macy, not, however, because of coldness in his nature or of indifference toward his friends, but because of the overpowering modesty of his character. He had none of the small talk of everyday intercourse; he never talked about himself, doubtless because, himself so modest, he did not think that such talk would interest anyone. He was ever ready, however, to express his opinion when asked for it, but never forward in advancing one, or combating the opinions of others. He felt, nevertheless, deep devotion for many of his friends, notably, among the older men, for William Brewster and Walter Faxon, and when he met a man for whom he cared, his face shone, alight with brilliant welcome. Many of us can recall some favor he did for us or some pretty compliment he paid us, all unostentatiously, as if he were pleasing himself.

The friendship he offered was the kind that the world seldom gives, built on the broad principles of Christianity, free from selfish interest, of a depth unguessed and therefore sometimes misunderstood.

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SOME IRRELEVANT BEHAVIOR IN BIRDS[1]

BY A. L. RAND

IT has long been known that birds, when excited, sometimes behave in a manner which apparently has no bearing on the situation confronting the bird. A typical case is that of a bird flying up and singing when disturbed by an intruder near its nest. Huxley (Auk, 33: 142–161, 256–270, 1916) and Tinbergen (Amer. Midl. Nat., 21: 210–233, 1939) have brought together a number of examples of such behavior; the following are additional cases, illustrating its prevalence and some forms it may take.

One example is that of the incubating Pileated and Downy Woodpeckers (*Ceophloeus pileatus* and *Dryobates pubescens*) which, at the approach of a human intruder, threw chips from the nest cavities that contained eggs (quoted in Bent, U. S. Nat. Mus., Bull. no. 174: 49, 191, 1939). On one occasion this made an egg collector think that the nest was incomplete. As he did not then examine the nest more closely, and as at a later visit he found young in the nest, these actions had saved the eggs. The egg collector then suggested that

[1]A contribution from the Archbold Expeditions of the American Museum of Natural History, New York City.

this was a ruse of the woodpecker to deceive him, making him think the nest was being excavated.

During the past spring (1940) at Tucson, Arizona, I saw several examples of this type of behavior. The Vermilion Flycatcher (*Pyrocephalus rubinus*) furnished several of these. This species is strictly territorial. Once, when I invaded a territory, following the male from perch to perch, the male finally came, apparently by chance, into the immediate vicinity of the female. He then flew to the female and attempted (unsuccessfully) to copulate with her. This was after there were eggs in the nest and copulation would not normally occur. On several other occasions, when I disturbed a male in his territory, he gave his display flight and song. This could not always be evoked; it was more normal for him to retire from perch to perch.

Another example at Tucson was furnished by the Phainopepla (*Phainopepla nitens*). Approaching a nest containing eggs which I had occasionally visited, I saw the male a few feet above the nest. Usually when disturbed by my presence the bird simply flew away, scolding. On this occasion, however, on my close approach, the male flew to the nest, pulled out part of the rim and flew away with this material to the vicinity of the female, about thirty yards away. When I followed, he flew about, scolding. The nest was later deserted. This tearing down of a nest was a normal action, but the circumstances were abnormal. In this species, nest building plays a part in courtship. The male builds the nest. If he gets a mate, she may help with the completion of the nest; if he completes the nest without securing a mate, he starts another nest, and may tear to pieces the first nest and use this material in the next.

Another example was related to me by Mr. J. H. Storer of Waltham, Massachusetts. He had set up his photographic equipment about fifty feet from the nest of an Osprey (*Pandion haliaetus*). The bird flew away and shortly returned with a branch in its feet, dropping the branch on the nest without alighting. Twice again it flew off, broke off small branches with its feet, and returned to drop them on the nest.

The Osprey had previously brought many sticks to its nest. It was a normal act at certain times; here it appeared out of place, and the sticks were dropped on or near the nest because the presence of a person nearby kept it from coming closer.

Other examples which clearly illustrate the irrelevancy of this type of behavior are those in which the attack is transferred from the real object of disturbance to a substitute object. On Long Island, New

York, in 1935, I was climbing to the nest of a Blue Jay (*Cyanocitta cristata*). The two jays flew about screaming. They came within a few feet of me but did not attack me as they would probably have attacked a lesser enemy. As I neared the nest, one of the birds alighted a few feet above my head and hammered vigorously on the branch with its bill. This type of action is quite normal for jays under some other circumstances such as when opening an acorn held under their toes.

Somewhat similar incidents of irrelevant attacks are cited by Skinner (Bent, U. S. Nat. Mus., Bull. no. 170: 21, 35, 1939) for the Prairie Falcon (*Falco mexicanus*). When human intruders disturbed the birds at the nest, the falcons sometimes struck and even killed other birds in the vicinity of the nest. Dawson (in Bent, loc. cit.) explains it: "If she does not vent her spite on you, she will fall on the first wight who crosses her path."

These situations listed above all have this in common; the birds were confronted with circumstances with which they were unable to cope effectively, in an area they apparently did not want to leave. But in every case the bird did something. The act always was a normal act, one which the bird probably had performed many times before; but the circumstances under which these acts were performed were not the usual attendant circumstances of these acts. They were normal but irrelevant acts, substituted for relevant acts.

Many minor, less conspicuous acts appear closely related to this type of behavior. When a Song Sparrow (*Melospiza melodia*) brings food to the young in the nest and feeds them, it ordinarily pauses, which gives time for the young to defecate, whereupon the adult carries away the fecal sac. If the young does not void, the adult may stay for a few minutes and may peck at the head or body of the young or at the nest itself; it may even pick up stems from the nest and pass them through its bill; it may preen, or it may settle on the nest and brood, none of which acts, presumably, it would have performed if the young had provided a fecal sac to be carried away.

Tinbergen (op cit.: 227) suggests that the substitute (or irrelevant) acts tend to 'use' a pattern closely related to the normal actions. Looking at the above examples with this in mind, it appears that this is true of the jay and the falcon. The same might be considered true of the Vermilion Flycatcher. It used 'display and song,' which have significance in the protection of its territory from others of its own species, but not from predators. The actions of the Phainopepla and the woodpeckers were probably used in the original nest con-

struction, and would be used again if the present nest were destroyed, and the same might be said in part for the Osprey's actions, but these do not appear to be at all similar to any normal nest-defense actions, nor does the attempted copulation of the Vermilion Flycatcher.

The ulterior biological function of an irrelevant act is incidental and accidental. In the above incidents, one action—that of the woodpeckers—was once beneficial; one was detrimental—that of the Phainopepla; the others were neutral.

A convincing explanation of this type of behavior is not immediately evident. Huxley (loc. cit.) calls them self-exhausting acts, the performance of which provides satisfaction to the bird; Tinbergen (loc. cit.) says they are parts of one cycle of behavior substituted into another cycle of behavior and suggests a psychological explanation of conflict of drives. In any case it is a type of behavior of widespread, sporadic occurrence. Giving it a name does not explain it, but having a name for it helps in briefly referring to some of its characteristics and correlating it with similar phenomena.

Kirkman (Bird Behavior: 78–80, 213, 1937) has used the term 'substitute reaction'; Tinbergen (loc. cit.), the term 'substitute behavior.' In view of the different uses of the terms 'substitute' and 'substitution' by various authors, as substitution for conditioning (Watson, Behavior, An Introduction to Comparative Psychology: 272, 1911) and for the use of less desirable food when more desirable food is absent, and for the use of a less desirable sex partner when a more desirable one is lacking (Katz, Animals and Men: 157, 195, 1937), it seems advisable to use some other term for this type of behavior. Since irrelevancy is the main criterion for evaluating the behavior, 'irrelevant behavior' seems a more suitable term.

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NESTING HABITS OF THE YELLOW RAIL IN GASPÉ COUNTY, QUEBEC

BY L. MCI. TERRILL

Plates 5, 6

WHILE on a holiday in Gaspé in 1939, my wife and I had the pleasure on July 5th of hearing for the first time the unmistakable calls of a Yellow Rail (*Coturnicops noveboracensis*), in a marsh near the coast between Percé and Gaspé. The notes have a decidedly flinty