

NOTES ON THE NESTING OF THE SAND-MARTIN.

BY

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OF the three British representatives of the family of Swallows, the Sand-Martin (*Riparia r. riparia*) is generally assumed to be the most conservative in its behaviour and the least able to adapt itself to the conditions of our civilized life, or to gain advantage from the gradual growth of human influence.

It has, undoubtedly, not made itself so entirely at home, or domesticated itself amongst the actual conditions of civilization ; nor has it taken such an advantage of the protection that man's presence affords, as the Swallow (*Hirundo r. rustica*) and the House-Martin (*Delichon u. urbica*) have done. But although it most commonly retains its ancestral methods of nesting in self-made burrows where those methods are practicable, and rarely goes beyond utilizing the sites that have been left available after the formation of railway cuttings and embankments—this is not, I think, owing to any inferiority in adaptive ability on the bird's part ; nor is it necessarily associated with exceptional shyness or distaste for human presence.

Although the habit of utilizing holes in walls for nesting has been recorded on many occasions since the days of Gilbert White (Letter XX. to Daines Barrington : 1774), these cases of adaptiveness have, I think, hardly received the attention they deserve.

I wish here to give details of, and to discuss some points of general interest in connection with, such cases occurring in the Bristol district, where this variation in nesting behaviour appears to be displayed in an unusually generous degree.

The earliest note I can find is in the *Proceedings of the Bristol Naturalists' Society*, where Mr. J. A. Norton refers (1899) to a colony in "the retaining bank at the back of Bridge St.," facing the water. This colony, which was right in the centre of the city, no longer exists, possibly owing to increased industrialization and pollution of the stream, and hence absence of insect food. He also refers to a colony on the "right-hand side of the road by Three Lamps." There is a high wall here, which is probably the one referred to, but it is now covered by a very large advertisement hoarding—a factor which in the future may have some effect on the ecology of the Sand-Martin ! Finally, he refers to "another colony nesting between the stones of a roughly built wall in Kensington Hill, Brislington." I can find no colony

here ; but it is possible that the recorder made a fairly common mistake and referred to Kensington Hill, instead of Bristol Hill.

I know of two nests in the high wall at the top of this hill, which is a very frequented main road with a double line of tramcars. About a quarter of a mile away, on the Bath Road, there is a colony nesting in the holes of a high wall facing the road. Here there bred seven pairs in 1927, most in holes about eight feet from the ground. This road is very much used, and there is a perpetual stream of vehicles and pedestrians. The birds, however, are not at all shy, but will fly into their holes in front of the passer-by's eyes.

About two miles away, at Keynsham, there is another colony, of six pairs, in a high embanking wall, facing the Station and the main road to Bitton. This wall is higher, and the birds nest well out of reach. The road is not nearly so frequented as the Bath Road at Brislington, and I have found these Keynsham birds markedly more shy.

For many years there was a colony at Stapleton, another suburb ; this was formed of two groups of birds some distance apart. This year, however, for some reason, they have not nested in the accustomed holes in one part ; but in the other—a wall nearer the river—I observed one hole occupied ; and as this was rather late in the season, probably there were others, as I saw a number of the birds flying above the river.

Finally, there is a colony in the suburb of Redland, near where I live, and to which I have paid a good deal of attention. This again is in a wall facing a rather infrequented road, and an allotment and tip beyond. The population of this has varied considerably. I am informed that twenty-five years ago it was a considerable colony. I have known it myself for eight years, and during that time it has varied from four pairs to a single pair. It has also changed its site and moved about 100 yds. up the road, and its old holes are now nearly all filled with ivy-leaved toadflax. There are, this year, five holes occupied, more than has been the case for a long time. The birds are not at all shy, and will frequently fly into their holes before the gaze of the passer-by.

In addition to these, I am informed by Mr. Coldstream Tuckett that he and Mr. R. P. Gait have observed similar examples of this nesting habit "on the main Weston Rd. from Long Ashton to Flax Bourton, also at Pensford."

There are many interesting points arising out of this variation in the nesting behaviour of the Sand-Martin—of bird

psychology, bird ecology, inheritance of acquired characters, territory, influence of environment. In this paper I can only refer briefly to certain conclusions and certain difficulties that have struck me in connection with my own observations and those of others.

First, I wish to draw attention to the environment of these Bristol birds. There is only one small outcrop of sand in this district, at Bitton; and the stiff clay that is so general in the area (whose geology is mainly limestone and heavy clays) would not be suitable for burrowing purposes. The district as a whole is indeed a most uninviting one to the Sand-Martin, particularly the immediate neighbourhood of the city, where, of course, the hand of man, by building and the like, has radically altered the face of the land, and created conditions that are only possible for nesting purposes to a small minority of birds.

It would appear, therefore, as though the Sand-Martins have utilized these artificial sites under the compelling influence of necessity. If they had not varied their behaviour in some respect they could not exist where they do. At some past date, forced by what Dr. Julian Huxley calls "biological pressure"—absence of food, over-population, lack of nesting sites, etc.—or by other reasons, from the localities in which they were born and in which they were reared, one or several pairs overflowed from an area where sites were abundant into this new area, where the nature of the rock and soil did not allow of their normal method of nesting, but where other conditions were less intense—in fact, where the protection afforded by man's presence against natural enemies was of great value in the struggle for existence. In addition to this latter, more negative, advantage of human presence there was probably another, more positive one, an increase in food resulting from man's frequently filthy habits, as evidenced in tips, for instance. These Sand-Martins were not apparently affected in this change by any shyness or avoidance of man, as Gilbert White believed.

This pair, or these pairs, of birds were faced with the fact that if they did not vary their nesting behaviour, they would not be able to breed at all. But the impulse to breed is only second in strength to the impulse of self-preservation. Under the internal stimulus of this intensely powerful impulse the birds' minds would be working at almost full pressure. The result was that they changed their behaviour to some extent and adopted a fresh habit. This variation in behaviour of

the Sand-Martin was a radical one, more radical than that of either of its relatives. I suggest that a study of it will not lead one to the conclusion that the Sand-Martin is less intelligent and less adaptive than the other Swallows. The change involved the complete omission of the whole complex series of actions that are concerned with the making of a tunnel. All this was dropped entirely; the bird cut altogether with this most important and complex part of its ancestral instinct. It still holds on to the principle of tunnel-nesting. It still, as a general rule, builds its nest well away from the mouth of the cavity, and often it penetrates far back for many feet, placing its nest in an absolutely impregnable position, frequently being able to turn a corner, or make use of a narrow neck. But it has broken the chain of instinctive actions that normally precede the actual building of the nest. In this, at any rate, it did not follow out mechanically a series of acts in which the response of the one was the stimulus to the next following. This is obviously quite a different thing from its adopting the sites provided incidentally by man in railway cuttings and the like, where the bird merely follows its usual instinctive course of behaviour and makes no real alteration in its way of life.

In thus coming into the actual daily life of men, the bird has, moreover, quite changed its environment, leaving its quiet haunts to enter an environment of noise, bustle and commotion. It has really revolutionized its mode of living.

But the problem is by no means so simple as would appear from the above. There are instances that are not so straightforward, and that cannot be explained in this way as direct adaptation to environment. Mr. P. F. Bunyard records an interesting observation (*B.B.* Vol. XVII., p. 187) illustrating this difficulty.

On May 28th, 1923, he saw "several Sand-Martins flying up and down the line" at Rye House Station, G.E.R. "Some were carrying nesting materials and I was astonished to see several of them disappear into holes in the brickwork of the sides of the platform, just over the metals. I mentioned this to the guard of the train and he informed me that they had bred there for several years . . . It is remarkable that the birds should have chosen such a precarious position, when there are plenty of gravel and sand pits quite near."

I am also informed by Mr. E. W. Beacall that "several pairs used to nest regularly in drain pipes in the bank of the Gloucester and Berkeley canal at a place near Hempstead—

these pipes were rather damp, and only about a foot above the water level." He goes on to say, "they are fairly common along the banks of the Severn a few miles below Gloucester, particularly about Stonebench, where they nest each year. From here to the canal at Hempstead is only about $2\frac{1}{2}$ miles."

I find it impossible, as the facts are at present, to understand these, more especially in the example that Mr. Bunyard gives. This side of the question requires more examples and fuller details. The only suggestion I can make is that "wall-nesters" have drifted into a district where natural sites are available, but that the new method of nesting has been retained, in spite of the presence of normally suitable sites. But this is merely tentative. If true, it would imply that the habit became fixed. But the matter requires full investigation and observations—that might finally, perhaps, shed light on some problems of general biology.

I can only refer briefly to one or two interesting points that arise out of this variation in nesting behaviour on the part of the Sand-Martin. One is the inheritance of acquired characters—in relation to the vexed question of the inheritance or non-inheritance of habit. Professor Lloyd Morgan refers to the adaptive behaviour of the House-Martin with regard to this problem in *Habit and Instinct* (London: 1896: page 286). Do the progeny of the wall-nesting Sand-Martins always afterwards nest in holes in walls; or do they abjure walls for the more primitive, burrowing, site when it is available? If the first alternative is true, do the young birds, as Prof. Lloyd Morgan suggests, nest in walls by association of ideas—by their associating the idea of holes in walls with the idea of nesting through personal experience, and tending to nest in the situations where they themselves have been reared? Or do they nest in walls by "inherited habit," transmitted from their parents?

More facts are needed before any attempt at deciding these points is possible. Exact evidence is needed, indeed, to prove whether the Sand-Martins that have nested in the same spot and fashion for over twenty years, have done so generation after generation, young following parent.

This, and other matters of interest, perhaps at present overlooked, can be solved with the help of the "British Birds" ringing scheme. The ringing of wall-nesting Sand-Martins should be particularly concentrated upon. Details of the nesting sites of marked Sand-Martins should be mentioned on the recording sheet. Recoveries should, where possible,

state whether the bird was found in a wall or in a burrow. The subsequent value of such records would be great*.

I am unable to say why this variation in the nesting behaviour of the Sand-Martin has not spread more widely than it actually has done ; or, indeed, whether it is still spreading. There are many walls available, in this district at any rate, with similar and often better holes that are not used ; and only a small number of the holes available in the actual colony are utilized. In some cases, probably, the factor of wet has been a means of restriction, although all the holes that I have inspected have been perfectly dry and unaffected even by the very wet weather of this year.

*It has been suggested that ringing these birds is not a very easy task. It is not easy, but it is quite practicable. The difficulty is that the birds usually nest out of reach, frequently around corners, and often they choose the narrowest of holes. I myself ring them at night. I find that by flashing a small lamp in the birds' eyes, I can, by "hypnotism," draw them to the mouth of the hole. The parents can be ringed at any time by this method ; the young are best captured when full fledged.