FURTHER NOTES ON A TYPE OF INSIGHT LEARNING IN BIRDS

BY

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LAST year I published in Brit. Birds, Vol. xxxvii, pp. 29-31, under the title "A type of Insight Learning in Birds" a short account of the ability of three species of tit and of a number of other birds to pull up food which is suspended by a thread; the pulled-in loop being held by the foot while the bird reaches for the next pull. As a result of this note a considerable correspondence reached the late editor, who passed it on to me with the suggestion that I might summarise any records of particular interest.

Firstly, I would like to remedy an omission in my previous article by referring to the interesting article by M. Brooks-King, (Brit. Birds, Vol. xxxv, pp. 29-32) entitled "Intelligence Tests With Tits." This describes a number of remarkable performances of Blue and Great Tits, one or two of which suggest insight of the same type and degree as that described in my own article.

Many of the letters received confirm, or amplify in some not very essential particular, examples already recorded. Such observations are interesting to have as confirmation, but do not require any comment. Mr. T. C. Witherby, however, sends some interesting recollections of experiments with caged birds supplied with food and water in trolleys of the usual type. These serve to confirm the statements of other authors that there is great individual variation in learning ability. He says:—"I myself succeeded only with cock Siskins and with seed in a trolley and not with water. I tried also Bullfinches (hand-reared), Redpolls (caught), and probably some other species now forgotten. It always seemed that as Siskins were (a) greedier than my other birds (they often died of over-eating) and the cock Siskin far greedier than the hen, and as (b) it was easy without starving them, to tempt them with their favourite seeds (hemp and maw)—that this accounted for the greater ease in teaching them tricks." ......."Not all individual cock Siskins could be taught; only those able to concentrate. There was always in all cage birds a marked difference as between the behaviour of different individuals." He describes how cock Siskins could learn to pull out a drawer containing food in an apparatus similar to that used by Mr. Brooks-King, but emphasises that in order for the birds to persevere at learning the trick it seemed necessary for them to be able continually to see the seed in the box. Tits, on the contrary, seem extraordinarily independent of vision in this respect. Mr. Brooks-King remarks (p. 30) "one is almost tempted to believe that a keen sense of smell is manifested." In this connexion it is interesting that of a number of birds proved by Zahn (Z. vergl. Physiol., 19, 785-96, 1923) to possess a sense of smell the Blue Tit was the most rapid learner. Its odour perception,
however, seemed little if at all more sensitive than that of other birds, being of approximately the same order as the human olfactory sense. It excelled merely in the rapidity with which in training experiments with odours as signals, it could profit by its perceptions.

A very interesting record comes from Mr. J. Walker, of Clevedon, who describes how on one occasion only (winter 1932) a cock House-Sparrow after three ineffectual attempts to land a piece of swinging suet, commenced to pull in the string 7\frac{1}{2} inches long and, after some failures, succeeded in holding the loops by means of both feet and so secured the food. This is, as far as I can find, the only record of a House-Sparrow solving a problem of this kind and seems at first sight surprising. But there is a certain amount of evidence that the House-Sparrow ranks in intelligence somewhat above the average of common passerine birds, for D. Lack (The Life of the Robin, 1943, p. 14) speaking of his Robin traps says:—“Of all the birds which entered the house traps only House-Sparrows and an occasional Blue Tit were able to go in and out regularly without getting caught: House-Sparrows are perhaps more intelligent than most birds.” Moreover, L. S. V. Venables (Bird Banding, 1936, Vol. vi, p. 45-46) describes how, when working the bird-banding trap on Isle of May, he noticed repeatedly that the House-Sparrow and Starling were more adept in escaping than any of the passage migrants or than any of the other five passerine species resident on the island. He says that when the birds were being driven into the deep cul-de-sac of the 36 ft. funnel trap the Starlings, and Sparrows “without hesitation would fly straight towards the noise and danger, dodging our uplifted hands, and make good their escape.” He suggests that superior intelligence may be one of the many factors which have played their part in accounting for the great success of these species on both sides of the Atlantic.

Some observations of Mr. Eric Evans on Chaffinches at Shipley, Yorks, serve to confirm Bierens de Haan’s statement that individuals of this species occasionally, by vigorous tugs, show evidence of understanding the connexion between string and food, but are unable to hold the string. Mr. A. H. V. Smith, of N. London, however, records a successful pull up by a Greenfinch after preliminary attempts at hovering, the bird using its foot to hold the loop without difficulty. Finally, Mr. Roger Casson and Mr. T. L. Bartlett give accounts from Walkerburn, Peebleshire, and Harrow respectively, of Rooks pulling up suet—a useful confirmation of Sowerby’s statement.

Mr. Trevor Miller, of Riding Mill, Northumberland, in several letters, described in full and exact detail how in 1938 when a boy, he had suspended a conical tit-bell of the usual type 3 ins. in diameter half filled with fat. A fine string was hung centrally through the fat, its end about 4 ins. below the rim of the bell. To this end of the string a light stick of balsa wood 4 ins. long and \frac{1}{4} in. thick was suspended, tied firmly by its middle. The second day after this apparatus was put up, one or more Blue Tits, failing to reach the
fat by any other means, landed on the bar and, hanging in an
inverted position, rolled it up the thread with rapid movements of
the feet and so reached the fat. This process was seen “once or
twice a day for several weeks” and it is thought that more than
one bird was concerned. Mr. Miller has, I understand, since
repeated the experiment without success. That such an achieve­
ment could have been an example of “insight learning” I do not
for a moment believe, but I think some subsequent observations by
myself and my friend Mr. T. C. Wyatt in Cambridge suggest how it
might have come about. Having fitted up an apparatus similar to
Mr. Miller’s I found that unless the bell was composed of some
extremely hard smooth substance (wood, glass, bakelite and metal
bells were all tried) both Great and Blue Tits were able to hang on
to the edge. If this mode of access was denied them they climbed up
the string even though it was well greased. If fine silk or cotton
thread was used they were unable to do this and then the results
were very instructive. The varied resources and “ingenuity”
displayed by Blue Tits in reaching the fat was astonishing. Some
would manage to pull themselves up the thread parrot-wise with
beak and foot sufficiently well to make a rapid stab at the fat before
falling off. Others would hover below and make quick upward
darts at the food, securing a beakful each time. If the string was
not too long others would straddle with one foot on the string and
the other braced against the bar and so, with effort, would lever
themselves up until just within reach. Yet others would stand on
the bar and with a rapid stepping movement execute little fluttering
jumps carrying the bar a little way with them. None succeeded
in rolling the bar up the string, but I think this last performance
shows how a bird such as a tit (a bird which is in any case habitually
hanging from twigs and righting itself) might accidentally roll the
bar up a little way. Having done so we may be sure that such a
rapid learner, as this species is, would perceive the advantage and
repeat the process.

The absence of any record of the Robin pulling up a string led
Mr. Wyatt (who has a number of hand-tame Robins in his garden)
and myself to experiment with mealworms suspended by strings
from a perch. In every case the Robin secured the bait, not without
a little difficulty, by hovering in the air and snatching it off. When (in
my experiments) this was prevented by standing on the feeding table
below the perch a glass (lamp glass) cylinder 10 ins. high and 4½ ins.
internal diameter and allowing the string to hang down into it the
Robins were completely defeated, even though the string was very
short (3-4 ins.). The birds would look at the mealworm through the
glass, occasionally pecking the glass but, even though they had a
moment before been snatching a mealworm from an unprotected
string, evinced not the slightest understanding of the potentialities of
the string nor of its relation to the food. So far as our observations
go, therefore, the Robin seems to be a bird of low problem-solving
ability.
To sum up:—The general result of these communications, for which I would like to express sincere thanks, is (1) that individual birds of a species (as with other animals from ants upwards) evidently vary very greatly in their learning capabilities. (2) These records make it appear rather more improbable than before that the performance is dependent on a fully formed inborn automatism. Nothing final can be established till carefully controlled experiments have been carried out on a large scale with hand-reared birds of known experience. But in the meantime observations of wild birds in field and garden are suggestive and provide many valuable hints and indications for future work. It is to be hoped, therefore, that ornithologists will continue to make careful and critical observations on this type of behaviour, always attempting to establish with as much certainty as possible whether the initial step in any problem solving of this kind has been accomplished accidentally or whether true insight is involved. We are still completely without observations on many of our commonest birds; e.g. Wren and Song-Thrush—birds which often give the superficial impression of a fairly high level of general intelligence.