

IS NEST-BUILDING AN INSTINCT IN BIRDS?

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MR. ALFRED R. WALLACE, in his contributions to the theory of natural selection, has an essay on the philosophy of birds' nests, in which he controverts the doctrine, which he admits to be almost universally held, that birds build their nests by instinct; and he believes that both birds and men, in a primitive state, build by imitation. He says, "It will be objected, that birds do not learn to make their nests as man does to build, for all birds will make exactly the same nest as the rest of their species, even if they have never seen one, and it is instinct alone that can enable them to do this. No doubt this would be instinct, if it were true, and I simply ask for proof of the fact; this point, although so important to the question at issue, is always assumed without proof, and even against proof, for what facts there are are opposed to it. Birds brought up from the egg in cages do not make the characteristic nest of their species, even though the proper materials are supplied to them, and often make no nest at all; but rudely heap together a quantity of materials: and the experiment has never been fairly tried of turning out a pair of birds so brought up into an enclosure, covered with netting, and watching the result of their untaught attempts at nest making."

I have lately had the opportunity of making the experiment, which Mr. Wallace states has never been fairly made; and much to my surprise, for a year ago I fully believed Mr. Wallace was right, the results are at complete variance with the opinion which Mr. Wallace has promulgated upon this subject. I will give the details of my experiment in full, reserving all comment until I have done so.

Last spring I received a pair of young ring-doves (*Columba risoria*), in their first plumage, which had been hatched in the breeding-box of an ordinary dove's cage, upon a straw nest built on the floor of the cage. These were a male and a female; but at the time I received them they were so young that I came to

the conclusion, from their very quarrelsome habits, that they were of the same sex; in consequence of this opinion, which I afterwards found to be erroneous, I asked the lady who gave me the first pair to give me another young dove. She gave me one brought up in the same manner. I kept these three doves in a wire cage until this spring. The exact size of the cage was three feet by two, and two feet high. They turned out to be a cock and two hens. At the end of February each hen laid two eggs on a bundle of hay placed in one corner of the cage; but there was not the slightest attempt at nest-building, although they played with the hay, carrying about a piece in their bills by the hour together. The females sat by turns with the male, and in due time three of the eggs hatched. Although some interesting facts were brought to light in the rearing of these young birds, it suffices to observe in the present connection, that only one of the young birds became fully fledged, the others died from heartless neglect on the part of the parents, apparently because they were feeble and two days younger than the chick that was reared.

In the middle of April I turned the three birds out into an aviary in the open air, in which there was a large branch of a tree with numerous twigs and buds to serve as a perch. The highest branchlets of this were about nine feet from the ground.

I provided the birds with a double breeding-box, similar to the one in which they were themselves hatched, in one side of this I placed a handful of hay, together with their newly fledged offspring. I left the other side empty, in the expectation that they might possibly build a nest of hay or straw, and I supplied them with both materials. The young dove learned to fly in a few days, and slept in its box at night, its parents and foster-mother fed it continually in the nest-box; but there was no attempt to make another nest in the box.

About a week after I placed the birds in the new aviary they took possession of the highest twigs of the tree branch, each with a small piece of stick in its bill; as I judged they intended to build in this portion of the tree, I at once supplied them with a number of twigs; these were nearly all straight twigs of varying length and thickness, without any lateral branches; but amongst them were a few pieces, each with a short lateral branch, which were at once collected by the doves, and carried to the place they had selected for their nest; but they evidently had not the slightest idea of the use of the sticks they had selected. They tried in vain to fix them to the wall of the aviary or to its roof, almost always to the latter, and waved them about above their heads until they dropped them. I thought that they might be in the habit, in nature, of laying the foundations of their nest in twigs above their heads, so I fixed some perches below the cleft

in the tree which I thought they had selected to build in, and wove two or three small branches in such a manner as to afford them a choice of resting-place, and also to catch the sticks they dropped. I ought to have mentioned, that the birds were excessively tame, having been brought up in the house, and that I was constantly in the habit of taking them from their cage and playing with them, hence they allowed me to stroke them or handle them without fear, so that my interference did not disturb them. As soon as I had finished, the male bird found the new place, and cooed in evident delight, and he was immediately joined by the two hens, each with a stick.

After vainly endeavouring to lodge the sticks above their heads for a couple of hours, sometimes from the old and sometimes from the new resting-place, and dropping them, they gave up work.

I now, however, observed that all the cleft and branched sticks had been gathered from the bottom of the aviary and lodged amongst the branches near the top of the tree. I also observed that the birds every now and then picked up a stick, balanced it for a little time in their bills, and then dropped it again. The thought struck me that straight sticks and twigs would not do, so I collected a number of forked branches and branches with lateral twigs. No sooner were these thrown into the cage, than the birds made their usual crowing noise and resumed work. As soon as all the branched sticks were used, they at once ceased work, although there was an abundance of unbranched sticks of suitable size in the cage. The end of all this was, that in three days, they had finished a nest exactly like that of a wood pigeon. They lined it neatly with straw, and ornamented it with some tufts of the dried flowers of the sugarcane (*Saccharum officinale*), which I took out of a vase in the drawing-room, and broke up, as I thought the soft feather-like flowers of the grass would make a good lining to the nest. They did not use it, however, for this purpose, but let a few pieces hang over the edge of the nest, with a great deal of straw, perhaps for the purpose of concealment. Each dove laid two eggs in the nest, and they are now sitting by turns with the male.

The apparent use of the side branches on the twigs which they use is to peg the nest together, as these hang down and pass through the meshes of the sticks which are already laid.

The important facts to my mind are, first, these birds had never seen a tree, or, at least, sat on one, yet they selected a place nine feet from the ground for their nest. They had never seen twigs, and could have no experience in the use of lateral branches, yet they carefully selected these and no other. Secondly, they had apparently no idea of the use to put the sticks to, when they had selected them, unless they are in the

habit, in a state of nature, of starting the nest on branches above their heads. As soon, however, as a few branches had lodged below them, they finished the nest, which accident had commenced for them. Thirdly, they followed the habits of the species to which they belong, although it is probable that these habits had been in abeyance for many generations, and certainly they had been in abeyance for more than one generation. Fourthly, the conditions were present which would have enabled them to breed in the same kind of nest as that in which they were themselves brought up, and in which they had already reared a young bird. Lastly, these birds were very tame, so that if new conditions could have modified their natural habits, this was a case in which we might have expected modification, as all the circumstances were in favour of a perversion of natural habits.

I do not know how to account for the fact that these birds built a natural nest. And I may be hasty in my conclusion, but I am in my own mind convinced that we have here an instance of what is usually called Instinct. This conviction is the more important because it is not a year ago since I gave a lecture in Great Ormond Street, at the Working Men's College, in which I maintained the view that animals act in such cases entirely by reason and experience; and at that time I felt certain from all I knew that Mr. Wallace was right, or nearly right, in his views.

The whole phenomenon had a striking similarity to the slow return of memory, brought about by a series of associations. There can be no doubt as long as the birds remained in a comparatively confined space, without the use of their wings, and without a natural branching tree to build in, they would never have built a characteristic nest. My own belief is, that the tree acted as a stimulus to their instinct, and that the natural surroundings prompted them, as it were, and awakened their dormant inherited powers. Although my impression is, that the final site of the nest was determined by the place where the sticks fell, which they failed to fix above them, I am by no means assured in my own mind that even this was not determined by a subsequent awakening of an instinctive act, and that the sticks were intentionally dropped upon the branch below them. The want of readiness in some things which these birds exhibited at first can hardly be considered surprising, when we remember the number of generations in which it is probable no natural nest had been built. Indeed, it is quite possible, and I think even probable, that their progenitors had laid their eggs on hay or straw on the floor of a dove-cot for fifty years or longer.

The importance of these facts can hardly be over estimated,

as they bear upon the theory of innate ideas, or at least of innate genius. From the foregoing experiment the conclusion is very tempting, that the birds are endowed with special faculties and ideas, just as it appears that men are born with a special aptitude for certain acts, both mental and physical, and that mind is endowed with properties of a special nature; at least, they are of great interest because they are facts which ought not to happen, according to the theory which is daily becoming more fully received. They belong to one of those by-paths of Biology, which it is Mr. Wallace's delight to tread, and in which he has done such excellent work.