

the ground, and did not come up into view within 6–10 ft of the nest site.

Parental brooding seemed quite efficient during periods of inclement weather. After a night of hard rain, a check of nest A revealed that the inner nest and nestlings were dry even though the morning was damp and the surrounding vegetation soaked.

SUMMARY

Nestling Sage Thrashers usually stayed in the nest for 11–13 days. Incubation seemed to start on the day before the last egg was laid, since there was usually one nestling that hatched one day after the others. Nestling Sage Thrashers weighed about 8.5 per cent of the weight of two adult females on the day of hatching and attained approximately 87 per cent of the adult weight before leaving the nest. The rectrices emerged from the papillae between the fourth and fifth days. After the fifth day, rectrix length may be a means of aging nestling Sage Thrashers. Constant disturbance did not seem to cause the nestlings to leave the nest more than a day or so sooner than if they had not been disturbed.

COURTSHIP AND TERRITORIAL DISPLAYING IN THE VERMILION FLYCATCHER, *PYROCEPHALUS RUBINUS*

W. JOHN SMITH

Department of Biology
University of Pennsylvania
Philadelphia, Pennsylvania 19104

In 1968 I observed courtship activities in two pairs of Vermilion Flycatchers, *Pyrocephalus rubinus*, and also persistent patrolling of territorial boundaries by three males, all in the vicinity of Portal, Arizona. The observations provide information not available when I earlier commented (Smith 1967) on the displays of this species at the same sites. Together with the previous material these observations make possible systematic comparisons of the display behavior of this and related species.

The *Nest-Site-Showing* display (N-S-S) was seen during three days in one pair and one day in the second, in the period in which the female was selecting a nest site and beginning to build. (It could also have occurred in pair-formation, a phase I have yet to see.) Most observations were of one male, who displayed repeatedly. The form is similar to that in *Sayornis phoebe* (Smith 1969) in that the male would crouch in a potential nest site, make slight nest-forming movements, and flutter his wings close over his back in a small-amplitude movement while calling. This was done at several sites in the nest tree and in a nearby tree; one site was used more than half the time. His mate initially began to build about 10 m from this site in the same tree, but eventually completed her nest within 2.5 m of the male's preferred site.

During several hours of observation on one morning, this male displayed very frequently, and somewhat more often in his mate's absence than in her presence. He frequently responded to her return to the nest tree by going to one of his sites and beginning N-S-S. She often appeared to ignore him, but several times joined him at the site, crouched down

LITERATURE CITED

- BAILEY, F. M. 1928. Birds of New Mexico. New Mexico Dept. of Game and Fish, Santa Fe, New Mexico.
- BAILEY, A. M., AND R. J. NIEDRACH. 1965. Birds of Colorado. Denver Mus. Nat. Hist., Denver.
- BENT, A. C. 1948. Life histories of North American nuthatches, wrens, thrashers and their allies. U.S. Natl. Mus., Bull. 195.
- DAWSON, W. L. 1923. The birds of California. Vol. 2. South Moulton Co., San Diego.
- GILMAN, M. F. 1907. Migration and nesting of the Sage Thrasher. Condor 9:42–44.
- HEADSTROM, R. 1951. Birds' nests of the West. Ives Washburn Inc., New York.
- JEWETT, S. G., W. P. TAYLOR, W. T. SHAW, AND J. W. ALDRICH. 1953. Birds of Washington State. Univ. Washington Press, Seattle.
- LINSDALE, J. M. 1938. Bird life in Nevada with reference to modifications in structure and behavior. Condor 40:173–180.

Accepted for publication 6 April 1970.

beside him, and then supplanted him over a period of a few seconds, during which both individuals did N-S-S with Chatter Vocalization side-by-side. He would fly off a few feet and watch as she continued the display in his site. Her display appeared identical to his except that it lacked the wing movements. Further, she sometimes displayed when actually building at one of her sites. In events in which she initiated the displaying he rarely joined her, and he never supplanted her.

The principal vocalization during N-S-S was the *Chatter Vocalization* (CV), not previously reported for this species. In form (fig. 1) it resembles the initial elements of the RRV (see below), but it was uttered at various rates and often more slowly than those elements. It resembles the CVs of closely related tyrannids (e.g., apparent homologues in *Muscisaxicola* species, Smith, in press, and that of *Sayornis nigricans*, Smith 1970a), as well as those of some more distantly related species (such as *T. tyrannus*, Smith 1966). Although sometimes absent from very brief bouts of N-S-S, it was inevitable and nearly continuous in prolonged bouts.

When used by this male, CV was frequently accelerated and developed into a *Regularly Repeated Vocalization* (RRV), which then might be repeated once or twice. RRV was also used once by the male of the other pair, in flight toward his mate.

During the early phases of breeding activity in late May, and again early in July after the rains began and some males renewed active patrolling of territorial boundaries, the RRV was used frequently throughout the morning, and sporadically later in the day. Thus it is less restricted to predawn and evening bouts than I had previously thought. It was more often uttered from a perch than in a flight display. When patrolling and countercalling with RRV, males tended to perch relatively high, but they sometimes used RRV from perches as low as one meter.

RRV thus has at least two quite different usages: in courtship (with N-S-S), and in territorial proclamation (patrolling, calling from station, countercalling, and flight displays). I was also able to elicit it from one male in response to a stuffed owl decoy (see below).

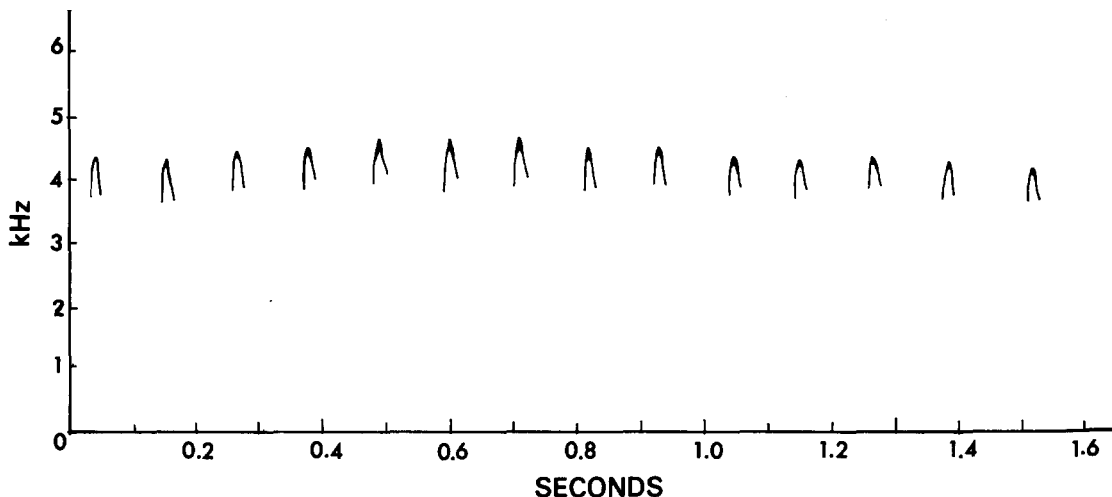


FIGURE 1. A sample from a Chatter Vocalization during Nest-Site-Showing.

Additional vocalizations were recorded that are similar in many respects to the "peent" call I described in 1967 (q.v.). Like the N-S-S, these were found only during the courtship phase, although some might be expected to occur at other times. The one form recorded commonly (although only from the most intensively studied male) is much briefer than the "peent," sounds like "tp," and has a descending rather than an ascending arm (see fig. 2a, b). Like "peent," it was uttered while perched, in flight, approximately on alighting, and sometimes with flight intention movements. The male was more likely to fly when calling "tp" than during most usage of the "peent," although the latter also occurred in periods of similarly high activity. No restriction on the *type* of activity was noted; the male might forage, as-

sociate with his mate in the nest tree, or leave and patrol.

One variant of the "peent" is like related calls of *Muscisaxicola* species (Smith, in press) in having two peaks (fig. 2c, d, e, f). It was recorded in only three events, but from three different individuals (one male and two females), and was always uttered by a bird flying away from its mate. Thus it appears to encode at least an escape message.

The remaining vocalizations are unusually variable (fig. 3), but are distinguished by having at least some rapid frequency-modulation of small amplitude. They intergrade with both the "peent" (including the two-peaked form) and the "tp." They were heard only in agonistic situations that arose as a male approached his mate, or sometimes when he

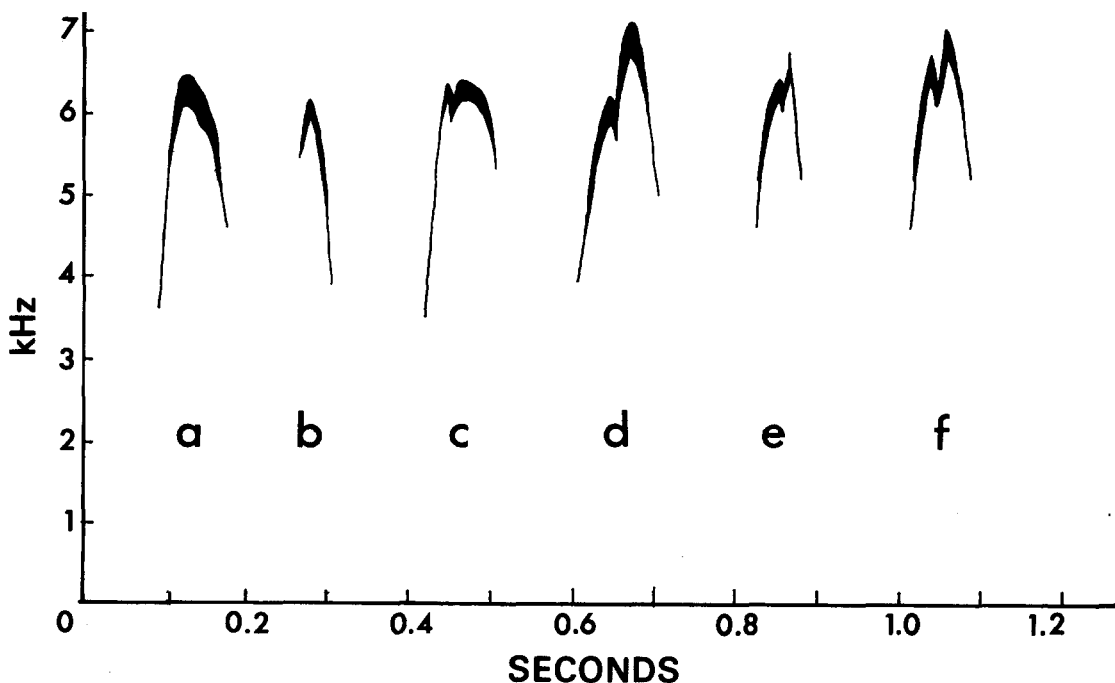


FIGURE 2. a: the "peent" vocalization; b: the "tp" vocalization; c-f: examples of two-peaked forms of the "peent."

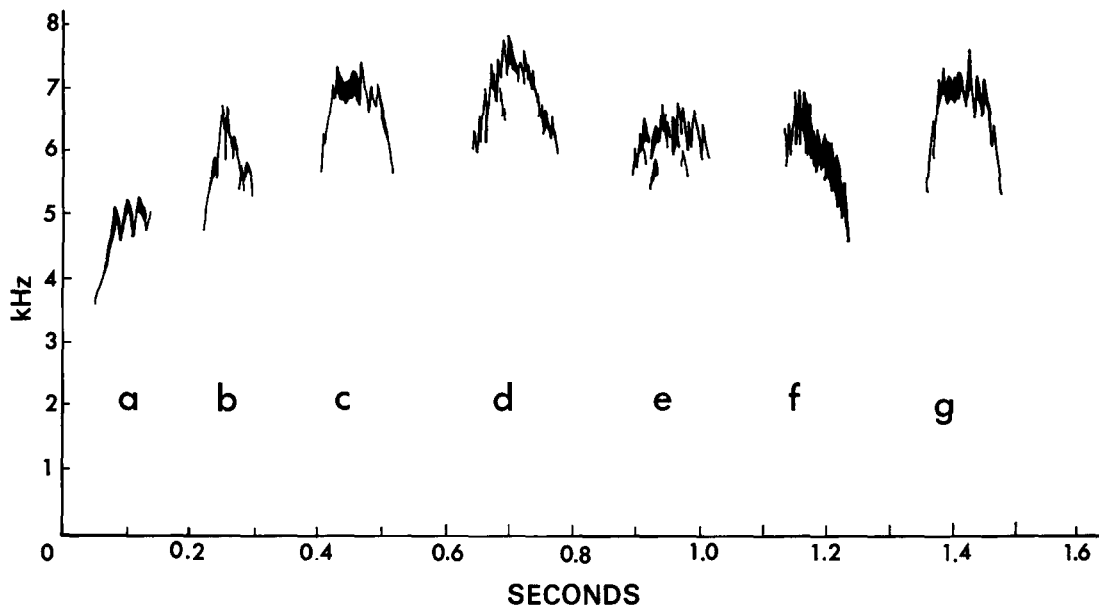


FIGURE 3. Examples of the variable, rapidly frequency-modulated calls that intergrade with the "peent" and the "tp" vocalizations.

was approached by her, or as he flew away from her after having made an abortive approach. The male most often watched was subordinate to his mate, but in the other pair the male appeared dominant. Within the first pair, most or all of these calls seemed to be uttered by the male, most often on flying toward his mate. One of the most extreme forms (a high "see," fig. 3e) was recorded on two occasions as he veered off from an approach almost as he reached her.

The more extreme forms of these "see"-type calls are recognizably similar to the fully-humped Initially Peaked Vocalization (fhIPV) of *Sayornis nigricans* and an uncommon IPV variant in *S. saya* (Smith, 1970b). Further, characteristics of their usage are similar. They are uttered in flight or on alighting, when a bird appears to be unready to complete the flight, or torn between flying toward or away from his mate. In the case of the fhIPV of *S. nigricans*, however, the situations need not involve orientation with respect to another individual. To the extent to which they are known, then, these "see"-type calls of *P. rubinus* appear to be a much more narrowly used representative of the *S. nigricans* fhIPV. But they intergrade in form with calls that resemble the Simple Vocalization of *Sayornis*, and *P. rubinus* appears to lack an IPV.

Like most *Muscisaxicola* species, *P. rubinus* thus appears to rely primarily on a brief, chevron-shaped vocalization "peent" and its variants ("tp" and the forms just described) for vocal signaling in most agonistic situations. In fact, in most agonistic circumstances (such as watching an observer near the nest, or the boundary encounter of two males reported in 1967) I have recorded only standard form "peent" calls. Further, in tests done after the courtship phase, using a stuffed Little Owl decoy placed within sight of the nest, I elicited only these "peent" calls, from both males and females, in two pairs. No Vermilion Flycatcher attacked this decoy, although one pair watched birds of several other species attack. They called only "peent" vocalizations during that event, but before the other species had seen the decoy,

the male perched high and gave a few RRVs, and he gave a few more RRVs after I removed the decoy.

In *Flight Displays*, the slight rise with stall or almost stall, and brief interruption of wing beats that I reported as characteristic of the most complex forms (1967) no longer appeared to be common, so that the degree to which this feature is used may be individually variable. Most birds in 1968 did not interrupt their wing beats, did not stall, and showed at most only a very slight tendency to rise at intervals during the display. Flight displays were also seen much more frequently than previously, apparently because all use of RRV during the daytime was common in territorial patrolling.

Wing Whirring was encountered in one additional situation. The male who was dominant to his mate once employed it as he made a supplanting attack on her. Immediately thereafter he made a second attack in which he did not simply supplant, but chased her, and in that case did not use *Wing Whirrs*.

A list, as complete as possible, of apparently homologous displays in *P. rubinus*, the species of *Sayornis*, and the species of *Muscisaxicola* and other Andean genera is presented by Smith (in press). The similarities among the displays of all these species tend to confirm the close phylogenetic relationships that are suggested by plumage patterns and other characteristics. But it is interesting that the displays of *P. rubinus* appear to be more similar in form to those of *Muscisaxicola* than they are to those of genera such as *Ochthoeca* and *Sayornis* (both basically tyrannids that perch on vegetation or other elevated look-outs, as distinguished from the very terrestrial species of *Muscisaxicola*). This relationship is most striking for the RRV, the Flight Display, and the "peent" set of calls and the comparable displays of *Muscisaxicola* species, as indicated above. *P. rubinus*, however, is a distinctive species in many respects (e.g., its bright plumage and sexual dimorphism) so that it is perhaps not surprising that it appears specialized by comparison with the species most obviously similar to it in gross features. What is potentially interesting is

that it does not appear to have adopted displays that are unusual within its subfamily, but instead to have developed, perhaps secondarily, forms characteristic of an anatomically and ecologically distinctive part of that subfamily.

Financial support during the period in which these observations were made was provided by National Science Foundation grant GB6108.

LITERATURE CITED

SMITH, W. J. 1966. Communication and relationships in the genus *Tyrannus*. Nuttall Ornithol. Club, Publ. no. 6.

DUPLEX NEST CONSTRUCTION BY HOODED ORIOLE CIRCUMVENTS COWBIRD PARASITISM

JOHN WILLIAM HARDY

Moore Laboratory of Zoology
Occidental College
Los Angeles, California 90041

On about 24 January 1970, Thomas Young collected an old nest (MLZ NE-574) of the Hooded Oriole (*Icterus cucullatus*) that he found suspended from a splintered beam of the overhanging eave of a house in Whittier, Los Angeles County, California. He brought this nest to me at the Moore Laboratory of Zoology. The nest is seemingly unique for this oriole in that it has two approximately equal-sized nest chambers and foundations interwoven side-by-side and suspended by a single group of strands attached to a splinter of the roof beam. The nest, as reported for the Hooded Oriole by many authors, is woven entirely from fibers of the Washington palm (*Washingtonia filifera*) and is sparsely lined with other plant fibers and down. The unusual nest site has been reported once before by Bent (U.S. Natl. Mus.,

SMITH, W. J. 1967. Displays of the Vermilion Flycatcher (*Pyrocephalus rubinus*). Condor 69: 601-605.

SMITH, W. J. 1969. Displays of *Sayornis phoebe* (Aves, Tyrannidae). Behaviour 33:283-322.

SMITH, W. J. 1970a. Displays and message assortment in *Sayornis* species. Behaviour. In press.

SMITH, W. J. 1970b. Song-like displays in the genus *Sayornis*. Behaviour. In press.

SMITH, W. J. In press. Behavior of *Muscisaxicola* and related genera. Bull. Mus. Comp. Zool.

Accepted for publication 19 February 1970.

Bull. 211:228, 1958). Usually the nests are suspended from palm fronds. One compartment of the present specimen contains an egg of the Brown-headed Cowbird (*Molothrus ater obscurus*) and otherwise shows no sign of use. The other compartment has a thicker lining and the outer rim flattened and thickly clotted with a mass of dried defecation, indicating that young were raised in it by the orioles. It is thought that the used "second" nest represents an unusually complete extension of the tendency shown by many birds to make a new nest lining when interfered with by an external agent, such as a parasitic bird's egg. Friedmann (U.S. Natl. Mus., Bull. 233:36, 1963) summarizes the few instances of reported parasitism of the Hooded Oriole by this cowbird. This oriole is not included in his list (ibid, p. 183) of 29 species of birds that have been known to avoid nest parasitism by burying the eggs of the cowbird beneath new nest linings. Among the 29 is the Baltimore Oriole (*I. galbula*). There are no previously known instances of the duplex construction as a means of circumventing parasitism. Dr. Friedmann (pers. comm.) knows of no other similar cases. I am grateful to Mr. Young for permission to publish this note.

Accepted for publication 6 April 1970.

NEW RHINOCEROS AUKLET COLONY FOR BRITISH COLUMBIA

DAVID HANCOCK

Wildlife Conservation Centre
3215 Island View Road
Saanichton, British Columbia
Canada

Triangle Island, located about 30 mi. W of the northern tip of Vancouver Island, British Columbia, probably contains as many species as and greater numbers of individual seabirds than any other rookery in the eastern Pacific Ocean south of Alaska.

Extensive ecological surveys were conducted on the island in 1949 and 1950 by the Provincial Museum staff (Carl et al., Ann. Rept. B.C. Prov. Mus. Nat. Hist. 1950:B21-B63, 1951). During the Museum expedition, however, no burrows or specimens of the Rhinoceros Auklet (*Cerorhinca monocerata*) were discovered.

On 3 August 1966 I located an extensive colony of Rhinoceros Auklets on the southern facing slope of Triangle Island. Upon closer examination the next morning, the eastern half of this slope, extending perhaps 1200 ft along the beach and upward from

the beach to an elevation of 300-500 ft, appeared to be a continuous Rhinoceros Auklet colony. I estimated the colony to contain in excess of 3000 occupied burrows, which would make this the largest Rhinoceros Auklet colony in British Columbia. On 4 August the young checked in ten burrows ranged from one-fourth to four-fifths grown, with 75 per cent of them between one-half and two-thirds grown. Live specimens were collected for the New York Zoological Society.

Only about 20 per cent of the burrows were occupied. Most of the burrows were very deep and many of the tunnels were forked, indicating a long established colony. The vegetation over the burrows was predominantly a dense covering of salmon berry, *Rubus spectabilis*, ranging in height from 7 ft at the beach to 2 ft on the higher, steeper slopes. A few areas of clearing among the thickets were predominantly occupied by burrows of Cassin's Auklets, *Ptychoramphus aleutica*, and Tufted Puffins, *Lunda cirrhata*.

Financial support for this expedition was given by the New York Zoological Society and the Wildlife Conservation Centre. The cooperation of the Federal Fisheries Department in the use of their patrol vessels for transportation is greatly appreciated.

Accepted for publication 20 February 1970.