come ca.

Saltator I

December 24, 1958

iguanas

The gray Saltator that I have been watching for a few days seems to have another type of LWS in addition to the one I have described before. "Dub Whoooshoooooo Whooshooooo Dub Dub Whoooshoo"

Come ca:

Specifically separated from the usual sitting posture, Bell OCB with notes, frequently associated with "ordering" LWS. The Saltator gave a few brief phrases intermediate between the "special" LWS and the "ordering" type, and the most common variation of his "special" type. Its elf was the omission of the last note.

I think that the un Erotik Saltator I watched last week also gave "special" LWS's of this type.

This Saltator's singing posture is quite long-necked. Neck feathers quite ruffled during the notes. Lower body feathers somewhat ruffled.
between as well as during phrases

(Quite a good drawing this!)

I have now seen more "courtship displays" between males more or less alike yesterday. Hoping they did not land in a tree and the male eventually GHAC as well after he came into land. Then sat side by side for a second or normal sitting postures. Then the male began LWS, the female immediately started GHAC. She immediately stopped LWS and began to do GHAC too. They did GHAC together for a second, then shut up and sat silent for a few seconds. Then the female began LWS again, the male began GHAC before he had finished the third note of the LWS. She stopped LWS and continued GHAC. They both did GHAC for a couple of seconds, then shut up. This whole procedure was repeated at least 5 times.

This behavior would certainly suggest that the "cresc. GHAC to suppress song calls of cop. attempt.?" by the female. It would suggest that the GHAC contains a hostile component as its actual sound would certainly suggest also. (But I must add that I have never seen the birds make attacks on one another during GHAC. Except during the one copulation attempt I saw, they have just sat, usually looking toward or facing one another, apparently quite uninterested in sitting postures.)
Watching a pair of streaked saltators here. One bird flying about from tree to tree. Each time it came to land, it uttered a series of notes. These are obviously what I have been calling "cluck" notes (e.g., Apr. 17, p. 12), or, at least, closely related to them, but I noticed today that they are rather louder.

They sound, in fact, very similar to the GHAC of the gray saltator. The notes of the streaked, however, seem to be somewhat deeper-sounding, and with somewhat longer pauses between notes. The notes of this streaked saltator this morning seemed to be exactly intermediate in form, between the GHAC of the gray saltator at Squires and the usual "landing CN's" of the thrasher tanager!!! (This would suggest that the "GHAC" is more closely related, phylogenetically, to the CN's of tanagers than to the HAC a HAC patterns of tanagers."

The bird today gave its "cluck" GHAC notes (which I shall call just GHAC from now on) both when it landed near another bird which I presumed was its mate and when it landed some distance away. Although the other was always present, I think, in the general area — say within 20 or 30 ft. — it is possible that the mate responded by giving GHAC in return, when the first bird landed near it, but I am not sure about this.

The only other sounds uttered by these 2 birds were a few "squeek" notes, quite like those of the gray saltators at Squires, although probably less metallic. I saw no reason to believe...
that there were particularly alarm reactions (cf. Mar. 17 p. 2).

Saltator, June 30, 1959
Rio Piedras

I watched a pair of Black headed Saltatoris moving through the trees near second growth near the river here. Probably feeding.

Very very loud & noisy. Constant call notes and other alarm notes (similarly provoked by me). The notes were extremely variable, ranging from high pitched rattles penetrating "Stit" to very harsh "Chank". Also some metallic bell-like notes, quite like some notes of the Socialised Hypatias and the Blue black forlorn. These notes usually uttered as single notes, occasionally doubled. Double notes of the metallic bell-like type were particularly reminiscent of the Black blue forlorn. Bill usually spread and closed with each note, but apparently no other ritualized postures or movements.

Every time one of the birds landed near theutter, they both performed GHAC. Made up of about 4 elements, "whitk" "chank" or "kank" like notes perhaps with an R undertone. Very rapid but rather irregular in rhythm. Almost certainly more irregular than the GHAC of the Attacked Saltator and probably much more regular than the GHAC of the Grey Saltator. Perhaps some ca.

After ending an apparently prolonged rising note, which sometimes, but not always, became clearer a more whistle like in quality.

The GHAC was attired from an ordinary unritualized sitting posture.

Bill open, with mandibles moving in rhythm with the call.

Later on this morning, I heard some most peculiar calls uttered by a bird which was probably a Buff forlorn. The bird definitely had a bushy three
(although its color was untruth) The calls it uttered appeared to be WS's, but were quite unlike any other WS's of the species I have ever heard. Usually preceded by and directed toward me. Some of these calls might be transcribed as "Tsitit tsitew" while others were preceded by one or two musical reeling notes. "Tsitit tsitew." All most peculiar.

Salatot, Jul 1, 1959.
Rio Piedras.

Back at the same place today. Watching another Buff-throat. Sitting alone, leg on tree, over second growth. Doing a lot of preening, interspersed with song-like soft warbling phrases. Obviously homologous with the call described immediately above, but slightly different in form. I think this difference in form was purely an individual difference—as the bird performing today was almost certainly different from the one I watched yesterday. Most of today's calls might be transcribed by something like "Tsitit tsitew-who-so." I think I shall call all such phrases (including calls such as the one I heard yesterday, "WBL"). WBL's are certainly quite different from the WS sun call—and also much softer. The bird giving WBL's this morning certainly gave same of them when there were no other Salatot's audible in the neighborhood; but it also gave a lot apparently as response to WS's coming from several yards away. (I couldn't see the bird giving WS's, but the WS's themselves were quite typical of either the Buff-throat or the Steelyard, and I presume that they were being uttered by the mate of the bird giving the WBL's.) The bird giving the WBL's apparently started every WBL after the other.
had started the WS, and then continued the WHL a few seconds after
the latter had started the WS. The rate of WHL into WS's was
obviously 1 to 1 in such circumstances; WHL answering a single WS
also watched the same pair of Black-caps as yesterday. Behav-
ioring in much the same way as yesterday. Lots of CN-calls notes
whenever disturbed by one (but usually quite silent otherwise). I think
I shall have to give the different types of these notes different names. I shall
call the harsh "Chack"-calls notes "CHN"; and the high pitched "Tsit"-nots
TSN. I think that the particularly well-cited Blue-black Grosbeak-
calls notes may be nothing more than remnants of the TSN. It is my impres-
sion that both birds occasionally gave all types of these notes; but cer-
tainly for long time one bird consistently gave CHN's while the other con-
sistently gave TSN's. Possibly a sexual difference ?

I wonder if these two type of "CN" arrangements is homologous or
analogous with the similar division of CN's in Phamphoreus tanagers.

Both birds also gave a lot of GHAC today. Again much as yesterday.
But I noticed that a bird often uttered GHAC when it landed by itself
at least several feet from its mate, as well as when landing just beside the
mate. J.E. the GHAC of this species is uttered in very much the same way as
that of the Hyarded (see Dec. 30, 1958, p. 23). There is undoubtedly sound
able variation in the GHAC's of the Black-caps. One bird today
uttered quite a lot of GHAC's, quite close together, which might be heard
das "Tsit sit tochant tochant tochant tochant tochant tochant..."

This appeared to be essentially composed of 2 TSN's followed by an acceler-
ated series of 4 CHN's. The bird uttered these when it was settling down.
Saltator, July 1, 1959, III.

I found a pair of Black caps here too, with a nest, with at least one young (presumably half grown, as far as I could tell from a distance) in it. In general the birds behaved much like the birds I have seen at the Rio Pedras. Lots of TSN's, CHN's, and GHAC's.

When I came particularly close to the nest, the only sound that was around at the time uttered lots of single CHN's, and very few TSN's. Might suggest that the CHN's are relatively high intensity.

One bird was heard to utter double notes, 1 CHN - 1 TSN

When I wasn't very close to the nest, I do think that those 2 types of "CN" are not strictly segregated according to sex. I also wonder if those double notes are related to the double notes in the WS's of the flattened Buff-streaked Saltators, and some of the introductory notes to the songs of the Green-backed Sparrow.

One of the Black caps sat about a little for several seconds, when I was far away from the nest, and uttered at least 3 bursts of "GHAC" sounded quite like the GHAC's I have heard before. The bird quit sat still while it uttered these phrases, facts might suggest...
Saltator, July 7, 1959, II.

that this species has lost (or learned) a song pattern similar to "WS" of the other saltators (see below), and that it uses its GHAC as a "substitute" for the "WS", of the other species.

I also watched some streaked saltators this morning, apparently unmated males, doing a lot of singing while separated from their mates. Much as before, I did notice, however, that sometimes especially early in the morning, a bird would utter a nearly "random" jumble of "WS" notes, high & low notes not uttered in regular alternation like the notes of typical WS's. Sometimes reminiscent of the short jumble-like notes of Green-Headed Sparrows early in the morning (see today's notes on American)

One streaked certainly uttered a complete GHAC, once, when landing in a tree by itself, when the mate was apparently not in the nearby hedge.

So far, it would seem that the streaked and the gray saltator are more or less intermediate between the Black-capped Saltator and the Buff-streaked Saltator in behavior.

One thing I have noticed both here and at the Rio Bravas is that these local species seem to overlap extensively, without any indication of hostility between any of them. This morning, the same perch, at the top of a tall tree, was used alternately by a streaked saltator (who gave WS's there) and a Black-capped Saltator (who gave GHAC's and/or "CN"'s there).

The streaked saltators here do not seem to be buried in the low undergrowth. Like the streaked described by Stejneger, they usually or always give their WS's from perches quite high in trees, at least 20 ft. above the ground, and sometimes considerably higher. It may be significant, incident
ally, that I have never seen a streaked perform anything like a "flight song" here.

At the Rio Padras, the only species I have seen really high in tall trees (40 ft or more) is the Buff-throat. Both the Black-caps and streaked seem to stay lower (at heights of approximately 10 to 20 or 40 ft) at least most of the time. The streaked is the only species I have seen in very "open" second growth, in bunch or trees on the edge of pastures, but it also occurs quite frequently in the thinnest second-growth where I have been watching the Black-caps.

I think I shall drop the term "WS" as applied to saltator, and put in the term "song" tout court.

Saltator, II.

Saltator, II.

Saltator, II.

Saltator, II.

April 12, 1960
Porto Bello

Black-capped saltator are by far the commonest species of saltator in the neighborhood here. We saw at least 3 pairs of Black-caps here in the first half mile east of the Las Cruces Trail. (The only other species of saltator I think I have seen here is the Buff-throat. I may have seen one or two apparently single Buff-throats, around, but I cannot be sure of it.) The Black-caps were very noisy and conspicuous, and may well have begun to break the sleeping was on.

I think that I understand the song-related patterns of this species a little better now.

We came upon one pair around 4:00 a.m. which appeared to be engaged in a territorial dispute. At least 3 birds flying around from
tree to tree in a very rapid and excited manner. One of the birds (the 2 of the defending pair?) paused from time to time to utter songs. In a picture could say:

Bell up; head small; neck elongated.

All the songs thus heard uttered during the dispute were essentially identical in form.

All the songs began with a single long, high-pitched and/or rising note, which might be transcribed by something like "Tseeeeeeceeee" or "Wheeewweeeeeeet." This was always followed by a series of piping notes (obviously the same as the notes I called "G-H-A-C" on previous pages, e.g. on June 30, 1937, p. 24) presumably just a type of HAC in these circumstances. Some of these HAC notes might be transcribed by something like "chuk-a"—although this probably greatly exaggerates the lengthwise division (which was never more than slightly indicated). I think that the series of HAC notes following the initial "Tseeeeeeceeee" or "Wheeewweeeeeeet" note usually included 2 or 4 notes. These series of HAC notes were always or almost always followed by a single "Tseeeeeeceeee" or "Wheeewweeeeeeet." Note exactly like the one that introduced the performance. This last "Tseeeeeeceeee"
Note always marked the end of a song phrase. There was always a pause after these last notes (before the beginning of a new song phrase). All the song phrases during this dispute might be represented by the following diagram:

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"Teeeeeeeessssssssssss,"  HAC  HAC  HAC  HAC  HAC  HAC  HAC
```

I shall call these "Teeeeeeeessssssssssss," or "Wheeheeheeheehee," "introductory" and "terminal notes." See "Notes," and the HAC Notes during song phrases "SHAC."

After a few minutes, this dispute apparently died down. I then, the intruders, must have left. After this, we could no longer see the birds well, but one bird (presumably, the 7th of the victorious pair) uttered song phrases after song phrase, at few-second intervals. These singing phrases were rather different from those uttered during the heat of the preceding dispute. They always began with what might be called an "introductory" phrase of 3 or 4 notes. (I shall abbreviate this term to "Intro" throughout the following pages.) Many of these song phrases were preceded by a few single CHN's. The first note of the Intro phrase of the song was also a CHN, apparently identical with the ordinary single CHN's. This was followed immediately by a "Sreeeee Note," quite like the "Sreeeee Note" during the dispute described above. This in turn was followed immediately by a couple of relatively low-pitched and descending notes: "Ja-tu-b" or "Nu." This marked the end of the Intro phrase.

What followed next was rather variable. In many cases, a brief
warbling phrase occurred after the Intro. This might be translated by something like "Tee-tee tee tee-youu"

In other cases, the Intro was followed by a few SHAC Notes and then the warbling phrase as above. (I shall abbreviate this warbling phrase as "WBL"). Both types of songs, those with both SHAC & WBL and those with WBL but without SHAC, usually ended with another Intro just like the preliminary one. Thus a song phrase with WBL alone might be represented by the following sequence:

---

CHN Snee "Ja-tuk" WBL CHN Snee "Ja-tuk"

I only caught one glimpse of the bird while it was uttering these songs. It appeared to be sitting alone, probably in the same posture as drawn above on p. 30.

I think that these songs must have been less strongly hostile than the songs with SHAC but no WBL during the preceding dispute. It also seems likely that the songs with both SHAC and WBL are more strongly hostile and/or more aggressive than the songs with WBL but no SHAC.

Some of these songs after the dispute may have been "true emphatic" songs — whatever that may mean.

Later on we came across another pair. Obviously disturbed by our presence, but reluctant to leave the neighborhood. Remarkably territorial. One or both birds kept flying away and then returning to the same tree near us. They may have had a nest there.

In any case, as a result of all this flying back and forth, the nest
as were frequently widely separated from one another. One bird (the $\text{?}$) uttered these notes when separated from its mate. What I presumed was another bird (the $\text{?}$) uttered bursts of 2 or 3 notes which appeared to be partial or complete Intros, without any other song elements, in similar circumstances.

When these 2 birds were together, one or both of them uttered more "complete" song patterns. An Intro phrase of 5 notes, followed by SHAC, followed by WBL, followed by a long descending note! This might be represented as follows:

```
CHN

"Juh"  "Chuk-a-chuk-a-whee-whee-whee-ee"
SHAC     SHAC     WBL     WBL
```

These songs were repeated quite frequently. Eventually similar in form every time. Apparently always ending with a long descending note.

Again I couldn't see these birds very well—so I couldn't tell what exactly was provoking these performances. Some of them may have been "greetings." Some were certainly territorial and provoked by our behavior. Every time I made a vigorous movement, one or both of the birds responded by uttering one or more of these songs.

I have now idea if the terminal descending notes of these songs were an individual peculiarity, or not.

I should mention, before I forget, that the only part of any of these song patterns which is really very reminiscent of the typical
As I turned my eyes towards the east I noticed a grebe swimming towards me. It was a grayish color with a white belly and black cap. The creature looked very similar to the ones seen near the lagoon before. I watched it swim in a rhythmic manner, creating small ripples on the water's surface. The bird seemed to be searching for small fish to eat, as it dipped its head into the water repeatedly.

Two days later, on the 12th of April, I observed another flock of birds that I had not seen before. They were much larger and had an iridescent greenish-blue coloration. I called them "Greenひ∠∠" on the previous page.

I only caught a glimpse of one bird which gave the song with descending terminal notes while it was actively swimming. At times, it was sitting on a post near which it was either very similar to or identical with the one drawn on p. 30.

At one time, while we were watching this last group, I saw that one bird was sitting on a post near which looked like a cow-vulture. It was this bird which I was at the same time, so I don't know what provoked the posture. It may have been performing and stayed on this post for quite a long time, perhaps a minute or so without uttering a sound, and then flew off.

I watched a single Buff-streaked puxxalaya 7, mercury-like bird. It looked like itself today. It was a curious and ordinary, uninteresting, but quite interesting creature. The most interesting feature of this performance was that the song phrases were long or complete. It sometimes preceded by notes like the six notes of Black-bird, and followed by descending whistling-like notes like those of the Black-bird described above on April 12, 1960. A typical song phrase might perhaps be transcribed by repeating: Alice.
Saltator, Apr. 21, 1960

See Note

WAB

(In some cases, at least, there were more notes in the WAB part of the phrase, at least 3, just a doubllet and then a triplet.) The whole thing was quite remarkably reminiscent of the Black-cap.

None of the phrases appeared to provoke any response from any other bird, and the singer eventually flew off.

Saltator, I.

April 21, 1960

Frizoles

Watching an apparently single Black-cap near the RR station this morning, sitting high in a tree by itself. A completely uneventfulanager [sic], alternating TSN’s and CHN’s, almost stakily [i.e., stakily] for minutes on end!! Bell opening and closing with each note. The alternation of these 2 types of notes was very quite exceptionally regular. The only irregularity was the occasional interjection of a single extra CHN.

This whole performance was apparently identical with the performance of the bird described above on July 4, 1939. These long series of alternate notes must be a regular component of the display repertoire of this species.

I was again reminded of the “Whit-chu”s of the Green-backed Tanager when I heard this Saltator. This resemblance was increased by the rhythm of the alternating notes of the Saltator, which co-
Saltator, Apr. 28, 1960, II

as follows: TSN - CHN - pause - TSN - CHN - pause - TSN - CHN - pause - TSN - CHN - pause - etc. etc. etc.

I should not be surprised if the original form of “song” in the Saltator - Green-backed Sparrow-group was a “warble.” This “warble” may well have been enlarged or completely replaced in the course of evolution by louder but simpler patterns based on alternate notes.

Saltator, I

May 6, 1960

Brisco, Colorado

I have had a pair of Boff - thrushes in an outside cage for a long time. One unbanded, the other banded yellow. They have not been very active—until today.

Early this morning, I noticed that the yellow bird, presumably I, was sitting on a perch, uttering lots of distinctive notes. These notes were sometimes staccato and at other times sonorous, trisyllabic or tetrasyllabic (more often tetrasyllabic than trisyllabic). A typical series might be transcribed as something like: "Hew-Whew-ee-oo Hew-Whew-ee-oo Hew-Whew-ee-oo Hew-Whew-ee-oo Hew-Whew-ee-oo Hew-Whew-ee-oo..." The spaced (very slightly) and closed with each note of such a series. During such series the bird sat in an apparently neutralized diaphanous upright sitting posture, with wings usually or always meeting over the rump, and the tail held in line with the body (not bent more strongly downward). When this yellow bird uttered such series, it was usually or always sitting on a perch some distance from the other, unbanded, bird in the cage. As far as I could tell, the unbanded bird did not respond to yellow’s perform.
Pal 4j '71

All these performances by Yellow were very reminiscent of the "Kee-ee" whining of my captive A7 female to Fox. This "Whew" whining (as I shall call it) must, I think, be strictly home
coupled with the "Kee-ee" whining of the female to Fox.

These "Whew" and "Whew-ee-ee" Notes are certainly quite dif
ersent from "Whew" (A7's see below) but they may be closely related
to or even identical with some terminal parts of some Wbl's (see below)
I think that they are fairly distinct from the fee Notes of the Black Cap
and (almost certainly) the fee Notes of this species (at least the introd
ou see Notes of the Buff-threat described above on Apr. 21, 1960, p. 35)

Every once in a while Yellow would interrupt his "Whew" sing
ning to utter a brief, not very loud Wbl. Some of these Wbl's included
3 notes, while others included 3 notes. "Whew-ee-ee" and
"Whew-ee-ey" (Yellow may well have uttered 4 note Wbl's too,
but I didn't actually distinguish any of this type). These Wbl's were
not introduced or followed by any distinctive fee Notes or anything or
anything else. I think they were accompanied by the same postures as
the Whew "whining" and they did not appear to provoke any response
from the unbanded bird.

I imagine that the "Whew" whining may well be provoked by
some frustration or thwarting of some nesting or sexual drive, but
the Wbl's may be largely or completely sterile (see below).

After lunch, I put 2 new birds in the same cage with Yellow
and the unbanded bird. One of these new birds was banded red, and the
other was banded blue. These 2 new birds had been kept together in a
small cage inside the annual home for a month or so.

The introduction of Red & Blue provoked a lot of hostility for
Yellow

Yellow began by assuming a posture very much like the FG-H (H of the Rio Gordo Sphyraena).

Breast & belly feathers spread
caterally to a very extreme degree (as much as in my drawing of the FG-H of the Rio Gordo — but not lowered very greatly). Viewed from the side, the most peculiar feature of this posture was the way in which the fluffing of the breast feathers was separated from the fluffing of the belly feathers (indicated by — above). It looked almost as if the bird had a "false wing."

This FG-H posture (as I shall call it in this species also) was quite silent, and was not accompanied by any G. It was combined with quite a lot of irregular pivoting, which appeared to be unritualized and also some irregular "bowing." This bowing was considerably less frequent than the pivoting, and appeared to be equally unritualized — as such. In some cases, it was obvious, however, that the posture at the top of the up phase was itself extremely ritualized. I shall call this ritualized posture STG-H (H). It is obvious a combination of the same G-H as in the FG-H with an "ordinary" not very exaggerated "therapeutic" ST posture. It was also silent, and not accompanied by any trace of G. It is drawn on the next page.
Saltator, May 1, 1940, IV.

St. G. Heff

Notice shape of head.
Small-headed in appearance

Notice "frontal shield."

(The way in which the white eye brows are so conspicuous in their G. Heff patterns — it is possible that the white feathers are even raised— while the dark crown is always seen or hidden — are reminiscent of the display of the yellow forehead feathers, and the hinting of the dark crown feathers in the G. Heff patterns of the Pho gondo.)

While the Yellow was performing these patterns, he faced the Red newcomer almost directly. Then the Yellow began to perform supplanting attack after supplanting attack upon Red, trying to pick Red whenever he got close enough, and succeeding not infrequently. Red tried to escape without any defense in most cases. Every once in a while Yellow would interrupt his attacks to perform more G. Heff patterns. Usually the G. Heff, with little or no "bowing" and/or FG. Heff. Some of his G. Heff's in the intervals of attacking may have been even more extreme than the FG. Heff's before Yellow began to attack. (Actually, my drawing of the FG. Heff is primarily based upon postures between attacks.)

Both birds were silent during almost all this attacking and escaping. I did, however, hear one "Whew" note and one brief "Whe" in the middle of the excitement. Probably uttered by Yellow. The name of "Heff"
...soup & Whl's during the encounters would indicate that matter
is predominantly red.

One of both birds occasionally uttered a whistle "Whew" but
during the attacking and escaping. Some of these "Whew"'s were
accompanied by yellow, but it is also possible that a few were uttered by
red. I could not determine if these "Whew"'s were hostile or purely
comic.

Once (unfortunately when I wasn't looking) one bird uttered a
series of 3 or 3 hoarse "Whew!" Notes - obviously HAC or something
closely related to it.

After a while, Red obviously became very tired. Yellow also
began to pause a little more frequently between attacks. Then Red sat
in a "submissie" ruffled posture whenever Yellow wasn't attacking

Submissive Ruffle

Back smooth

Belly feathers even more strongly
ruffled than breast feathers

Notice CR (possibly slight
ly exaggerated in this drawing)

(It is interesting that this species does CR when escape is ob-
nervably predominant over attack).

Once, when Yellow approached Red while the latter was sitting
in this Submissive Ruffled Posture, Red zipped G'd instead of retreating.
This seemed to be effective as threat as it caused Yellow to retreat himself,
temporarily. Aside from this one encounter, Red kept his bill closed all
the time he was in the Submarine Ruffle.

Finally, after a particularly vigorous attack by Yellow, Red dropped to the ground and crawled wretchedly under a bush.

Yellow remained sitting on a high perch after Red dropped and then uttered 3 or 4 WBL's, one right after the other. "Triumph song" (like the "Triumph song" of the Black Cap described above on April 12, p. 32). Possibly due to a sudden relative decrease in the strength of Yellow's escape drive, and relative increase in the strength of his attack drive, due to Red's sudden disappearance from sight? In any case, Yellow did not make any attempt to approach either of the other birds in the cage after his WBL's.

I then took Red out of the cage, as it was beginning to look much the worse for wear.

After Yellow settled down again when I left the cage, at first sat in a rather sleek, alert look (pre-flight?) posture for a few seconds. Then he performed quite a lot of BW movements. Displacement? ? ? ?

Then he performed a few not very energetic supplanting attacks upon Blue, whom he had completely replaced before then. None of these supplanting attacks upon Blue was accompanied by any display of any sort. This would indicate that Yellow distinguished between Red and Blue in some way. I think that Red must be T and Blue F, and that Yellow could distinguish their sexes by their appearance.

I stopped observation at this point, as I thought that the birds were slightly nervous about my presence.
Saltator, I

May 7, 1960

Trigoles

Watching a single, presumably & streaked saltator, singing, here. In usual erect posture, with tail-down. These songs seemed to be more or less typical of the most common forms of songs of this species. Relatively slow, with relatively longer notes than any of the WKB of other species, with which it may be more or less completely homologous.

The complete songs of this bird might be transcribed as follows:

"Dub dub dubDubDubDub"

I am not absolutely certain that the diagram of the 4th note, which is relatively long and without a break, is really correct. It is possible that the pitch is descending in all except 4th notes.

It is also possible that there is considerable variation in the 4th notes from time to time. It is possible that some are ascending while others are descending.

This is obviously the same thing I called "WS" in my earlier notes on the streaked (e.g., Apr. 7, 1938, p. 7, and Apr. 10, 1938, pp. 10 and 11).

I am sure that this must be closely related to the songs of other species of saltator, but the exact details of the relationship are still obscure. It is conceivable that the whole "complete" song of the streaked, such as sung by the TVI watched today, is strictly homologous with the WKB of the Buff-throat. More probably it is strictly homologous with the whole "WS" of the Quayola, and the WKB + 2 or 3 notes of the Buff-throat and the Black Cap. If so, it is
necessarily only the first 3 notes of the stilled song, the
which is strictly homologous with the Wbl of other species.
If so, the homologue of the Wbl has been somewhat slowed down
in the song of the stilled

The bird I watched today also uttered quite a lot of "incomplete"

Saltator, I

Saltator, I

March 28, 1941

Sjololes

Watching some birds in the sjololes are this morning. From

approx. 6:15 a.m. to approximately 8:00 a.m.

I watched one stilled (presumably I) sitting by itself in the
top of a tree singing a rather distinctive "song" for at least 15 minut
es, almost without interruption. A series of clear, whistled "Kew" Notes, occasionally interrupted (at irregular intervals) by a single high
or pitched, slightly rattling "Knee" Note. Commencing: "Kew-kew-
kew-kew-kew-kew-knee kew-kew-kew-kew-kew-kew-kew-kew-kew-kew-
kew-kew-kew-kew-knee..."

The bird sat in the usual unswayed sulying posture wih
be uttering these notes.

The bird was uttering these notes when I arrived, but stopp
ed when full daylight arrived. This would definitely appear to be a
form of "dawn song".
The whole performance was quite remarkably reminiscent of the "Pee-goo" song of the Faunus de Foveo and the "Whew" whining of the Buff-colored Faunus.

The fact that all these performances are essentially "dawn songs" would suggest that they are all morning noises.

I heard a number of "songs" uttered by solitary Buff thrushes at various times this morning. All well after daylight long after the "Kew" song of the Streaked thrush described above. All these songs were largely or completely Wob's. Some might be transcribed as "Frit too-bhe-ber." Others might be transcribed as "Frit too-ba-ber." All utter twitttering, twittering, twittering from apparently unrioted nesting places.

Sometimes I think there were 2 "Frit" Notes at the beginning of the Wob's. The single "Frit" Notes (and possibly the double "Frit") at the beginning of the Wob's were quite sharp and thin and twittering, twittering, twittering. Riving notes? Fresh notes may be successful. Close related to the "Whew" Notes I have heard uttered by Buff thrushes before - apart from Wob's. On April 28, 1935, I saw one bird nesting by itself in the top of a tall bush this morning which uttered lots of single "Frit" notes without Wob's. These "Frit's" may be largely or completely homologous with the SV's of Palm and Blue Tanagers and the SV's of Faunus de Foveo. (I doubt whether the "Frit's" and/or "Whew" are alarm notes.) I think that the "Frit's" which were associated with the Wob's of the Buff thrushes this morning may not have been "integral" parts of the Wob's (in the same sense as the preceding 3-note phrases or 3-syllable notes).

It seems that the "Pattle" notes of Buff thrushes described...
above on April 7, 1958, p. 8, and the calls transcribed on June 30, 1958,
p. 24 & 25, were really just typical WBE's of the species.
I am really quite stunned at the extreme close resemblance
between the vocal patterns of the saltators and those of the Sauge
de Joff. By comparing the patterns of Tangara, Turquique, Salt
ator, the Green-billed Toucanet, and the Sauge de Joff, it may be
possible to determine the "basic" elements of the vocal repertoire
of the whole group.

Saltator, I

March 29, 1961
Birn Colorado

Notice flat head!

This morning there was a single
flushed saltator in the clearing. Presumably
male. Squeaks repeatedly for at least an hour. Near
a cage with juncos, 2 house captive flickerels.

All the songs uttered by the free bird today
were the type I called "uncomplete" before — see my
notes of May 9, 1960, p. 43.
All these songs were essentially uniform. I think this
can be represented by the following diagrams

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and

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(I am now fairly certain that the long notes, the whistles, are descending in pitch.)

(I have also come to the conclusion that such song patterns are rather similar to certain songs of *Altapetes* spp.)

I wonder if these "incomplete" songs are perhaps on wholly known logons with the WCL's of other species of *Saltator* ???

The streaked wren which sang this morning usually sang from a posture like the one shown on the preceding page. Crown feathers smooth, head tilted upward. Neck not very elongated. The drawing on the preceding page is a much better drawing than the one shown in my notes of April 13, 1958, p. 11.

The only variability in this singing posture involved the position of the wings and tail. I think that the wings and tail were sometimes held as in the drawing on p. 11.

The birds always sat still while singing. Between song phrases, or if hopped from brush to brush and tree to tree, it uttered low, lead, harsh notes when it moved. Usually in series of 3 or 4 notes. There were probably G HAC. Possibly HAC. One of the captive birds in the cage frequently uttered similar notes while the free streak sang.
Saltater, I

March 30, 1941

Saltater

Back at Angeles just at dawn (6:10 a.m.).

A studied Saltater flew to a high exposed perch soon after I arrived, and began "Kew" song. Probably the same bird I heard and witnessing "Kew" song on March 28, 1941. Fruging in same place.

The posture in which the bird was uttering "Kew" song to-day was comme sa:

I think the white eye brows were vivid, like the yellow eye brows of the Yellow-faced Grassquit.

Wings not drooped very much.

The "Kew" song uttered by this bird this morning were slightly different from the one I heard on March 28. Usually alternation of clear notes and lower pitched rattling notes. (These rattling notes might possibly be transcribed by something like "Krook"). Sometimes a single note which was much higher than most of the other clear notes was interspersed in the songs usually in the position in which
An ordinary clear note would be expected. At first, I thought that the unusually high notes were a distinctly different type of note, but later on, I noted that the bird occasionally uttered intermediates between typical clear notes and the highest kind of high clear note. A typical bit of "Kew" singing by the bird this morning might be represented by the following diagram:

---

Every once in a while, the bird would utter 2 clear notes, usually one of relatively low-pitch and then one of relatively high pitch, in the middle of the song. Commonly:

---

The bird continued "Kew" singing for almost an hour, with only 2 or 3 brief interruptions. These interruptions occurred when it changed perches. (It did not utter song in flight.) Alternated between 2 trees (the same trees in which it gave "Kew" song on March 28.) Always perched high in an exposed position when it gave "Kew" song.

None of the "Kew" singing provoked any response from any other bird.

When I first arrived, while it was still rather obscure, before the stanza began "Kew" singing, I heard a few typical streaked "Incomplete" songs coming from rather low-in-the-structure of the area which later appeared to be within the territory of the streaked which gave the "Kew" songs.

Later in the morning, around 7:25, some time after these first
called had stopped "Kew" singing. I heard more "Incomplete" song coming from the same area.

All this might suggest that "Kew" singing and "Incomplete" singing are produced by the same type of motivation, and that the "Kew" is lesser intensity than the "Incomplete."

All the "Incomplete" songs of the trilled this morning were the usual type.

I saw a Buff-throat, by itself, utter quite a number of "Incomplete" songs, of the usual type for the species, in a perfectly relaxed sitting posture. Not elongate at all.

It is definitely my impression that the Buff-throats do not usually utter their "Incomplete" songs from high exposed perches. Usually a little below the top of moderate aged trees and tall bushes, rather concealed by leaves. (Note: "Incomplete song" = W6E).
to these "songs" were quite variable.

Some of the "songs" appeared to be typical WBC's. Such typical WBC's were only uttered when there was a momentary lull in the dispute apparently centering vitally than the other "songs" uttered during the dispute.

When the dispute was most vigorous, two slightly different types of "song" were uttered. One was a pure Rattle, followed immediately by a typical WBC (the WBC appearing to be a sort of "terminal flourish" to the R). Here or less common were:

- [Redacted]

The other type of "song" was similar except that the terminal WBC had a definite scolding quality or undertone (sometimes almost as strong as the pure R).

(This combination of WBC + R may be reminiscent of the Yellow-mowed chicken.)

I am not sure if the less aggressive bird uttered any.

After a while, the less aggressive bird appeared to become tired, and occasionally let the more aggressive bird lead close beside it without flying away. The more aggressive bird would then go into a rattler unvitualized "forward" Peck and peck at the less aggressive bird. This "forward" Peck was very much like the FG Hff drawn on May 6, 1960, p. 38, except that the breast & belly feathers were less fluffed and (probably) there was slight trace of CR. Always silent. The less aggressive bird always flew away immediately after being pecked.

Both birds sometimes did a little irregular unvitualized clucking and croaking, usually silent, when they were perched not too far from one another.
I heard naive “Tweet” Notes from time to time during the dispute this morning. Usually or always, I think, when the birds were flying. But I couldn’t determine who uttered them or why.

There were no real FG-Sylls or FG-Fly or Sublimine Ruffle + G patterns during the dispute this morning.

It was obvious that the more aggressive bird during the dispute this morning was relatively less aggressive than the Yellow-bird during the dispute observed on May 2, 1960 (inside the CR).

Saltator I

May 30, 1961

Grijoles

I saw a few interesting reactions by Saltatoris near the RR station this morning.

One Buff-bird, sitting by itself, on a high exposed perch, singing a slightly distinctive "dawn song" around 6:15.

In pasture more or less common r.

Rex not stitched up.

Perhaps a low intensity pasture?

I am not quite sure of the position of the wings. Almost certainly drooped to some extent.
The song uttered by this bird might be transcribed by something like "Whee-ew-whee-ew-ew-whee-ew-ew-ew-ew-ew." (In the terminal "ew-ew" note, the terminal "ew" was always very quietly accented.)

This did not appear to provoke any response from any other bird and the singing bird eventually just flew away.

Much later in the morning, I saw a vigorous dispute between two Buff-thrashes. One of these birds may have been the bird I heard singing earlier). Lots of upplanting attacks. Very rapid. One bird retreated very steadily before the attacks of the other. Both birds quite silent, except for a few "Wol's" (probable uttered by both birds). Once the retreating bird assumed a very conspicuous ritualized posture. More or less common...

Accompanied by "WF's", and 1 or 2 "Wol's."

The retreating bird was supplanted again a few moments after adopting this posture. I.e. the posture was certainly not effective or threat.

Early in the morning, when I first arrived at the RR station, there was a streaked songer in the same area where I heard the streaked singing "Kew" and "Kew Kreo" songs on March 28 and March 30 (see above). But today it only sang the type of songs which I used to call "incomplete," i.e. the type of song shown in the diagrams.

Breast & belly very ruffled.

CR?

Wings drooped?

Tail fanned?
Turtle, May 30, 1961, III

Saltater, I

June 3, 1961, Angeles

Have been watching Queen Bees around here for several days (see current notes on Queen Bees). During all this time, there has been a family of Golden-tailed Slaters in the neighborhood. 3 birds. Presumably 2 adults, 1 young. Very noisy. One (or more) birds utter(s) a lot of incomplete songs. All the birds seem to utter lots of barhool "GHAC", somewhat frequent and when landing near to one another.

This morning, around 8:00 a.m., I saw one of these Slaters land near the other two. It uttered "GHAC" as it landed. One of the other birds immediately flew straight to the newcomer, uttering "GHAC" as it did so. Land ed directly on the back of the newcomer. Perched there for a second or so, fluttering its wings. Both birds silent. Apparently a copulation attempt? Then the bottom bird presumably flew away, and the other bird followed. One or both birds uttered more "GHAC" as they flew away.

If this was a cop. attempt (as I think it must have been), it was obviously unsuccessful.

I think the "GHAC" notes uttered by these birds might be transcribed as "chá-áh chá-áh chá-áh ....". Quite remarkably harsh—much more so than the GHAC's of Queen Bees.

All the incomplete songs I have heard uttered by this bird (or birds) have been remarkably stereotyped. Might be transcribed as "Dul-dul-dul dul dul dul... brrrrrrrrr...". Uttered briefly at dawn and later in the morning.
June 5, 1961
Ballo, Colorado

Yesterday I caught a wild Buff-throat. Banded orange.
Put in cage with some other finches: 2 other Buff-throats, 2 Streaked Saltatos, 12-9 Rose-breasted Grosbeaks.

This morning, just before leaving for Ballo, I noticed that the new Buff-throat was singing a "dawn song." Here is its comminga:
"Tee-hoo- tub-tub-hoo- tee-hoo- tub-tub-hoo-...," Quite regular alternation of trisyllabic and tisyllabic notes. Only exception the very occasional insertion of an extra "tee-hoo" note.

In posture comminga:

(Notice how large-headed and short-tailed the bird looks. I think that I may have been drawing my Buff-throats too long-tailed.)

While the bird sang in this way, it was sitting alone. Quite in
sung the other finches in its cage.
Saltator, June 5, 1961.  

The bird did not sing continuously. Occasional regular pauses. But its song was obviously indeterminate. Several times, in the pauses between songs, the bird did silent "CR, in an ordinary sitting posture, when another Buff-buff came close to it.

Saltator I

Grisales

June 5, 1961

Early this morning, I saw a single Buff-buff (probably the same bird observed singing on May 30, uttering "dawn song") and. Began at 6:05 a.m. (not earlier). Songs "Tea-hoo tea-hoo-tea-hoo-tea-hoo-tea-hoo-tea-hoo-tea-hoo-tea-hoo," etc. It is now obvious that the alternation of bisyllabic and trisyllabic notes is characteristic of this species.

This morning the bird sang from three different high perches, all in the same area (about 20 ft apart from one another). Stood in ordinary standing posture while singing. Looking quite slim (not at all like the drawing on p. 51)

The "dawn songs" were not continuous for long periods of time. Frequently interrupted by silent Buff-buffs (sometimes 3 or 4 in a series). Displacement?

It struck me this morning, that one of the most characteristic features of the "dawn song" of this and other species — all the indeterminate songs in fact — is that the constituent notes are usually very evenly and regularly spaced — — — — — — — —
Saltator, I

June 10, 1961
Tulsa, Colorado

Looking at my cage full of saltatoris between 6:00 and 7:00 a.m.
The 2 old Buff-threats are banded blue and red. Red seems to be A. He was uttering "dawn songs" this morning when I first began to watch the birds. Usual form.

Several disputes between 2 birds (can't identify the birds).
With silent G's. Once a bird did G & CR. Another time a bird did G definitely without CR.

One bird did a lot of "dawn singing" around 6:15 a.m. I couldn't tell if the bird if was red or orange. All I could see was part of the lower half of a bird. It was sitting in an ordinary sitting posture, with wings closed and spread a little. Every time it uttered a "dawn song" note, the wings were slightly fluffed or perhaps were probably quivered very briefly and slightly. I don't know if the quivering or fluffing was fluttered or not. It may have been nothing more than the mechanical after-effect of producing the notes (like flutter simultaneous tail movements). I did not watch the birds for a few days after first introducing the orange Buff-threat, because they are all quite shy and I didn't want to get them too excited until the new bird became acclimated.

While casually walking in the area around the cage, however, I did not see quite a lot of chasing in the cage during the first 2 days after orange was introduced. Usually red chasing orange. Sometimes blue chasing orange. There were quite a lot of WBC phrases during the chasing during the first day. I did not notice R's or R- like sounds on the first day. On the second day, however, there were lots of "talk talk talk talk" and
similar calls uttered during the chases of the Buff-throats. Here appeared to be R's, probably lower intensity than many or most of the R's uttered during the duet described in my notes of May 30, 1961. Never included many syllables in a single series. (Most of the R's heard during these chases were very reminiscent of the R's of Summer Tanagers in sound. Some of the R's of the Buff-throats during these chases might possibly be transcribed as 'Tit tit tit tit' rather than 'Tock tock tock...'). The number of notes per R was somewhat variable. I think the R's with fewer syllables tend to be slower than R's with more syllables. The Buff-throats also uttered a few WBL's during the chases of the second day in addition to their R's. By this morning, however, had greatly diminished in frequency and vigor. I heard one WBL during a chase this morning. A few more R's, but not many. All the R's this morning were Summer-tanager-like.

There are 2 Steelcrows in this cage with the Buff-throats. They have not shown the slightest tendency to get involved in any of the Buff-throat reactions.

The Buff-throats have occasionally uttered their high single "Treet" Notes while flying around the cage during the last few days. These must be PCN's or FCN's. I rather incline to think they are the latter although they sound like the PCN's of many other species. These "Treet" are probably identical with the "Mreet" described above on May 6, 1960, p. 40: Apr. 17, 1958, p. 12; and Apr. 28, 1958, p. 12. I have also heard quite a lot of similar notes, recently, uttered by flying small wild birds near Fligely.

This morning, every once in a while, when one of the captive birds (usually red) landed near me, it uttered 10 or 13 (usually 1) sharp
but not very loud "Tit" or "Tsit" Notes. Before flying away again, immediately, there may have been AlCN's. They also sounded very much like single syllables of an R.

I have heard quite a lot of GHAC's by streaked Sal. alters recently. Both my captive birds and the wild ones at Figuoles. At Figuoles, they are occasionally uttered by single birds in flight (vire shoots), but only, I think, when the birds are flying to go in a companion and can see the companion already. I can confirm my earlier statement (December 30, 1959, p. 23) that the GHAC patterns of the Streaked are intermediate, in form, between the more "typical" GHAC's of some other species and the "chuck" notes of Palm & Blue Storms. They seldom or never have the "accelerated diminuendo" effect of the GHAC's of Green-bailed Sparrows.

Yesterday, at dawn, I observed a Streaked, sitting by itself in a low brush, utter a rather peculiar version of "incomplete song".

```
Whit-clu clunk chaa aang aang
```

More reminiscent of the Green-bailed Sparrow than the usual "incomplete song" of streaked Saltator. Often repeated.
Early this morning, I saw a single streaked saltator singing a typical "incomplete" song, with CR.

Yesterday I took two newly hatched nestlings away from a pair of streaked saltator. The female is probably the bird which sang the peculiar song described above on June 13, 1961, p. 58, and sat in the same perch as pictured immediately above. I have also heard it utter a lot of perfectly conventional "incomplete" songs during the last couple of weeks while I have been watching the Green-backed Sparrow. I.E. the bird has sung a lot while its mate incubated.

This may also have been the bird which attempted the unusual nest copulation described above on Jan. 5, 1961, p. 33.
This morning I was very interested to see what this pair would do, after seeing its young. Unfortunately, I could only watch the saltator oc
casionally, because the green-leafer sparrows were so active.

I noticed that one or both of the saltatores uttered quite a lot of GHAC-type notes when it (or they) were moving about very actively.

Some of these GHAC's were relatively very sharp. Almost like the click notes of the Green-banks. Probably more strongly intense than less sharp GHAC's.

It is possible that these saltatores were alarmed by my presence today.

The sharp GHAC-type notes may have contained a strong escape component.

If so, they may be strictly homologous with the click note of the Green-

banks. I may eventually decide to call them 'click notes' too.

I shall call this pair of humped saltatores "X" from now on.

"X" sang a lot this morning, around 6:10 a.m. A continued series of "incomplete" song.

\[\text{etc. etc. etc.}\]

No trace of "typical" dawn song.

Saltator, 1

July 26, 1961
Dinda

\[\text{Saltator}\]

= Trinided race of Gray Saltator = S. c. brevistri

Besides these species are supposed to be quite common around

here in second growth, typical saltator-like country.
July 26, 1961

Yesterday morning, down at the old abandoned American aviary, we saw a solitary Gray Saltator singing. Around 9:30 a.m., his song consisted of repeated phrases. All the phrases were essentially identical:

\[
\text{Whit} \quad \text{Whit} \\
\text{Whit} \quad \text{Whit} \\
\text{Haul} \quad \text{Haul} \quad \text{Haul} \quad \text{Haul}
\]

The bird sat in an ordinary unornamented posture (neck not stretched upward) while it uttered these phrases.

According to David Snow, most of the songs of his relatives are usually composed of doublets.

Saltator, I

July 27, 1961

Frinka

Walking a pair of Gray Saltatores in another area of the savannah this morning.

The 2 birds were perched near the top of a medium-sized tree on expandable branches, about 6 ft. apart from one another. One of the birds (presumably the male) sang the same phrase over and over again. One of their phrases might be represented as follows:

\[
\text{Whit} \quad \text{Whit} \\
\text{Whit} \quad \text{Whit} \\
\text{Haul} \quad \text{Haul} \quad \text{Haul} \quad \text{Haul}
\]
Saltator, July 27, 1961

"Duh duh whereeeoo whereeeoo dahl"

Sometimes a few extra, monosyllabic notes were tacked on to the end of melodic phrases. The terminal "duh" notes were loud, nasal, and "trumpet-tint" (rather zebra-frilled-like). These terminal notes may have been closely related to the "hark" notes of the song described above on the preceding page, but they were very much more emphatic and conspicuous. The bird sat in a quite unDatumal posture while it uttered these song phrases. Except rather fluffed. Feet not sheltered.

It is possible that the song patterns of this race are really quite different from those of the 7 quotes race.

Saltator, I

February 15, 1962

Fryoles

I have been watching birds along the RR tracks here in the early mornings, both yesterday and today, between 6:00 and 8:00 a.m. Saltators are still numerous here, but not very active - yet.

I have not heard any "incomplete" song by stricken Saltator (nor have I heard one bird on the island utter several "incomplete" songs this morning).

I watched a solitary Buff-throat yesterday morning uttering occasional brief "notes" as it moved through the brush. All these notes were essentially similar "Duh dahl dahl sweeeoeoe - zah"

Quite shrill, more or less complete, homologous with some "incomplete" song of Flightbirds, but accelerated.
This morning, I noticed a Buff-throated wren in a tree. Not close together. One of the birds uttered a brief "WEE. The other flew away, and landed in another tree. The first bird followed, and landed in the same other tree. Again, not close. The first bird uttered a thin, high-R, as it landed. The other bird flew away. The first remained where it was uttered, near WCL's.

This incident was presumably lustful. But it resembles some of the behavior between mates described by Hulick. Was Hulick mistaken?

This afternoon, I heard WCL's coming from my cage of captive Buff-throated. Presumably accompanying chasing. These WCL's were longer and stouter than the ones I have heard uttered by the Jungles birds recently.

Does this species have a distinct type of "WCL"? I doubt it.

__Saltatar, I__

February 17, 1962

Rio Piedras

I came across a swiño Black-capped this morning, ca. 8:45 a.m., about 30 ft up in Cecropia tree. Uttering one type of phrase, repeated by at least rapid intervals. A swiño phrase might be transcribed roughly as: "ta wreeeeeee tib tib"

The long second note usually or always quite metallic or bell-like. Definitely always (also) whistle-like. First 2 notes somewhat hoarse. Rather CNN-like. Whole phrase quite reminiscent of what I called
Intro before, but the first note was definitely not CHN. Very reminiscent of a slowed-down version of the ordinary \textit{CHN} uttered by single Baff-ithrots and the "incomplete song" of single Stelated \textit{Saltator}. The bird uttered these phrases while sitting or standing in a variety of apparently unnaturalized sitting and/or pre-flight postures. No CR (or FR).

Sometimes it uttered abbreviated versions of these phrases.

always.

A few minutes later, ca. 8:30, I saw the bird again, moving through the trees. Itterating lots of short, moderately loud, "Isect" notes. Presumably what I called "TSN"s before. Presumably homologous with the "SP"s of other species.

\textit{Saltator}, II

February 21, 1962
Rio Pedras

Area where Black-cop was on Feb. 12. Area ca. 20.
Still quite dark.

A single Black-cop flies into the tree ca. 8:25. Utterings single "Aow" Notes and flies in and after landing. These "Aow"s are both pleasurful and harsh. Bird feeds briefly. Continues uttering single "Aow". Also occasional single CHN"s, and occasional single notes which seem to be intermediate between typical CHN"s and typical TSN"s (I shall call the latter \textit{CH-TS notes}).

The bird then flies away. Beck immediately, uttering CHN"s.
as it comes. Then two CHW's close together - quite out louds.
Then better were quite reminiscent of the "CHAC" or "HAC" type notes
of other species.

It is possible that the Hoarse Note and Short Hartle Note patterns
are better species, and the Streaked (at least) are not well separated.
More closely related than in such species as the Goonge or the GBS.
Then the bird stays in tree for quite a while. Sometimes perched
sometimes feeding. Utters a few "TSN"'s. Then it utters a whole
series of CHN's, interrupted by occasional CH-TS Notes, while feed-
ing.

6:40 a.m. I can now hear series of TSN's in distance. But
can't see bird uttering them. I think there are probably 2 Black-cap-
s in the immediate vicinity here, but I can never see more than one
at a time - if that! - This series of TSN's indeterminate, but not
long. Much more irregular in rhythm than most "Dawn Calling" other
species. Some of the TSN's are quite hoarse. Intermediate between
typical TSN's and typical CH-TS Notes.

6:42 One bird begins "Intros" More or less common ca:

"Tseece-tseece tsa-wa chu-lu-chu-lu"

The last 2 notes of each phrase seem to be typical CHN's. Each phrase
very rapid. Repeated at fairly frequent intervals. Some of the phrases
include one extra pair of "Tseece" type notes. More or less comme
Unfortunately I can’t see the bird uttering the Intros.
Leaving to try to get a better view—6:45
Back again 7:00. Bird feeding in trees. Not uttering
Intros. Utters a few number of single TSN’s, a few CHN’s. More
or less jumbled. Then utters 1 Intro phrase in middle of TSN’s and
CHN’s. All three notes, including the Intro, uttered from completely
unritualized postures. Not accompanied by special movements.
A few minutes later, a single bird in the same tree, begins
to utter series of “abbreviated” Intros. “Isa-aaaaaaa”. Comme

These notes are uttered as the bird feeds. No ritualized postures or mo
(The bird which uttered these abbreviated guttural has very little
black on crest, &?)

17:15 a.m. Hear a Black-cop in a tree some distance away.
Probably not the bird(s) I have been hearing & watching most of the
morning. This bird uttering TSN’s and CHN’s in rather regular
rhythm. Usually alternately. An occasional extra CHN interjected
from time to time. This is very reminiscent some W Note and CH
Note patterns of GBS’s.

Saltator, I

February 21, 1962
Rio Piedras

Working in another area this morning.

At one time this morning (ca 4:00 a.m.) a single Black-cop
came upon me unexpectedly. Perched low in brush, watching me. Uttered
lots of very harsh “Aow” Notes. With some WF’s and lots of TF’s.
TF’s V-D. Usually, but not always, with very extreme lateral compen-
sant, then flew away.

Sometime later, I heard a single Black-cop (probably the same
bird) uttering more single “Aow”s. Few harsh than the earlier not-
es. Uttered in rather regular rhythm at fairly long intervals. The
bird seemed to be quite near me, but I couldn’t see it. Eventually
flew away. Uttered one CHN, then more “Aow”s, as it flew.

This was certainly not the bird that I heard uttering “Aow”
yesterday.

I don’t really understand the function of the typical, not
Saltator, Feb. 22, 1962, II.

Truly homologous with APCN's at Freycinetia ovoata.

Today (not this morning, ca. 7:50 a.m.), I came upon a single Buff-throat uttering Wbl's. Repeating "Isawoo, isawoo." Then another Buff-throat landed in a bush, about 10 ft. below the first bird. The first flew down toward the newcomer, landed about a foot away from it. Uttered brief soft rant & flew down. Then began to sing most Wbl's. Repeating "Isawoo, isawoo." Then one bird flew away. No certain hostility between water.

Saltator I

February 23, 1962
Rio Piedras

I came upon a S. streaked Saltator by surprise at 17:30 a.m. today. The immediately flew to a tree approx. 20 ft. away. Uttered 2 or 3 "HAC" and for short Hostile Notes as she flew. Landed on a high exposed perch. Immediately went into a Pru copulatory posture. Lifted head and bill up. Spread wings horizontally. With little or (much more probable) no song. Breast lowered, underparts fluffed or ruffled. She probably raised her tail at the same time, but I couldn't actually see it. She stood in this posture 1 or 2 seconds then a @ flew straight on to her back. Copulated. Quite possibly unsuccessful. But cop may brief. Quite silent then the @ flew straight of the S's back. Landed on perch about 8 ft. away. No post cop display by either bird. Both sat for approx. 10 secs. Then © fled of. I follow her. One bird utters a few "HAC" or Hostile Notes in flight.
Arrive area where streaked Saltators were 4:00 a.m. Every
thing still silent.

5:05 a.m. See two Buff-throats perched high in dead tree
One bird uttering lots of Wbb's. Long sustained, but divided into
great definite phrases. Each phrase more or less commenca
"fit fit to fit tracer tracer..." Often waits more shut
"fit" like notes at end. All very warbling in effect. The other bird
quietly. Then the two birds start to fly from perch to
perch within the same tree and in adjacent trees. The one bird which
was Wbb. mg when I first saw the birds (the ?) usually sits on
more Wbb's as before at each perch. The other bird (the ?) remains
silent. Usually quiet sitting. Both birds do a little preening
from time to time. The presumed Q more often than the presumed Q. The
presumed Q may be particularly apt to preen when approaching or be
approached by the presumed Q. The presumed Q spends considerable
time sitting. Cooling away from the presumed Q. The two birds do
not seem to be moving steadily in any particular direction. The presun-
med Q probably follows the presumed Q more frequently than the reverse.

But there are obvious exceptions to this general rule.

When I first saw this behavior, I thought it was connected
with pair formation. A g shooing to a G who was still relating strongly hostile to her. But now I am not so sure. The presumed G may have been engaged in a territorial dispute with a third bird whom I did not notice. In any case, a third bird suddenly appeared on the same tree as the first two. The presumed G of the pair chose another tree and after the attack flighted. The presumed G followed the presumed G during this chase. Then the 2 birds of the pair level together. The presumed G uttered more Wul's. With lower breast and belly feathers fluffed oruffed (presumably Coffy).

After this, I lost track of the birds. But further observed and recorded a new dispute, probably involving the same 3 birds mentioned above. One of the aggressive birds uttered lots of Wul's. Also some rattles. According to Smith's recording, the rattles tended to occur before the Wul's. Smith also saw one bird (not the vocal bird) do what like the pattern shown on p. 39. With Jun, (but Jun didn't notice any general fuffling or rushes of lower body plumage.)

7:34 a.m. A single streaked flies by. Presumably going to join its mate. Itters "Chea Chea Chea Chea..." notes. These may be considered "chuck" notes of the "HAC" type.

7:50 a.m. Come across pair of Buff-streaks (again). Almost certainly the pair observed earlier. Both sitting. One alternately periods of Wul-ing and silent preening. Then they start to move them-selves. One uttered a series of accelerated "fut" notes, developing into real quiet flight, when landing beside the other. Then one supplants the other. Wul before supplant. Then both fly off. Utter "fut" notes in flight. Series of a few single "fut"
Saltator, Feb. 24, 1962, III

Then utter an accelerated series of "hit", forming an R, when one lands beside the other 8:00 a.m. Hear more R's when one lands beside the other.

Does this suggest R's are lower intensity than Wolf's???

The observations today would suggest that the R of the Buff-throat has replaced the HAC of the streaked in much the same way that the R of the yellow-rump has replaced the HAC of the longcope.

Saltator, I

February 25, 1962
Rio Piedras

Arrive same area as yesterday 6:05 a.m. 7:00 a.m. Hear some "incomplete" songs of a streaked. Almost certainly of pair that copulated day before yesterday.

"Dub dub whee" and "Dub dub whee wheel whee".

---

7:35 a.m. I Buff-throat Utterly Wolf's Supplanted Orange-tan other. Since each time supplanted utters R before and during supplanted then supplanted flies in pursuit of supplanted. Supplanted utters R before during chase.

Was presumably a territorial dispute. Territorial disputes seem to be remarkably common in this species.

Come upon a pair of Buff-throats 8:05. Probably same pair.
that I thought was engaged in perching yesterday. Utter series of "zit" in flight. Then perch about 5 ft apart. Flutters WOC's sit rather regularly and long intervals. "zit" seems quite at first. Doing about 1 ft. Moderate contact. Superimposed upon ordinary calling posture. Wings slightly drooped or spread. Then "f" stops. St. turns around and away. Then both fly off. Utter series of "zit". Notes in flight.

True hostilities display (WOC's at ft) may have been provoked by and directed toward me.

I surprised a single streaked late in the morning. This bird may have uttered a single "beat" note flying away from me.

Saltator, I

March 3 1963
Rio Pedras

Come across two streaked Saltator 6/17. Same area where population seen week before last. The two birds perched and flying from perch to perch about 20 ft apart. Uttering lots of "Zeeze" Notes. Sometimes HNC type, sometimes SHN type. Most often the latter. I think lots of intermediate notes and intergrades. One bird also utters brief R's. More or less common say "Kroo". Uttered at least a couple notes (single, both times) while perch. Then the 2 birds fly together. I can't see what they are doing, but I hear at least one more "Kroo" and lots more "Zeeze" Notes. Then both fly away.

I couldn't tell if this was a "pairing" reaction or a territorial boundary dispute.

The brief R's seemed to be identical with the trim notes sometimes uttered by 76 during "alternate note song"!!!
One streaked back almost immediately. Alone, feeding. Hyjed from branch to branch and perched to perch. Jitters one or more. (usually at least 2 or 3) 泛音 notes (CNH type) each time steps or flies to a new perch. Both when moving and landing. Not before taking off. Once when it utters a series of 泛音 notes, it is "answered" from a considerable distance by another streaked who utters another series of 泛音 notes, but this is the only apparent response provoked.

This streaked moving from perch to perch also utters occasional single "Frit" notes. Sometimes alone. Sometimes just before a series of 泛音 notes. Presumably some sort of "ALC" or "ECC".

Four birds of a presumed pair of Baff. streaks. Letting perched about 3-5 ft. apart. One perches. The other utters male's no overt indication of hostilities. From nest between two birds. Then both fly away.

Back to same area in afternoon.

Hitching single streaked 5:45 p.m. Flee to another perch, uttering 泛音 notes in flight. Then lands where I can't see it. Utters a "Frit" note. Then begins to utter "Incompletes" song. All eventually "dih, dub-dub, chik chik chik chik.

All the "Incompletes" songs I have heard here on other days were of the same type. Characteristic of this individual (or local population)? On typical of form late in breeding season?? (I must compare these phrases with the corresponding phrases of the streaked saltators at Tri.)
A single stilted land about 20 ft. from me 6:35 p.m. Utters a relatively high pitched Hoarse Notes (CHN type) as it lands. Then sits. Utters several single "Fret". Then 2 "Fret"s are not accompanied by special actualized posture or movements. Definitely no CR. Then bird flies away again uttering more Hoarse Notes in flight.

Saltator, May 3, 1962. II

2 of my captive Buff-throats Red and Orange, banished within the last few days. Orange actually fed last night. His leaves me with only a single bird in the cage. The old Blue. (It seems to have lost its band.)

Watching it now, 1:10 p.m. Flying about cage uttering several oval night "Fret" notes.

A wild Buff-throat comes in to visit. Utters briefly as it lands in nearby bush. Looks. Blue continues uttering "Fret"s, but I can't see it now, 1:14 p.m.

Visitor is just towering & pivoting nervously, irregularly. No CR or RF. Silent. Does several rapid BW's.

Then visitor flies away.

Blue continues uttering "Fret"s. Each note quite short. But weave as a whole quite regular.

--- Indeterminate. Quite mimetic singing of BC BT's. Then stops.

Then starts to fly around cage. Uttering occasional single "Fret" Notes.
Then winter back. Again utters brief R as it levels on perch.
1:15, Blue doesn't meet overtly, continues flying around as before
then winter disappears again. Blue shuts up.
Then Blue starts to utter short, long, plaintive, single 'Treet'
when perched, before flying down to feed. Then when feeding quite
quieter. Then shuts up again 1:35.
Caught the winter 1:40!!! Bounded yellow. Put in cage
with Blue flies straight into slumberly. Can't see it.
Then I hear R, R, Wil, and Wil! Also occasional
'Treet's in background. Then only 'Treet'. Then another Wil
then pursue flight with 'muffled' R. Followed by more
Wil's. All short Wil's short. Composed of short notes.
Brief flight. Silent. Can't see who is attacking whom.
Then Blue stands in G & H. Apparently uttering Wil's
in this posture (?!?)
More Wil's by bird I can't see. All preceded by brief R.

1:40 p.m.

Brief interruption while I get boots.
Come back to find Yellow in F 'posture. No Hss. Jo CR,
silent. Gaping (Panting). Lots of TF's & WF's. Some pouting
"F" posture, obviously one pre-flight.
Then some chasing with 'muffled' R's. I think Blue must
be the aggressor, but I can't actually tell.
Both birds silent 1:55. Except for occasional single "Treet".

By Blu?

Blue supplanted yellow. Blue utters brief R coming in. Other
was no display.

A little irregular chasing still going on 1:58. But this is
certainly far from a highly urinating fidget. Both birds silent now. Can't see Blue. Yellow out, Habitual Yellow quit trying to get out of cage
Leaving myself 7:00 pm before Yellow becomes too exhausted.

I forgot to add that Yellow uttered a series of Hsu's (and/or "Kwash Yuan" Notes) when handled in the net.

The notes I have transcribed as "Tweet" above are certainly identical with the notes I transcribed as "Wheat" on previous occasions. I am still a little puzzled about them. They certainly sound as if they should be SW's, but this would be difficult to prove.

I watched Blue very briefly early this morning. When the presumably became aware that Orange had disappeared. She uttered a few single "Tweet" or "Wheat" Notes when flying about the cage. Then a burst of similar notes just before going down to feed and during feeding. Also a burst of similar notes while she perched on a branch after I had gone into the cage (to remove Orange's body) and then left.

I don't think I have ever heard bursts of "Tweet" (like the bursts I have heard several times today) before. Blue may be (or have been) uttering more "Tweet" today because she is trying to attract a mate.

Heather Orange met Blue uttered very many "Tweet"'s or "Wheat"'s yesterday afternoon when I went into the cage - in spite of the fact that they flew around frantically. This would suggest that such notes are not ALCN's, and probably not FCN's. The fact that such notes are not uttered more frequently when they
Slatatar, March 5, 1967

A sickly Slatatar has uttered a lot of “incomplete” songs near my home during the last 2 days. (This may be a case we heard I let loose a couple of months ago.) All these vocal patterns have been identical with the “incomplete” song diagrammed above on p. 74.

Slatatar,

March 5, 1967
Bueno-Colorado

Watching the Blue and Yellow-Bill it threatened briefly this morning, but after dawn, Dell. Blue is flying about the cage in a more or less normal manner, most of the time. Sometimes with, sometimes without, “Fleet” Notes. Yellow, holding on sitting quietly.

At least once, Blue assumes a not very serious HG-Yellow for a few seconds. Silent.

Blue repeatedly supplants Yellow, without display by either bird.

Now, 6:45 a.m., Blue is almost completely silent. Utters very few “Fleet”s.

Leaving myself

Slatatar,

March 14, 1967
Río Piedras

In Black-cap area at dawn. First bird shows up, close, at 6 a.m. Quiet, except, probably, for a few seconds.
set "Notes (presumed TSN's)."

A few minutes later I hear a couple of CNN's, then occasional single TSN's— that is all. From 6:20, combinations of WB- and HAC-type Notes (can't see birds).

4:00 a.m. Come across what seems to be a boundary dispute between Black-caps. 3 birds in tree. 1 repeatedly follows, often yapples, evolutes. The third just tags along, some distance after the other two. The supplanter spends most of time in an ft. posture. Like the one drawn at Porto Bello, with beak lowered ("BL"). Put bill sometimes almost vertical. Little or no flapping or ruffling of any kind. Sometimes silent in this posture. At other times quite vocal. When vocal, utters calls consisting of one whistle-like "Tsawecat" Note, followed by a variable number of Hoarse Notes. Sometimes eventually CNN's. More often HAC-like. These calls would seem to be abbreviated versions of some of the more complex calls I heard during disputes at Porto Bello. Once the supplanter bird uttered a burst of HAC notes just as it landed after being supplanter. A sort of "landing on HAC" in a completely unnaturalized sitting posture.

Eventually, one bird flies off, and all 3 disappear.

The ft's during this incident were obviously ritualized. And obviously more than flight unit. Moves, finally assumed facing the bird toward which they were directed. Emphasizing white throat with its black borders.

Come across a single Black cap at 6:00 a.m. Uttering lots of CNN's, interrupted by single TSN's. Often irregular, sometimes regular alternation 2 CNN's and 1 TSN. Bird eventually flies away.

9:30. Come across 3 or 4 more Black-caps. Moving thru tree tops, low irregularly. One bird utters lots of "Tsawecat."
I think all these calls were uttered from more or less unobstructed sites by the cows, but I can't be sure about this.

Birds moved on, ca. 9:40, without my being able to follow them.

William. I Buff-toucan in tree, about 20 ft away from another. Utter Wbl after Wbl. Each phrase short, but all separated by wide intervals. No other overt signs of hostilities. But it is significant that the Wbl's of this species are uttered relatively more rarely, but...
completely solitary birds. The overwhelming majority of them are uttered by birds near other birds. Quite different from W5's of PT and PT II.

Saltator I
March 17, 1963
Rio Piedras

6:40 a.m. Apparently, single Black-cap flying from perch to perch. Utters "Tsawecceet tra-tra" phrases each perch. "Ts- tra" notes slightly hoarse. It is possible that such phrases are intermediate between typical WBL phrases and "Tsawecceet" - HAC patterns.

6:45. One Black-cap perched moderately high and very exposed. Uttering alternate CHN's and TSN's. Occasionally extra CHN's. Another, presumably its mate, perched about 5 ft. away, uttering very occasional TSN's at long and irregular intervals. Then latter flies away. First bird continues Alternate Note Song as before. Very long-resonated, still continuing 6:53. Bird sitting erect. Not CR or other special postures or movements. Occasionally greets between notes.

This species seems to utter Alternate Note Song comparatively frequently.

Then another livid appears near bird uttering Alternate Note Song. That again. Apparently uttering "Tsawecceet" - HAC each time it chairs, going from perch to perch, altho I can't actually see it. Greeting - Landing Call ?? First livid continues Alternate Note Song for a few seconds. Then both fly off. Probably in same direction.

7:40. One of same Black-caps back. Utter Alternate Note
Long as before, flew away almost immediately.

14:50. Two birds back. One perched fairly low. Uttering "Tsaweeceee" - HAC patterns. Each phrase might be transcribed as: "Tsaa - weeeceee kha kha kha teaa..." Number of terminal HAC notes quite variable. Sometimes only 3 or 4. Sometimes at least 3 times as many. Both hoarse and sharp, but less sharp (and loud) than usual CHN's. Birds sitting in ordinary posture. Quite erect. No CR. Not particularly elongate.

The other bird sitting hidden a few feet away. Every time the first bird utters the terminal HAC notes of the "Tsaweeceee" - HAC phrase, the second bird also utters a burst of similar HAC notes!

Rhythm now fewer than the first bird.

During many of the phrases of the first bird, the initial "Tsaa" of the "Tsaweeceee" was hoarse and harsh - hardly distinguishable from the terminal HAC notes. Then "Tsaweeceee" patterns were very reminiscent of the phrases I called "Intro" when I watched the Block caps at Berto Bello!!

After a minute or so, this behavior, the two birds moved off, flying from bush to bush. Each time they landed, the first bird uttered a "Tsaweeceee" - HAC phrase as before, while the second usually uttered a few HAC notes at the same time the first uttered its terminal HAC's. Obviously "greeting" like CHAC of the streaked saltators. Then they stop, first bird perches and utters phrases as before. Then I see second bird is picking up in m.u.!!

So this is definitely a pair!!

Then both birds fly off and disappear.

I shall call this pair "B"
Come across a single streaked 8:25. Sugary "Incomplete" songs (I shall call these "duos" from now on). All eventually sing a mimic form: "Dhik sub-chub-whih-whih wheel-oooooooo.

In tree of my terminal roost with reminder tone (such notes are obviously not usual parts of the duos.) These duos being uttered from usual posture. Finally (always?) with crown feathers ruffled (but not raised together to form "real" crest). Also throat feathers ruffled. Quite conspicuous.

Then build fliers about, utter HAC notes in flight and also when landing by itself, then back to duos as before 8:35

Saltator, I

March 18, 1942
Rio Pecos

An area of B Black-caps 6:00 a.m.

Hear faint Black-cap calls 6:15 a.m. Repeated phrases: "Wheat-wheat" - several HAC notes. And for away. Also utters occasional "Wheat-wheat" alone. Also occasional "Insect- wheel-wheat"

Come across another Black-cap 7:00 a.m. It starts Alternate notes song as soon as it sees me. CHN's and TSN's with occasional extra CHN. This seems to be a "not bad." reaction. Others birds have tended to do it when I appeared.
There is another bird near the Black-caps. It's on occasional "sea-sweet" - HAC N's as fruit continues. Alternate note song ("ANS") perhaps twice B, para after all.

Then fruit bird starts to utter "sea-sweet tea-ta" phrases. Second bird starts to synchronize its "sea-sweet" - HAC phrases with phrases of first bird.

"sea-sweet" notes tend to intersperse with CHN-TSN doublet. TSN starts to come immediately after CHN. CHN becomes less common or varying. TSN becomes somewhat longer.

Bordelli, 7:05. Then I move to another area. Black bird which is definitely one of the B's, 7:10. Uttering "sea-sweet" - HAC pattern.

"sea-sweet" - HAC is definitely the equivalent of the CHN of the streaked saltator (at least in the case of the B - I haven't definitely heard both sexes of Black-caps with such phrases. They are probably both capable of it - I have heard both sexes with "sea-sweet" s and HAC notes separately - but they may not give both notes together at the same time.)

Everything is very still here today - both among the Black-caps and the Yellow-rumps. Why? Correlated with inaction? It is still and partly overcast today. Birds were much more active earlier, when it was sunny and it looked like heavy rain at any moment.

8:19 a.m. Again a bird starts. Alternate note song when I approach one of B's. Then starts to utter "sea-sweet" - HAC phrases. Perhaps more has joined it in tee at this point. Then switches to "sea-sweet tea-ta" phrases, then back to "sea-sweet" HAC phrases. At this point, I finally manage to get bird in my glasses. Lifting, erect, wings slightly droopy. 30-35 CR. Then it's mate lands on same
branch, about 2 ft. away. Mutual “greeting.” Both birds utter
"Tsa-meeet tra-tra"-series of HAC Notes. Bill OC B for "Tsa-meeet"
and "tra-tra," closed throughout HAC Notes. Then both birds utter
a lot more such phrases, at moderate long (but fairly regular)
intervals. One bird starts, and is joined a second later by its mate.
I notice both birds have a tendency to “lean” forward, head and neck
pointing diagonally upward and forward, with each burst of HAC Notes.
Quite a conspicuous contrast with upright posture during preceding
notes. Heads bill more or less in line in diagonal posture.

During some of the latter phrases, one of the birds, almost cutting
the g (smaller than its mate) utters a soft, whistled, "ta-ta-whereee-
whereeeooooo" toward the end of the phrases. Much softer, more pleasant, and
more plaintive than any other call of the species I have heard. This occurred
at the same time immediately after the terminal HAC Notes of the phrases
I thought it was uttered at the same time as HAC by the same bird.

Comm cha:

\[
\{ Tsa-meeet tra-tra ta-ta-whereeeooooo \}
\]

But perhaps the HAC Notes accompanying these terminal plaintive
whistles were uttered by the other bird.

I think I have heard similar terminal whistled phrases uttered in
association with "Tsa-meeet"-HAC phrases before. Also, OC B, one of OC
Saltator, Mar. 18, 1962

Why does this species have such an elaborate vocal repertoire? Obviously very aggressive. And perhaps the birds of different pairs of this species are more strongly attracted to one another than are fleahed Saltators.

Saltator, I

March 23, 1962
Rio Piedras

Saltator, I

March 24, 1962
Rio Piedras

and "Teececececect" Notes are less hostile than HAC (or CHN).
9:14. Can hear Black-capped Uttering Alternate Note Song in
distance. I don't think this bird can be reacting to me
7.15. Now a bird does start Alternate Note Song when
it sees me.
8:17. Another bird (of different pair) also starts Alternate
Note Song when it sees me.

Saltator, I
March 25, 1963
Rio Piedras

Notice solitary Black-capped bird 6:50. Utters Alternate Note Song
when it sees me. Then switches to uttering "Teececececect" Notes when
I move away a little and it seems to become habituated to me. In quite
regular rhythm
One or
into of the "Teecececect" followed by single HAC Note. Then flies off to
feed. Continues uttering "Teecececect" Notes from time to time. I think
it is answered by bird in distance. Uttering occasional "Teecececect"
and "Teececececect" - HAC patterns.

This incident suggests "Teececececect" may be real PN used to
call in mate. If so, it is easy to see how this species could have evolved
"Teecececect" - HAC "greeting" from the "CHAC" of other species.

A few minutes later, one of the same birds flies in to branch
right over my head. Utters Alternate Note Song. Its mate utters both
single "Teecececect" and "Teececececect" - HAC patterns while the
first bird continues Alternate Note Song
Then first bird flies to reform mate. One of the birds utters
"Teecececect" - HAC as it lands.
I think I shall call "Fra-woococt" Notes "PN", from now on.

Saltator, Mar. 25, 1962

March 24, 1962
Rio Piedras

Two Black-caps moving through at 7:20 a.m. "Greeting" each time they land together. One bird utters PN-serials of HAC Notes or PN-serials of HAC Notes-PN, while the other bird joins in on the HAC.

Quite as before. They also utter their patterns sometimes when both are just sitting a few feet apart or one is sitting while the other feeds nearby. Quite like other saltatorus.

7:55 a.m. 2 Black-caps (different pair from above?) sitting in tree. Uttering "greeting" PN-HAC-PN patterns. Ani (smooth-billed?) sitting in same tree, a few feet away. The two Black-caps continue their vocalizations for quite a while. Gradually change.

One or both birds tend to utter musical phrase, more or less "chul chul - breeee~" after HAC instead of terminal PN.

This musical phrase is similar to whistled phrases I have heard after PN-HAC-"bree~" circumstances. Then one of the birds begins to supplant the Ani.

At least 3 times. Perches between suppliants. It utters PN-HAC-PN each time it perches. Its mate twice does silent G when it passes.
by during the supplies. An eventually leaves supplies than
its a few feet away from mate. Both birds repeatedly utter PN-
HAC-PN, more of less synchronised. Both have breast and belly fea-
tures rather puffed, keep during and between vocalizations
both sitting erect. One, at least, (I can't see the other one well)
also seems to have slight CR (see drawing on preceding page)

Their musical phrases after PN-HAC are the only patterns
of the species which are reminiscent of the US's of streaked. Could
have been derived from something else the latter.

Saltator

Saltator

Saltator

April 22, 1962

Avo Fruita

Working at first site this morning at level of the town
6:40 a.m. Her (without seeing) a streaked uttering
"Incomplete" song. All essentially similar:
"Dub dub wheeeееее ah dub dub"

Last a notes sometimes repeated. Rattle undertone to long notes.
These songs more like those of the crested tinamars are the songs of the
streaked Saltator of central Panama.
Saltator, I
May 10, 1962
Grand Colorado

Both my old captive Buff-threroats are doing well. Yellow lost its band and has now been re-banded Red.

This morning it poured rain. Shortly after dawn I heard DC coming from the Buff-throat Avenue. Went down to find that the DC was being uttered by Blue. Almost all this DC was composed of soft, flute-like notes, quite like the DC Notes uttered by other Buff-throats I have watched. Except that all these notes were essentially 5 syllabled. "Cee-a-a-a-weyco."

The bird was sitting in posture common to sp.

Quite fluffed. Light CR. (Both types of scattle erection may have been reactions to rain.)

Bill OCB with motifs, but only very slightly.

This DC was very long-rununed. Occasionally interrupted by a single "Cheewuik" Note. Barely distinguishable from loud and harsh, in that ordinary DC Notes. With a faint rattle undertone (at least toward the end of each note).

These Cheewuik Notes may be homologous with the R's of the Alternate Note song of the Floridaed Saltator. They were also ver
y reminiscent of the R's of Piranga spp. !!!!

Saltator, I

Saltator, May 10, 1947, I.

May 12, 1947

Barn Coloured

Putting the yellow x purple banded bird ("Yellow") cage with Blue and Red 4:30 a.m.

All birds freeze when Yellow first put in. Can't see them

Then Yellow hops around in extreme ft, extreme feet, and create fluffing underparts. Melting rapid slight bowing movements.

Little or no CR. No Tussle. One of the other birds笺ers WC (soft and rapid). Then one of the other birds flies to perch near Yellow.


All this bowing quite slight. Head not lowered below shoulders. Bill probably pointed downward to some extent in all or most cases. The whole thing looks unnatural in form.

The birds kept their bodies horizontal or only slightly diagonal during their flt's & bowing. Not in line with head + bell during flt's.

Yellow hopping about now, 4:40. New flt's. Extreme fluffing underparts. Definitely no CR. Wings very drooped + spread, but not held out from body. Silent.

4:41. Sudden aerial flight + chase. Involving all 3 birds. Sets up lots of Wbb's. All very prolonged and rapid, and all very
much softer than usual. These WBLS are probably also less "melodic" than usual (i.e., the notes are not very different in pitch) but they are certainly far from being rattles. Several times, one of the birds (probably Blue) rattle up with another (presumably Yellow) and a violent pecking bout develops. These pecking bouts are accompanied by HAC notes. Always brief.

While a fighting continues irregularly for some minutes. At one time, Blue and Yellow pause for a few seconds, facing one another, about 2 ft apart. Blue perched above Yellow. Below: Yellow. A gap between the two birds' heads, one perched very near the other. Underparts were flushed. No CR or Hiss. Wings drooped and spread. Tail in very extreme fan! Some indications of natural TPs, but these are slight and seem to be "uninserted". Blue WBLS steadily throughout this period. WBLS soft, rapid, as before. Continue for a considerable period of time. Bill kept slightly open throughout. Mandibles not moving to any appreciable extent.

While Blue does this, Yellow faces him, looking up at him (this may be 3 ft, but difficult to tell). Bill wide open in extreme gap. At the same time, Yellow utters series of very soft and "breathy" HAC notes. Each note separated by definite pause. I shall call such notes "MHAC." While doing the G-MHAC, Yellow has underparts flushed and wings drooped. Does not Bow. No CR. The feathers of his throat are slightly ruffled, but not enough to prove that he is performing a ritualized Hiss pattern.

Yellow seems confused and defensive while performing these G-MHAC patterns. They may be high intensity, produced when escape is stronger than attack.
It seems obvious that Yellow is a D. At least, Blue thinks so!

Then the draining and fighting resumes 4:45. We remove Yellow and put him back in his old cage by himself. Also remove Red and put it in a cage by itself. I hope Red is all right.

When we closed Yellow first, at 4:30, before putting him in a cage with Red and Blue, he uttered a few “Beat” notes flying back and forth in his cage. Red and Blue could hear him when he uttered these notes. They immediately began to fly back and forth in their own cage, in an excited and alarm-filled manner. This would suggest that the “Beat” notes are alarm sounds.

(If so, this may suggest that Saltator is related to Emberiza.)

Yellow uttered these each time when actually caught by morning.

This afternoon I heard Blue begin to utter DC Notes at 1:30 p.m. Continued for several minutes. Began shortly after rain stopped. Why? Something to do with light intensity? Or result of being not immobilized during the rain??

These DC Notes were more or less as usual. Ordinary tone and loudness. All or most composed of 4 syllables. Littered in essentially indeterminate series. Most of the time, the successive notes were in many identical. But every once in a while a brief series of notes would be composed of slightly different notes in regular alternation: “cheeawee, cheeawee, yoo”
Such pairs of notes were slightly reminiscent of the doublets in the K.V song of Pinaigra and Phineuticum, in some respects, but I don't think that the pauses before and after each pair of notes were any longer than the pauses between the notes of a single pair. I am beginning to think that this Saltator may be quite primitive!!!

Saltator, I

June 5, 1962

Bano Colorado

Blue has continued uttering DC from time to time. This morning I will put Red back with it. Red put in 6:10. Absolutely excluded after being chased for five minutes. Just sits in corner, panting. Blue just hops about erratically.


Still continuing. 6:45 am. Only difference is that Blue now utters occasional single "Tsett" in flight.
6:40 a.m. Suddenly long aerial chase. Accompanied by many “Tract” Notes ———— Then birds separate again. Red flies silent, in corner. Blue flies about, by himself largely silent. Utters occasional single “Tract” Note (I call all calls including “T” Notes from now on).
Blue does a lot of BW when perched between flights. Still continuing as before 6:53 a.m. Blue quite silent now.
4:25 a.m. More churning accompanied by “Tract” Notes. All or most of these “Tracts” are certainly uttered by Red, the chasing bird.

7:06 More churning, just as before. Then separate again. Red flies on more side Reed. Blue flies about silently.

7:17 Blue lands beside Red. Goes into ST Giff. Apparently with T Notes. Then flies Red alone accompanied by both T Notes.

Red and R all jumbled together. Former more common than latter. Then birds separate as before.

It is obvious now that T Notes are definitely young hawkite. And produced when E is stronger than A. (Possibly Red uttered some T's when I was trying to catch it before putting it into cage with Blue). But T's are probably not Alarm Calls. Primarily used during extra specific disputes.

Red remains rather sleek while frozen. No trace of sub-unseen Ruffles.

Now of the ST Giff's this morning have been accompanied by either C & ST Giff

7:40 a.m. More churning with T Notes.

7:42 More freezing. Quite silent. Then birds separate as usual.
Leaving 8:05 a.m. as nothing more is developing.
10:00 a.m. Suddenly notice chasing going on in Red-Blue cage
Accompanied by rather thin, stilted MAC notes. "Kee-yah, Kee-yah,
Kee-yah, Kee-yah,...". Can't see if there are any up
social posture or movements. When I can see the birds, Red is frisky
and silent and Blue is moving about normally.
10:05. Blue suddenly supplants Red. Accompanied by T
Notes and 1 brief, stilted MAC Note.
Then birds separate again as usual.
Note: This afternoon I could still hear chases in the Red-Blue
cage. Also Blue uttered DC occasionally. So it looks as if Red is D.

June 6, 1962
Barn, Colorado

Waiting Red and Blue again. Dark rainy day.
5:50 a.m. One bird, presumably Blue, is uttering lots of DC.
Final form of "Cheewike".
It is still too dark to see what's going on. DC stopped
5:53. At least one bird flying about, uttering occasional T Notes.
Then another brief burst of DC. Then were flying about. Then were DC
Then complete silence. Then an aerial chase (both birds definitely male
and) with series T Notes. Then birds separate. One goes back to DC
Then silence again. Then more DC bug. The DC bug bird is Blue
Red is frozen on side of cage at this time.
5:59. DC bug includes occasional Paranga-like "Cheewike" Notes.
6:01. Blue flying about from perch to perch. Uttering low-pitched
Salt Lake, Jan. 6, 1962.

In each place Apparellis guides Red throughout. DC performance far the DC of these species is definitely not even partly sterile.

Then Red suddenly moves. Blue immediately changes it back and forth along cage. Come with some T Notes. Then birds separate. Blue starts DC again. DC still with occasional "cheerwink."

Blue utters DC from almost every possible variety, sitting alone, pre-cognitive posture. Quite unusual at this time. No trace CR. Wink, or special wing movements. DC never uttered in flight.

6:10 a.m. New: Blue shuts up and starts preening.

Blue now just flying silently around cage. Leaving 6:20 as it is obvious nothing will develop here.

Ok. Another chase. Again obvious that it is Red who utters T Notes while escaping.

Yesterday morning we let the yellow-and-purple bird go free. This morning it visited the Red and Blue cage around 9:30 a.m. (or earlier) and stayed a long time.

It frequently flew back and forth and around and around, outside the cage, while Blue flew back and forth eventually inside the cage. Both birds uttered a lot of DC's at such times. Blue (at least) also utters occasional R's.

Every once in a while, the yellow bird flew 20 or 30 ft away from the cage, sat, and uttered DC (without DC's). DC perfectly normal with form. No "cheerwink."

It is obvious that this yellow bird was both looking for a mate and attempting to drive out a rival.

"Cheerwink" may be an individual peculiarity of Blue.
About 2 weeks ago, I made some observations by the road near the Jaffores Lake (the Huwa Huwa Trail). Saw a few Buff-throats.

4:00am. Single bird calling. Notes quite variable. Usually more of a "Koo-woo", occasionally "Keevee". (Also some other variations.) Sometimes organized into doublets: "Koo-woo-keevee koo-woo keevee koo-woo keevee...". Uttered from various postures.

4:10am. Pawing fly. Uttering lots of Ri. Short and harsh. This may be the "GNAH" of the species.