THE NEST OF THE BAYA WEAVER BIRD.

BY CASEY A. WOOD.

Plates XIII–XVI.

THE two species of Weaver Birds found in Ceylon closely resemble in outward appearance the House or "English" Sparrow. The variety that builds the more elaborate nest is the Baya (*Ploceus p. philippinus*). The bird is also found all over British India, Java and Sumatra. I had excellent opportunities of observing this remarkable nest builder and found many of its constructions throughout Ceylon. The male resembles the female during the "off" season but after the spring and autumn moults he assumes a canary-colored crown and other yellow patches, well distributed over most of his otherwise brown and white body. This decoration he loses when there is no nesting to occupy his attention.

The Weavers love to live and build in colonies, and generally choose for the purpose the neighborhood of a convenient tank or of a terraced rice field. Being graminivorous animals they find that paddy fields furnish valuable granaries for a food supply.

I noticed, also, that nests found in the Northern Province of Ceylon almost invariably hang from the north and east exposures of the trees in which they are built and thus are least endangered by the battering winds of the southwest Monsoon.

Although much has been written about the remarkable nests of *Ploceus* there are many interesting points connected with their construction that have escaped most observers or that do not appear to have impressed writers sufficiently; and I propose with the aid of a series of photographs taken *in situ* to point out some of these curious happenings.

While the Tailor Bird does her best to conceal her nest (in which she succeeds admirably) the Weavers build their homes quite in the open where they can be seen of all men.

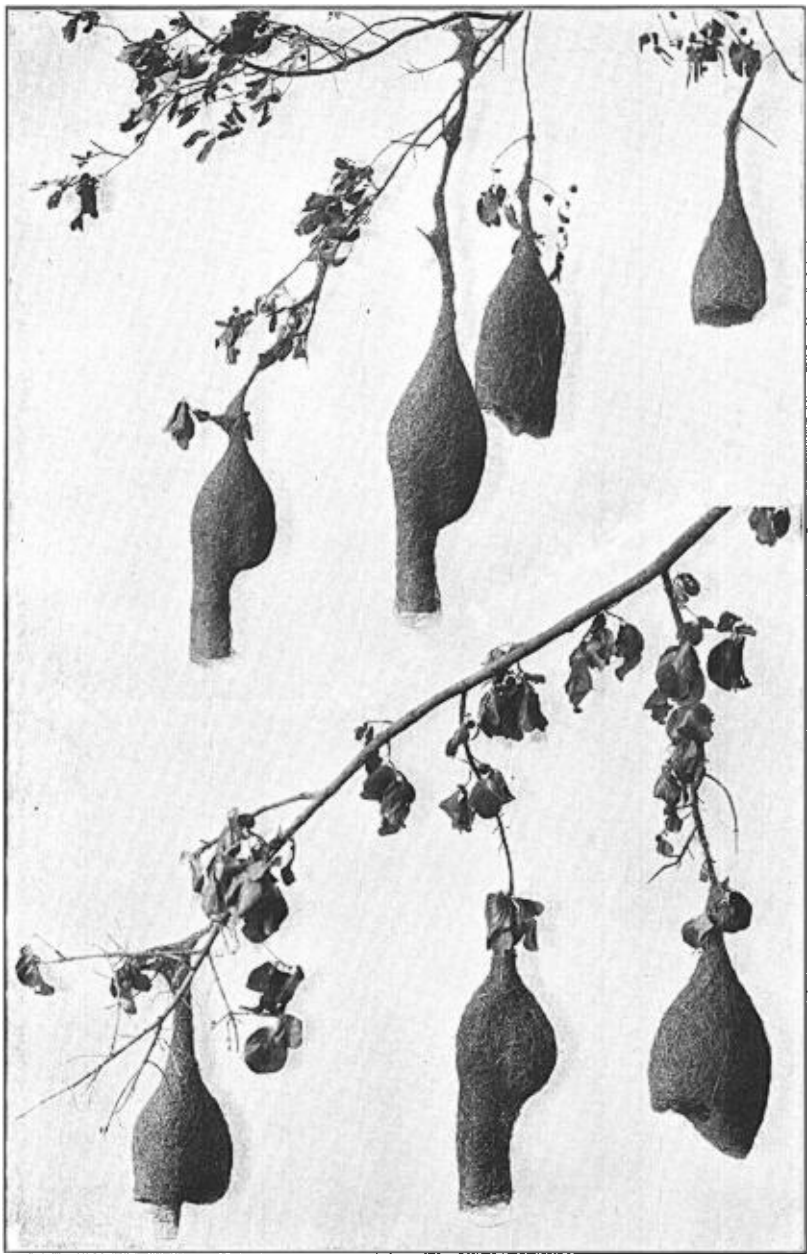
I saw a number of nests in a colony that had settled in a large tree growing about the center of a Ceylon *cheena*, or clearing made in the jungle for agricultural purposes. The proximity of a watch-

house occupied by a boy whose duty it was to drive off destructive birds did not seem to affect the Weavers to any appreciable extent. They came and went as if no human being were near them. Wherever placed the main objects sought are shelter from bad weather and safety from enemies. These provisions are reflected in the suspension of the nests on the sheltered side of a tree on branches detached from other limbs and by the peculiar form and swinging character of the nesting houses. There is, however, one precaution always taken—the nest hangs free in air and swings from the tree on which it is built in such fashion that it cannot be approached from below or from neighboring branches, and when that end is accomplished the birds may suspend their nests from quite low points, often not more than fifteen feet from the ground. The terminals of palm fronds and other branchlets, about twenty feet from the earth, or surface of a pond, are favorite sites.

According to some writers, the Weavers, instead of building a new nest once or twice a year, may repair an old one, the chief evidence of which is the color contrast between the nest and the old grass employed in the process. Indeed a tree colony of several dozen nests may exhibit at the same time a collection of structures that vary in age from old specimens battered by months of wind and rain to new and fresh nests on which the builders are still working. In some of the latter from one to four white eggs may be hatching; from others issue little chattering cries that betray the presence of hungry fledgings.

The shape of the Ploceine nest has been likened to many objects —retorts, inverted bottles, flasks, etc. But to my mind Newton's similitude comes nearest to it. He compares it to a stocking hung up by the toe, the heel enlarged to receive the eggs, while entrance and exit are made through the leg.

The material out of which the nests are made is mostly pliant grass stems and other tough fibers, especially strips of palm fronds. Legge and others think the birds strip from the leaves of palms, plantains, agaves, and other stringy plants fine but very strong threads for the weaving process. The bird collects them in this manner:—He bites a small piece from the base of the palm, sisal, hemp, or other fibrous plant, repeats the incision towards the tip, and grasping a few strands of the margin in his beak,



Photos by C. A. Wood

TWO BRANCHES OF DAMBA TREE SUPPORTING NESTS AND CANOPIES OF CEYLON WEAVER-BIRD

jerks his head away from the leaf, thus tearing off a fine cord, perhaps a line in breadth that corresponds in length to the distance between the two incisions. I have examined with a lens this weaving material from many nests and believe Legge's description to be most accurate. Moreover, I have watched the birds repairing the exterior and arranging the material of their nests and have often seen them tugging at a length of fibre, part of which has already been woven into the nest, and I have seen them flying in the air with the free end of a strand in their bills, so that it might be drawn taut and smooth before inserting it beneath other fibres for the support of the nest wall.

As a preliminary to the construction of the nest proper, the birds wrap a considerable amount of fibrous material around a chosen limb or frond. Often it is as much as three or four feet from the top of the pendant nest to the farther end of this anchorage, thus securing a firm hold upon the tree. The small strips are not only wound round the branch but are plaited together so securely that it is impossible with ordinary effort to separate them. The plaiting is then continued downwards from the branch to form a stout aerial stalk from three or four inches to a foot in length, the end of which is evidently expanded into the globular structure of the nest proper. The long diameter of this bulb is from five to six inches; its short diameter about four.

Having shaped this upper chamber and located the future egg chamber, the birds next build a strong, compactly woven transverse band or bridge, that divides the lower part of the space into two unequal chambers. (Plate XIV, fig. 1)

In every large colony are found what look like unfinished nests—that do not in building get further than this perch or roost stage, looking, as Jerdon says, like an inverted basket with a handle. So far as they go, these structures seem strong and well-finished, giving rise to many speculations as to their status. Are they made in an excess of home-building zeal by the male bird upon whose feet and beak time hangs heavily? Or, are they shelters to which he may retreat and rest secure from the torrential Monsoon? My friend, Mr. John Still, calls these half nests "canopies" (plate XIV, fig. 2) and believes they are intended by the male builder as a protected roost, and are not merely unfinished nests

or an expression of extra-architectural activity on the part of the male. The main argument favoring this hypothesis is, of course, the finished appearance in many cases, of the canopy itself, its thick, smoothly plaited walls, the rounded edges of the perch and the absence of any attempt at completing the base of the globular chambers or the entrance spout. Captain Legge suggests that the canopy is a nest deserted after partial construction on account of some fault in it—an egg chamber too small, a neck not strong enough, etc.

Whether the canopy is deliberately planned as a shelter for one or both birds, or whether it is only a partially built and deserted nest, there can be no doubt that the non-incubating male has been seen occupying the structure and using it as a perching convenience; and there is no doubt that, whatever the original purpose of these structures, the canopy does make an admirable refuge from wind, rain and hot sun.

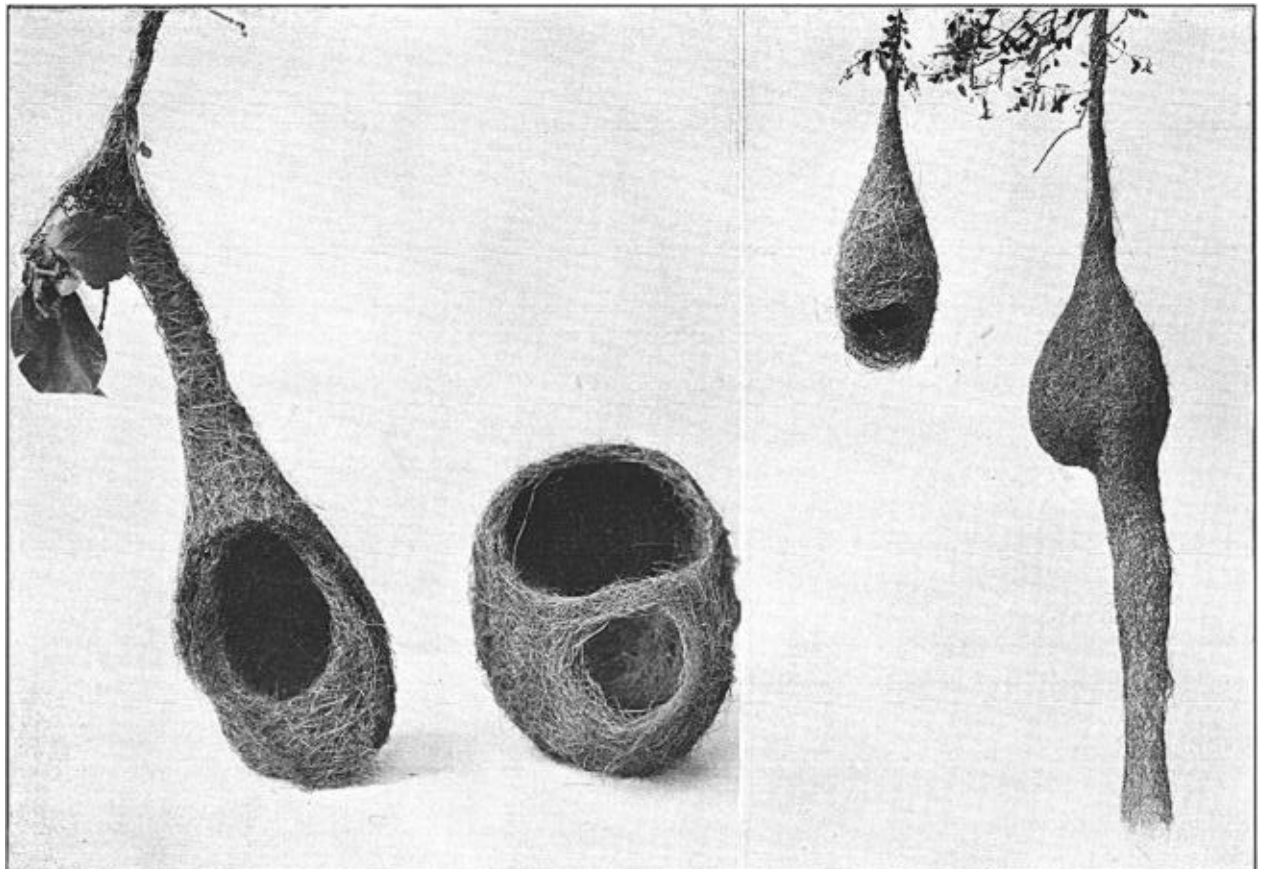
The illustrations show more plainly than any description the forms and the relative size of the completed nests and so-called canopies, both before and after removal from the tree-colony. One colony, placed in a Halamba tree, furnished four canopies, as well as two full length and one short nest. On the ground beneath the tree were picked up—evidently detached by the wind—five full length and two short-tubed nests.

In another tree we found seven canopies and five nests. Three egg chambers held a single egg and two had two eggs each. All the canopies had, on or near their margins, small lumps of dried mud, about which something further will be said; on the other hand, very few nests showed these deposits.

The lowest structure was twelve feet from the ground, the average was sixteen feet and the highest about twenty-five feet.

A small but for many reasons interesting colony had nested in a Damba tree. It numbered two canopies, one definitely unfinished nest, one long (with its entrance tube fifteen inches) and two completed but shorter nests. The long nest contained fledglings on June 1, 1925.

Measurements were made of five nests and four canopies in one colony. The diameter of the entrance tube attached to the shortest nest was 2.75 inches; the others varied from 2.25 to 2.50



Photos by C. A. Wood

LEFT.—PERFECT NEST AND CANOPY OF CEYLON WEAVER-BIRD CUT TO SHOW INTERIOR. RIGHT.—PERFECT NEST AND INCOMPLETE NEST OR CANOPY.

inches. The length of the shortest tube was 3 inches; the others varied from 6 to 15 inches. The circumference of the smallest nest was 14 inches; of the largest 18.50 inches. The longest nest measured, over all, 37 inches; the shortest 17 inches.

As for the four canopies the total length of the shortest was 12.75 inches; of the longest, 16.50 inches. The height of the chamber varied from 4 to 6.50 inches; the width of the bridge or perch, one half to one inch; the diameters of the two entrances (either side of the perch), from 2.25 by 3.75 inches to 3.50 by 2.50 inches. The circumference of the largest canopy was 20 inches; of the smallest 15 inches. Hence one sees that the nests and canopies vary appreciably in size and capacity. The smaller of the two cavities divided by the transverse roost or perch is the one continued into the long tube-like entrance.

As soon as the egg-chamber is finished the female bird confines her attention to the completion of the interior of the nest, and leaves the work on its exterior to the male. They seem to work together, although the male gathers most of the building material which he pushes through the walls. It is then woven back and forth as long as possible, that is, until thick, tough, solid, basket-like walls are the result. The male bird now completes the entrance-spout, strengthens the walls of the upper nest and, in some instances, begins a second nest—like the structure already mentioned.

During the nest building both birds enjoy themselves thoroughly, the male often singing a little song as he joins with his mate in weaving the nest material into place.

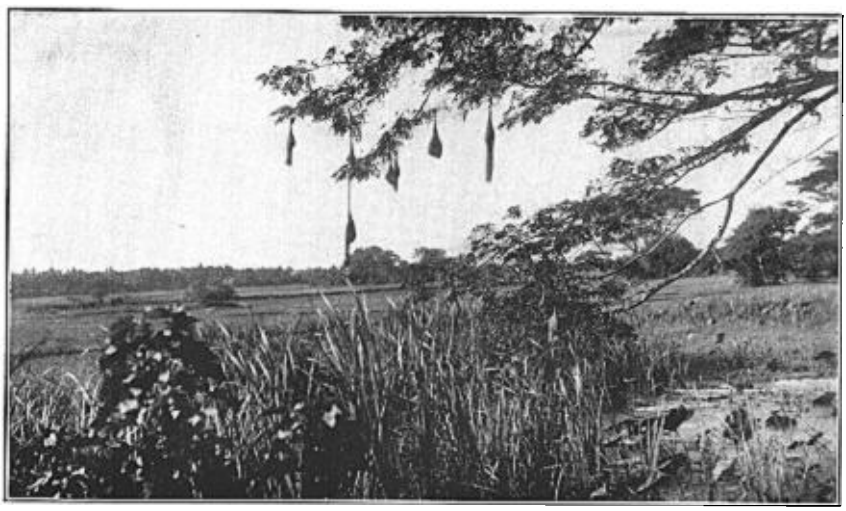
Even after the eggs have been laid and the female has commenced to incubate the male continues to lengthen the entrance tube and to put what he regards as the finishing touches on his house. Often have I seen him diligently pushing fibres into place and pulling them back and forth on the surface of the nest to the accompaniment of a sweet little warble. I have never found a smooth firm margin on the end of any entrance tube; it is always frayed, thin and loosely woven, presenting a decidedly unfinished appearance. This condition is, I think, precautionary; it makes it all the more difficult for an enemy, by gaining a foothold on the threshold to invade the interior.

The length of the cylindrical entrance tube—generally two inches in diameter—varies greatly, as will be seen in the illustrations. Indeed the longest one I ever saw was in the private aviary of Mr. Shore-Bailey of Westbury, England, who has been very successful in breeding these birds in captivity. One of his nests has the entrance tube more than thirty inches long.

The length, strength and thickness of the various external components of the Weaver Bird's nest depend largely upon the building capacity of the male bird. As with male humanity this varies greatly. Long after the female begins to sit he may continue his task of nest building. If he is possessed of the building urge he strengthens the attachment of the structure to the tree above, adding more strands of fibre to and lengthening the rope that is already wound about the branch above. This suspension cord is also increased in sustaining power by short fibres of palm or agave, plaited with strands already in position; and the walls of the nest chambers themselves are consolidated by similar material worked into their thickness. Meantime the tubular entrance is extended and the upper two-thirds of it further strengthened.

When the young birds are first hatched they are probably fed by the parents with food brought in by way of the long tube but in some instances, at least, openings are made by the male bird from the outside directly into the egg chamber and the fledglings are fed through these holes.

One of the most fascinating habits of the Baya is the manner in which he enters and leaves the nest. I have watched the process many times and have always gazed in wonderment. Even the so-called Chimney Swift entering his home may learn something from a bird who, apparently without agitating the shaky structure of his domicile, flies up the narrow chimney-like structure and out again without hesitation. I have seen the male in the midst of a job of repairing the roof suddenly take it into his head to visit his brooding wife. Flying or tumbling down the side of the nest he spread his wings just in time to stop his fall a foot or two below the entrance. Seemingly without effort, he turned in mid-air and shot, like lightning, into the cylinder above him. I do not believe any other bird could have done it. Legge, who has often watched the performance, thinks that the bird closes his



Photos by C. A. Wood

ABOVE.—NATIVE WITH NESTS OF THE CEYLON WEAVER-BIRD
BELOW.—NESTS AND CANOPY PENDANT FROM LIMB OF TREE

wings at the moment of entering the tube and runs up it to the egg chamber. Be that as it may, *Ploceus* is secure in his home, for he is certainly the only animal that can fly, crawl, run, or creep up the smooth, fragile, tube that leads to the interior of his nest.

The completed nest is a firm springy contrivance and so well woven that when thoroughly dried it is used by the natives for filling mattresses.

Sometimes during nest construction the birds bring in small lumps of wet clay which they stick to various parts of the interior of the nest and its walls.

I found these curious deposits in varying quantities in nearly all the nests I examined. One had about a tablespoonful of plastic mud deposited on three different localities, including one small patch in the egg chamber. On the other hand a few had no mud deposits and others had very little.

Just what these clay deposits mean is by no means clear. Certainly none of the numerous explanations is satisfactory to me, and I especially reject the generally accepted theory that the mud is employed to balance the nest in the wind, and to prevent its being blown about while the birds are entering and leaving it; nor can I adopt Layard's guess—that the birds use the clay as a sort of whetstone on which to sharpen their bills. In the first place, half a tablespoon of dried mud plastered midway of a large and long swinging nest can have no influence whatever upon its equilibrium in even a mild breeze. Then again, many nests have no mud in their structure at all. Of course the natives, as usual, have their interpretation of the phenomenon—the bird uses the clay as a candlestick on which are stuck glowworms to lighten the darkness of the nest! Perhaps I may add another and to my mind more plausible theory—the habit is the survival in *Ploceus* of some ancestor who built his nest partly or entirely of clay. The black clay deposits in Baya's nest, then, serve no useful purpose at all. They are merely vestigial remains of a household economy, like the sleeve buttons on one's coat! One is reminded of a somewhat similar example in the habits of birds entirely unrelated to the Weaver. As is well known, certain Swifts—*Collocalia*—(the so-called "edible nest" variety) make their nests

almost entirely of their own mucus. But this genus is in an evolutionary sense flanked on the one hand by genera (*Micropus, Tachornis*) whose nest material is partly mucus and partly other material, and on the other by genera whose nests have little or no mucoid matter in their make-up.

However that may be, our Weaver Bird is a highly intelligent animal, and whether one attributes his remarkable house-building to instinct, to reason, or, as is most probable, to a combination of these faculties, he makes a very attractive captive and an engaging presence in an aviary large enough to afford him plenty of room in which to build and breed. He is, however, impatient of avian relatives, and is very likely to quarrel with other birds placed with him in the same flight.

T. B. Fletcher (Birds of an Indian Garden, 1924) tells us that among the natives of the Punjab a popular rhyme contrasts the helpless monkey with the resourceful house-building Weaver, in that the former cannot protect himself from the weather in spite of his human hands and feet. "This verse is quoted for the benefit of small boys and girls who object to learn, just as the busy bee is held up for infantile admiration of Western lands."

Kandy, Ceylon.