

## CHAPTER XI.

## NEST-BUILDING, INCUBATION, AND MIGRATION.

THE activities which were considered in the last chapter are characteristic of a period of high vitality, and one of emotional expressiveness and susceptibility. Whether we accept or reject sexual selection by preferential mating as a factor in the evolution of these specialized activities, it is a matter of observable fact that these activities are coincident in time with the pairing impulse. And it is probable that any selection, which may have been instrumental in their development, has been in some way associated with the mating instinct. If struggle or competition has occurred, it has centred round the processes essential to the propagation of the race; and the specialized activities of song, dance, or aërial evolutions may be regarded as expressions of the emotional state which accompanies and characterizes the pairing season, and may be held to possess, at least in some cases, a suggestive value.

There are, however, other activities characteristic of the same period in which the element of suggestion cannot be regarded as of much importance. Nest-building, the instinct of incubation, the maternal offices—these do not depend in any appreciable degree upon a suggestive element. Their direct biological value is, perhaps, more apparent than that of song or dance or strange antics, since they are more obviously of utility. To a consideration of some of the activities of this type we will now turn.

Is nest-building an instinctive activity, or is it a habit

rendered definite through intelligent imitation? Is the habit transmitted through organic inheritance, or handed on through the influence of tradition? Mr. Wallace has advocated the latter view—at least, so far as specific definiteness is concerned. On his view, if I rightly interpret it, a bird may inherit an indefinite tendency to exercise its energies in building; but how it builds depends upon the tradition of its species. Exclude imitation, and they no longer built a typical nest. Thus chaffinches taken to New Zealand, and turned loose there, built nests which bore “some resemblance to those of the hang-birds (*Icteridæ*), with the exception that the cavity is at the top. Clearly these New Zealand chaffinches,” says Mr. Dixon,\* to whom we owe the observation, “were at a loss for a design when fabricating their nest. They had no standard to work by, no nests of their own kind to copy, no older birds to give them any instruction, and the result is the abnormal structure.”

Mr. Wallace quotes this under the heading of “variations of the habits of animals.” It would be well to restrict the term “variations” to departures of congenital origin, and to apply the term “modifications” † to those departures which are individually acquired. According to those, who are unable to accept the inheritance of acquired characters, of whom Mr. Wallace is one, the two modes of departure from the activities normal to the species are of very different value. Modifications, since they are acquired, are not on this view inherited, and can play no part in the development of instinct; while variations are those departures which by natural selection can be rendered definite and stereotyped as instincts. This,

\* *Nature*, vol. xxxi. p. 553. Quoted in “Darwinism,” p. 76.

† Prof. Mark Baldwin adopts this usage in his paper on “A New Factor in Evolution,” in the *American Naturalist* for July, 1896.

of course, is not intended as a criticism of Mr. Wallace's views concerning nest-building, since he does not regard the habit as founded on a definitely instinctive basis. It is a suggestion towards increased exactness in our technical nomenclature which may be found generally useful.

No doubt nest-building is subject both to variation of congenital origin and to modification through experience. Mr. Blackwall, in the first volume of the *Zoological Journal*, says, "It is evident that birds of the same species possess the constructive powers in very different degrees of perfection, for, though the style of the architecture is usually adhered to, the nests of some individuals are finished in a manner greatly superior to those of others;" and he quotes a case in which a yellow bunting failed to build at all, depositing its eggs on the bare ground, in which situation she sat upon them till they were hatched.\* Such differences are probably due to variation. On the other hand, modification may often occur. Bolton, in the preface to his "*Harmonia Ruralis*," says, "I observed a pair of goldfinches beginning to make their nest in my garden on May 10, 1792; they had formed the groundwork with moss, grass, etc., as usual, but on my scattering small parcels of wool in different parts of the garden, they in a great measure left off the use of their own stuff, and employed the wool. Afterwards I gave them cotton, on which they rejected the wool, and proceeded with the cotton; the third day I supplied them with fine down, on which they forsook both the others, and finished their work with the last article. The nest, when completed, was somewhat larger than is usually made by this bird, but retained the pretty roundness of figure and neatness of workmanship which is proper to the goldfinch."† Very

\* See Yarrell, "*British Birds*," vol. i. p. 491.

† *Ibid.*, vol. i. p. 541.

frequently birds, as Mr. Headley says, in his interesting book on "The Structure and Life of Birds,"\* "adapt themselves to new situations. The swallow and the house-martin have availed themselves of barns and houses. The palm-swift in Jamaica, till 1854, always built in palms. But in Spanish Town, when two cocoanut-palms were blown down, they drove out the swallows from the piazza of the House of Assembly and built between the angles formed by the beams and joists. In America the tailor-bird now uses thread and worsted for its nest, instead of wool and horsehair, and wool and horsehair may originally have been substitutes for vegetable fibres and grasses. In Calcutta an unconventional crow once made its nest of soda-water bottle wires, which it picked up in a back yard. In districts liable to floods, moorhens often build in trees. In New Zealand the paradise ducks, which usually build on the ground near rivers, have been known, where disturbed, to build on the tops of high trees, and to bring down their young on their backs to the water." But all this, as Mr. Headley points out, does not show that birds have not a nest-building instinct of congenital definiteness. It only shows that, as we have had occasion to note in many other cases, their instinct is modifiable by intelligence and experience. The habit may well be built upon an instinctive basis, and receive its final touches through individual experience.

Mr. Jenner Weir, writing to Darwin in 1868, says †: "The more I reflect on Mr. Wallace's theory, that birds learn to make their nests because they have themselves been reared in one,‡ the less inclined do I feel to agree

\* Pages 334, 335.

† Quoted in Romanes' "Mental Evolution in Animals," p. 226.

‡ This was Mr. Wallace's earlier view; his later view introduces tradition in a broader sense.

with him. . . . It is usual with canary fanciers to take out the nest constructed by the parent birds, and to place a felt nest in its place, and when the young are hatched and old enough to be handled, to place a second clean nest, also of felt, in the box, removing the other. This is done to prevent acari. But I never knew that canaries so reared failed to make a nest when the breeding time arrived. I have, on the other hand, marvelled to see how like a wild bird's the nests are constructed. It is customary to supply them with a small set of materials, such as moss and hair. They use the moss for the foundation, and line with the finer materials, just as a wild goldfinch would do, although, making it in a box, the hair alone would be sufficient for the purpose. I feel convinced nest-building is a true instinct."