Cyanocitta, I.

November 3, 1957
Boulder Colorado

I have a pair of C. cyaneus, here, given me by Mrs. Maniacy

♂ white ring, left leg
♀ yellow ring, right leg

These are quite tame and settling down quite well to their new surroundings, but have not shown much behavior as yet, however.

When they are disturbed by me, they fly around quite a bit, landing here, there, and everywhere. Usually standing in a variety of unstreamlined, sleek, elongate postures. When landed, the crown feathers of the ♂ are sometimes sleek, but more often ruffled (CR) sometimes these feathers go up & down repeatedly quite frequently. The ruffling is about strictly confined to the turquoise feathers on top of crown, sometimes including a few of the sapphire feathers of the nape.

Both ♂ & ♀ sometimes utter a single, loud, rather harsh "Cheep" when flying around. Bill opens & closes. It is noticeable, however, that this call note (CN.) is not uttered nearly as frequently as the equivalent CN's of the Goldfinches or Estrildines. (The CN's of the Euphonias are equally rare.)

Sometimes, when one bird of the pair lands beside the other, one (usually not the landing bird) or both give a brief display, gradually building to a climax. Most of the

Cyanerpes, Nov. 3, 1957, II

(2)

curee I have seen today have been by the ♂.

He is usually sitting fairly relaxed, i.e with breast & belly feathers moderately fluffed, looking dumpy — but also with CR (at least sometimes).

He then suddenly points his bill up (without usually stretching his neck up) and utters a soft, whispering whee, call (WH). This is most frequently compressed perhaps be translated as "Wheeoo wheeoo wheeoo" or "Wheeee wheeee wheeoo" with sometimes one or two more similar but briefer notes tacked on at the end. Bill certainly opened during the call; & throat opened & closed with notes

Several times, during this performance, the ♂ held his wings out slightly and quickly fluttered them.

I have seen the ♀ give the same performance, without the wing-flutter

Several times, when a ♂ gave this performance when a ♀ landed beside him, she quickly turned & jabbed at him with her bill. I don't know whether it was his performance that triggered her off; but it certainly looked like it

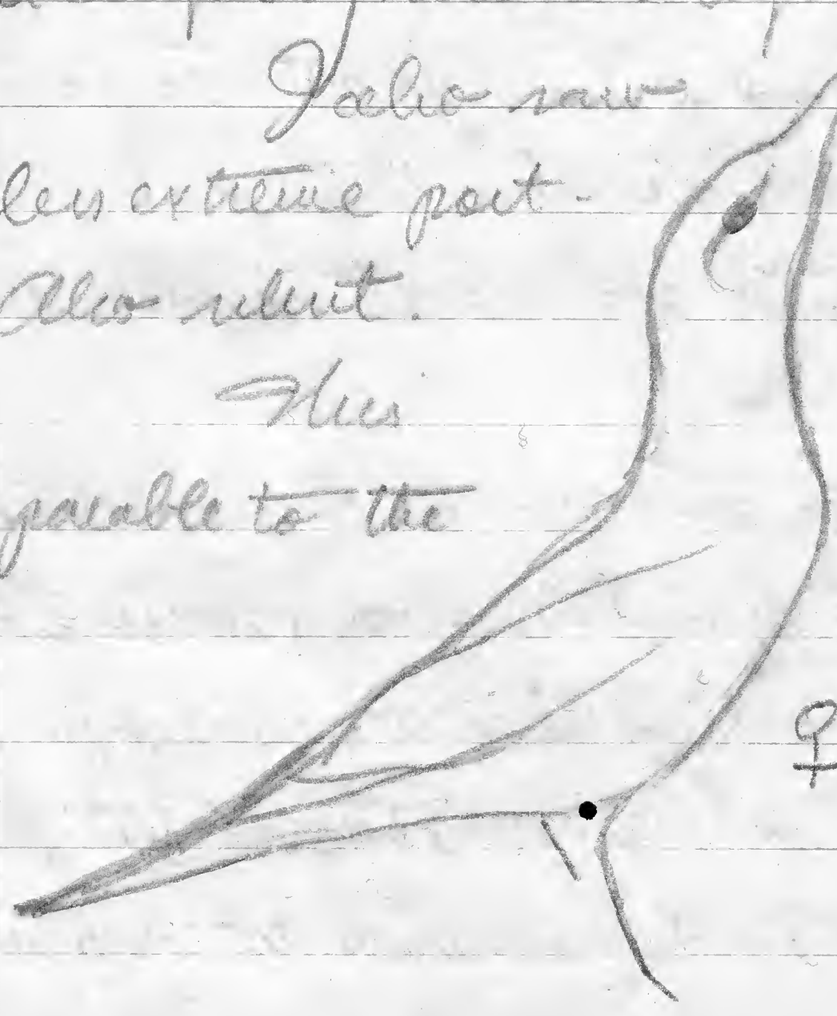
In general, if either bird is dominant, I would say it is the ♀.

I think that CR may be a generalized sign of moder-

ately low-intensity, relatively non-aggressive, hostility.

These birds do not seem to have any ritualized tail- or wing-flick patterns. An occasional wing flick does occur, but this seems to be a purely unritualized int. mov. (or momentarily thwarted desire to fly). An occasional sideways jerk of the tail also occurs, but never, I think, without a corresponding body movement.

The ♀ has just had a fight with one of the Euphonias during which she gabbled at him in a sort of unritualized "head forward threat" posture, with bill partly open, (perhaps a trace of gape hue), and uttered loud "Whee-hoo whee-hoo" notes (obviously an extreme form of the previously mentioned Wh) Then, immediately afterwards, she stood in an extreme "Bill-up (BU) posture, much taller & thinner than any I have seen before — and silent — for a couple of seconds before relaxing



Later saw the ♂ adopt a similar posture after gabbling a Euphonia would certainly seem to be comparable to the V + HF complex of many gulls.

♀

for sure, you know, the display behavior of this

Cyanerpes, Nov. 3, 1957, IV.

species (i.e. the Wh - BV complex) looks as if it might turn out to be not unlike A. & H.'s description of Embernagra!

Now I first saw a nice case of the complete Wh & BV & Wing-quivering (Qu) performance of the ♂, when the ♀ landed beside him. Very tail raised obliquely, quite

fluffed underneath. High. Only momentary about as low as the wing ever got

Cyanerpes, I. November 4, 1957
Barro Colorado

I may have to modify my previous description of the CN a little. It is not always harsh. Sometimes, perhaps usually quite clear. Almost always loud. Increases in frequency when the birds move about more. But always really single notes - so far.

I rather think that the clearer CN's contain a stronger escape element than the harsher ones. What one would expect I suppose

During a dispute this morning, I saw the ♀ adopt a bill and not extreme BV with definite CR. This is the first time I have been sure of this last component in her case. Looked just like the ♂'s CR! There is no doubt, however, but that

Cyanerges. Nov. 4, 1957. II.

NI ♀ does CR much less frequently than the ♂

I have seen the ♀ do quite a lot more & this morning. Not quite the same as the ♂'s of the Euplocamus in all respects. Given from an ordinary unmutivated but rather aggressive head-forward posture, sometimes in association with jabbing, or even, apparently, from a slight BU sometimes bill may wide open; but usually only moderate.

I rather tend to the opinion that this is really low-intensity or a remnant of Wh — into which it sometimes develops — or which it sometimes follows

I have seen & heard both the ♂ and the ♀ do Wh from unmutivated postures. The ♂ once did it actually looking down at the ♀ flying below him

Cyanerges, I. November 5, 1957.
Boco Colorado

Watched the ♀ perform her CR pattern at length during a prolonged and violent dispute with the ♂ Pico Gordo. The ♀ seemed to be rather afraid of the ♂ Pico Gordo, slowly retreating from him the length of the branch on which they were perched; but she also fought back from time with sudden jabs at him. These jabs were frequently accompanied by one or more Wh notes!

The CR was practically confined to the slow retreats, or the intervals between successive retreats. Sometimes quite prolonged. Usually given with the bill pointed

Cyanerpes, Nov 5, 1957, II.

upwards (sometimes almost vertically), head more or less pulled back, and neck more or less stretched upward — i.e. in postures quite reminiscent of typical BV. This whole performance looked quite high intensity, no pun. Perhaps the ♂ was high intensity as, or even higher than, the ♀/juv, only containing a stronger escape element.

Extreme "retreat BV" by ♀ with ♂

I also saw some more typical "friendly" BV's with ♀/juv, directed by the ♀ at the ♂ Cyanerpes. These were with slight CR, but much less than most of the corresponding performances by the ♂.

The ♂ has CR almost constantly while I am watching him and/or any other bird is nearby

Cyanerpes, I November 6, 1957
Bauer-Colorado

I have now put the 2 birds in the outside aviary. They attract another ♂, in full breeding plumage, who just sits for hours looking at them, with constant CR. No trace of song.

Cyanerpes, Nov. 6, 1957, II.

I noted today that extreme CR by the capture of may
me accompanied by slight ruffling of throat feathers

Cyanerpes, I. November 11, 1957,
Barro Colorado

Not much new to report, but there have been
a lot of wild ♂'s (at least two in perfect plumage,
and two in molt) which come to watch the captive
♂ sometimes (most often, in fact) just sit and
peer intently.

One ♂ in full nuptial plumage sat on top of the
cage for 15 minutes, uttering constant "pure" CN's
at regular two or three second intervals. (I didn't
get a good look at him, but I am fairly certain he
just sat with CR's). Then, when I approached, he
flew up in the air and began to give a whole series of
equally "single" but rapid "hard" or "wheezing"
CN's (HCN). Does this mean that the HCN's contain
a stronger escape component than the other CN's. I
rather think so.

I have also seen the same or another ♂ in
perfect plumage give a whole series of HCN's from
the tree when I was sitting quietly beside the cage. I
did notice that this ♂ never did CR. This might
confirm the "anxiety" nature of the HCN's, and it
might also suggest that the CR contains at least an

Cyanerpes, Nov. 11, 1957, II.

appreciable aggressive component.

The ♂ in the aviary usually reacts to the presence of the wild ♂'s by peering intently, occasionally flying about excitedly, and an occasional CN or HCN. Sometimes quite a bit of silent CR, sometimes not.

Cyanerpes, I. November 13, 1957
Barro-Colorado

Another ♂ in perfect plumage tried to join the capture bird today. He wasn't very active, but he wasn't very shy either, and he did do CR and utter the endearing pure CN's.

Cyanerpes, I. November 17, 1957,
Barro-Colorado

The attraction of the capture birds (the ♂♂ & ♀♀) for the wild birds seems to be as strong as ever. I have seen up to five birds, males in all plumages (but most of them perfect) sitting on the tree above the cage & peering. I am also still annoyed by the lack of display by the capture birds, the wild birds toward the capture bird, or the wild birds to each other (they sometimes sit within a few inches of each other, on the same branch.) Just a lot of CR and a few CN's and HCN's.

In this latter connection, it should be noted that I saw one of the wild birds today sit for a long time with more or less

permanent CR, only interrupted when it gave an occasional HCN and smoothed down its crown feathers, momentarily, at the same time.

This is certainly the most highly social of the tanagers around here, with the probable exception of the Tangara species. These little wandering flocks of ♂'s tend to move around as a unit. One bird flying off tends to stir the others off too. (And the sudden departure of one or more of the wild birds, also sets off the captive birds, subject to follow-)

It should be stressed that these mobile flocks, at least as they appear near the aviary, are almost always composed of ♂'s only. I have seen only one wild ♀ come near the captive birds; and I am not sure that she was "really" part of a flock.

The most peculiar aspect of the lack of display by visiting birds and the captive birds while being visited is that they are quite obviously greatly "excited". The captive birds tend to dash madly back & forth (particularly the ♂), and the wild ♂'s make constant little rallies toward & away from the aviary), or sit obviously torn by conflicting desires.

Cyanerpes, I.

November 30, 1957
Bruno Colombo

[redacted] = Blue Honeycreeper = cyaneus.

These birds are fairly common around the clearing on the island, and I have also have 2 captive birds in the large aviary (one male, banded white left, and one female, banded yellow-right). Both the captive birds are in unusually good condition, as I got them from Mrs. Marcano.

The wild birds are not usually very conspicuous, except when "visiting" the captive birds (see below). They usually range from moderate to high vegetation, except during the visits.

I am rather puzzled about what stage in their annual cycle the birds have reached now. Most of the ♂'s (including the captive ♂) seem to have completed the molt into full nuptial plumage at least several weeks ago (although there are, of course, some laggards); but I haven't seen any signs of "real" reproductive behavior yet.

Both wild and captive ♂'s and ♀'s have WF's & TF's of more or less the usual tanager type. The TF's are little developed, but the WF's are both relatively and comparatively quite extensive and exaggerated (in comparison with both the TF's of this species and the WF's of most of the other species). Thus may be correlated with the yellow-wing patches.

Both ♂'s and ♀'s have CV's of the usual type. Their "last rather surprising loud "Tseto", uttered as single

notes, or in twos and threes, while flying about or perched or hopping on twigs.

The ♂'s (and possibly the ♀'s) also have a definitely harsher and coarser call note (CHCN). This is morphologically quite distinct from the ordinary CN (intermediates are very rare or non-existent). It seems to be more strongly hostile than the ordinary CN. I have seen a "visiting" ♂ (in perfect plumage) utter a whole series of ordinary CN's while clinging to the cage beside the captive birds, and then fly up (as I approached) and utter a whole series of HCN's from a nearby tree. This might suggest that the HCN contains a stronger escape component than the CN, (although I must admit that the exact signs of escape have been few or non-existent in the other cases of HCN I have observed).

A very common and conspicuous ritualized pattern is crest-raising (CR). This is done by the ♂'s very frequently when they are slightly disturbed. It seems to be a sign of low-intensity hostility in general. All the feathers of the turquoise crown patch (and perhaps a few of the sapphire feathers just behind the crown patch) are raised very conspicuously. Definitely ruffled rather than fluffed. (In extreme cases the throat feathers may also be raised a little).

I have only seen the captive ♀ show a brief, slight, CR, in one case — showing a dispute with a Euphonia.

There seems to be some sort of correlation between the CN's and CR. Almost all the (non-flying) CN's are accompanied by CR (the CR often or usually being maintained in the

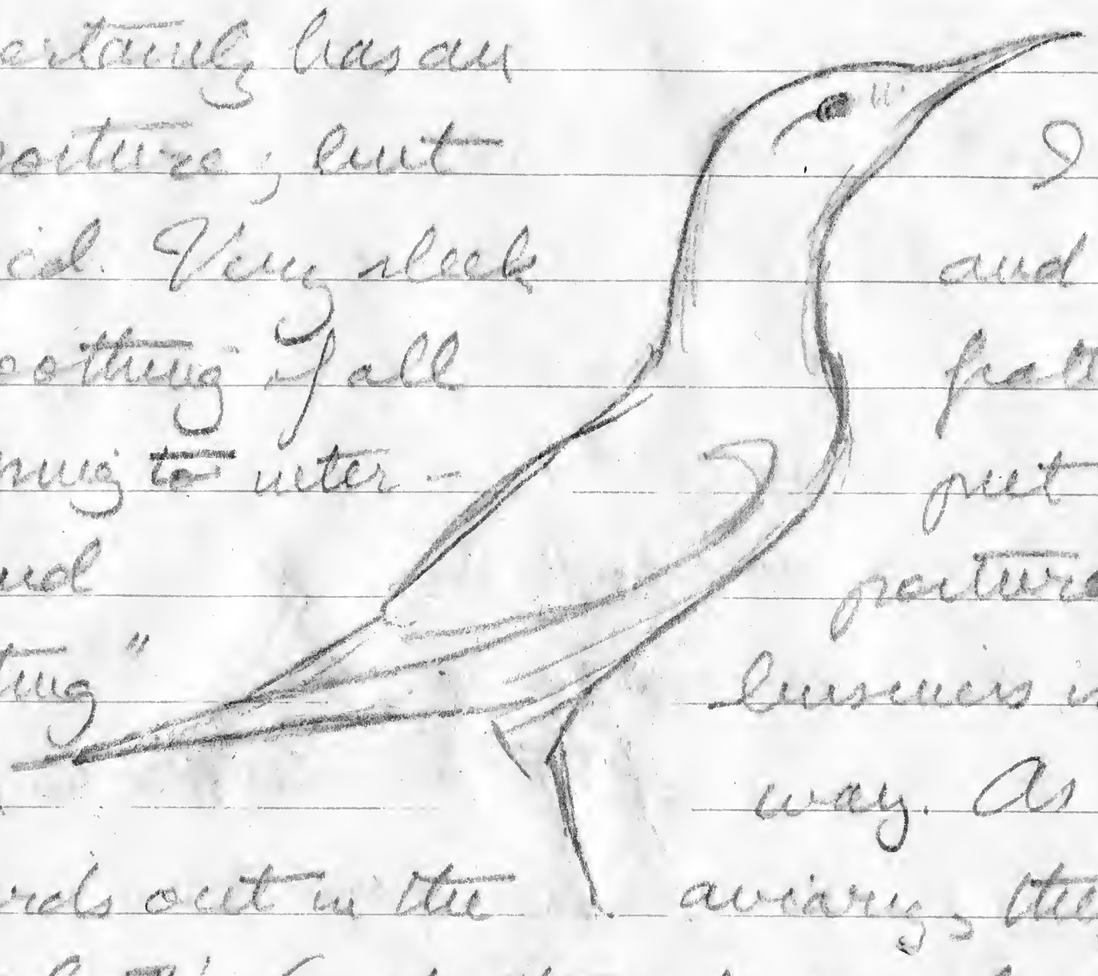
intervals between CN's). It is noticeable, however, (at least among the visiting ♂'s) that the crest is usually or always smoothed down when HCN's are uttered.

This species certainly has an "anxiety" pre-escape posture, but I doubt if it is ritualized. The sleek white neckmarks, the smoothing of all the significant in helping to intensify movements and

the whole "emoting"

quite remarkable in a

I put the captive birds out in the



I rather
and long,
feathers may
put various
postures.)

business in really
way. As soon as
aviary, they began
to be visited by lots of ♂'s (in both perfect and incomplete
plumage) and at least one ♀. Most frequently in early morn-
ing, just after dawn. The visitors may just sit in the tree
above the aviary, or fly about excitedly, or even come down
and fly about and even land on the cage itself, apparently
trying to get. (It should be noted, incidentally, that the
visitors do not seem to be interested in the food of the capt-
ive birds, they don't usually come to that side of the cage).
The most remarkable thing about the whole situation is the
relative rarity of elaborate display. This is just the situat-
ion in which I would expect all sorts of elaborate hostility
— particularly as there may be several wild ♂'s visiting at
the same time, and flying or sitting close together — but nothing
of the sort! The visitors may do TF's and WF's, CR, and
utter CN's and HCN's, but I have never seen anything

Cyaverpes, Nov. 30, 1957, IV.

which seemed to be almost that, among the wild birds or directed by the wild birds toward the captive ones. The captive birds may fly about eventually (although they sometimes seem to remain quite calm), and give the same range of apparently to-a-intensity displays as the visiting wild birds, and the captive often sometimes seems to be trying to "get at" the visitors, but they don't do anything very exciting either.

It should be noted, incidentally, that the aviary doesn't seem to be in the territory of any wild birds — and it certainly couldn't be in the territory of all the visitors — so it is a little difficult to see what the attraction is. It may be just general gregariousness.

This species does seem to be quite gregarious in some ways. I have never seen flocks assemble, except in the cases when 3 or 4 visitors are gathered together, but it is noticeable that whenever one of the visitors flies off suddenly all the others tend to follow it — and the captive birds try to follow too. This species does at least have the follow-the-leader tendencies of many gregarious species, (and this may also be correlated with the brilliant yellow-wing-patches).

When I first got the 2 captive birds, they were put in a small cage (with the Euphonias); and I saw a couple of displays in these circumstances which I have not seen again since they were put in the aviary. There were gapings; and an elaborate stretch (St) pattern with breast-belly feathers fluffed (BF) and wing-fluttering (WFl) and a peculiar soft husky call (Huh). All the latter may be included in a "Huh complex".

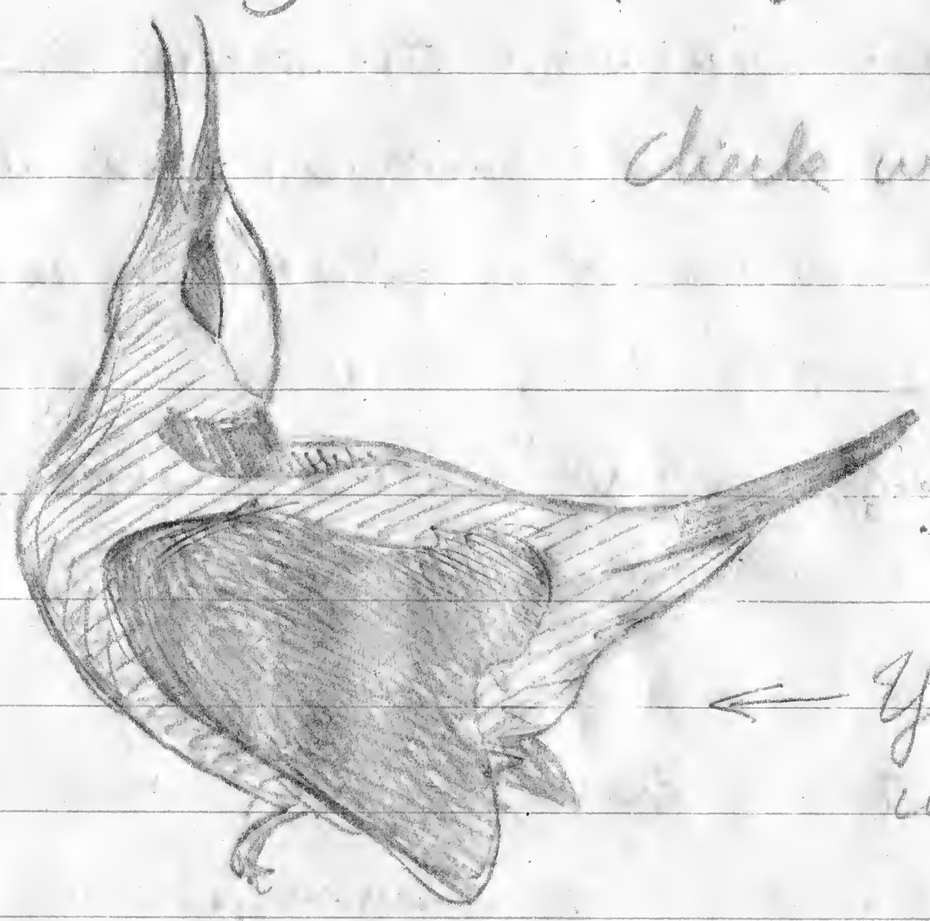
Cyanerpes, Nov. 30, 1957; I.

The ♂ was most often alone by the ♀ during disputes with the ♂ Rio Gordo. Just a simple opening of the bill, sometimes quite wide, but usually not extreme. Usually open with head drawn up and perhaps pulled back a little. The ♀ sometimes did this when she showed a slight tendency to advance (alternating it with Wk Notes when she showed a slight tendency to advance), so it probably doesn't contain a very strong aggressive component. It certainly seems to be relatively little ritualized. Only saw the ♂ do the same thing once, very briefly.

The Wk Complex performance may vary greatly in elaboration. Usually done by the ♂, whenever the ♀ approached him closely (and once or twice apparently elicited at the ♀ when she was a little farther — almost a foot — away). At its lowest intensity it seems to consist of one, two, or three soft, hushy "Wkecoo wkecoo . . ." notes uttered from an unritualized posture, with a slight tendency to point the head and bill upward. At higher intensities this posturing becomes more extreme (a real ♂ being achieved), the breast & belly feathers are fluffed more and more conspicuously, the wings are lowered more & more, and, finally, at highest intensities, the wings are also fluttered and the tail may be noticeably raised. (The above description is somewhat misleading, as I never saw a case of slowly rising intensity. All the Wk Complex performances I saw were very brief. The ♂ just suddenly went into the performance at a particular intensity level and then quickly stopped again. Once or twice

Cyanerpes, Nov. 30, 1956, VI

there was a very fast "build up" of one or two elements — e.g. the wing-fluttering might begin a second or so after the rest of the complex began — but this was relatively rare.) The highest intensity Wh Complex posture was about as follows:



Chirks with tail ♀ 4

← Yellow wing patch not usually visible

The Wh Notes themselves are rather reminiscent of the HAC Notes of other species — although less harsh, but they must be less aggressive (this ♂ certainly made no attempt to attack the ♀; and the whole posture & accompanying movements looks like appeasement or a sexual pattern).

The ♀ did utter similar notes once or twice, but without any elaborate movements or postures, nothing more than a mere vocalization of the ♂.

Cyanerpes, I December 1, 1957,
Barro Colorado

Well — after writing yesterday that I had not seen a Wh Complex performance since the birds went into the aviary, of

course one occurred today. Quiet by one of the birds when the A landed suddenly beside the Q. And, of course, I didn't manage to catch any of the details!

The Q also did one of alarming feeding. Probably excited at, and provoked by the A (although it is possible that the A Pico feeder was the culprit instead). Just put head up and opened bill looked almost like an intention movement

This of a WA same

complex performance, and I rather got the impression before, once or twice, when the birds were in the small cage.

One thing I have noticed, whenever the birds seem to be disturbed in any way, by my approach or a visitor, they both, and particularly the Q, peck at the beads on their legs very frequently & vigorously. Reduction?

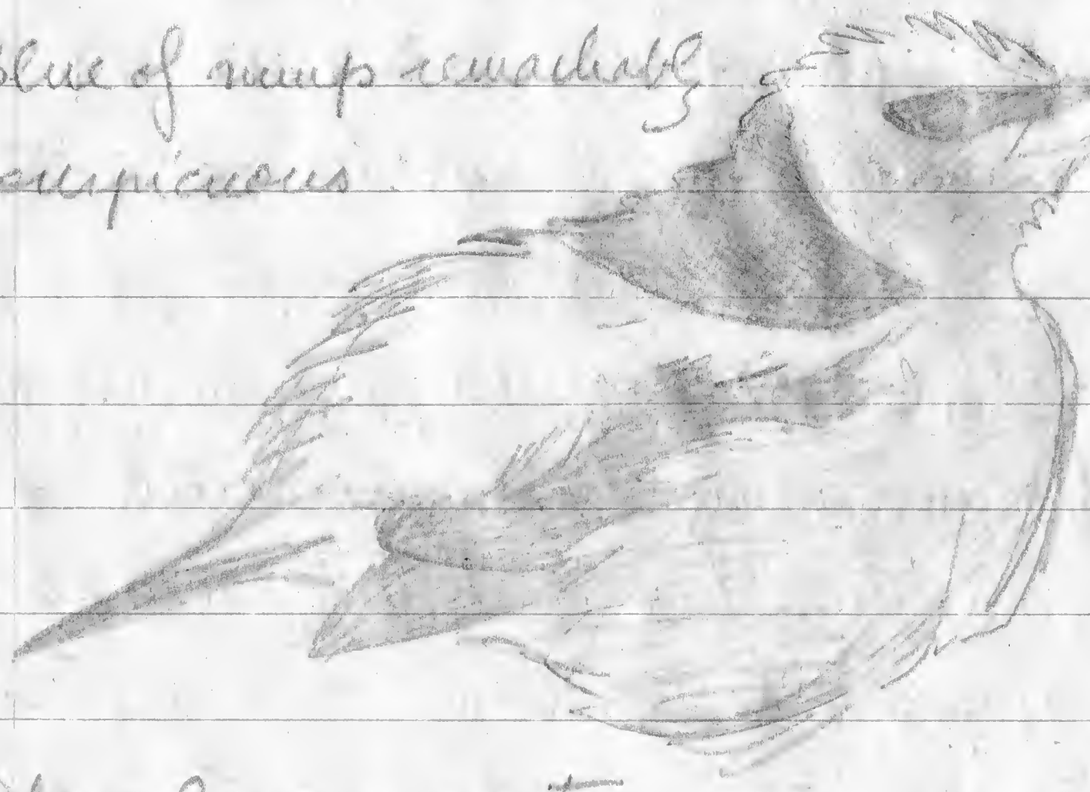
As further evidence to support the theory that the HCN contains a relatively stronger escape component than the ordinary CN, I should mention that a visitor of this morning gave a lot of HCN's in the tree (with mouth down as usual) and then changed to CN's when it flew down and tried to get at the birds inside the cage.

The ordinary CN is certainly the usual form given by the capture of flying about excitedly inside the cage when visitors are present

I am now rather tending to the conclusion that inverting must be a habitual pattern — although general grey movements may be involved in some of the patterns that occur, at least affecting the form they usually take.

Cyanocyras, Dec. 1, 1957. III.

As further evidence of the low-intensity nature of the CN (and its lack of appreciable escape element) I can cite the case of the captive ♂, this afternoon, who gave a whole series of CN's, at rapid intervals, for at least 5 minutes, in a perfectly relaxed posture. His perfectly relaxed posture was, as usual, an extreme case of fluffing or puffing. Extreme fluffing seems to be characteristic of birds half asleep — especially in the sun



Blue of rump remarkably conspicuous

(Black of back extends up head & looks very velvety).

CN with extreme relaxed fluffed posture

Blue of rump quite light — almost turquoise like the crown.

The bill is opened & closed conspicuously with each CN, and the tail jerks upward slightly just as the call is uttered.

Cyanocyras, I. December 2, 1957.
Barro Colorado

One visiting ♂ in perfect plumage just gave a HCN (perhaps not the very-harshest type) with CR. This must, I suppose, be considered an ambivalent case.

The captive birds seem to ignore or pay little attention to a

Cyanerpes, Dec. 2, 1957, II

wanting & in incomplete plumage. This is quite striking, contrast to their usual reaction to a visitor. (It may be significant that the head of the visitor is still the non-occipital skull green.)

Another burst of ♀ calling when the ♂ walked beside the ♀. Can't recall this kind of it, but it does seem to be any ritualized postures or movements involved. The call itself could best be transcribed as "Waah waah waah waah waaaaah" — the last particularly nasal.

A wild ♀ has just come visiting. Stayed around a long time, more interested in the captive birds than any wild ♀ I have seen before. Seemed particularly interested in the ♂ (And he lunged, repeatedly.) Gave a burst of typical HCN's at one time — so this must be a normal component of the ♀ repertoire.

Cyanerpes, I. December 7, 1957, Barro Colorado

When I went into the aviary today, the ♀ uttered repeated Wh Notes, with CR but no ft or anything else, apparently provoked by and directed toward me.

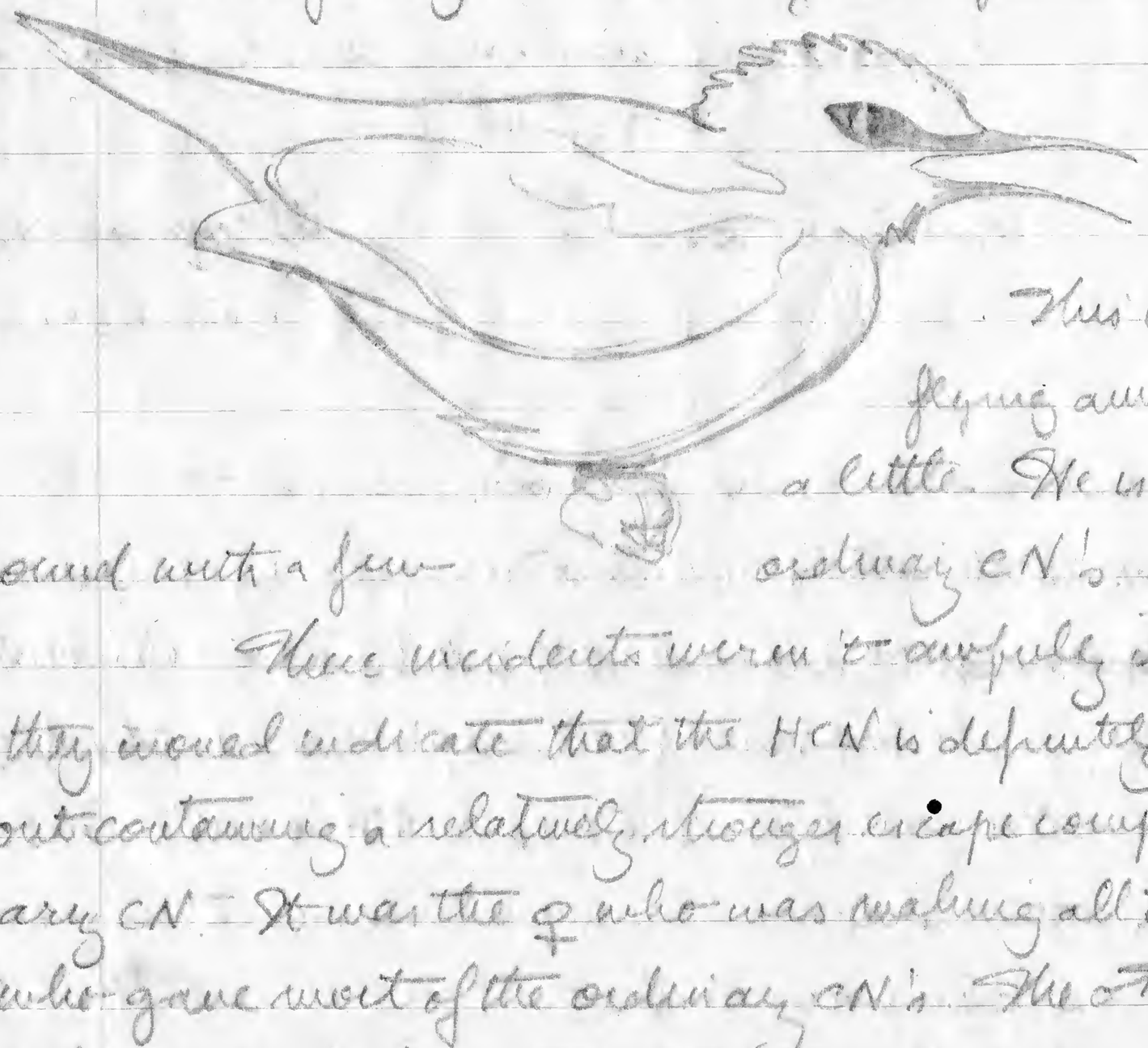
I put a stuffed hawk in the aviary today, to see the birds' reactions. I think they were quite upset, but the reaction wasn't as spectacular as I had hoped. A lot of flying around, in association with the usual TF's & WF's, and a lot of calling.

The ♀ began flying around very nervously, with a lot of loud and rattling shrill but apparently "ordinary" CN's. I clo-

Cyanerpes, Dec. 7, 1957, II

not think that there were a distinct "al" CN pattern. If not, why doesn't this species have an alCN??) Then, particularly when the ♂ began his HCN-ing, she gave a lot of HCN's too, almost antiphonally. Gradually quieting down. Now just flying a bit, with the usual flutings, and an occasional CN.

The ♂ just sat at first, with an occasional flute; then began a whole heap of HCN's, quite regular, each note a few seconds apart. Crown feathers usually smooth, a trace of CR between notes, otherwise no ritualized postures or movements (except for occasional flutings, of course). This continued for a long time, and then, while the HCN's remained the same and almost as frequent, the posture gradually changed. CR gradually developed quite strongly, and a trace of frontal bill feather fluffing appeared, until finally the ♂ was giving his HCN's from a posture like this:



This was ended by the ♂ flying away, feeding, relaxing a little. He is now just flying around with a few ordinary CN's.

These incidents were truly illuminating; but they would indicate that the HCN is depurely hyglien intent, without containing a relatively strong escape component, than the ordinary CN. It was the ♀ who was making all the escape movements who gave most of the ordinary CN's. The ♂ may have given a few ordinary CN's from time to time, but he was stationary, in the

Cyanerpes, Dec. 7, 1957, III.

middle of the cage (i.e not plastered against the walls with fright), when he gave most of the HCN's. And there were no loud, quick & long-sustained that I) am compelled to think they were relatively high intensity.

Cyanerpes, I. December 8, 1957,
Barro Colorado

There was a slight dispute (with a few pushing int. moves) between the 2 Honey creepers and the Yellow-bellies, when the latter jostled the Honey creeper as they all came down to bathe. Shortly after the Yellow-bellies were let loose in the aviary, the 2 Honey creepers certainly gave a series of Wh Notes, (with only the slightest trace of ft) during this dispute. Would seem to indicate that the Wh Notes may be purely hostile

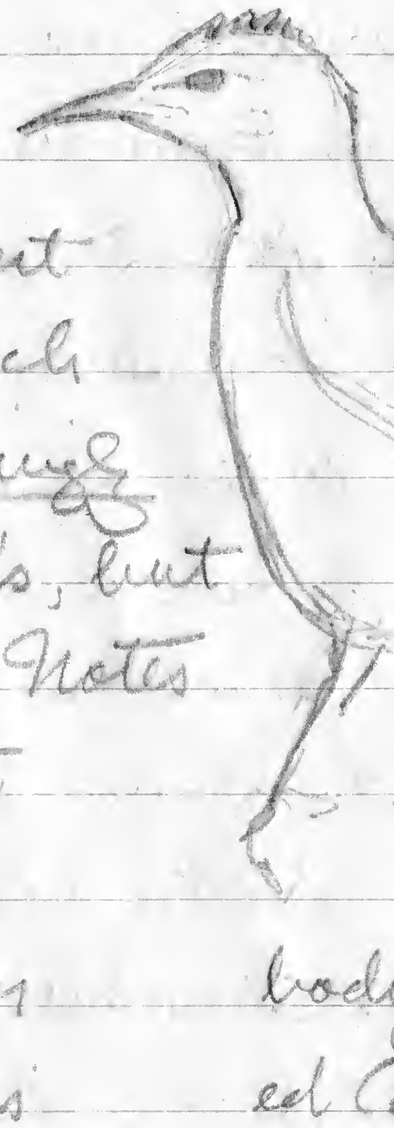
Cyanerpes, I. December 14, 1957,
Barro Colorado

Have introduced 2 new birds, bought at El Valle, into aviary with the others. Both ♂'s in very good condition. One, banded green right, is apparently fully adult (completely black wings and tail), just beginning to molt into nuptial plumage, largely green, with a few blue feathers underneath. The other, banded black right is apparently immature. Just acquiring black wings & tail, no trace of blue yet.

There was some reaction when I introduced these 2 ♂'s, but nothing very violent.

Cyanerpes, Dec. 14, 1957, II.

Most of the reaction, of course, was by the pair which has been in the aviary a long time. Both of CR, the ♂ doing it in a rather low, obvious, invitualized, ordinary sitting posture, the ♀ doing it in a much more erect posture, which I shall call the Upright (V). some flying about by almost all birds, but not too much all the CN patterns surprisingly rare. A few ordinary CN's, but no HCN's! A lot of Wh Notes by both the ♂ and ♀ of the established pair, whenever one of the newcomers sat or flew too near. Some of this from completely unritualized postures. Others with ♂t. (and often with cR). When a marked ♂t developed, it was usually combined with an apparently ritualized body posture — which was different in the 2 sexes. The ♂ went into a more or less low intent, version of the posture drawn on page 6 (Nov 30, II.) Definite BF, and body more or less horizontal, tail perhaps slightly higher than usual. I shall call this posture of the body L. There was no trace of Wpe during any of these encounters. The "♂t" posture accompanying some of the ♀'s Wh Notes was rather different. Much higher posture, inclined more forward, which I shall call H♂t. Quite like the posture with G drawn on page 7 (Dec. 1, II.)



♀ V & cR (wings sometimes out of feathers). slight fluffing of lower belly feathers. Whole body & neck sometimes inclined (diagonally) further forward).

Both ♂ and ♀ of the established pair attacked the intrud-

Cyanerpes, Dec. 14, 1957, III

ers occasional♂. Often without any ritualized preliminaries a post-attack display. The ♀ was more often aggressive than the ♂. (This confirms the impression I got months ago, when I first got the pair.) Once she gave Wh Notes from an unritualized posture before attack, & (with perhaps a slight trace of C) after attack. Twice she stood in the Post-ure drawn on the preceding page before attack, then advanced with unritualized movements & posture, attacked, & gave Wh Notes in an unritualized posture after attack.

The ♂ and ♀ of the pair showed a slight tendency to elicit the hostility provoked by the newcomers toward one another (i.e. turned to face one another during Wh avoidance-ceremonies) Once the ♀, in the midst of a dispute with a newcomer, turned to her "mate" and died C in H & T.

Both ♂ & ♀ of the pair showed a definite tendency to pick at their hands or their legs during the general excitement.

The newcomers did very little. At first just flew around and sat or stood very sleek. Then, gradually, began to dispute a bit of CR — the older newcomer first. They may also have given a few CV's from time to time; but I am not sure of this.

The whole disturbance subsided quite soon.

The patterns displayed during this encounter would seem to confirm the impressions I got earlier. CR is the lowest intensity ritualized hostile pattern (with the possible exception of the CV's — which weren't important in

Cyanerpes, Dec. 14, 1957, IV

this moment), probably usually appears when the attack and escape drives are approximately in balance. Wh Notes are probably the next highest intensity patterns, probably also produced when a. a e. are in approximate balance — with attack probably slightly predominant. G is apparently less aggressive than the Wh Notes. The ♂'s never appear at quite such low intensities as some of the G's and Wh. The other "Wh complex" patterns, e.g. BF, are higher intensity still.

It should be noted that the ♂ of the established pair tolerates the approach of the newcomers rather better than does the ♀. It is possible that the newcomers tend to approach the ♂ of the pair more than they do the ♀. Anyhow, the net effect is that the 3 ♂'s are sometimes more or less close together, while the ♀ is a little set apart. This may be significant — especially when it is remembered that ♂'s are much commoner "visitors" than ♀'s. It may be that the ♂'s of this species are more gregarious than the ♀'s.

Both the intruding ♂'s sometimes gave Wh Notes (usually in doublets "Wheeoo-Whoo") when flying away from an advance or attack by one of the pair bonds. These Wh Notes seem to be lower, and perhaps slightly harsher, than some of the Wh Notes between the old-established ♂ and ♀; but there seem to be all sorts of intermediates between the 2 types.

Later, several hours after being introduced into the cage, the older of the 2 newcomers is making lots of vigorous short flights around the cage, with lots of slightly harsh CN's (possibly intermediate between CN and HCN's). Escape behavior? Settle OR between flights

Cyanerpes, I.

December 22, 1957
Barro Colorado

Very early this morning, just after dawn, the capture pair of I was very active flying back & forth repeatedly. Uttered both single notes and series of 2 or 3 (— — —), both when flying & perched between flights. In all circumstances, the quality of the notes varied from pure HCN to pure Wh, through all possible intermediates. No ritualized postures or movements, except for the usual flicks (F), and perhaps a trace of CR.

Cyanerpes, I — January 4, 1958

All the Blue Honeycreepers slept very close together in the same clump of Bagoda Bush last night. Not, I think, touching.

Two or three Honeycreepers (= Cyanerpes) came to visit very briefly this morning. I didn't get a good view of them. All I can say is that they uttered a lot of call-notes of some kind, more often & in longer series, than most of Blue Honeycreepers in the same situation. The notes were rather clear & sharp.

Well Well! It never rains but it pours literally as well as figuratively. During the first part of the morning all the captive Blue Honeycreepers were persecuted by the Green ones (see today's notes on Chloropsides), fleeing before their attackers without making any attempt to fight or display back. Then, as soon as the Green Honeycreepers were removed

Cyanerpes, Jan 4, 1958, II

the capture of Blue Honeycreeper in perfect nuptial plumage began to display violently, off and on for quite a long time, toward the ♀. Obviously primarily hostile. Presumably due to the same cause(s) as the aggressiveness of the Green Honeycreepers today (or nearly, perhaps, due to the "stirring up" effect of the Green Honeycreeper alarms).

The ♂'s display took the form of a series of "7th couples" patterns, somewhat different from any I have seen before, although incorporating most of the same elements.

When I first saw the ♂ he was uttering CN's (apparently by just ordinary CN's) in a ft. Posture somewhat:

Head very ruffled, looking very large.
Under feathers not very ruffled.
Yellow of wings not visible
most of the time
Legs flexed.

This posture varied considerably in height, i.e. the extent to which the breast was lowered varied considerably at different times. This ft. Posture was continued or alternated with a variety of movements. The ♂ hopped from twig to twig from time to time, and kept turning in order to present his chin & throat to the ♀

Cyanerpes, Jan. 4, 1957, III

(this orientation was maintained very well). He also did nearly constant elaborate ritualized Pivoting (Pvt), swinging fore part of body from side to side (without hopping like the Thamnobius, except perhaps, when moving from twig to twig). This seemed to be nothing more than a great exaggeration of the body movement which seems to be the essential part of ordinary Tail-flirting. This was also accompanied by nearly constant WF of the usual sort. I think that the WF's were synchronized with the Pvt movements, but everything happened so fast that I can't be absolutely sure about this. Occasionally, the WF's would develop into even more extreme Wing-flirting movements (WFrt), in which the wings were flicked horizontally much farther than in the usual WF, revealing a flash of yellow. The WFrt's were single movements, like the ordinary WF's. I saw no trace of wing-flutter (Qu). He frequently lowered the bill to a more or less horizontal position, or even looked down at his feet, in the midst of all this; but this was variable and occurred at rather irregular intervals, so that it did not seem to be a form of regular ritualized Lowering.

The frequency of CN's by the Male during this performance was also variable. Sometimes silent for a few seconds, sometimes uttering CN's one right after the other as fast as possible. I didn't notice any regular difference between the St and accompanying movements during silent periods and periods of CN-calling — although I rather imagine that there must

the some motivational difference between the 2 periods)

The CN's were sometimes replaced by Mk Notes of the usual sort, but occasionally sometimes without change in the accompanying postures or movements. Probably the highest intensities of the performance. Otherwise annoyed with attacks by the ♂ on the ♀. (These attacks were nothing more than brief forward jabs, but I think that they were quite momentarily hostile). Mk Notes were probably given by the ♂ during & after the attacks

She also seemed to be a tendency for the ♂ to adopt a particularly extreme St posture (with or without CN or Mk Notes) momentarily, immediately after delivering the attack.

The ♂ eventually answered clearly, at least momentarily, without doing anything more

The ♀ responded to all this with similar but slightly different patterns

a St. Posture, than that of the ♂ She also did at rather less regularly wings were cocked seemed to be trying steadily as he was certainly relaxed this to time, but I am ever actually looked drawn") Most of the

She also responded to all this with similar but slightly

She also spent most of her time in but it was almost always lowered

Relatively little CR, I think. least some Pot and HF, but than the ♂ Most of the time her over the base of her tail. She to face the ♂ quite as trying to face her. She St. posture from time not sure that she down at her feet (except" by time she also uttered ordinary

Cyanerpes, Jan. 4, 1958, V.

sounding CN's (perhaps less frequently than the ♂). She also seemed to switch to Wh Notes when the ♂ died, and showed a definite tendency to utter Wh Notes and/or assume an extreme St after seeing attacked.

She also did a lot of WT's during the encounter with the ♂, but not Wflut or Qu. Later on, however, during a temporary lull when all the Blue Honeycreepers went down to feed, she did several Wflut's, very extreme, without any trace of St. These were probably provoked by, and directed toward, one of the juvenile ♂'s feeding near her. (This may be a threat pattern).

Aside from this last incident, the Q and the full-plumage ♂ both ignored the young ♂'s throughout.

The absence of pronounced ruffling of the breast & belly feathers and Qu by the ♂ during this encounter might suggest that these last 2 patterns, as I saw them performed during the first few days after getting the birds, were partly due to an activated neurosis.

I have often, today and on earlier days as well, heard one or more birds utter Wh Notes without any regular feather ruffled patterns or movements when the whole bunch of Honeycreepers comes down together to feed. The youngest juvenile ♂ seems to do this more often than the others. This would seem to be a very low-intensity pattern. If so, how does it differ from such patterns as CR or St alone. More aggressive? This would certainly be very difficult to prove.

Cyanerpes, I.

January 5, 1958
Barro Colorado

Several times this morning the adult capture of ♂ went into a long St- (with CR) when the ♀ landed beside him. That is all, however. No call, little or no WF, no Part. Then St's more of the more exact type - which moved suggest that this type is relatively low-intensity.

Cyanerpes, I. January 7, 1958

Nothing much of interest today, except a visit by a pair of adult birds, ♂ in full nuptial plumage and ♀. Behaved much as usual; except that once, when the ♂ came close to the ♀, he went into an extreme of the W/h complex performance. St + CR, WF's, breast lowered (I shall call this component BL), and W/h Notes. This is the first time I have seen this done by wild birds. The breeding season must be coming along. I hope!

I have also been trying to check up on the flushing of this species. I think my statement on page 10 is approximately correct at least as a description of the usual behavior of the birds here now. The TF's seem to be essentially lateral, like those of the Euphonias → or ⇄ Very little vertical component; and that appears with always V-D.

Cyanerpes, I

January 14, 1958
Barro Colorado

There has been nothing of any real interest for days. It is probable that there are fewer visiting birds now than earlier.

I saw one adult ♂ in full plumage today who seemed to be flying around with a flock of Plain Tanagers (+ one or two Blues & Palms)!

An isolated ♂, high in a tree near my house, and fairly far from the aviary, uttered a lot of HCN's for quite a long time. He certainly didn't seem to be alarmed by anything, and I wondered if this HCN-ing might not be the "equivalent" of "song". (I should like to see a sound spectrograph of this HCN. I wonder if it is at all like the R of other species??)

Cyanerpes, I

January 29, 1958
Barro Colorado

Yesterday I saw a flock of closely associated wild birds, including at least 5 ♂'s in full nuptial plumage + 2 ♀'s, flying around the trees in the clearing. The largest flock I have seen

There was absolutely no display in this flock. And the other visitors to the aviary birds (which have become numerous again) have been doing nothing but HCN's & CR, and not too much of those. This species, at this time, seems to be a good example of a gregarious form in which overt hostility is prevented

by a general suppression of wakefulness of the hostile drives, a peculiar modification or general raising of the releasing threshold levels.

But it should also be noted that the HCN's (and CN's, I think) and CR of the visitors are far more often given by birds sitting in the trees some distance from the aviary than by birds actually perched on the aviary itself. This might suggest that such manifestations of "un-quiet" hostility are suppressed by too close approach to another bird! How is this achieved? By increase of the escape drive? But birds perched on the aviary don't show any overt signs of stronger escape than birds in the trees.

Perhaps I should modify the above statements a little, in view of the fact that I have just been watching more adult ♂'s in full nuptial plumage making visits. These visitors were quite silent when perched on the aviary — in spite of the fact the capture birds did utter a lot of HCN's — but they did sit with CR (or at least wet feathers raised) — and even, in one case, with the breast + bill feathers rather flopped (this looked almost like a completely relaxed sitting posture). These visitors were not, however, very close to the capture birds inside the cage; so the mouthing of the crown feathers may be only characteristic of encounters when birds are literally face to face only a few inches apart.

It is also hardly conceivable that the HCN is not a hostile pattern at all, but a gregarious pattern, the result of "frustrated" gregariousness, an attempt to "call in" another bird.

Most of the wild flocks I've seen to contain an excess of ♂'s. Is this real or deceptive? And I think that visiting ♂'s are

Cyanerpes, Jan. 20, 1958, III.

more apt to give more HCN's than are visiting ♀'s. Could the ♂ of this species be more gregarious than the ♀?

Cyanerpes, I. January 23, 1958
Barro Colorado

There have been very few visitors the last few days. This would seem to indicate that the relatively large flocks that were around on the 19th - 20th has moved on. Which would mean that these non-breeding flocks are mobile rather than territorial.

Well — I take this back a little (although I still think the flocks of this species tend to be mobile at this time). We have had a couple of wild ♂'s, in complete nuptial plumage, and one wild ♀ visiting this noon. Much as usual — HCN's the usual pattern. But the ♀ did get with Wh Notes on top of the cage. Apparently directed at the birds inside the cage — as the wild ♂'s were rather far away & number at the time. This is about the first time I have seen this.

Cyanerpes, I. January 29, 1958
Barro Colorado

The youngest of the 2 captive juvenile ♂'s modeled most into quite full display, for a very brief period, when the adult ♂ came near him. St + CR + BL + Wh Notes — but none of the other "Wh complex components). This would seem to be a further indication that most, at least, of this complex is non-sexual.

January 27, 1958
Barro Colorado

Well! Well! Well! I just realized that the youngest captive juvenile ♂ was singing this afternoon (He may well have been doing so for several days, at least, without my noticing it) The utterance itself was a soft, rather prolonged, warbling sound, (not too unlike the WS of the wild Palm Tanagers or even the song of the young captive ♂ Yellow-bellied Seed-eater, but lacking the distinctive notes, e.g. the "freeze" of the Palms, which are sometimes conspicuous in the songs of the other birds). Rather ventriloqual, in the sense that it was sometimes difficult to tell exactly where the sound was coming from. Fluffed with the bill closed, or only opening & closing very slightly, with the throat visibly moving in and out (and possibly the wings vibrating a very little) in rhythm with the notes. Not accompanied with any particular ritualized movements or postures (not even fluffing) with the possible exception of some preening movements (see below)

I think I shall call this "song" WS.

The circumstances of this WS were rather peculiar in some way. When I first noticed the bird, he was spending most of his time flying actively back and forth from one end of the aviary to the other. Just pausing briefly between flights from time to time. Sometimes he just landed and clung to the sides of the aviary, and uttered one or more WS's while he clung there. Sometimes he landed on a branch of a bush and uttered one or more WS's there. All these games were very long. But the bird

sometimes pause on a branch long enough to do a little preening, sometimes alternating several WS's with several preening movements (usually preening breast and belly feathers or under wings). He also, at such times, did a lot of bending down "to look at feet" ie what were presumably int. mous. of preening (I shall call these BD). The WS sometimes continued through the BD. His plumage was usually quite smooth throughout this whole performance (without even a trace of CR), although he did one general ruffle during a WS immediately before a general shaking-out of the whole plumage. This preening looked as if it might be "really" significant, i.e. definitely linked to the WS by particular internal factors — like the comfort movements associated with the song of the Banaraquit, (although the actual performance of a complete preening movement suppressed the WS, momentarily as the bird could hardly sing and preen absolutely simultaneously), but this apparent coulation may have been coincidence. The bird certainly always gave WS's and preened whenever it landed where it could do both conveniently, but it may be that it just had a high preening drive anyhow. This must be checked by further observations! The preening movements themselves certainly looked perfectly normal and "autochthonous".

Now if the other Blue Honeycreepers reacted to the WS's of this young juvenile. The older juvenile sometimes flew back + forth in the cage, more or less following the younger bird in his flights, but this is a common performance in any circumstances. The adult ♂ once landed beside the young juvenile

while the latter sang, but nothing came of this, and the adult soon flew away again.

I wonder if this relatively elaborate song of the young bird might be comparable to the song of young or swallow fledgers - i.e. a case of ontogeny repeating phylogeny???

It may possibly be significant in connection with this outburst of WS that the young juvenile ♂ twice tried to pick up long straws this afternoon. These straws are the sort of thing which might well be used for nest material eventually. (There wasn't any very strict temporal correlation between these attempts to pick up straws and particular bursts of WS, but they did occur during the general period when he was doing a lot of WS from time to time.)

I should also note that the molt of this young juvenile (and the older juvenile ♂ as well) seems to be retarded. His wings were only partially black when I got him, and they are still the same. He has added a few, very few, blue feathers since his arrival - but that is all.

Cyanerpes, I. January 30, 1958
Baño Colorado

The captive young juvenile ♂ hasn't done much WS-ing yet, this morning, but the little that he has done has not been associated with preening or BD's.

February 1, 1958
Barro Colorado

Watching a large flock of Blues (all the ♂'s in complete nuptial plumage & dress), including perhaps 20 birds, perhaps evenly divided between ♂'s and ♀'s, in a Balsa tree by Chapman House this evening. At first feeding more or less peacefully; but then a couple of pairs of Green Honeycreepers in the same tree (see today's notes on Chlorophanes) began to get aggressive, and shortly after the Blues began to chase one another back and forth. Eventually all the birds seemed to get involved in the disputing, and the whole imbroglio lasted over a half an hour — until sunset. This seemed to be very "general" disputing. None of the birds seemed to be defending a specific territory; nor did particular birds seem to have particular enemies. It was just that every bird seemed to resent it whenever any other bird came close!?! The whole thing obviously was aggressive.

Most of the hostility took the form of supplanting attacks, with or without accompanying ritualized patterns, or bouts of face-to-face mutual display. The common displays were just the same as those I have seen performed by the captive birds. Lots of CR, and St (taking the characteristically bigger, different form in ♂'s and ♀'s), and HCN, with lots of WF's and TF's (there were about the most extreme I have seen in this species yet). There were also one or two actual fights, the birds tumbling over and falling in the air. There were accompanied by Wk Notes. There were probably also some Wk Notes during mutual displaying

without actual fighting. There was also a lot of G-ing by birds during mutual displaying, especially by ♀'s; but it would be difficult to say exactly how much, as some of the apparent G's may have been accompanied by notes which I didn't catch.

As far as I could determine, the Blues confined their hostile attentions strictly to their own species. (Contrast with the behavior of the Greens during the same disputing today!!).

There was no much more hostility than I have ever seen before in a flock of Blue Honeycreepers that it suggested that the breeding season may be ready to start.

Cyanerpes, I February 4, 1958
Barro Colorado

A pair of Shining Honeycreepers showed up again today feeding in the Balsa by Chapman House. I watched them for quite a long time. Quite silent, and without a trace of any ritualized gestures or movements (not even CR), except for TF's and WF's quite like those of Blue Honeycreepers. Quite ignored the HCN's of Blue Honeycreepers in the same tree.

This species looks possibly a little heavier-bodied and shorter tailed than the Blue Honeycreepers.

I watched a pair of wild ♂'s uttering HCN's this evening near the Balsa Tree. They were sitting quite hunched, with all feathers quite ruffled, including CR; but this may have been more out of after-effect of a tempestuous rain storm we had last night. Lots of birds seem to be unusually fluffed or ruffled today.

February 5, 1958
Barro Colorado

sunset nape crown or tail, so

Watching a pair of birds in orange tree at sitting in fluffed posture, with the black particularly conspicuous - very ruffled indeed, flat (very flat!), rump crowned or meeting over - that the blue rump was almost completely covered. Sometimes sitting looking straight ahead, but frequently turned to look to one side - to give the effect drawn above I think he was silent. His mate was with him, and one of the 2 birds was giving HCN's, but I think it was she. He may have done a little tongue pumping" in this posture, but I am not sure of it, as the light was fading fast

This posture, in some ways, appeared to be just a "normal" unnaturally relaxed fluffed posture - more or less equivalent to the quite different looking relaxed fluffed posture drawn on Dec 2, p 17. But it is so different from the latter, presenting such different visual stimuli to an observer, that I think it must have some vigual function of some sort.

I shall call the posture drawn on this page the "Black-fluff (Bkfluff), and the one drawn on p. 17 the "Blue-fluff" (Blue-fluff).

I can't imagine really what signal this was meant to convey - except that it may have been hostile (and it may be significant that the ♀ was giving HCN's at the time). It may have been provoked by and/or directed toward several larger

Cyanerpes (1 Blue and 1 Summer) in the same tree I couldn't see what this posture eventually led to, as the pair eventually moved behind some leaves

Earlier this afternoon I saw what was presumably a different ♂ showing traces of what was probably the same pattern beside the Bahia Tree near Chapman House. He was apparently single, sitting quietly most of the time in a more normal posture than the one drawn above — except that his black hood was more or less "swollen" most of the time (looking almost like a tumour. Has had also left before I could see if some more overt behaviour could develop.

I saw a little more usual hostility during another incident at about the same time. a ♀ landed right near a ♂, who immediately went into a "Wh complex" performance, with extremely vertical ft quents, and with 2 notes, but not very extreme ones between typical HCN which resembled quickly HBC ♂ relaxed quickly flew and started to preen.

which seemed to be intermediate and typical as the ♀ ignored in the usual way. (Posture comm ♂, with no flashing.)

trace of wing-quivering or wing-

I seldom or never seem to hear any ordinary CN's during my observations of mixed birds. Is this just because they are relatively faint? I wonder: I suppose so.

Cyanerpes, I

(40)

February 6, 1958
Barro Colorado

Both juvenile captive Blues have been giving a lot of WS's this afternoon. Much as before. Bill absolutely closed throughout all the performances of both birds. Both usually sitting in a very low-intensity huddled posture (with crown feathers raised as usual). Occasionally associated with preening and other comfort movements, but not frequently enough to prove that the association was "significant". The older juvenile occasionally interrupted song with single HCN's (provoked by some stimulus outside cage?), and sometimes sang in a slightly more rigid, more "typically song-like" posture than the younger juvenile. Again none of this response, or lead to any song bird,

(although I should add that both the young Blue Honeycreepers seem to have been a little more active than usual this afternoon - flying back & forth suddenly across the cage.)

Whenever (or very frequently when) a wild bird goes another (no matter what sex) one or both birds may briefly point the head & bill upward. Without obvious signs of retraleization (except for a CR which may or may not be present in almost any circumstances) This might be a very weak form of it; but I rather think that it is nothing more than an int. mov. of flying up. The captive birds also do it sometimes - but more rarely.

Extremely elongate WS Posture.

February 7, 1958
Barro Colorado

Watching the aviary early this morning. Both the captive juveniles have been very vocal indeed. HCN's, Wh Notes, and WS. All given by birds sitting more or less by themselves, in a more or less relaxed posture (sometimes a slight trace of bm fluff), with CR, but no other ritualized patterns). There is no doubt but that all 3 calls are closely related, i.e. the Wh Notes seem to intergrade with both the others. I was particularly surprised at the frequency of Wh N's this morning by birds which were not engaged in overt fighting. They gave these Wh N's in definite, apparently organized, series of 3 or (less frequently) 4 notes. Sometimes definite series coming as:

— — — –

All these Wh N's were accompanied by definite opening & closing of the bill with each note, and this seems to be one of the best distinctions (in the case of dubious utterances) between the Wh N's and WS. None of these calls induced any obvious response by other birds (both the juveniles have had supplanting attacks made by adults upon them; but such attacks did not seem to be definitely correlated with calls by the young birds).

Some of the series of Wh N's of the younger juvenile are even longer than those described above. Including at least six notes.

Some of them also done with little or no CR.

I wonder why the adult ♂ isn't being nearly so vocal? Is it because he is already "mated"???

Cyanerpes, I

February 13, 1958
Barro Colorado

There was quite a lot of chipping in a large flock (including 8-10 birds) in a bare tree this evening. The usual stuff, i.e. CR, HCN's, & St's, but more frequent than I have ever seen before. Breeding season coming on?

Cyanerpes, I

February 16, 1958
Barro Colorado

I caught 2 new Honeycreepers today: a ♂, just completing the molt into full nuptial plumage, banded blue left; and a ♀, banded light green left. Probably a pair before they were caught. I released them in the aviary.

The general excitement when they were let loose attracted 3 visitors, an apparently mated pair first, and then a visitor.

When the pair first came, the ♂ visitor first did CR, while the ♀ visitor did lots of HCN-ing in a moderately alert-looking posture (without CR). This seems to be quite a common arrangement, i.e. ♀'s also seem to give more HCN's than ♂'s.

When the second visiting ♂ showed up, he wandered close to the ♂ of the visiting pair, whereupon the latter advanced toward him, in St. with CR and BL (and presumably some Wh N's as well, although I didn't actually hear them). This caused the second ♂ to retreat.

There was very little hostility by the other captive Blue

Cyanerpes, Feb. 16, 1958, II.

Many creepers when the new ones were introduced. Just a little disputing when they all came down to feed. The old ♂ and ♀ both became aggressive (at different times) Just stretched head & neck forward toward the new-comers, or obliquely upward & forward. Apparently unritualized int. mov. of attack. Accompanied by a few forward jabbing movements which did not actually come into contact.

When the new birds did not retreat before this, the old ♂ then went into ft. and CR, and eventually retreated himself! (This was the new ♀ who withstood his threat. Perhaps she will turn out to be dominant too.)

Both the old ♂ and the old ♀ uttered a few Wk N's during these disputes Just as usual except much fainter (but not particularly "muffled" sounding) Low intensity?

Cyanerpes, I February 17, 1958
Barro Colorado

A little disputing going on between the old & new pairs this morning. Much like some of the disputing I have seen in the wild (e.g. in the Bolsa Flor). All sorts of things, but little BL and apparently no ritualized wing movements (except WF), and, perhaps surprisingly, little G. I have only seen one or two points which deserve comment.

The old ♂ several times made jabbing attack movements toward the new ♂ when they were both feeding. Each attack movement immediately followed by ft & CR by the attacker. App.

acutely silent

I have seen the old ♂ quite WH Notes from a perfectly unritualized cool looking sitting posture & CR. I have seen the old ♀ give WH Notes from a quite unritualized sort of pre-attack posture without CR.

There may be a slight tendency for the old ♀ to dispute with the new ♀, and the old ♂ with the new ♂, although I have certainly seen the old ♂ dispute with the new ♀ also

The tongue is certainly raised and very conspicuous (ritualized) during HCN's

Ordinary CN's can be given with exit smooth as well as CR at least in the case of the ♂)

The new ♀ has been rather strongly persecuted by the old ♀, and it may possibly be significant that she has spent most of the morning sitting very quietly in a rather hunched up, fluffed posture (In what seems to be the usual, unritualized, resting fluffed posture, i.e. what I have called Buffy in the case of ♂'s.)

The older young ♂ has continued to do quite a lot of WS this morning. In a posture in which I think must now be recognized as the "typical" WS posture. Very little ritualized if at all The bird stands (or, rather, sits — as its legs are flexed) more or less erectly, with head more or less horizontal, and CR. The wings are slightly drooped, but not spread, and the wing feathers aren't spread either. There is usually some very slight fluffing all over. This is particularly conspicuous (although still very slight) in the case of the rump feathers. The hair of the back is then comes ca.

Cyanerpes, Feb. 17, 1958, III

The wings & tail always vibrate a little in rhythm with the notes. The bill is certainly usually closed; (but I have seen the younger juveniles, once, open & close the bill slightly but definitely during the WS, again in rhythm with the notes.)

The old adult ♂ has done one thing repeatedly this morning which rather puzzles me. Setting by himself, in the posture described above as the typical WS posture, but with head & bill inclined slightly obliquely upward. From time to time, it is then noticeable that his wings (and tail?) are moving just as they are during the WS's of the juveniles. I haven't yet been sure that I have heard any real WS sounds during this performance by the old ♂, (although he does utter both CN's and HCN's occasionally in association with the performance), but this certainly looks as if it were a case of "silent song" — the bill is always completely closed throughout (except during the CN's and HCN's), and I have not yet been able to detect any unmistakable throat movements. The old ♂ is always sitting alone when he does this, and I have yet to see it provoke any unmistakable response by the other honeycreepers in the aviary.

I am almost certain that the old ♂ gave a little "silent song" (SS) this afternoon in a perfectly ordinary, but rather stiff, Buffy posture.

Cyanerpes, I — February 21, 1958, Barro Colorado

I have got a ♀ shining Honeycreeper from Mrs. Marcias,

which I will only be able to keep temporarily. Have put it in the large aviary.

The commonest note of this bird is a loud CN, much like the ordinary CN of the Blues in quality, but much louder. (Mrs. M. also describes it as more metallic.) Often uttered in long series. Often accompanied by WF's and TF's; but never any CR. I think that many of these CN's may well contain a relatively strong escape component. They were uttered very commonly by the bird during the trip from Balboa to B.C.I., and there was another long and rather rapid burst of them just now when I entered the aviary.

These CN's would certainly appear to be homologous with the ordinary CN's and/or the HCN's of the Blues.

They may be sharply distinguished from a melodious and greatly accelerated burst of notes which seem to form an R. Each "syllable" of the R is apparently identical with a CN, but they are much more rapidly repeated than the notes of even the most rapid series of CN's I have heard. (I.E. there is a discontinuity here. This R pattern of the Shining Honeycreepers is very reminiscent of the R's of the Tanagara tanagers in sound, and also in the way it obviously seems to be derived from a rapid series of ordinary CN's, and yet has become sufficiently ritualized, in itself alone, to be considered a distinct pattern by itself alone.)

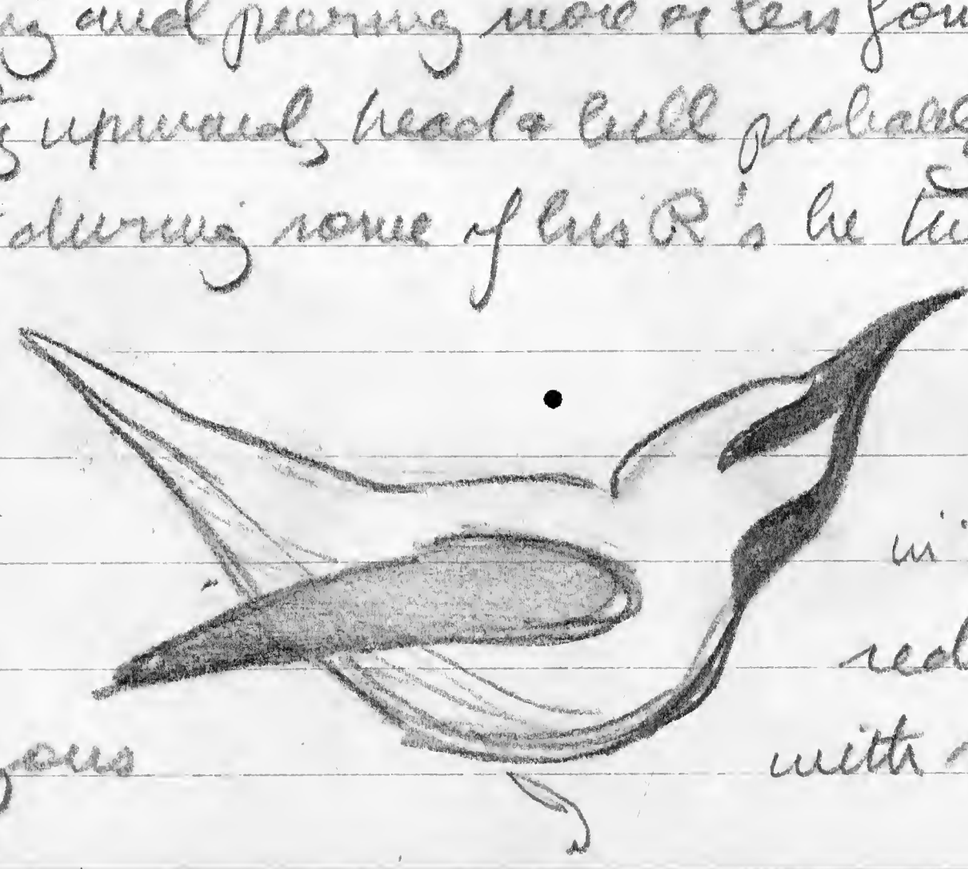
The R of the flowerpiercer may be introduced by 1 or 2 preliminary CN notes, in which case the R does indeed appear to be a literal accelleration.

I presume that the R's are at least partly higher intensity than the CN's. They sometimes appear to be the "climax" of a burst of CN's.

But the R's may also contain a relatively stronger attack component than at least some of the CN's. The capture ♀ did not give her first R's until this morning, when she was getting used to her travelling cage (i.e. her escape component was probably becoming relatively weaker). She also did more R after I left her loose in the aviary the first time, in the midst of all the other birds, when she seemed to be quite hostile but not overwhelmingly panic-stricken. And the R was also done by the ♂ of a visiting pair.

This pair came to visit the aviary briefly very shortly after I let the capture ♀ go. Do you imagine that there are lots of strangers around all the time, although one doesn't see them very much?

The ♀ of the visiting pair didn't seem to do much. Just sat and stared. The ♂, however, alternated lots of CN's with many series of R's. (He may also have uttered a few B_{33}'s — see below — but I can't be sure of this, as the capture ♀ certainly uttered some B_{33}'s at this time.) I didn't get too good a view of him, as everything happened very fast and leaves were in the way. But he certainly uttered almost all his CN's and some of his R's from an apparently perfectly normal erect posture (no CR, and even very little fluffing), just sitting and peering more or less forward (neck probably inclined slightly upward, head & bill probably pointed slightly downward). But during none of his R's he turned to the ♀ in a posture

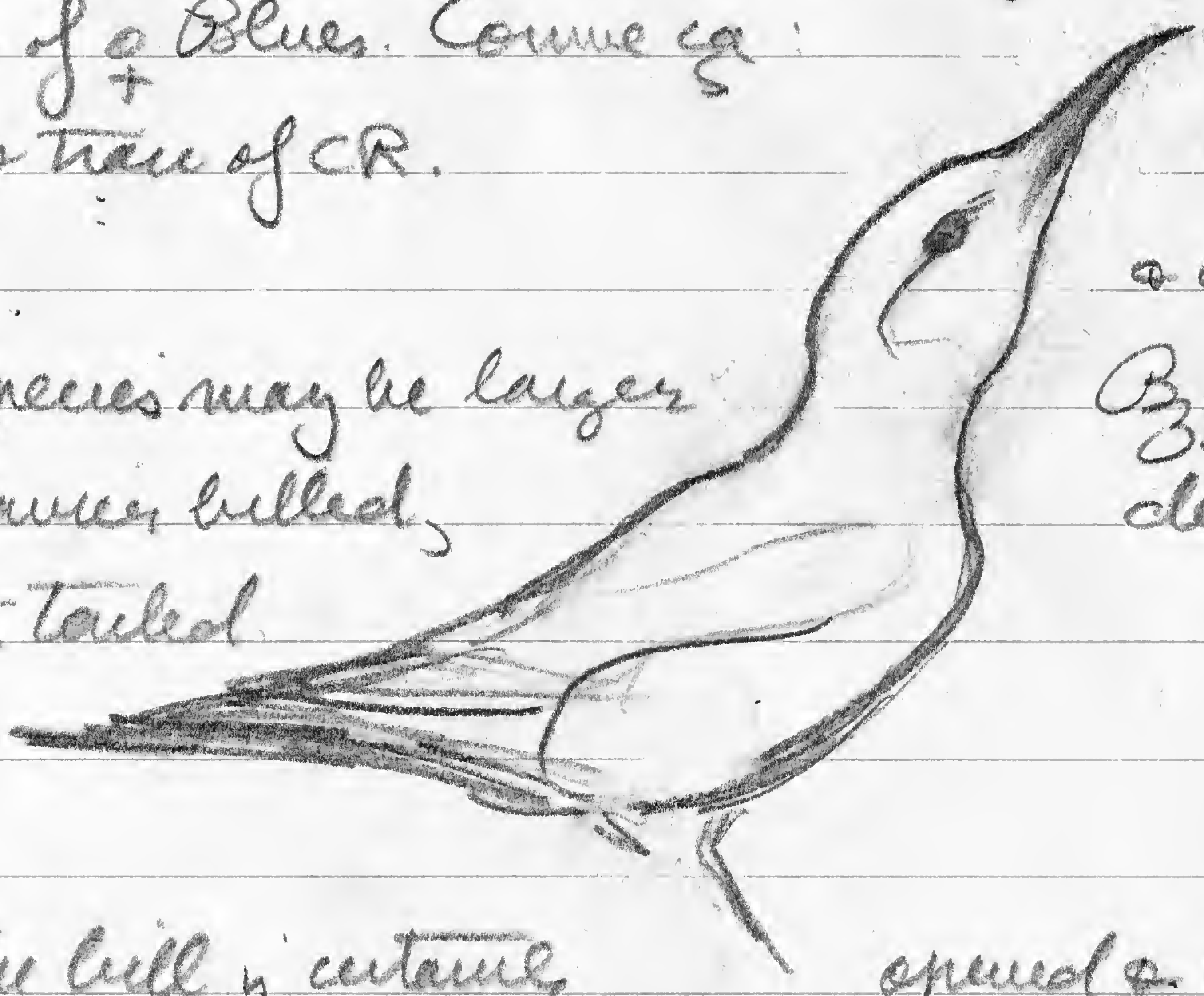


roughly comparable in this posture very, reduction? and with none of the posture-

al components of the Wh Complex of the Blues ??? It certainly looked like it, but, if so, it is peculiar that it is associated with the R which certainly does not seem to be related to the Wh N's of the Blues

The captive ♀ has, however, uttered some notes which may be related to the Wh N's of the Blues in one way or another. Single short buzzy notes, with a pronounced "twang" (rather like the LCN's of Bonaparte's Gull) which I shall call Bzz's. She has uttered quite a lot of them from time to time, always (or almost always) when an adult ♂ Blue has come too close to her. Apparently very hostile. Usually uttered from posture which is very reminiscent of the less extreme Ft's of ♀ Blues. Comme ça:

Again, no trace of CR.



I think the bill opens & closes slightly with each Bzz note, (it certainly does with some!).

(This species may be larger headed, heavier billed, and shorter tailed than the Blues).

The bill is certainly opened & closed quite widely with each CN. The general sound of these CN's is much more like that of the CN's of the Green Honeycreepers than is that of the Blue CN's

The general effect of all the Shining Honeycreeper behavior I have seen this morning, in fact, is quite reminiscent of the Greens (although obviously related to Blue behavior). Certainly much more so than I expected.)

The captive ♀ Shining has certainly shown no tendency to advance toward or join the captive Blues, except more or less accidentally.

Cyanerpes, Feb. 21, 1958, IV

Early this morning, while still in her travelling cage, the ♀ uttered a burst of R's which were fluctuating and uninterpted in such a way that the whole thing was slightly reminiscent of a "rattling version" of the W.S.'s of the young captive ♂ Blues. She has not done this again, however, so it may not have been significant.

I have caught a lot of Blue Honeycreepers this afternoon, in my unavailing efforts to catch the flamingo. Several ♂♂ Blues have uttered long hoarse screams when handled. These are similar to the HCN's and Wh N's in quality, but much longer & louder. I shall call them HScr. They are very high intensity, and probably contain an appreciable attack component, (as these birds try to bite when handled!)

I think the usual low-intensity series of Wh N's, unaccompanied by ritualized postures or movements (except, perhaps, a tiny head dip (R)) is made up of only 2 notes " — — "

Watching the ♀ flaming this afternoon, I am rather coming over to the idea that R's can develop quite smoothly out of a series of accelerating ordinary CN's.

Cyanerpes, I.

February 22, 1958
Barro Colorado

There were no visits by wild birds for a long time this morning; and the ♀ flaming was relatively placid as compared with yesterday. It may be significant, therefore, that she gave lots of CN's, and lots of B33's (when other birds came too near), but no R's, during this calm period. Would suggest that R is definitely higher intensity than at least some of the other notes.

Cyanerpes, Feb. 22, 1758, II

I think that the notes of the Blues that I called H8cr yesterday must be strictly homologous with what I called the HC of the greens (re notes of Jan. 4, p. 12, on Chlorophanes) I found just the name. (I have caught some more Greens in the net today, now I have been able to compare) H8cr is the better name, and I shall use it for both species from now on.

The wild pair of Shinings (presumably the same pair as yesterday) finally paid a brief and unenticing visit to the aviary late in the morning. Just sat and looked from high up in the branches of a tree (rather like Dacnis). I did notice, however, that the ♂ visitor tended to sit in a posture comme ça: Either facing the birds in the aviary, or turning to face his ♀ when she approached apparently silent, but I think that it vocalized — and is presumably correlated distinctive black throat patch.

I should say that the WS's of the young ♂ Blues are becoming louder. They certainly could not be described as "sub-song" or "whisper song" any longer. Still done in the same way with the same postures through

Various Blues have been down to visit the capture birds as usual. Both ♂'s stood in Bckfluff, CR, sometimes with a noticeable

But one of the most of the time sometimes with without. It that the light

Cyanerpes, Feb. 22, 1958, II

cap was quite separate from the black ruff showing CR

Cyanerpes, I

February 23, 1958
Barro Colorado

A pair (presumably the same pair) of flowerpiercers came back for a very brief visit this morning. Just sat in the tree-tops & peered. The general habits of this species certainly are like Dacnis!

Cyanerpes. I

February 24, 1958
Barro Colorado

Just at dawn this morning, the capture of ♀ flowerpiercer and gave several R's, each one immediately followed by one or more B_{33}'s. Rather reminds of the R-Rsp performances of the Greens.

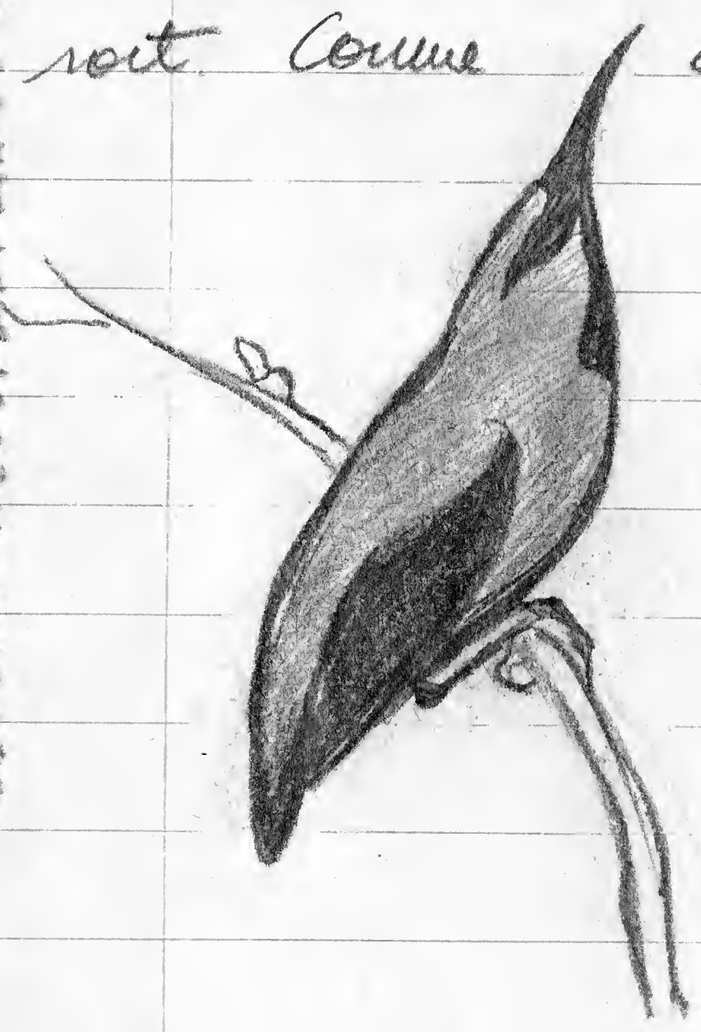
She does tend to do ft's with her B_{33}'s when another bird comes too close, but these are always short-necked (like my drawings on previous pages) and she doesn't seem to have anything like the very erect ft's of the ♀ Blues.

She once definitely did B_{33}'s before, during, and after an attack on a ♂ Blue.

She also sometimes gives B_{33}'s when she is sitting more or less by herself, in a moderately relaxed posture, with all plumage slightly fluffed. Further proof that B_{33}'s can be very low-intensity.

Finally the male came to visit again. Nothing very exciting, behavior much as usual, but a little more interesting than yesterday. Again, the ♂ was in all degrees of ft for much

of the time he was around (but none with tail raised like the one I saw above on Feb. 21, p. 47) He certainly grew on R from an St. posture like the one I drew on Feb. 22, p. 50. Once he went into an even more extreme St, without call of any sort. Comme ca:



Definitely hanging on the bent legs.

I couldn't see what released this, or what response, if any, it induced

Cyanerpes, F — February 25, 1958
Barro Colorado

The youngest of the 2 miniature Blue ♂'s has been singing a lot this morning. Most (but not all) of his WS's were introduced by 1 or (more frequently 2) notes which seem to be indistinguishable from ordinary HCN's and a few of the phrases ended with a single similar note. This would seem to indicate that the motivation of the WS contains a hostile component

I have once seen this miniature make a supplanting attack on the nest & immediately after a WS, but this is the only case of the sort I ever remember observing. So the WS cannot normally contain a relatively very strong aggressive element.

I have seen quite a number of long & violent disputes between veiled Blue ♂'s (in full nuptial plumage) yesterday and

Cyanerpes, Feb. 28, 1958, II

today I haven't been able to follow this well, but I have seen that the ♂'s tend to sit and look violently right, left, upward & downward, in the pauses between active chases & fights. This is usually accompanied by extreme TF and WF (usually upward & stunk). The head & body movements are very conspicuous, and they are presumably what Hutch calls "bowing". But they do not seem to form a ritualized whole. Just extreme wit woos., the result of "inhibited" desire to move off.

The capture & filming did some more revealing early this morning just as they did at dawn yesterday. Lots of rather irregularly spaced R's, usually introduced by gradually accelerating CN's, and terminated by one or more BZZ's. The whole thing is rather reminiscent of a "song", and she seemed to alter or modify a few of the CN's or R Notes in such a way that the effect was almost "warbling" at times.

I have now been listening to more songs by the young captive Blues, and it is obvious that many of them (probably a majority) are not associated with HCN's. It is only that HCN's are the only "overt" patterns with which their WS's are ever associated with any appreciable frequency at all.

The blue left ♂ has been following a flying after the light green left ♀ much of the time this afternoon. She has n't led to anything much, except once, when he got the ♀ into a corner above him, he went into an extreme ft & CR posture, just like the ordinary ft. of ♀'s, very tall & thin. I.E. the ♂ is perfectly capable of assuming a "feminine" pattern — when the orientation factors are suitable.

Cyanerpes, Feb. 25, 1958, III

The younger immature captive ♂ Blue modeling flew to a ♀ this evening, and gave a few Wh Notes in an extreme ♂ st, with CR, BL, wings drooped, a tail-raised posture (i.e. a posture very much like the flaming posture drawn on Feb. 21, p. 47)! The ♀ immediately flew away and the ♂ then relaxed and made no attempt to follow her.

Cyanerpes, I. February 26, 1958
Barro Colorado

The old white left ♂ Blue did a little "silent song" (SS) again this morning. Again looked like the WS of the younger ♂'s, without any trace of bill movements or apparent sound during most of the performance. But this white left ♂, this morning, did utter a few very soft notes, which appeared to be a very soft but just barely audible version of HCN's, during his SS — and his bill did open & shut visibly during these particular notes.

I should mention the fact that the vent is always or almost always raised during these WS's and SS's, and that it remains raised during the HCN's and HCN-like notes associated with the wings.

Cyanerpes, I. March 1, 1958
Barro Colorado

I have taken the capture of flaming out of the aviary, put her in a small cage under the Balsa, and watched the behavior of all the flamings in the neighborhood.

Cyanerpes, Mar. 1, 1958, II

There are at least 3 Shrimps around here, 2 ♂'s and 1 ♀ and possibly more. It is certainly my impression, in general, that Shining Honeycreepers are a good deal more common on BCI than previously thought — certainly much more so than I thought before I got this capture of ♀

One mild ♂ came and sat on the ♀'s cage in an extreme St. Posture with definite BL and fluffing. Comme ca:
No CR No wing fluttering.

Bill remained quite closed throughout this performance was accompanied by some R by some buzzes, but I think that the R was actually uttered by the ♀ in the cage

There was one long flight, largely supplanting attacks between 2 of the ♂'s, which I couldn't follow well, but it was certainly accompanied by lots of R's and Buzz's by one or (more probably) both birds

Something about this fluffing, in at least one case, made me think of the fluff of the Greens. This whole pattern of the Blues and Shrimps, in fact, is emotionally the same as that of the Greens, except that they have an St. instead of a V

I have acquired a new ♀ Blue, banded red right, which has lost its primaries. This bird has been very quiet indeed, ever since I got it — not answering the wild birds or any of its cage mates. Its accident seems to have completely suppressed all its bellicosity. It doesn't attack other birds, nor does it seem particularly afraid of them. All it does is defend itself when absolutely necessary.

(56)

Cyanerpes, I.

March 2, 1958
Barro Colorado

More behavior as before near the captive ♀. In particular, I noticed some fights between the wild ♂'s. As usual with R's, B33's, and silent St's (with BL and Bfluff). I am now certain that the St. pattern is usually, and perhaps always, silent. I have also seen a ♂ in an unusual St + Bfluff posture which seems to confirm the relationships of this pattern to the V-fluff of the Greens.

(In the case of these Flowers, this may be just a low intensity form of the more extreme St + BL pattern).

One thing about both the cyanerpes: they are both extremely neat nuts (in strong contrast with the Greens which just pile in pell-mell, one right after the other).

I have noticed Cyanerpes honeycreepers clever in avoiding the Greens which just pile.

The capture of flowing did her usual peculiar "singing" this morning, i.e. repeated R's & B33's, and I was able to confirm the fact that some of her single R notes were unusually flute-like, less sharp & abrupt than usual. This is what makes the whole performance sound so much like the WS of the Blues. I should be inclined to think that the WS of the Blues was derived from some such performance — were it not for the fact that so many other tanagers have WS's.

Cyanerpes, I

March 7, 1958
Barro Colorado

Well! I finally managed to catch a ♂ flaming in the net this morning. Banded white left.

The initial response by the ♂ when he was let loose in the aviary was flying to him with a burst of R.

This ♂ several times gave the same B33 & ft performance both before being caught and after being let loose. Adapted an ft much like the one drawn on Mar. 1, p. 55, with pronounced BL and belly-fluffing - but with wings meeting over lower back. Each time he did this - and he must have done it at least 4 times - he gave a few B33 notes. They seemed to be an integral essential part of the performance.

This would certainly suggest me, though that the B33's are homologous with the WhN's of the Blues - a conclusion which rather surprises me, I think, but seems quite plausible.

There was also a small dispute between the 2 full adult captive ♂ Blues. The aggressor first advanced down a twig toward his opponent, in a more or less quivering posture with gaping bill. When the less aggressive bird, however, stood in an extremely high, stretched up ft (like that of some ♀'s I have seen at times) with extreme CR and a slightly fluffing of the head & belly feathers. He would stand in this extreme posture for a second or two, retreat a fraction of an inch, stand in the same posture again, etc. Finally flew off. Both birds seemed to be quite silent throughout. This incident would certainly suggest that the high ft and CR cannot be very aggressive.

Before I forget, I should add that the capture of Shining gave excited R's toward visiting wild ♂ Blues this morning before I caught the ♂ Shining. I.E. she seemed to be reacting to them as if they were members of her own species. I don't remember seeing this before, however, so it may be just that her motivation was very high.

The capture of Shining is now giving a B_{33} + St + BL + belly fluffed performance every time the ♀ comes near him (actually, in many of these cases, I am not sure that it is not the ♀ who is giving the B_{33}'s. But this doesn't affect the general conclusions, as she usually shows some St. too.)

Now I have just seen a particularly extreme case in which it was certainly the ♂ doing the B_{33}'s. But it is obvious that the B_{33} is only accompanied by pronounced opening & closing of the bill when it is very high intensity. (This may be the only time that the wings are slightly drooped too.)

I have now seen the ♀ Ruby again & again toward visiting Blues (of both sexes) with pronounced R, in spite of the fact that she now has a ♂ of her own species with her. This pronounced aggressiveness is also rather reminiscent of the Greens. (This sort of reaction might certainly be considered an indication that the R is more aggressive, on the average, than the B_{33}.)

Cyanerpes, I

March 9, 1958
Barro Colorado

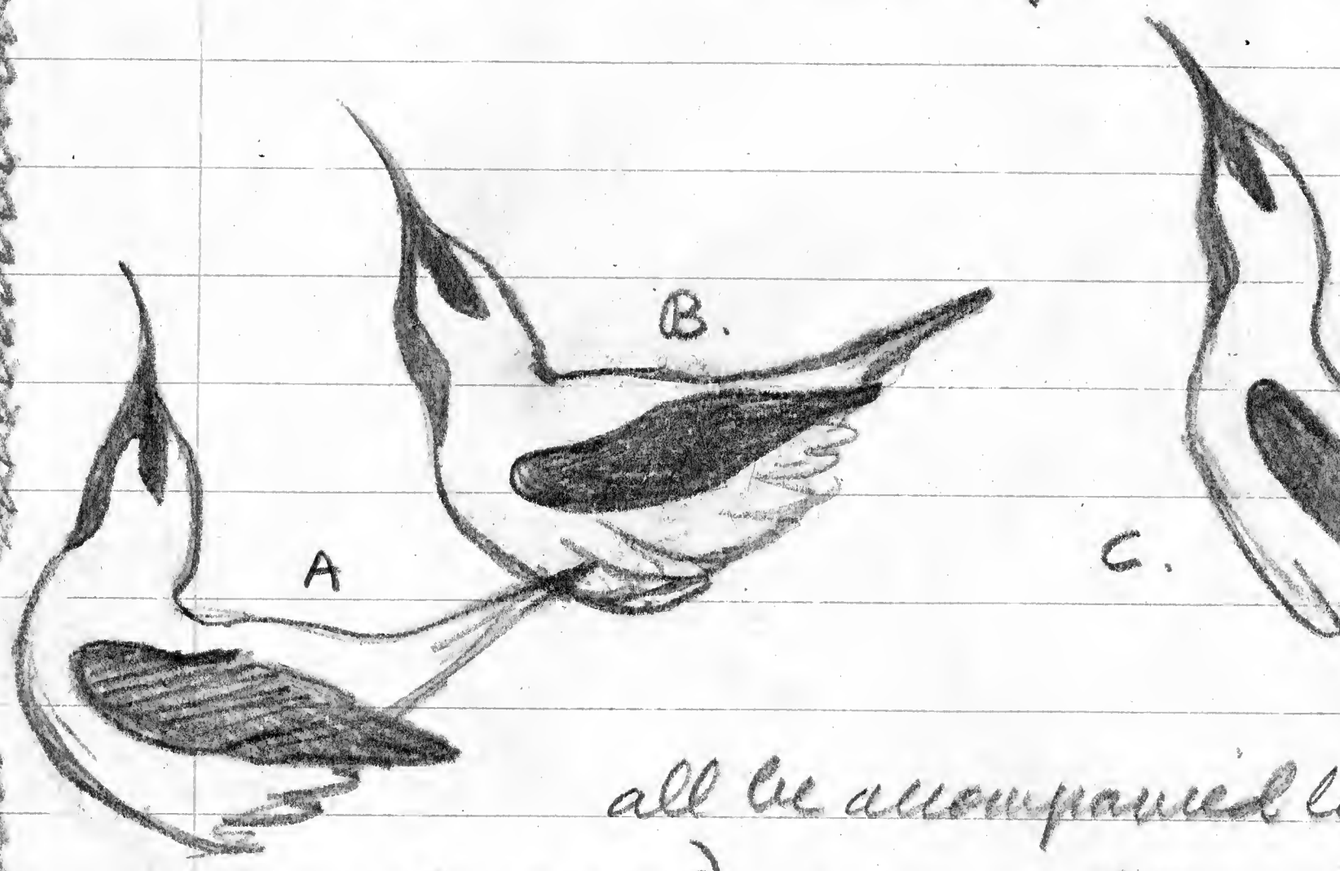
Cyanerpes, Mar. 9, 1958, I

Caught a new pair of flamingos in the net this morning; and finally let them loose in the aviary this afternoon. God! What a mess! A few minutes of very violent disputing, and the new ♀ was so badly injured that I had to pull the new pair out (the new ♂ was pretty battle-scarred too!) The essential outline of the whole encounter was that the old pair rushed to the new one, displayed violently, the new pair displayed back violently, the old pair attacked, and the new pair fled.

The displaying was unbelievably fast on the whole, and I certainly couldn't follow all of it, but I did notice the following. Monty R and B33 calls with a huge variety of ft pastures!!

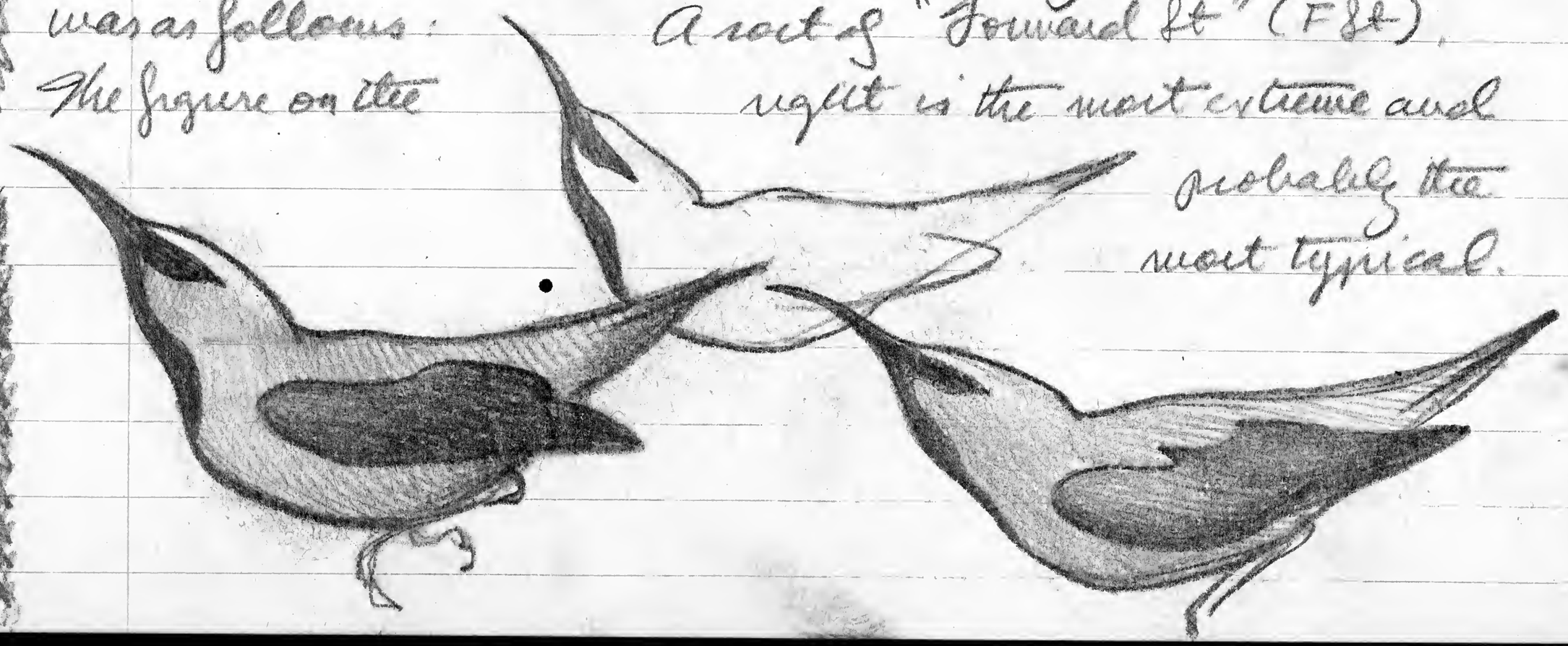
The relationship between the B33 and R is a little clearer now. The old birds began violent R-ing when I first put the new ones in — and the new ones R'd back — during a brief initial lull before the actual fighting broke out. The B33's began when the real violent fighting began, when they were attacked by all 4 birds. At this time the R's almost stopped completely. This would confirm my theory that the B33 is higher intensity than the R. And this afternoon it was also very noticeable that the B33 seemed to intergrade with the R, i.e. some R's became faster & faster until they developed into perfectly typical B33's. It was my impression that the relative level of aggressiveness was much the same in both the B33 and the R (certainly both or either could be given by either retreating or advancing birds). It is possible that some B33's are more aggressive than any R's — as it was B33's rather than R's which were given by the attacking birds during the fight — but I think that this appearance was deceptive — just the result of the fact

that the dispute as a whole was so high intensity. These calls were accompanied by all sorts of flt — all the flt's I have ever seen before and some others as well.



These 3 postures (with all their intermediates) are obviously what can be called the "common flt's." They may all be accompanied by slightly drooping (but not spread) wings, or the wings may be folded over the edge of the wing. They may all be accompanied by B_{33}'s, or R, or be completely silent. I am not sure of the causal differences between them, but the one labeled "C." above may contain a relatively strong escape component (birds in this posture seem rather alarmed, and they do apparently tend to escape more than birds in other flt's).

A new flt which I saw today for the first time was as follows: The figure on the right is a sort of "forward flt" (FFlt). The figure on the left is the most extreme and probably the most typical.



Cyanerpes, Mar 9, 1958, III. (61)

This Flt was accompanied by B33 Notes, and was performed by the old ♂ advancing down a twig to attack the new one. Obviously very aggressive (as its mere form would suggest).

There were 2 cases of definite wing-fluttering or wing-quivering (Qu). Both by ♂'s. Once (I didn't catch which ♂ was doing it) in the Flt pictured labeled "B." on the previous page. Once by the new ♂ in the picture labeled "C." This seemed to be one of the less aggressive patterns. The birds stood still while doing it. Almost certainly accompanied by B33 Notes

The actual movements of Qu seemed to be rather simple. The wings were just held straight out from the body (not obviously either up or down), the primaries were slightly drooped, and the whole wing was fluttered very rapidly.

The new ♂ once stood in the "C" (or Erect Stretch — Flt) posture and uttered a call which I haven't heard before either. Like a series of fairly rapid CN's (much slower than the syllables of R), but much softer and thinner, less sharp, than the ordinary CN's. Possibly due to partial physical exhaustion, but more probably a definite distinct call, one of the less aggressive calls certainly.

There was a general tendency for ♀'s to flight ♀'s, and for ♂'s to flight ♂'s; but there were exceptions of all kinds.

Again the female (of the old pair) seemed to be more aggressive than the ♂

The general effect of this encounter was to demonstrate even more forcibly the remarkable resemblance in general vocal behavior between these flaming Honeycreepers and the Greens (and the

Sauvagre de Torres too, to a less extent). It has become obvious, ever since I had captive Shamas, that this species is quite as prone to visit as any other; but it is also obvious that this visiting is as little the result of general gregariousness as it is in the case of the Greens)

The great problem in determining the relationships of the genus Cyanerpes as a whole is, of course, the obvious resemblances between Lucidus and Chloropsiones and Tangara on the one hand, and between cyaneus and Rhamphocelus on the other. The whole group of genera may be linked together by something like Thraupis

One wonders which (if either) is the more primitive, the exclusive gregariousness of the Blues, or the extreme aggressiveness of the Shamas. If the former, then the behaviour of the Shamas must be a secondary reversion to the type of social relations characteristic of primitive passerines (this might possibly explain the peculiar nature of the "song" of the captive ♀ Shama). If the latter, then the Blue may be considered another example of the general tendency of the Tanagers and Tanager-derivatives to form complex societies. It may have followed the same sort of evolutionary development as the Plain Tanagers, but not have progressed so far.

I might just mention, before I forget, that the Shamas involved in this free-for-all did do some of that irregular and obviously unritualized "bowing" which Blues also do during hostilities. They did alternate their St's with some irregular & variable Cooings, down and from side to side

Cyanerpes, I

March 12, 1958
Barro Colorado

I have been catching Shining Honeycreepers after Shining Honeycreepers in the nets. As soon as I catch one pair, another shows up. It is now quite obvious, therefore, that these birds are very common around here (although probably somewhat less so than the Blues or Greens), and that they must seem rare because they are relatively inconspicuous. And this latter, in turn, must be the result of their extreme gregariousness. I presume that whenever one comes into contact with another, in the wild, one attacks immediately and the other retreats without more than a brief argument.

I am keeping several of the birds I have caught, at least temporarily. The second pair is now banded ♂ light blue right, ♀ light green left. The third pair is banded ♂ dark green right, ♀ black right.

A lot of these birds (both ♂'s and ♀'s) seem to be just completing a molt. Either young birds just assuming adult plumage, or this species (including the ♀'s ?) has an eclipse plumage like the Blues.

When I first put the dark green ♂ in with the second pair, in the small travelling cage, they chased him quite a bit; but the whole dispute was relatively mild compared with the fights a few days ago in the aviary. (No actual pecking and occasional pauses.) It is probably significant, therefore, that the consonant patterns of both the ♀ and ♂ of the second pair were all sorts of more or less E ♂'s, with or without BL, ♀ BF but almost all quite silent. This would seem to confirm the hypothesis that silent ♂'s are lower in intensity than ♂'s with calls.

Cyanuses, Mar. 12, 1958, II

The first ♀ seems to have stopped her peculiar early morning "song" now. Is this because she has a ♂ with her and is apparently "mated"?

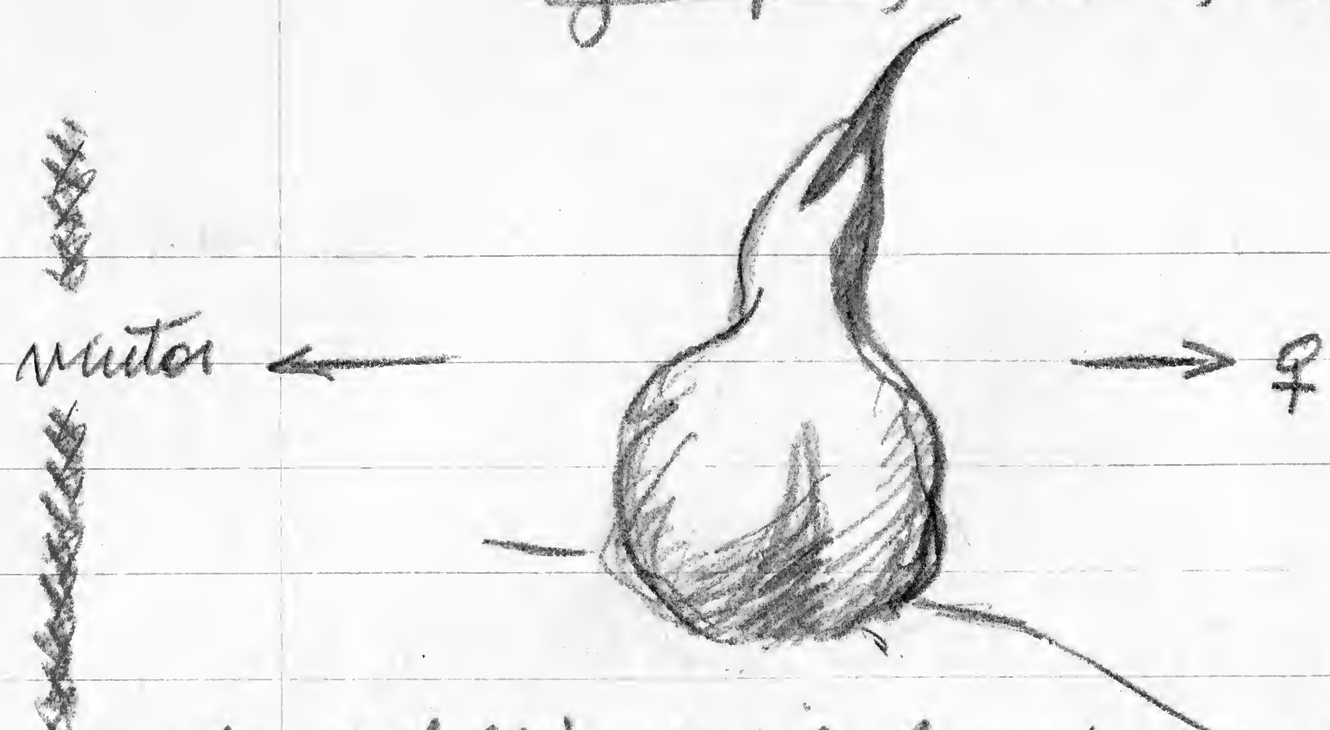
I think that I may have somewhat misinterpreted the B33 in my earlier accounts. I think that there may be a somewhat distinct types of B33.

I noticed that the ♂ of the second pair tends to go into an E♯t with BL. (I think I shall call this E L♯t — to distinguish it from the very tall "alert" ♯t Postures — like the usual ♯t of ♀ Blues) with considerable BF (this stands for Belly-fluffing), whenever the ♀ came near him. This was usually accompanied by some sort of B33-type note (this whole thing is just the same as the common courtship between the ♂ and ♀ of the first pair I watched earlier.) But these B33's were perhaps softer than some others I have heard earlier (during actual fights?) and seemed to lack the twang completely. It is possible that the lack of twang is a secondary sexual character, but I don't think these B33's can be very aggressive.

I also noticed the ♂ of the second pair went into the same E L♯t with BL + BF + the same soft B33 Notes when still showing Honeycreepers came to visit, and that he simultaneously faced toward his ♀ (without moving his body). This seemed to be obviously submissive, and I think that it must indicate an escape tune of some appreciable strength.

I have now heard one of the birds of the second pair give one of these soft B33 Notes when I passed by the cage!

Cyanerpes, Mar. 12, 1958, III



This is a diagram of the situation during the reduced St's described on the preceding page.

These incidents must indicate that the B_{33}'s are not overwhelmingly aggressive on the whole. They probably occur when attack and escape are nearly equal, the soft notes (SB_{33}) occurring when both the drives are weak, the loud notes (LB_{33}) occurring when both the drives are strong.

(This interpretation is not really contradicted by the amount of the flight between the first and second pairs a few days ago. The initial response of the first pair to the second pair was a rush forward & R — and this must have been the most aggressive response — although not the highest intensity. The LB_{33}'s — ("L" I think) — were the patterns that led precede attack during the highest intensity flights — but these flights tended to be preceded by an infinitesimal pause while the 2 opponents stood face to face.)

I wonder if the fact that the black throat is most prominently displayed during the less aggressive displays is in accordance with my interpretation of the values of these black & blue colors in the Blue Honeycreepers? I think so. In the case of the Blues, it would seem that the raising of the most prominent blue feathers (i.e. the crown) is characteristic of a display which does not (to any the least) contain a very prominent escape element.

Cyanuropes, Mar. 12, 1958, IV

I might add that the rather vulturine Bokeelia "relaxed" posture might be result of a general relaxed stiff plus an added escape component just strong enough to depress the crown feathers.

Well! Well! Well! ?? I would mean that a ♂ Blue which I caught in the net (and gave a lot of the usual H Ser when handled) gave a quite definite R as it flew away after being released. Don't tell me this species has an R pattern too, but confined to the very, very highest intensities ?? I doubt it. I must be mistaken

I might add a few details about the distribution of the wild flamingo before I forget. I have seen a lot of apparently single birds and a lot of apparent pairs. I have never seen more than 2 birds going around together naturally. Some of the pairs are composed of a ♂ and a ♀; but others seem to be composed of 2 ♂'s! (I have seen at least 2 such pairs).
Rattus maraberi-like

March 13, 1958
Bruno-Colombo

Cyanuropes

Today I got rid of a lot of captive birds, i.e. the 2 young ♂ Blues (banded green right and black right), leaving me just the 2 pairs of this species, and the second pair of flamingo (♂ light blue right, ♀ light green left), leaving me just 2 pairs of this species too.

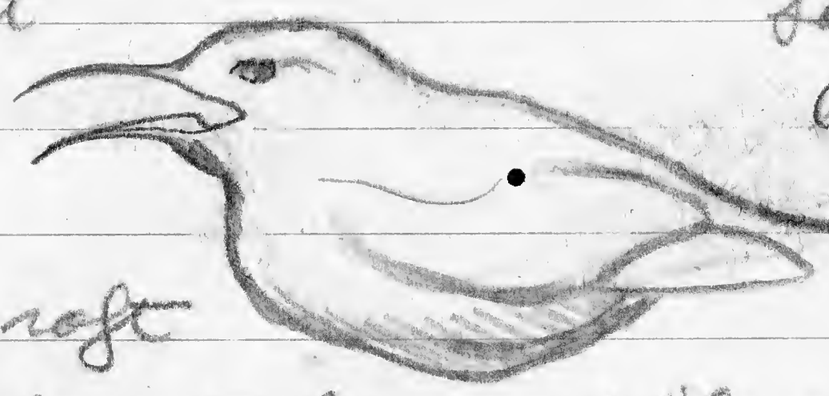
Cyanerpes, I

March 22, 1958
Barro Colorado

Aha! I think sex may be coming its ugly head — in the related pair of capture shining Honeycreepers (♂ dark green right, ♀ black right)

Every once in a while (usually just after I sit down after standing up and disturbing the birds) the ♂ flies to the corner where the ♀ has taken refuge from my disturbance, and goes into a St Posture, (of the E St type, sometimes very extreme, sometimes less so). He usually faces more or less in the same direction as the ♀, his body parallel with hers, occasionally turning his head toward her.

He usually utters B33 Notes when he goes into these E St's, the usual apparently not very aggressive B33's uttered between ♂'s and ♀'s. Sometimes, however, his E St's are quite silent. In any case, the ♀ immediately responds by going into a Hunched Posture and uttering a "silent" or "squeaky" or "sex" Rattle (SR). Her Hunched (H) is not usually very extreme. More or less comme ça:



The SR is obviously just a modification of the usual R. Sometimes sounds just like a very soft version of the R (so soft as to be inaudible part of the time) without tone change. Sometimes (but less frequently) not only are somewhat but quite slightly fluffed

Cyanerpes, Mar. 22, 1958, II

soft but also very high-pitched & squeaky. Her bill is held quite widely open during both the plani soft and squeaky SR's; and her tongue is partly raised, at the base, so that the inside "angle" is quite conspicuous (see drawing on previous page). Both her lower mandible and the tongue vibrate conspicuously in rhythm with the call.

The 2 birds may sit ridelly side by side doing this for several seconds. The ♂ may interrupt his E&E's & B33's to peer at the ♀, silently, or even make a more or less gentle poke toward her crown, cheeks, or chin. This looks very much like an attempt at mutual preening! But the ♀ has never responded in what I presume would be the right away — as yet. The ♂'s peering and poking seems to initiate her, and she usually responds by turning her head toward him, continuing the SR, sometimes making a few tentative jabbing movements. (Even when the ♂ doesn't begin to peer and poke, the ♀ usually interrupts his E&E's and B33's in the same way.)

The ♂ may respond to these actions by the ♀ in any one of several different ways. He may hop back a fraction of an inch, stand a minute, and then fly off. Or, most frequently, he may resume his E&E's, with B33's, after a momentary pause. Or, less frequently but not really uncommonly, he may go into an H a SR pattern too!!! The 2 birds may then sit ridelly side doing more or less the same thing. His H seems to be essentially identical with hers, and so is his SR in most respects. But I think that his SR usually tends to be even squeakier than hers. And he often responds to her apparently initiated turning

toward him by first doing a sort of G which only gradually turns into an SR. Finally he first does a G with a wide open bill, in a sort of semi-St-semi-H pattern, (head rather low on the whole, but bill definitely inclined obliquely upward), and then his tongue gradually becomes visible, his tongue and mandible begin to vibrate, and the squeaky SR gradually becomes audible (I should think, perhaps, from this sequence, that the G contains a stronger escape element than the SR). This relationship between G and SR is certainly reminiscent of the relationship between G and Wh N's in the ♀ Blues.

All the cases I have seen (and there have been a lot more during the period I have been writing these notes) have petered out without further developments. The ♂ seems to get discouraged and eventually moves off.

The only unusual variation in this procedure that I have seen was once when the ♂ responded to an E St + B_{33} by the ♂ by giving SR in a "hanging" flight wit. usu. posture. This would seem to indicate that itself contains an appreciable escape element. Which I would expect anyhow.

When I first saw this SR + H pattern I thought that it was probably largely or completely sexual. If so, it's form is certainly unusual for a passerine. But I now think that the sexual component, although almost certainly present, may be weaker than the hostile component. Certainly, if it is the H + SR by

Cyanocorax, Mar. 22, 1958, IV

the ♀ which seems to be the thing that discourages the ♂

I am still laboring a bad at wild Blues from time to time. The only pattern which I have seen performed by wild ♂'s which could possibly be the equivalent of the song of Cyanocoraxes in the HCN. I have seen apparently single ♂'s sit in the top of bare trees and give single HCN's (with CR) repeatedly for long periods of time. Calling a mate ???

Cyanocorax, I — March 23, 1958
Boxer Colorado

Watching the same pair of captive Blues as yesterday. They are behaving much as yesterday. I can amplify a few points in connection with the E St - B_{23} - H - SR performances.

The ♂ often sat of beam over the back of the ♀ when he goes into E St more or less fanning her. It is this which makes it look so much like he wants to mount her. Perhaps he does.

The ♀ doesn't have any real CR in her H, but her crown feathers are slightly fluffed. This is the only display posture of this species I have seen which doesn't look very flat-headed.

Aside from the one incident yesterday (in which the ♀ gave SR from a flight init. mov. posture), she has never shown any tendency to retreat from the ♂ during her SR's. (Her turning toward him might be considered quite the contrary in fact.) So the escape component in SR may be different, weaker than the counteracting motivation — whatever it may be.

I should note, however, that the ♂ of this pair may be

the dominant bird in most circumstances aside from display. 9.E. when the 2 birds are just hopping back & forth across the cage, the ♀ usually flies off when the ♂ lands beside her. It is possible, however, that part of this apparent timidity of the ♀ is due to the fact that she is more alarmed by my presence than the ♂ — as she certainly seems to be.)

Conveniently enough, this afternoon I saw the ♀ of the other pair of Shrikes (unbanded) give a SR with H, just like the ♀ described above, when her ♂ approached her too closely.

Cyanerpes, I April 5, 1958
Barro Colorado

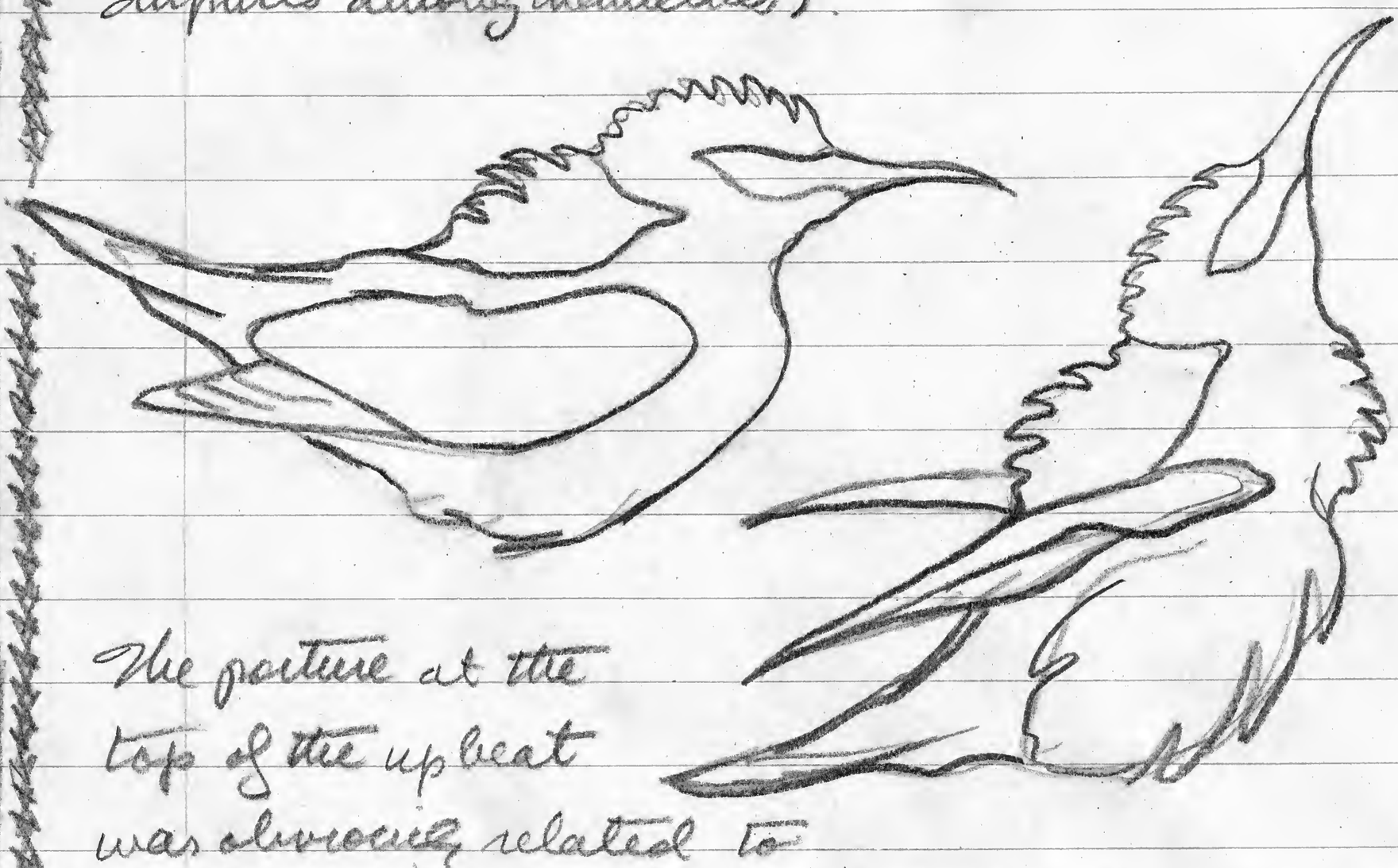
A most peculiar and prolonged incident between 2 of the Blues today — the yellow-naped ♀ and the blue left ♂ of all birds! Late in the evening just about when the birds were going to roost.

My attention was first called to the incident by a long series of loud HCN's, coming from inside one of the Pagoda Bushes (The leaves of this dense bush obscured a good deal of the birds from time to time, but I am sure of the following.)

The ♂ was uttering HCN's quite rapidly, rather irregularly, only a few seconds apart. This was accompanied by quite rapid Booing, rather like the more variable booing sometimes accompanying hostile disputes between ♂'s, but much

Gaweyes, Apr. 5, 1958, II

more standardized and almost entirely ritualized. Almost straight up and down, (very occasionally a downbeat was combined with turning to one side — in the way that ♂'s often do during disputes among themselves).



The posture at the top of the upbeat was obviously related to the ♀; but differed in that the black area of the back was prominently ruffled. (CR was also present — even during the HCN's; the lower breast & belly feathers were more or less ruffled as in ♂fluff; and the feathers of the throat were also ruffled — forming a separate "tuft" — presumably in connection with the uttering of the notes.) The posture at the bottom of the downbeat was a rather hunched sitting posture, also with CR and black back feathers ruffled. (The head was sometimes lower — but still almost horizontal — thus in my sketch above.) The HCN's were uttered during all phases of Bowing, at the peak, on the down beat, at the low point, and on the upbeat, but I think that they were most common as the bird went down from the high point (i.e. during the down-

beat). This Bowing was also accompanied by conspicuous WT's (I don't know about TF's). These could also occur during all phases of the performance, but they were also most common during the downbeat thrunk. Aside from their accency patterns, the upbeat and downbeat seemed to be "emphanized" equally.

The ♂ tended to face straight toward the ♀ during this performance, (she moved about a lot — so he was trying to keep facing her directly all the time).

The only conspicuous variation in this Bowing, aside from the ones mentioned above, was the occasional substitution of an ordinary CN for the HCN. This was relatively very rare, but it apparently could occur during any phase of Bowing.

The ♀ responded to this rather peculiarly. She hopped from turning to turning, back and forth rather irregularly, always very near the ♂, without really retreating or attacking the ♂ (but see below). She also uttered a lot of HCN's during this (could possibly CN's too), but I think that she uttered rather fewer than the ♂. She did not assume any ritualized posture or perform any ritualized movements (aside from flicking and, probably, CR).

This didn't lead to anything very definite — as far as I could see. The 2 birds eventually disappeared completely behind a leaf, and then, a few seconds later, came tearing out in a vigorous & prolonged aerial fight. Then other birds intervened and the whole thing ended.

I am rather at a loss on how to interpret all this. Both birds were obviously motivated by strong hostile drives, but was there any other motivation present as well? It is possible

that this was merely a particularly vigorous dispute over roosting perches, but I rather doubt it. I have never seen any roosting perch dispute of comparable vigor or length. And the fact that the ♀ didn't retreat may be significant. (If this dispute was purely hostile, the fact that the ♀ didn't retreat may help to explain the particularly standardized form of the ♂'s Bowing). All in all, I rather think that sex must have played a role during this encounter.

The usual forms of obviously pure hostility are still common in both the Blues and the Shinings, during encounters among themselves and disputes with visitors. I haven't noticed anything new during such disputes for a long time; but I might just add a word about Quivering. I don't think I have ever seen a bird of either species ever do Qu in a dispute in which its "mate" was not involved — either as a participant or a very close spectator.

I am becoming more and more convinced that those hostile patterns which display a lot of blue are usually comparatively aggressive and those patterns which display a lot of black contain a relatively strong escape component. This seems to be equally true of both species.

The Shining seems to be much more of a "creeper" during feeding than the Blue.

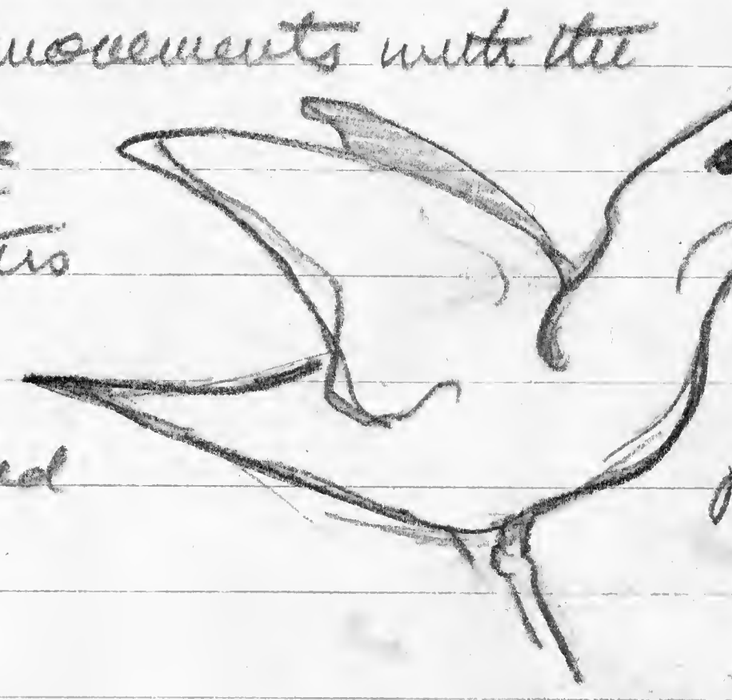
Cyanerpes, I

April 6, 1958,
Barro Colorado

A somewhat unusual incident among the Shinings

Cyanerpes, Apr. 6, 1958, I (75)

today. Noticed the ♂ and ♀ in the aviary hopping about one another, rather excitedly and irregularly. The ♂ mostly just uttering B33's. The ♀ in a more or less conventional &t, apparently silent, and doing Qu movements with the wings definitely raised well above the back. I don't know whether this was "really" different from the ordinary Qu performance, but it certainly looked peculiar. Could it be sexual ???



Cyanerpes, I — April 11, 1958
Bruno Colombo

I have now seen the ♂ flaming do this &t with wings raised and quivering, (I shall call this VQu). Toward the ♀. No call at all during the performance. The wings are raised so much that one can hear them click together as they meet over the back with each quivering movement.

This does seem to be something quite distinct from the usual &t+Qu performance. The usual &t+Qu is always, I think, accompanied by B33's.

Unfortunately, this VQu performance by the ♂ was not associated with any unmistakable overt activity, except for hostile displays, ie. &t's & ordinary Qu provoked by, and directed toward the ♀ and/or visiting ♂'s.

I have now seen a little visiting party of flamingos which consisted of 2 ♂'s + 1 ♀!

Cyanerpes, I.

April 12, 1958
Barro Colorado

I took the 2 ♀ Blues out of the large aviary this noon, and put them in a small cage about 15 or 20 ft away from the aviary — just to see what the ♂'s would.

The blue left ♂ first began by flying back and forth along the side of the aviary nearest to the ♀'s cage. He uttered quite a lot of ordinary CN's during this. All these CN's seemed to be without any trace of CR. Then, gradually, as the afternoon wore on, this blue left ♂ began to spend more time flying back and forth along the length of the aviary (from the side near the ♀'s to the side away from them and back, etc. etc.) in a rather excited manner. This was accompanied by lots & lots of WS's. (Mostly during the brief intervals when the ♂ perched on the far side, away from the ♀'s). The sound of this WS was more or less similar or identical with the WS's of the young birds I used to have. A soft prolonged warble. Usually introduced, and almost always followed, by HCN's. (Also a lot of HCN's uttered when this ♂ was flying about in the intervals between WS's). His WS was uttered from a rather different posture from that in which the young birds gave their WS's. He gave his in quite sleek (i.e. no CR or fluffing of body feathers) pre-flight, rather alert, postures.

Whenever this ♂ seemed to be particularly highly motivated, i.e. when he was flying about most excitedly, and giving WS's most frequently, the WS's became louder — but I still find it difficult to believe that they could ever carry further than about 20 yds — at best.

Cyanerpes, Apr. 12, 1958, II

The other ♂, white left, doesn't seem to have reacted to the absence of the ♀'s at all. He has quit rat, slept, fed, & preened all afternoon, in an apparently perfectly relaxed manner.

(In this connection, it might be mentioned that the blue left ♂, although he has completed the pre-nuptial molt, still has a little green on the tertials — so he may be a first-year bird. The white left ♂ doesn't have any green anywhere.

It is also quite possible that the difference between the 2 ♂'s is due to the fact that the white left bird is already past the peak of the breeding season.)

As far as I can tell the 2 ♀'s have done nothing but fly about and utter a few CN's and (consequently) HCN's.

Cyanerpes, I April 13, 1958
Barro Colorado

The blue left Blue ♂ has done fewer WS's today. Is this a sign of negative conditioning?

It is obvious, watching this ♂ yesterday and today, that he only begins WS when all other drives (except preening) are low. It almost appears to be a "residual" activity. (He also seems to be free of the ringing of all or almost all the other species I am studying.)

The white left ♂ hasn't done any WS's at all yet.

(In this connection, it may possibly be significant that the blue left ♂ seems to be the dominant bird. At least, it can make supplanting attacks on white left, and force the latter to retreat.)

Cyanocorax, I

(178)

April 17, 1958
Baiao Colorado

Nothing much new recently among the Blues.

The white left ♂ still hasn't begun WS'ing yet (the ♂'s are still being kept apart in a separate cage.) Dan began to think this may be significant, as he does spend quite a bit of time flying back and forth in the aviary uttering calls. This afternoon he mostly uttered ordinary CN's (with head feathers very smooth rather than CR.)

The blue left ♂ still sings from time to time, but it is obvious now, I think, that he sings much less than the 2 young birds I kept earlier. This may also be significant.

I have been paying a little more attention to some of the vocal patterns of the flirtings too, and I am now quite certain that slow series of CN's can merge with the most rapid R's through every possible intermediate.

The ♂ flirting did a peculiar "Wing flailing" performance yesterday. Started to give a lot of single CN's when a ♂ Blue came to visit, and each note was accompanied by a single, only moderately fast, "flail". The wings suddenly flicked out, and slightly down. Slightly spread. And then folded normally again. No trace of the up-and-down vibration of QU. I rather imagine that this was just a slightly exaggerated form of ordinary WF.

Cyanerpes I

(19)

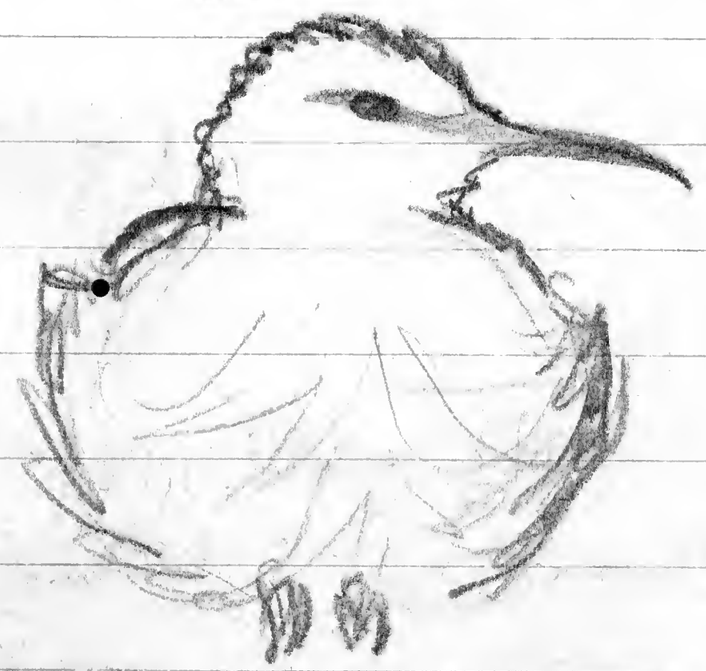
April 13, 1958
Barro Colorado

I finally put the 2 ♀ Blues back in the aviary with the males this afternoon. There wasn't much in the way of a reaction. The ♂'s flew to them and followed them, off and on, but I couldn't tell what the motivation of the ♂'s was.

The flirtings were quite docile to the ♀ Blues. The ♀ flirtings in particular attacked both ♀'s Blues at first. It is obvious, in fact, that the flirtings react to Blues almost as if they were the same species (as if the Blues were "sub-normal" members of the same species). This is also evident in the reaction of captive flirtings to wild visiting Blues.

Shuteh is probably correct in saying that ♀'s only attack ♀'s, and ♂'s only attack ♂'s, (although both sexes may display at birds of the opposite sex). This seems to be true of both species of Cyanerpes.

Both ♀ Blues spent a lot of time in a fluffed posture this afternoon after being let loose in the aviary. Difficult to interpret. Looked perfectly "normal", occasionally annoyed with preening and/or other comfort activities.



The ♀'s have a "crest"

Cyanerpes, Apr 23, 1958, I.

But it also was particularly conspicuous after the ♀'s had been attacked and threatened by the ♀ flowing, and during general "panic freezes" provoked by the appearance of an Accipiter hawk near the aviary, so it may conceivably have been a heritable performance. Perhaps comparable to that general fluffing Hinde et al talk about. But it couldn't have been the result of a relatively very strong escape drive. Seldom or never preceded overt escape, and twice a ♀ sitting in this fluffed posture attacked a ♂ Blue when he came too close!

This fluffed posture, incidentally, was rather different from any of the fluffed or ruffled postures of ♂'s I have known. Head, breast, & belly feathers very ruffled, but upper back only moderately fluffed, and wings definitely meeting or crowed over base of tail & ♂ ♂.

During one of the "panic freezes" I noticed that the ♀ Shining was sitting in the H posture drawn on Plate 28, p. 608, giving SR. The ♂ was also sitting in the same posture, and gave a little of the same "call"!! This might suggest that the SR is really just an inhibited form of the ordinary R, and that the inhibition may be due to different factors in different cases. In this case, I would presume that the factor was fear

Cyanerpes, I

May 5, 1958,
Barro Colorado

The yellow-eyed ♀ Blue apparently shed over a week ago, shortly after I put both ♀ ♀ back in the aviary. She was apparently mated or has mated with the white

left ♂; and it is undoubtedly significant that this ♂ failed to do any WS after her death either.

It is also significant that the other ♂ Blue stopped WS-ing after his ♀ was restored to him.

I have now caught another ♀ (unbanded) and let her loose in the aviary.

The ♂ Shining in the big aviary I has started to give SR now (each note could be nicely transcribed as "Jeek") when he is feeding in the Pagoda Bush flowers, whenever another bird (and particularly the ♀ Shining) comes near.

Cyanerpes, I

August 3, 1958
Barro Colorado

The Blues seem to have been almost or completely absent from the neighborhood of the clearing, ever since I released on June 23rd.

There are still Shinings around, however. I have just noted one interesting aspect of their social behavior. When I first put out the Plain and Golden-masked Tanagers in the big aviary, they were both shy, nervous, with all reds of CN's and CA's fed. It is probably highly significant, therefore, that these captive Tanagers were frequently visited by a wild ♀ Shining Honeycreeper (probably ? always the same ♀), in spite of the fact that there were no other Honeycreepers in the aviary. I think that the ♀ Shining must have been attracted by the sounds of the tanagers.

(82)

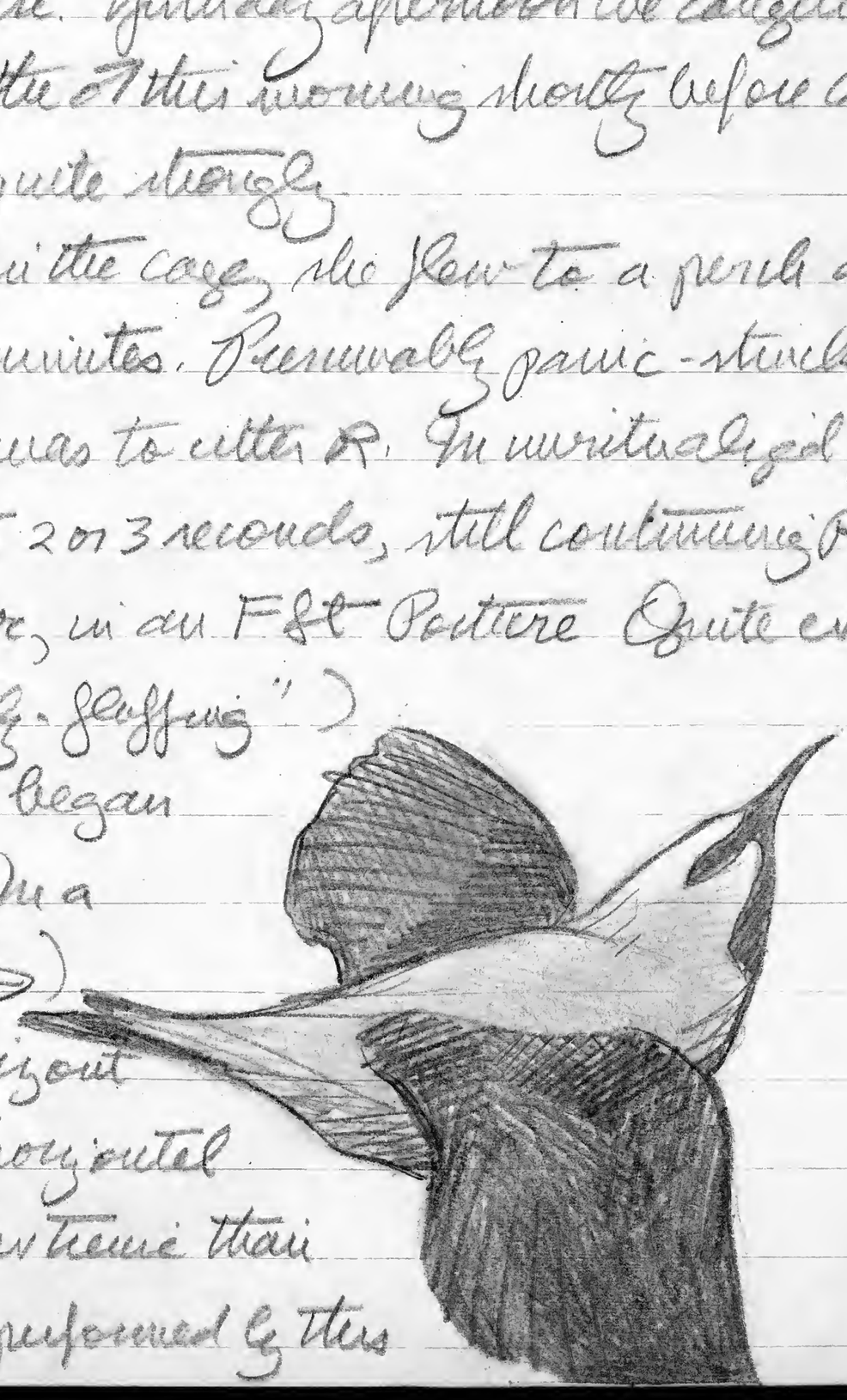
Cyanerpes, I. September 26, 1959
London Zoo

There is a single ♂ Red-leg here, in a small cage by itself in full nuptial plumage. It may be significant that this bird has shown no tendency to sing in any way during the period I have been watching him.

Cyanerpes, I June 23, 1960
Barro Colorado

I have long had 2 ♂ Shining's here. One in aft outside cage. The other in a small cage in the Annual House. Yesterday afternoon I've caught a ♀. I put her in the aft outside cage with the ♂ this morning shortly before 6:30 a.m. The ♂ reacted to her appearance quite strongly.

As soon as the ♀ was released in the cage, she flew to a perch and sat there, motionless, for several minutes. Presumably panic-stricken. The ♂'s initial reaction to her appearance was to utter R. In unvitalized post ure at first, but he flew to the ♀ after 2 or 3 seconds, still continuing R, and started to hop around her & near her, in an F&t Posture Quite extreme. BL (but probably with very little "Belly-Stuffing") Then, standing still beside the ♀, he began to perform a more elaborate display. In a moderately extreme St Posture (see →) he spread his wings approximately horizontally and began to quiver them. This horizontal stretching of the wings was much more extreme than any similar stretching I have ever seen performed by this



species before. Sometimes both wings were held straight out at the same level. Perhaps more frequently, however, one wing was held higher than the other. In this case, it was always the wing nearest the ♀ which was higher than the other. (This is the position of the wings shown in the drawing on the preceding page).

(The drawing on the preceding page is perhaps slightly misleading, insofar as it is drawn from above. The wings were usually at least level with the back. Not infrequently raised somewhat above the back - even when both wings were at the same level.)

As soon as the ♂ began this extreme horizontal ♂ display, he stopped uttering R's. His first part of this extreme ♂ display was apparently quite silent, but after a few seconds the ♂ uttered 2 (or 3?) very soft, muffled, BZZ's (no twang), still continuing the horizontal ♂ display as vigorously as ever.

The extreme horizontal stretching of this ♂ pattern was quite reminiscent of the BV of the large black Diglossa I have watched on Cerro Atacazo in Ecuador!

The ♀ did not respond to this display by the ♂ for some seconds. Then she flew away from the ♂, to the opposite side of the cage, where she hung, vertically, on the wire. The ♂ stopped his horizontal ♂ and BZZ display immediately, and followed the ♀. He landed on a perch below her, and immediately started to utter a long series of essentially uniform, rather prolonged and definitely high pitched "Eeeeeet" notes. Comme ça: ———

——— ——— ——— ——— ——— ———

In a slight ↓ Posture, without other ritualized postural components or movements. (It is possible that his slight "↓" was little more than looking up at the ♀). These notes were definitely more prolonged, and probably higher pitched, than the ordinary CN's. Definitely another type of display. The w

way in which these notes were repeated so rapidly for such a long period of time made me think that they might form a "song" of some sort.

The ♀ failed to respond to this performance in any way.

The ♂ eventually began to utter R again. Almost immediately after starting the R he flew to the perch beside the ♀, and hung there vertically, too. In this peculiar position he started ♀ again, ♀ of a more ordinary type than earlier, with the wings drooped and held out horizontally to a much lesser extent. At the same time, he assumed a not very extreme ♂ Posture (he could hardly have assumed an extreme ♂ in the peculiar position he was in). As soon as he began the ♀, he also stopped uttering R and began to utter a few very soft and muffled B_{33}'s.

Again the ♀ refused to respond in any way.

After a few seconds, the ♂ stopped his ♀ - B_{33} display and began to fly back & forth around the cage in a rather excited manner. He uttered lots of R during this whole period of flying (I was able to confirm that the individual notes of an R are harsher than ordinary CN's.). Eventually he seemed to relax a little. Continued flying back and forth, but stopped R. Just uttered ordinary CN's from time to time. Every once in a while, he would stop and BW, but I don't know if this was significant or not.

At the same time, the ♀ also started to fly around the cage. Apparently not paying much attention to the ♂. Apparently silent all or almost all the time (she may have uttered a few CN's, but I am not sure about this).

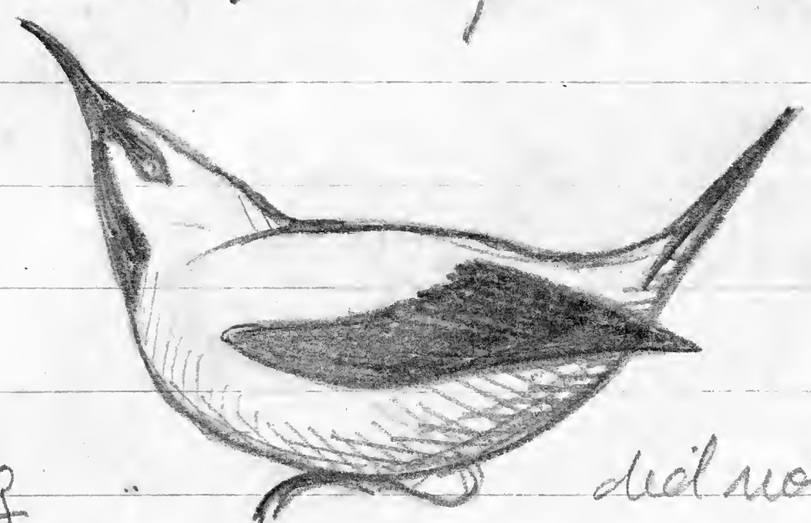
Eventually, the ♂ flew straight to the ♀ again and landed right beside her on the same perch. He immediately assumed an extreme E ♂, with BL, and slight Belly-fluffing. He remained quite silent, however, and did not ♀. Again the ♀ seemed to ignore him completely, and

he just flew away from her.

About this time, (ca. 7:30 a.m.), both birds seemed to be calming down appreciably. Both birds flying about less excitedly, with only a few CN's. Both birds fed from time to time.

Every once in a while, however, the ♂ would fly to the ♀ and start to perform a little more ♂ display. Usually depressed ♂ tail sometimes a little raised. Wings sometimes a little drooped or held away from the body, but without ♂ (the ♂ of this species must be a relatively very high intensity posture!). Sometimes silent; sometimes accompanied by a few soft, muffled BZZ notes.

The usual ♂ posture of the ♂ during these approaches was more or less comme ça:



Very little Belly-fluffing
Body looking relatively long

The ♀ did not respond to any of these approaches. Eventually she just sat quietly, rather fluffed, even slightly ruffled, apparently half asleep, quite ignoring the ♂.

The ♂ continued to fly around, approaching the ♀ from time to time. Each time he approached her, he assumed some sort of an ♂ Posture, but these gradually changed a little.

Became more like the VG-Ruff Posture of the Green Honeycreeper
Definite Belly-fluffing. The appearance of such postures after the ♂ had "relaxed" a little, and the ♀ had begun to sit quietly, would suggest that these postures (especially the Belly-fluffing component) are either an indication of low intensity motivat

son or, more probably, produced when the ♀ drive is relatively longer, and the drives relatively weaker, than in ♂ patterns without Belly-fluffing. Belly-fluffing, in other words, may be taken as an indication of sex.

(It may also be significant that the ♂ was apparently always silent when he approached the ♀ in ♂ with Belly-fluffing. The B33's seem to be an indication of expression of hostility.)

None of these ♂ + Belly-fluffing approaches were accompanied by ♀ of any sort.

The ♀ usually ignored their approaches. Only once did she turn toward the ♂ and open her bill. I couldn't hear any sound when she opened her bill, but it looked as much as if she might be uttering SR. She remained fluffed, in an H or semi-H posture, during this bill-opening. The ♂ responded by retreating at once.

The ♀ eventually went to sleep, head tucked under scapulars!!! She must have been exhausted by all the excitement of being captured, etc. (So I cannot interpret her previous fluffing and ruffling as the result of actual strong escape drive. She may just have been preparing to go to sleep.)

After the ♀ woke up, both birds flew around some more. Not very excited. Occasional feeding. The ♂ tended to assume a very weak ♂ St Posture, with or without BL and/or tail-raising ("TV") each time he approached the ♀ or the ♀ approached him. Only once did the ♀ assume a very weak ♂ St Posture (without other ritualized components) when the ♂ approached her. All these ♂ St's were silent.

I stopped observing about 9:15.

I must say that the occurrence of all these display patterns today definitely confirmed my previous impressions of the motivation of these displays.

Cyanerpes, I.

March 29, 1961
Barro Colorado

During the last week or so, I have made a few casual observations of Blue Honeycreepers around the clearing. In the intervals of watching tanagers. Among the reactions I have noted are the following:

When a snake tried to get a young Sangre de Toros, the parents fluttered about very excitedly, uttering lots of "Awk" notes. Their behavior attracted a lot of birds of other species. A sort of incipient mob-type reaction. Among the other birds attracted was a ♂ Blue Honeycreeper. He flitted about uttering a lot of HCN's. No other ritualized patterns, except fluttering (not even CR's).

Time and again I have seen apparently single ♂ Blues sitting at the top of tall trees (especially bare trees), uttering HCN after HCN, for minutes on end. Quite regularly.

Such ♂'s usually sit in unmutualized postures (only very occasionally do they CR, with or between the HCN's). Usually do not hop from perch to perch while they utter the HCN's. The behavior of such ♂'s is very reminiscent of ♂ Blue Tanagers and Palm Tanagers uttering SN's in order to "call in" a mate. The HCN's of such ♂ Blue Honeycreepers also seem to subserve some of the functions of the SN's of Thraupis spp. At least a ♂ usually or always stops uttering such HCN's when he is joined by his mate (see below) — unless other Blue Honeycreepers arrive at the same time and a general dispute develops.

It is remarkable that HCN's are used for this purpose. Because they are hoarse and harsh. Almost all other species "call in" mates

by utterance clear (often plaintive and/or whistle-like) notes.

I have seen no forms of WS and/or SS among the wild birds. The Blue Honeycreepers around here still associate in flocks quite frequently. Especially in the afternoons. Such flocks may be maintained almost steadily, in the afternoons, for at least a couple of hours. They usually include approximately 4 to 8 birds. The flocks often appear to include more ♂'s than ♀'s; but this appearance is quite possibly deceptive, as ♀'s are often difficult to see.

While they are in their flocks, the ♂'s tend to be very active, flitting here, there, and everywhere. They sometimes appear to prefer to flit about a ♀, but this appearance may be deceptive (see below). They may be flitting about one another. All this flitting is very unequal or. Obviously not ritualized in form at all.

This flitting is usually accompanied by a lot of low to moderate intensity hostility.

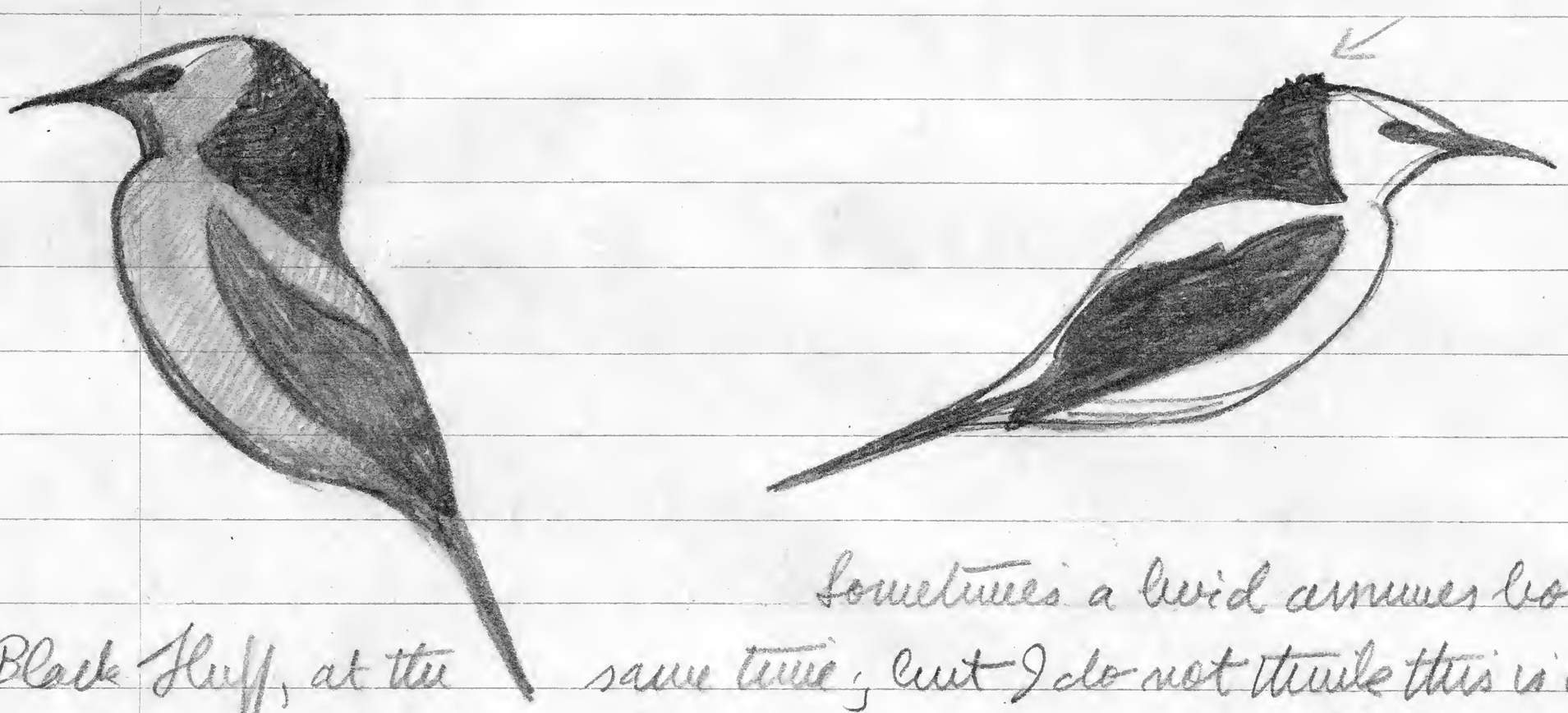
Sometimes all or most of the ♂'s tend to perform a lot of ft's. These ft's are often quite extreme. Usually or always with CR. Sometimes but not very frequently with a very slight trace of BL or BF (breast-lowering and belly-fluffing). I have not seen any ♂ or even wing-drooping or wing-spreading with the ft's in these flocks. Nor have I heard any Wh Notes in such flocks. All or most of the ft patterns of ♂ Blue Honeycreepers in these flocks must be silent (see below).

The ♂'s tend to make a lot of irregular up-and-down and/or side-to-side movements whenever they are in these flocks. Such movements seem to be most vigorous and frequent, on the average, when the ♂'s are performing ft's; but I have not seen anything like "real", stereotyped Bowing or Pivoting this year.

Some of the ♂'s ft's seem to be directed to one another. Often

s seem to be directed to ♀'s. (I consider an SL to be directed in the direction in which the black claw is displayed.)

Sometimes the ♂'s in these flocks perform few or no SL's but do a lot of CR and assume a lot of Black Fluff Postures. How Black Fluff Postures are quite variable. They are usually more or less similar to the postures drawn below:



Black Fluff, at the same time, but I do not think this is usual. Usually one or the other. I have seen ♂'s in Black Fluff point their bills nearly straight downward ↙ or ↓ This might be an intention movement of BW.

There seems to be a definite tendency for ♂'s to assume Black Fluff when they are near birds of other species. This might conform the theory that the Black Fluff contains a relatively strong escape component. But the ♂'s in these flocks also assume Black Fluff's quite frequently when there are no other birds of other species nearby.

I presume that the Black Fluff — CR performances are lower intensity, on the average, than the SL — CR performances.

I am almost certain that ♂'s in Black Fluffs are usually or always silent.

Sometimes the ♂'s in these flocks do little or nothing except CR

(in the way of bottle displays). Flight is presumably even lower intensity than Black Huff — CR.

Quite a lot of single HCN's are uttered in these flocks. But I have not been able to determine who utters them. I rather think that all or most of these HCN's are usually uttered by ♀'s.

The ♀'s (also) assume a lot of CR's, without uttering any sounds, in these flocks. No other ritualized bottle movements and/or gestures.

HCN's are the only sounds I have heard in these flocks.

At one time, I thought that all this flittering, etc., in flocks might be some form of communal display. But I rather doubt it now. I think that these flocks are just the result of the intra-specific gregariousness of the species still expressing itself in the breeding season. The hostility is presumably the inevitable result of the birds coming together at this season. The behavior of Blue Honeycreepers in these flocks may be strictly comparable to the behavior of the Plain-colored Tanagers in the flocks I watched today (see today's notes on Tangara).

It may be significant that these flocks of Blue Honeycreepers are formed most frequently and maintained for the longest periods of time in the afternoons. Sexual reactions are probably relatively rare in the afternoons.

All the ♂♂ Blue Honeycreepers seem to be in complete nuptial plumage now. They are probably all also mated (although they sometimes become separated from their mates). I have never seen a ♂ apart from a ♀ during the last few weeks. As far as I can tell none of the ♀'s are incubating yet. And there certainly don't seem to be any young around.

Cyanerpes, I.

April 4, 1961
Barro Colorado

Early this morning I watched a single ♂, in full adult plumage, sitting alone, in the top of a tall bare tree, uttering lots of single CN's (not HCN's). With CR. Occasionally stopped vocalizing to preen vigorously. Uttered a few CN's with Blue Fluff as well as CR. This Blue Fluff may have been an intention movement of preening.

Cyanerpes, I

May 3, 1961
Barro Colorado

I have been concentrating on filming Honeycreepers recently.

Before I forget, I should mention that when I got the 2 ♂ ♂ filmings mentioned above on June 23, 1960, one of the ♂'s still had a few juvenal plumage feathers showing. This is the ♂ that was kept alone in the left outside cage for several months. During this period it was alone, I heard and saw it "sing" several times, in the more or less early morning. These "songs" were quite distinctive sounded very much like the warbling WS's of Red-legged Blue Honeycreepers, translated into buzzes! a "buzzy warble." As far as I can recall, these "songs" were uttered from a perfectly normal, unperturbed-looking sitting posture.

The ♂ stopped uttering these songs after the ♀ was put in with him.

A couple of weeks ago, I took this ♂ out of the left cage, and left the ♀ alone. Then I noticed that the ♀ also uttered "buzzy warble" songs in the morning. As far as I could tell, exactly like the

sounds like ♂ uttered last year when alone. Also uttered from unritualized nutting posture.

Yesterday morning, I put the ♂ back with the ♀, around 7:15 a.m.

Both birds flew around excitedly for a few minutes, landing from time to time, but seldom very close to one another. One or both birds uttered quite a lot of the usual hard "CN"'s of the species. (Such "CN"'s might be transcribed as "Jit", or even "Tuck". I am beginning to think that they may be definitely hostile — see below.) I think that the ♀ uttered more of these "CN"'s than the ♂.

Both birds also uttered a few R's, within a few seconds after the ♂ was introduced. Some (probably) in flight. Others when perched. The ♂ uttered one R (at least) in a conventional, fairly high St. With little or no BL or BF. And no trace of S. The ♀ uttered at least one R in an St. Posture like the one shown on Feb. 24, 1958, p. 52.

When the ♀ began to utter them, high "Jeeet" notes. Essentially mute, but repeated quite frequently. These were probably the same as the "Jeeeeet" notes of the ♂ described above on Jan. 23, 1960, p. 83, although the ♀ probably did not repeat them as rapidly as did the ♂ last year. The ♀ sat in apparently unritualized perching and/or "pre-locomotory" postures while she uttered these "Jeeet" notes. She also flew about from perch to perch, a little bit, after she began to utter "Jeeet"s, but I think that she never actually uttered any "Jeeet"s in flight.

I think that these "Jeeet" notes (and the "Jeeeeet"s of the ♂) are probably strictly homologous with the SN's of the Rainbow-bird, Palm, & Blue Tanagers, the PCN's of the Sayaca & Tico, and re

lated notes of other species. I shall call them "SN"s too.

The ♀ also performed quite a number of BW's, when perched, during the period in which she uttered SN's. There may well have been an indication of frustrated or thwarted sex or pairing drive (s) — see below. She also performed 1 Pr movement during this first period of SN's

Sometimes the ♀ uttered notes which were more or less obvious ly intermediate between typical "CN"s and typical SN's. It was my impression that there may be complete intergradation between the 2 patterns.

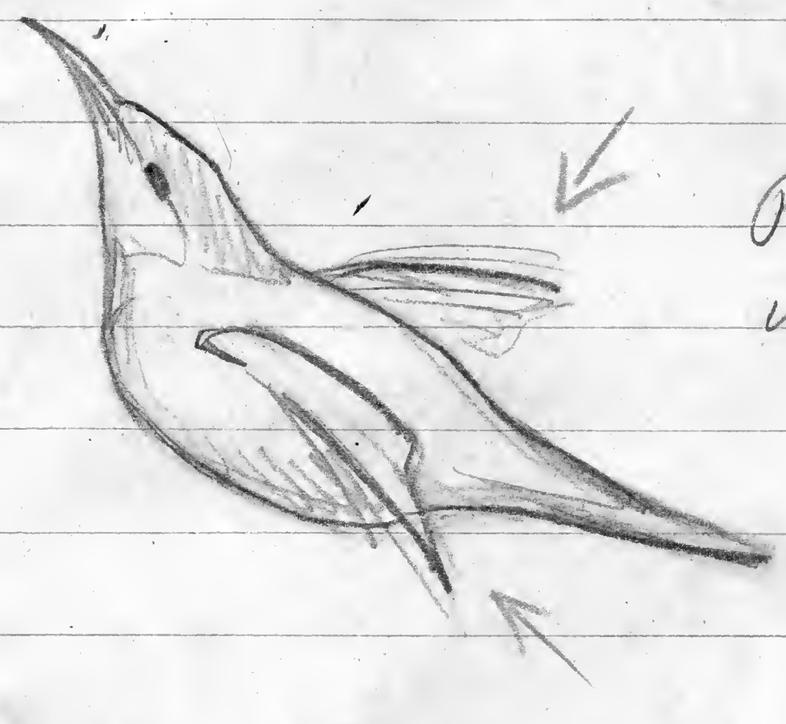
During the first few minutes after the ♂ was introduced, while the ♀ was uttering SN's, the 2 birds uttered a few more R's. The ♂ uttered their R's in conventional, rather erect St Postures. The ♀ probably also assumed a slight indication of St when she uttered her R's.

Then the behavior of the birds changed a little.

Every few minutes one of them would approach (usually from) within a few inches of the other. (Sometimes it was the ♀ landing beside the ♂, sometimes the ♂ landing beside the ♀.) Each time this happened, the ♂ would suddenly ride rapidly toward the ♀.

Whenever the ♂ suddenly rilled toward the ♀ in this way, both birds would assume a more or less extreme St. Posture. The first 7 or 8 times this happened, the St's of both birds were accompanied by extreme ♂ and soft B33's (like the ones described above on June 23, 1960). The ♂ also usually did more or less extreme Bowing, with his St-♂-soft B33 patterns, as he rilled. This Bowing was a rather regular alternation of rather high St's and F St's. The ♀ did not do Bowing. Her head & bill were usually

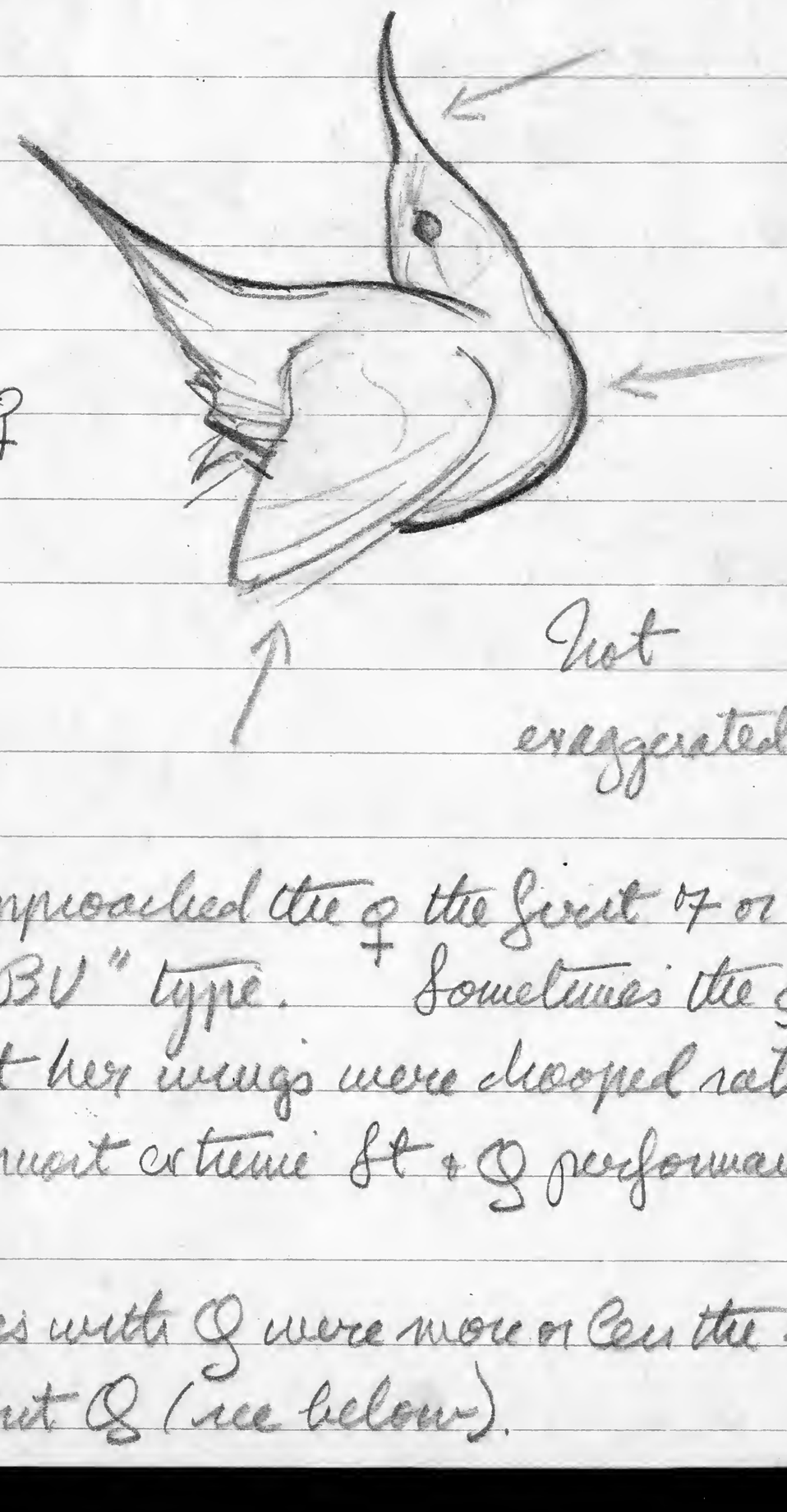
pointed nearly vertically upward, or even upward and backward, but her body was not usually tilted very much. The 2 extremes of her St-S Postures, during her first bursts of this behavior, were more or less common:



Relatively low intensity St + S Posture (during a period of high intensity St + S).

Drawn from slightly above and behind

The highest intensity St + S Posture by the ♀



Not exaggerated!

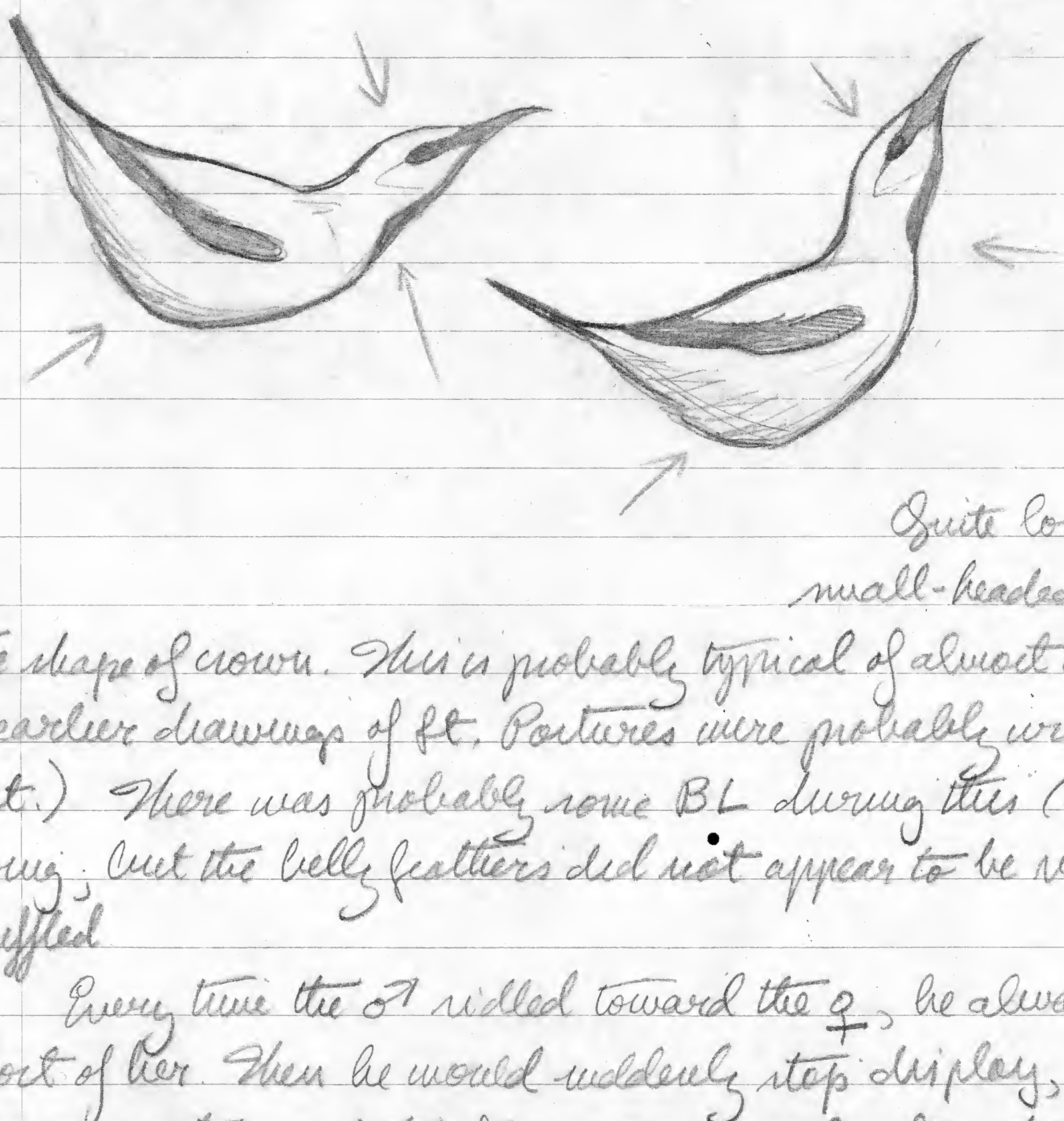
All the ♂'s S when he approached the ♀ the first 7 or 8 times was the extreme, horizontal, "BV" type. Sometimes the ♀ performed similar BV-type S. But her wings were drooped rather than spread horizontally during her most extreme St + S performances (see drawing above).

The ♂'s Bowing postures with S were more or less the same as his later Bowing postures without S (see below).

After a while, the birds began to calm down a little. The ♂ still
sidled toward the ♀ whenever the 2 birds came close together, but the
♂ displays gradually became less elaborate. This decline took slightly
different forms in the 2 birds.

The ♀ stopped soft BZZ's first. Then continued to assume ♂
Postures + ♂ (sometimes quite extreme) without uttering a sound of
any sort.

The ♂ stopped ♂ first. Sometimes he performed quite extreme
Bowing + SB, without moving his wings at all. His Bowing Postures
at such times were commonly:



Quite long-necked and
small-headed in appearance
Notice shape of crown. This is probably typical of almost all ♂ Postures
(My earlier drawings of ♂ Postures were probably wrong in this
respect.) There was probably some BL during this (and earlier)
Bowing, but the belly feathers did not appear to be very conspicuously ruffled

Every time the ♂ sidled toward the ♀, he always stopped just
short of her. Then he would suddenly stop display, perform 1 or 2
BW movements, and then fly away or, at least, retreat precipitately

down the branch away from the ♀. The ♀ usually or always continued her ♀ + ♂ (with or without soft B33's) until the ♂ did BW and/or until he retreated, but then she would stop without further display.

It looked very much as if the ♂ got "cold feet" whenever he got too close to the ♀.

The BW at the end of sidling and display performances would certainly appear to have been an indication of very strong frustration of some sort.

It may be significant, in this connection, that the ♂ interrupted all his other activities, quite early in the morning, to perform a lot of comfort activities, for 2 or 3 minutes on end. This long bout of comfort activities did not follow immediately after sidling and display toward the ♀, but it did begin with quite a lot of BW movements, followed by intensive preening of both wings (the wings were stuck out and downward during preening, in a manner which appeared to be perfectly "normal" but did increase the amount of black visible in the plumage of the ♂ to a very considerable extent).

The whole behaviour of these birds would suggest that the ♀ is sexually or pairing drive was relatively stronger than that of the ♂, and that the ♂'s hostility was relatively stronger than that of the ♀. If so, this might suggest that the Soft Buzzes are largely hostile, and that extreme ♀ is largely or at least partly sexual.

The ♂ did not appear to be very aggressive. It is obvious that the "forward" - type ♂'s are not always relatively aggressive. Just include a strong intention movement of advancing component.

Gradually the displays between the 2 birds died down alm

out completely. The ♀ stopped all display. The ♂ stopped sidling per formances. Just went into slight silent ft, without ⅋, whenever he happened to be close to the ♀. These low intensity ft's were com me ca
s

Body more or less horizontal Pronounced TV.

(This TV was more or less cha racteristic of all or almost all the ft. Postures I saw during this en counter. It may possibly be characteristic of all the ft's of this species. Perhaps I overlooked it in some of the ft patterns I saw on previous years.)

The ♀ still continued to utter SN's from time to time this morning, after the ♂ began to sidle and display. Usually or always between sidling & display performances. I think that the ♂ also utt ered some SN's (like those of the ♀) from time to time when he flew ar ound the cage.

This morning I began to observe the 2 birds before dawn. They were very quiet until well after sunrise. Occasionally one or bo th birds would utter one or a few hard "CN"s. The ♂ spent most of his time sitting hunched and fluffed. An indication of anxi ety? The ♀ spent less time sitting hunched and fluffed. The ♂ did one slight & silent ft. when the ♀ approached him. Also BW's, several times, when the ♀ approached him. He also did a lot of pre ening — much more than the ♀ — but not only when the ♀ approach ed him.

Then the ♂ suddenly started to chase the ♀. Again and again. Both birds uttered "CN"s during these chases. The ♂ perched from time to time, in intervals between chases, in an Ht Posture (usually showing his black chin to the ♀) and tried to nidle toward the ♀. No ♂ or soft Bzz's. No display at all by the ♀. She usually just flew away when the ♂ approached too closely.

Then the birds just flew around the cage, not together, perching briefly from time to time. The ♂ uttered SN's, and/or notes intermediate between typical SN's and typical "CN"s, both in flight and when perched.

Then the ♂ started uttering fluffed again. Then, when the ♀ landed beside him, he suddenly darted toward her in an extreme F&E (with BL) & soft Bzz's. This would suggest that his previous fluffing was partly sexual. The ♀ just flew away from him.

Then both birds started to fly around the cage again. Not very excitedly. ♂ usually following ♀. No displays, except SN's and/or (SN - "CN") s by one or both birds.

Cyanerpes, I — June 12, 1961
Trijoles

Very early this morning, just at dawn, I observed a ♂ Red-leg perched in a tree uttering a long series of CN's mingled with HCN's. Commencing: "CN-CN-HCN-CN-CN-CN-HCN-CN-CN-HCN-CN-CN-CN-HCN-CN-CN-CN....." I couldn't see the ♂ well while he uttered these notes (it was still quite dark) seemed to be sitting in a more or less ordinary sitting posture (I couldn't tell if he had CR or not), frequently looking from side to side.

Cyanocorax, Jan. 12, 1961, II.

The CN's he uttered were somewhat hoarse and urgent-sounding. I don't know if this hoarseness is typical of all CN's heard close up or not. Possibly these CN's were slightly intermediate with HCN's ???

This is the nearest thing to a "dawn song" I have heard uttered by Red-legs. Quite reminiscent of tanagers and finches!!!

Later in the morning I watched a family group of Red-legs. 1 adult ♂ (possibly the same as the ♂ who gave the dawn song earlier), 1 adult ♀, and 1 juvenile. The juvenile begged persistently from the ♀, and was eventually fed. During the begging, the juvenile remained in an H posture with slight TV, and G'd vigorously. No trace of St or BF. His begging was probably accompanied by a faint begging call, which I did not hear clearly. "Zee zee zee zee..." ??? The bill was kept open throughout the whole begging.

Cyanocorax, I — February 4, 1962
Barro Colorado

A pair of Red-legs were very noisy outside my house this morning. ♂ banded pink left. ♀ unbanded. Both uttering constant HCN's. ♀ did not have CR while she uttered the notes (I could not see the ♂). Then the ♀ flew to join the ♂. As she came close to him, I heard a sort of "GHAC" uttered by one or both birds. A hoarse "Zazee zeezee" Then both birds flew away

Cyanocorax, I — February 22, 1962
Rio Piedras

!!!

All the Red-legs here seem to be in pairs of 1 ♂ + 1 ♀.

Cyanerpes, I. — February 25, 1962 Rio Pedras

This morning, ca. 8:00 a.m., I came across a nestle of Red leg perched on a bare exposed branch. Uttering many HCN's in a rather regular rhythm — — — — — —

— — — Very long sustained. Answered by HCN's from another (invisible) bird about 50 ft away. Eventually, the ♂ flew away from the other bird. This would suggest that HCN's may be threat.

Cyanerpes, I — August 2, 1962 Barro Colorado

5:30 p.m. Came across a juv. Yellow-leg, begging from, and being fed by, an adult ♀. (No ♂ in sight).

Juvenile uttering Begging Call in H with ♀. Wings way out and quite high (about level with back) in ♀. H with considerable to extreme Belly-fluffing. Head moderately to very low. Bill more or less horizontal. No tt! But (sometimes at least) considerable TV! Tail not spread in TV.

Usually Begging call "zaa zaa zaa zaa zaa ....." Very loud and coarse. Quite rasping. Sometimes accelerated (and slightly softened) to "zuhzuhzuhzuh ....." (Once, at least, this occurred immediately after the bird was fed.)

Cyanocyras I

May 14, 1963
Barro Colorado

I have had a pair of Yellow-legs here for a long time. Don't know if they are a pair I have studied in detail before or not. Kept in small outside cage.

A couple of months ago, I separated them. Leaving ♂ in old cage. Putting ♀ in new cage, about 15 ft from ♂. Going to put them together again this morning.

Putting her in 6:15 a.m.

♂ immediately utters R. Declining into 2 or 3 soft B_{33}'s. With it? Then flies away, perches some feet from ♀.

Difficult to see, as it is still somewhat dark here.

♀ just sits in corner. ♂ flits about some distance from ♀. Does [illegible] ft. occasionally on landing. 6:17. Sometimes facing in direction of ♀. Sometimes facing away. ♀ flies to branch near ♂. ♂ creeps and lies rocketing around cage, in very fast and unusually noisy whirring flight, uttering R's as he does so. ♀ flies away. ♂ relaxes. Falls silent 6:20.

♀ goes down to feed. Utters 2 or 3 soft CV's as she does so. Both birds sitting quietly now. Just together.

♂ down to feed. Then ♀ goes down. ♂ immediately flies up. Apparently frightened of ♀. ♀ feeds. ♂ flies about excitedly near top of cage. Then ♀ finishes feeding, starts to fly up. Both birds silent except for occasional CV's until now. As the ♀ flies up, the ♂ swoops or pounces on her!! Brief chase. No vocalizations. Wing whirrs very near. Chases with the two birds hanging on wires side cage. Can't see th

on well. ♂ apparently hanging upside down, performing extreme BV-type ♫. Can't see if the is in ft or not. One of the birds uttering long soft, fluctuating, warble of B33's!!!! Throw or less like song of isolated individuals! But the ♂ is apparently only an inch or so from ♀ while this song is uttered. Then birds separate and fly apart. There was apparently no mounting attempt during this encounter.

6:35 a.m. ♂ repeatedly approaches ♀ fidling along branch in ft Posture. Uttering soft but otherwise regular Buzzes as he does so. Not fluctuating or warbling. ♀ finally quit retreats. Once she flew at him and supplanted him. She uttered one loud Buzz, with real twang as she did so. He flew away without display.

6:40 ♂ down feeding. Then flies straight to ♀. Lands an inch or so from her. Hanging upside down from top cage. Performs extreme BV-type ♫ in this position. At same time utters accelerated series soft Buzzes. Not fluctuating or warbling. ♀ quit flies away. ♂ relaxes.

♂ lands near ♀. In F&t. No ♫. Utters a few soft Buzzes. ♀ flies away. ♂ relaxes & goes down to feed. ♂ remains perched above. Utters a few PN's. No usual posture or movements. Then ♂ flies about. Utters occasional soft sings CN. Then ♀ flies up lands on branch some distance from ♂. ♂ flies to her, repeatedly follows and supplants her. Goes into F&t facing ♀ each time he lands during the process. Each F&t accompanied by Buzzes 6:46.

Then both birds relax again. ♂ BN's and preens. Then suddenly bursts into flight, whirring around cage. Lands on perch. Utters loud R in ft. Then comes out of ft, stops R, begins to utter loud PN's at first very rapid. Almost no pauses between notes. Then gradually slo-

♀ up down, pauses become longer. Unfortunately I can't see ♀. She isn't anywhere near ♂. ♂'s performance apparently provoked by outside stimuli (a wild ♀?) ♂ continues PN's for a long time, at least 3 minutes. Then shuts up 6:55.

Then ♀ lands on branch a foot away. ♂ starts to approach her in F&t with Buzzes. Stops. Utters 2 PN's. Flies away. ♀ just sits. ♂ back. Lands beside ♀. Goes into F&t, uttering Buzzes, facing her. She moves away. ♂ follows, still in F&t. Starts to utter R, in same posture. At same time, begins to ♀ wings! Wings held out only slightly, horizontally, during ♀. ♀ doesn't respond. ♂ stops R+♀, comes out of F&t. Then immediately utters series PN's. In unretracted posture, except that tail is raised above wing-tips (probably result of previous ♀ performance). ♀ just sits. ♂ shuts up & flies away.

7:01. ♀ continues to sit. ♂ occasionally approaches her. In &t or F&t. With Buzzes or R's. But she doesn't respond and he always flies away again immediately.

None of ♂'s Buzzes this morning have been loud or had any real twang.

♂ approaches ♀ again. In F&t with Buzzes. ♀ retreats. ♂ follows. As soon as ♀ retreats ♂ begins to utter R. Still in &t. ♀ retreats again & again. ♂ follows each time. Always in &t, with R, whenever he gets close to the ♀. Then both birds relax.

♂ seems to switch from Buzz to R as soon as he realizes that the ♀ is not going to respond sexually and/or aggressively.

♂ starts to follow and supplant ♀ with &t & R again.

All his &t's during such behavior are more or less F&t's. Usually with TV. Some BL. But no BF

Agami ♂ approaches ♀ with lt & Buzzes. ♀ flees away. Instead of following with R's, ♂ remains where he was. Goes into entire me ft, bill nearly vertical, with BL, quite a lot of BF, TV, and utters series of PN's in this posture. Wings slightly out, horizontal, and ♀'d slightly at same time! ♀ doesn't respond 7:13

♂ certainly seems to be highly motivated!

♂ occasionally approaches and supplants ♀, with lt & R's.

Both birds utter occasional single CN's almost all the time, even in close association with elaborate displays, but I have been too busy to record them this morning.

One or both bird(s) utter(s) Buzzes, without usual postures or movements, when Chachalaca lands on top of their cage

♂ again approaches ♀ with lt & Buzzes, switching to R when she retreats.

♂ somewhat less active now 7:25. Preens. ♀ flying about & now actively drawn before. Uttering occasional CN's.

♂ again approaches ♀ with ft and Buzzes. ♀ again retreats. ♂ stops display and BV's as soon as she leaves, instead of following her with R's. Is he getting discouraged? 7:33.

♀ goes down to feed. ♂ remains perched about 3 ft above her. He utters 2 or 3 PN's. Also a number of soft "CN"s

There are definitely 2 types of "CN"s. Commonest type is loud, hard and metallic "Jit". This is the type that is accelerated into R. Must contain a hostile component, but it is uttered so frequently (other birds are so nearly constantly hostile) that it may also function as a "real" contact note. Probably homologous with the SHN's of other species. I shall call it by the same name. It is probably an example of a Catastrege

of the transformation of a hostile signal into a contact note

The other type of "CN" is softer, a rather muffled "chuk". Probably the "real" CN (I shall continue to call it this). Probably homologous with the CN's of other species. Probably contains little or no hostility. CN's & SHN's intergrade. Difficult to tell how frequently, as even the extremes are not very different in sound.

Everything very quiet now 7:53. ♂ sitting alone, in rather hunched but apparently unritualized posture. Uttering occasional PN's.

I presume that these PN's are homologous with the "HCN"s of the Red-legs?

♂ suddenly lands near ♀. Goes into extreme ↓ with R, followed by rapid series PN's, still in extreme ↓. ♀ does retreat. (Is this only ♂ twitches to PN's ???). Then ♂ flies away. Lands a couple of feet away. Does R in ↓ again, facing toward ♀. Then stops, BW's & retreats. Then flies away. 8:04 a.m.

Both birds sitting quietly. Both preening. Far apart. Then ♂ flies to ♀, lands about 6 inches from her. Utters B_{33}'s in extreme ↓. Usual form ↓. F ↓, some BL, no BF. Wings out slightly. Apparently no ♂. TV. ♀ just sits. ♂ hops toward her. She flies off. He remains in ↓, but stops Buzzes. Then leaves 8:09.

♂ suddenly starts to chase the ♀ violently and repeatedly with lots & lots of Buzzes. This starts at the exact instant that a chachalaca lands on the cage. Redirection?

This, I think, is the only pair of Yellow-legs I have ever watched in which the ♂ was dominant over the ♀.

Leaving 8:15 a.m.

Cyanerpes, I — May 15, 1963
Pinto Colorado

Going to put another ♂ and ♀ Yellow-leg together. Not the same birds as those observed yesterday. (I shall call these birds "D," and the ones observed yesterday "I.") The D birds have never met one another before. They have been kept in small cages in the animal house. Going to put them together in outside cage.

Let loose in cage together 6:12 a.m. Both obviously excited by view, after being chased & caught.

Finally see one another 6:22. ♂ utters R in E flt. Then both just sit quietly.

Then ♂ lands near ♀. He is in flt, with BF. Pivots negligently and silently. Then flies away.

♂ occasionally approaches ♀ calls. ♀ usually responds by assuming a weak flt. ♂ then retreats.

♂ repeatedly approaches ♀ again. In flt with BF and Bows. ♀ just retreats or pokes her bill toward ♂, causing him to retreat sometimes ♂ performs irregular Bowing & Pivoting when he approaches. Once he stopped Buzzes and started R when ♀ did init. movs. of retreat. In all cases, he broke off displays & flew away after a couple of seconds.
6:35 a.m.

Again ♂ approaches ♀. In flt with extreme BF. TV. Wings out a little bit (panels, & 'd). Flies in the sort of flt which looks very much like V-flt of Green Honeycreepers. Accompanied by Bowing and Scratching very soft Buzzes, & goes into H. Can't tell if she utters SR or not. Then ♂ retreats, flies away 6:42.

Gaineques, May 15, 1963 II.

♂ aggn approaches ♀. Both utter R's in Est 6:44.

6:45. ♂ again approaches ♀ in Est with extreme BF and soft continuous Buzzes. ♀ responds by going into some sort of low posture (H?) which I can't see well. At the same time she definitely holds wings out slightly and performs slight ♀! But ♂ hesitates, retreats, flies off.

♂ utters soft Buzzes without display postures or movements when ♀ lands beside him. She does silent E Est, then flies away.

♂ again approaches ♀ in Est with soft Buzzes. She just sits in semi-H. ♂ retreats stops display 6:53. Again. This time ♂ BW's at instant of breaking off display. Again ♂ approaches ♀ as before. This time she responds by doing silent E Est, then turns her head toward the ♂ and does SR. Opening of bill and tongue movements very conspicuous in SR. (The ♀'s posture, except for her head, remained the same during SR as during the previous E Est. Quite erect. Definitely not H.) ♂ stopped display and retreated immediately as soon as ♀ did SR. SR seems to be quite remarkable gesture as a signal

7:00 a.m. Cop attempt. ♂ nibbles down branch to ♀. In Est with extreme BF and soft Buzzes as usual. Little or no Bowing or Pivoting (certainly no more than int. mvmts. — if that) ♀ appears to greet him, in H or semi-H. ♂ hops on her back. She flies off. Lands 6" away. Stands in E Est with wings out horizontally and definitely ♂'d quite vigorously. ♂ stands on ♀ just stands on silent ♀. Then both fly off and relax. This cop definitely unsuccessful.

♂ approaches ♀ again several times in next few minutes. His approach takes usual form ♀ doesn't respond. ♂ always flies off returns a couple of seconds.

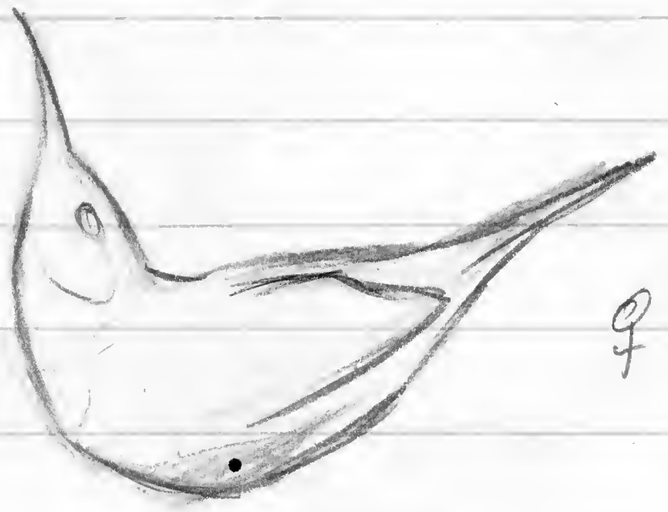
Both birds flying about quite actively now 7:05. ♂ pursuing ♀ enough & often following ♂. She often does silent flt when landing near to him.

7:07 Another cop. attempt. ♂'s approach just as in previous attempt. Can't see ♀'s pre-cop patterns very well. Probably quite successful. ♂ slips off. ♀ faces him. Does ♂ in low flt. ♂ just stands. Then both birds relax.

7:10. ♂ approaches ♀ usual fashion. She does definite ♂ in flt. Then apparently SR, turning head to face ♂, while ♂ continues. ♂ flies off.

Again ♂ approaches ♀ as before. She does flt with ♂. He tries to mount, but she slips away. He flies off. She continues flt + ♂ for a moment, then stops.

7:15. Still another cop. attempt. Usual approach by ♂. ♀ goes into flt. Bill extremely vertical, with extreme BL (apparently no BF) Apparently silent. Wings possibly drooped or held out very slightly. But no visible ♂ (this is definite). ♂ tries to mount twice, but slips off each time ♀ remains in same posture. After ♂ slips off for the second time, she remains in same pos twice, but begins to ♂!



♀ pre-cop

So ♀ is definitely more post-cop than pre-cop. ♂ just stands after slipping off. In unmutualized posture except for BF. Then makes a few

Cyanerpes, May 15, 1963, IV. (109)

irregular and obviously unmutualized bowing and pivoting movements. Still with BF. Then flies off.

BF must be definitely copulatory. Also BL in ♀'s.

♂ must be definitely hostile.

7:25. ♂ approaches ♀ again in usual way. She goes down in to H, turns head toward him, and utters SR, with bill open & tongue visible in usual way. He flies away immediately and she relaxes immediately.

Again ♂ approaches ♀ in usual way. This time she just does sit and he retreats.

It would certainly appear to be threat. SR is either threat or some sort of negative response comparable to the notes of ♀ toads when they don't want to be clasped.

♂ making his vigorous approaches now 7:25. All ♀ has to do is a very brief sit and he leaves immediately.

From the behavior of the birds now, I would presume that one of their cops earlier this morning was successful.

Approaches still continuing, but all very dull 7:50.

After approaching ♀ with sit and Buzzes, and being repulsed, ♂ often stands near ♀ in unritualized and/or semi-hunched posture with extreme BF connie ga

position of wings probably variable.

Cyanerpes, May 15, 1963 V.

7:58. Wild ♂ Yellow-leg comes to visit captives. Hangs on outside of cage. Both II birds rush toward it, utter many R's in lt. No 8. ♀ II stops rather soon. ♂ II continues longer. Visitor eventually flies away.

Visitor ♂ back again. Has time one or both of the II's (also certainly the ♂ Yellow one) "greets" visitor by uttering Buzzes (Jarvis soft, no Twang) in lt!!! Visitor flies away again.

Again visitor back. Again greeted with lt + Buzzes by ♂ II. Visitor leaves again

Leaving myself 8:10 a.m.

NOTES

The reason that Bowing and Pivoting are not mentioned in connection with most of the ♂'s approaches in the preceding account is that they simply did not usually occur in such circumstances. This species seems to lack the ritualized Bowing of some related species.

It is possible that the females showed a trace of lt and/or very slight ♀ which I did not see before some of the copulation attempts described above, but, if so, they must have been very weak indeed

4 p.m. Going to let another ♂ + ♀ Yellow-leg together, by removing partition between them. Call these birds "III." ♂ III has been in cage with ♂ II for months; ♀ III with ♀ II.

Let together 4:30 p.m. Rush close to one another. Both in extreme lt's, bodies nearly vertical. Both utter R's. Then ♂ utters a few loud Buzzes (without Twang). Then they separate. Sit silently at opposite ends of the cage

♀ utters long series PN's in unvirtualized posture. Then sudden

Cyanerpes, May 15, 1963 VI (111)

♀ begins to ♂, violently in ♂ posture

Upward ♂

Wings sometimes out horizontally, sometimes raised, in ♂. Part of this ♂-♂ performance silent. Then ♂ utters a few muffled notes that sound very much like the Notes of Red-eyes !!!! Bowed, soft muffled fluctuating Buzzes ?) of just looks. 4:35.

♀ stops display, starts to fly about excitedly

♀ starts to explore ♂'s half of cage. ♂ doesn't look at her. ♀ starts to preen. Then pecks vigorously at the band on his leg for a long time. Obviously displacement. He has had this band for months and has quite ignored it for a long time. 4:40.

Both do silent ♂ when ♀ happens to land close to ♂. Again. Again. Again. ♀ utters occasional SHN. Otherwise both birds silent.

♀ supplants ♂ without display

♂ does silent ♂ when ♀ approaches. ♀ doesn't display 4:50.

♂ suddenly starts to hop around ♀. He is in extreme ♂, with extreme BF, and extreme TV — but without ♀. At first with R. Then silent. Then with R again. ♀ responds by assuming extreme ♀. Silent. Does one long burst of extreme ♀, then stops. Remains in ♂ after stopping ♀. ♂ stops display. BW's twice at instant of stopping.

Then ♂ starts display as before. And ♀ responds by ♂ without ♀. ♂'s wings are slightly drooped with TV — but only very sli

Cynocephes, May 15, 1763, VII.

glads!

4:55. ♂ approaches ♀ again. Ri approach takes usual form. ♂ flutters about in ſt with extreme BF, TV. Lots of R fm Buzzes or ♀. ♀ responds by assuming ſt. Bill vertical but with extreme BL. Also extreme ♀. Horizontal. ♂ tries to mount ♀ immediately jabs at him. He flies away. Both birds stop display.

It is beginning to look as if ♀'s of this species will not allow ♂'s to mount if they perform ſt beforehand

ſt & ♀ so probably produced by exactly the same type of motivation as ♀ alone. Just higher intensity

Two more cop. attempts. Just like the one described immediately above. Except that during the last attempt the ♀ turned toward the ♂ with her head low, and did SR. Her ♀ continued during the SR. ♂ flew away and both birds relaxed (Also during this last attempt one or both birds may have uttered 1 or 2 Buzzes, Cucks, after a long period of R, just before the ♂ tried to mount.)

This ♂ seems to be both very aggressive and very strongly motivated sexually. As far as I can tell, the ♀ doesn't have any sexual motivation at all.

Again ♀ repells ♂ by performing SR, w/ H or semi-H, after he has approached her with ſt, BF, & R. 5:08 p.m.

Then ♂ hops near ♀, in ſt with extreme BF. And with both Buzzes & Bowing! (Both may be an indication of relatively strong motivational conflict.) ♀ doesn't respond. ♂ stops.

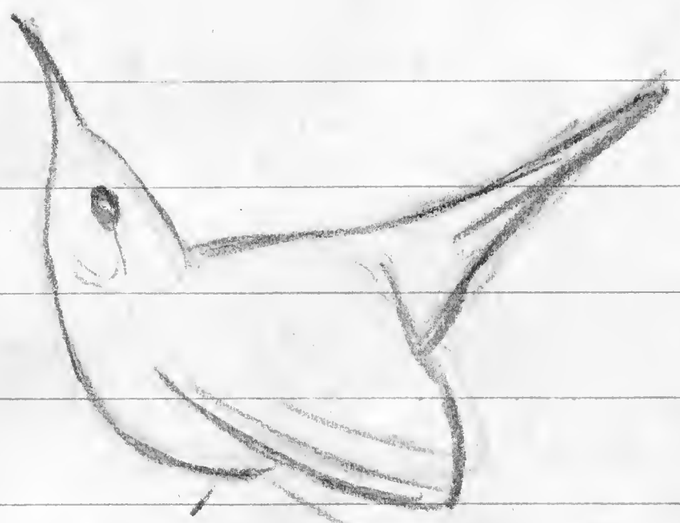
♂ hops around ♀ again. In ſt, with BF & TV. Uttering both R & Buzzes. No Bowing. ♀ turns to him, does SR, w/ H. ♂ stops displaying and retreats 5:15.

Cyanerpes, May 15, 1963, VIII (13)

♂ in nor performing silent flt with BF & TV whenever ♀ comes near him. But she ignores him. Flying about uttering SHN's.

5:25. ♂ hops around ♀. In flt with BF, TV, and R as usual. Tries to mount her repeatedly (at least 4 times in as many seconds). She goes into extreme flt with extreme BL, whole rear part of body raised, with very extreme BV-type horizontal ♂. Probably utters Buzzes at same time (at least one of the bouts certainly does). And each time the ♂ tries to mount, she jabs at him and forces him to retreat

♀ flt ♂
(Head perhaps more vertical).



for BL cannot be sexual. Probably purely hostile. May indicate that A & E are not far from balance (more nearly balanced than in other forms of flt.).

EXPLANATION: Whenever the ♂ does TV, he tilts the tail up at an angle to the body. Seldom or never raises whole rear end of body. Certainly never raises it much. This is quite different from the BL pattern of the ♀. Must make sure not to confuse the two in my notes.

Again ♂ approaches ♀ in usual way. ♀ repels him first by flt & Buzz and then by SRuH.

Leaving myself 5:30.

Anchisiana

April 20, 1963
Barro Colorado

Three young Anchisiana hatched in captivity March 31.
One died. Leaving 2. Left with parents. One vigorous now.
The other seems weak and very shy. Taking it out of cage of parents.
Putting it alone in small cage on animal house 7:30 a.m.

Utters lots of loud, single but repeated, "Tect" Notes.
With metallic a nasal quality. Both when running about and when
sitting down, neck up, looking alarmed. These notes seem to be alarm
Answer is frequent when a human being approaches. Answer when human
being goes further away.

Now 9:40. Bird just sitting quietly. Neck relaxed. Then starts
to uttering same notes again. Neck goes up as soon as notes begin.
Then bird shuts up. Neck relaxes. Then starts again. Neck goes up
immediately. Then quiet again. Neck relaxes again. Etc. Etc