BIRD WATCHING FOR CHILDREN

WONDERS OF BIRD LIFE

Written and Illustrated

By

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...

To

My Grandson

CHIPPIOO.

C O N T E N T S

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I

Who does not like birds? It is a great joy to watch them. They are beautiful and graceful creatures. They always appear so busy, flying here and there, now hopping, now running about, flitting up and down the leafy roadside, chirping, twittering or singing, splashing and preening, taking great care to look neat and clean. We love them for their pretty home-like ways, bright colours, songs and happy twittering notes. The country would lose half its charm without our little feathered friends, and a land where no bird chirps would be a dull and dreary place, indeed.

Just think of all the varieties of plumage, in what lovely patterns this is arranged - on some birds so indescribably delicate. All these patterns, so lovely in itself, are adjusted to their manner of living - tending to make them inconspicuous against the background of their natural environment. It is amazing the way colour harmonizes in an accurate matching in tint, hue, or shade between the bird and the vegetation, stones, or ground. The colour scheme of the plumage is to serve the bird a very useful purpose. It is a sort of camouflage, a "protective colouration". As long as the bird is motionless in its natural haunt, it is invisible. Birds like snipe (chaha) and woodcock (Tutitar), which live in weeds and grasses, or among fallen leaves and sticks, the plumage is blocked, striped and mottled in irregular lines and patches, which resemble the usual background. The game birds - partridges (Teetar) and quails (Bater) who visit riverine and other cultivation,

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have plumage very similar to the ground pattern, being brown with splashes of black. Unless flushed they are almost impossible to see even when closely approached in the fields in which they are taking cover. Small birds - larks (Bhurut) and pipits (sengur) found in fallow land and riverine tracts are helpless against birds of prey (kite, eagle etc.), but they look like clods of earth and escape detection. The black and white patches, the secant lines across the body, the markings of the head in birds serve the same purpose. The "Protective Colouration", however, is not confined to birds dwelling on the ground, but also to those who live on trees. Among green foliage, and with the strong contrast of bright sunlight, gaudy blues and greens, yellows and crimsons, plumes with most violent patches of colour, help to dazzle the eye of victim or enemy. The upper parts reflect the light and appear paler than they are, while the underparts being in shadow show up darkly against the background.

Quite distinct from camouflage is 'Mimicry'. Here the plumage is a disguise, to resemble some other strong or pugnacious species by weaker birds. The best case of 'protective mimicry' is that of Cuckoo resembling a hawk. In Madagascar we find harmless Thrush -like birds mimicking pugnacious shrikes. In the East-Indies weaker Orioles closely resemble in their plumage pattern the friar-birds. The friar birds are honey-eaters, noisy, and possess strong beaks and claws - thus holding their own against birds of prey.

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Birds are not only charming and satisfy our aesthetic sense through their handsome plumage and sweet voices - but they are our friends and helpers too. Without their aid the world would have been desolate; for we should have hardly a leaf upon trees, a flower in gardens; crops in fields, a fruit in orchards, or a green grassy patch. In our fields, forests, gardens, and orchards, there are armies of insects, small and large, working day and night, to devour and destroy every green thing that grows. There are about half a million or so different kinds of insects in the world - over 30,000 forms live in the Indian Region alone - about fifteen times the number of bird species. The total number of birds known inhabiting the earth is about 8,600. In India there are 2,061 different varieties of birds, of which over 350 come to visit us in winter, chiefly from the Palaearctic Region. Birds are our chief allies in fighting insect pests because they depend largely for their food on insects, and clear them off by the thousand thus keeping them in check. This does not mean that insects are always harmful. Even they have their part to play in Nature's kingdom- and, therefore, many of them are useful. But they increase and multiply at such an astonishing rate that their numbers have to be kept down; otherwise the world would become a desert!

No other creatures are so well fitted to capture flying insects as the swallows and the swifts. Swallows are beautiful birds of glossy steel-blue, with chestnut and pinkish white in plumage. Long tapering wings and long forked tail are their identification marks. They spend most of their time on the wing - wheeling, twisting, turning marvellously over

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our heads, twittering softly all the while. They feed on flying insects by sweeping to and fro through the air. They ~~xik~~ skim over the surface of the water to drink without pausing in the flight. They are strong and swift on the wing, but not at all at ease either on the ground or among the boughs of trees, and cannot hop or run in the bird-like way, because they have very small delicate feet. This can only be used to hold slender perch like telegraph or telephone wires, where you will find many swallows sitting in a row to rest.

The swifts, which circle and wheel tirelessly above towns and villages, are of a different order and are not related to the swallows though they resemble swallows in many ways. They can be distinguished from swallows by their very long and narrow scythe-like wings and uniform sooty-brown plumage. These are the most aerial of birds, rarely touching earth, never perching like swallows - since all their four toes point forward, they can only cling to rough surfaces when they go to sleep. They fly at racing speed throughout the day, hawking flies and midges, drinking on the wing, gathering nesting materials on the wing, and even making love while soaring in the air. Their joyous twittering screams float in the air as they go racing about over mosques, buildings, and church towers. The woodpecker is another insect-eating bird, working up stems and boughs of trees, digging out beetles and insects hidden in the crannies. A little bird has been observed to eat over six hundred caterpillars in less than half an hour; and yet another bird of the same size picked about 3,000 plant lice off an infested tree at the same interval. A pair of sparrows flew backwards and forwards over an hour, without a pause, returning on an average,

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twice in every minute, with a beakful of insects for their young ones. If they go on like this from sunrise to sunset, how many insects are killed by birds in a single day?

Kites, Eagles, Hawks and other birds of prey have a bad reputation among farmers and poultry keepers - who accuse them of stealing chickens and game-birds. But they are most useful birds as they destroy field mice, rats, and squirrels that do enormous damage to crops and agricultural produce. Many birds of prey help to preserve the ground birds by killing snakes and other harmful creatures who devour the eggs and young ones. They also check diseases often fatal to man by killing these vermin. Thus they keep an important check upon these destructive pests from which man has always suffered.

The vultures, kites and crows are most efficient scavengers - they keep our roads and villages clean by removing dead and decaying animals and other refuse most speedily. They play most important part during famines or floods when large number of domestic animals perish and lay scattered all round, by removing them quickly in large groups. The speed with which vultures clean the spot is astonishing.

The trees and bushes with colourful fruits and berries hanging in bunches, invite birds to come and eat them. You will think how kind trees and bushes are to the birds! But actually they are seeking help from birds. If all the seeds of fruits fall to the ground underneath the parent-plants and begin to grow, then there would be so many seedlings that they would choke each other, the young plants will get neither sunshine, nor enough air, nor water, nor plenty of space to grow into

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a strong plant; they will get sick and die. So, naturally the parent plants are eager to send the seeds as far as possible where they can germinate rapidly under favourable conditions, later on to grow into a strong plant. The best agent for this is the birds. To tempt hungry birds the parent-plants wrap their seeds in juicy coats of many colours. The bright colours attract the birds who go flocking to eat the fleshy portions, and in the process of pecking at the fruit they scatter the seeds. Those seeds which are swallowed are dispersed more widely, through the waste matter in due course. About some plants, it is said that the seedlings grow stronger, after passing through a bird's intestine. Many small seeds are carried far in the mud adhering to the feet and lower feathers of birds which seek their food in damp places. The Loranthus is tree-parasite - and is entirely propagated by birds like sunbirds and flowerpeckers. The sticky seeds stick to the bird's beak, when the bird takes a bite. They are so sticky that the bird can't get rid of them easily - for that it goes to a tree and rubs its beak on the branches - that is exactly what the seeds wanted the bird to do. The Bulbuls and Barbets are greatly responsible in distribution of seeds of the sandalwood tree in South India. Thus, the seed-eating birds are equally useful to mankind. Without their active help the distribution of plant life would have been impossible in the country.

A large number of birds play part in cross-fertilisation of flowers. Their tongue and bill are specially adapted to extract honey from the base of the flower-tubes. These pollinating agents, in quest of nectar, go from flower to flower -

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and while trying to reach at the base of the nectar, the forehead comes into contact with the anthers, as well as the feathers with the sticky ripe golden pollen dust, and the pollen is carried away by the bird to the next flower visited. The bird not only carries away pollen from the ~~fax~~ flower visited, but also brings to it pollen which had adhered to its feathers during previous visits. In this way the bird smears the stigma with pollen and at the same time carries off a fresh supply for future fertilisations. All of you must have noticed the Simal tree with large ~~thorny~~ showy crimson flowers - well, it is a sign-post to attract birds to come to the flowers. Each flower is plentifully supplied with honey. Scores of birds forgather these - maynas, bulbuls, drongos, parakeets, crows and so on - and what a joyful noisy chatters go on, can be heard at a distance of half a mile or more. Here again, the Simal tree is not only helping the birds, but is helping itself too - as it is mainly cross-pollinated through bird-agency. Experiment has shown that the offspring of cross-fertilization is more vigorous than that of self-fertilized flowers. How useful the birds are - not only helping in cross-fertilization but also helping to increase the general effectiveness of the plant world.

Thousands and thousands of game birds (Quails, partridges etc.), and water fowl (ducks, teals, snipes) are netted or shot, and sold in the market for the table. How much we enjoy eating them, and how much money the traders make each year. And yet we are unkind to our little feathered folk.

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A few species are destructive no doubt, but their numbers are kept down by natural enemies, specially the predatory birds themselves. Still the birds do not do so much harm to us as generally supposed to - they are blamed unjustly. We should not grudge and be cruel to them if they take a share of fruit and grain when hungry, considering the so much useful work they do for us. But man's interference with the bird population has generally been disastrous to the birds, and also largely against human interest too. The sportsman who shoots birds for pleasure, the 'mirshikar' who nets birds for marketing as food, and the trader in pets, in 'singing birds', and in plumes and feathers, have all contributed to the reduction in the numbers of birds. Some pretty birds have become extinct from our country - for example, the mountain Quail - a ground bird of slaty-grey plumage, with black and white bordered head, and legs and bill red. Then the long-legged Jerden's Courser - robed in pinkish brown, sprinkled with black and rufous; the third is the pink-headed duck. All three are no more met with - they have disappeared.

All of us should make it our business to protect our feathered friends - they should not be killed cruelly, their precious eggs not stolen, and their homes - the habitats preserved. The man who makes his living shooting birds, will make more, live longer, and die happier tilling the soil than by killing God's creatures.

II

There are a lot of amazing and interesting things about birds that most people do not realize. If you observe them closely you will find their land is one of mystery and wonder. The birds that you see constantly flitting from one tree to another are engaged in work, just like human beings. They court and love their mates, make various types of homes, know various ways of house-keeping, rear up their children with great care, change their dress; even their food habits have a similarity to those of a human being, and they have a language of their own. In their land there are many craftsmen too. There are tailors - the tailor bird, who collects thread of some fine fibres, cobweb, silk from cocoons and takes two or more leaves and sews together with the sharp, slender beak, by pushing the one end of the thread through a hole on one edge, the other end through a hole on the opposite edge of the leaf. The thread is pulled tight and then fastened; the sewing is done quickly with uncanny skill. When complete, the nest is, indeed, a wonderful piece of work. Those of you who have read Rudyard Kipling's "Jungle Book", must be familiar with the story of "Durzee", the tailor bird'. In this story the author makes the bird say, "Tailor and Singer am!" Tailor he certainly is, but singer - No. He has only loud cheerful call - 'Towit - towit - towit', uttered constantly as the bird hops about the bushes and creepers. He is a weedy, greenish, slim and bird with a rufous cap, and a long tail which he constantly cocks at a sharp angle to his body.

Woodcutters - the woodpecker. For his living he has to hammer at the tree trunk, as all kinds of wood-boring beetles

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and other insects live in the cracks and crannies of the bark, and many fat grubs have tunneled in the living wood of the tree, it is woodpeckers' job to hunt out and destroy these troublesome creatures that do so much harm to our forests and orchards. To do his job properly, he clings with his strong hooked claws to the rough bark of the tree, pressing the stiff tail feathers firmly to have extra support, swinging his head backward and forward, using his stout bill as a pick-axe he taps, tap-tap-tap, which echoes through the wooded country, and at the same time sends a shower of chips flying in all directions. His bill is a first-class carpenter's tool, wedge-shaped, with a sharp cutting edge. It is used as an axe to splinter the bark to take out the hidden insects, or as a chisel to chip out holes in decaying trees to make nurseries for the babies. The most interesting point in the anatomy of this bird, however, is the tongue. It is very long, rounded, sticky or fitted with a horny tip armed with sharp barbs. The tongue darts in and out of the bill quick as a flash, scooping and dislodging grubs and eggs out from their burrows in wood or bark. The other qually interesting point is that while running up a tree, the woodpecker often stops suddenly, claps his ear close to the trunk, probably to listen the sound of larvae at work driving tunnels in the Wood! The most common and extremely handsome is the Golden-backed Woodpecker - clad in black and golden yellow, with a bright crimson crest.

Fishermen - the kingfisher : You will meet this bird on the banks of Wooded lakes, or quiet shady pools, or by the side of a murmuring stream, perched on an exposed bough overhanging the water or on an old tree stump, gazing unwinkingly on the water below.

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The moment a silvery fish comes swimming by the fisherman of bird land suddenly drops from his perch and disappears below the surface and emerges with a fish held crossed-wise in his long, straight bill which works as spear for killing fish. His main occupation is fishing, which he does with great dexterity - and he is always associated with rivers, and he faithfully flies above the water, following the river's every curve, as if in love with his own reflection. He is a quarrelsome bird and jealous of intruders who should happen to interfere with his fishing rights. The well-known is the common Kingfisher - a most brilliant bird. His upper parts, from the crown to the head, to the tip of the short tail, are turquoise blue and green; from the bill below the eye, cutting the green, is a rufous streak, giving way to white below the ear - coverts. Breast and underparts are rufous; the small feet are pink. Now you can imagine how beautiful the bird must be to look at. If he is really in love with his reflection, we can't blame him!

Scavenger - the vulture . In appearance he is certainly not attractive. His large heavy body, untidy ruffled feathers, bald head and bare scraggy neck can't be a pretty sight. But on the wing he is unrivalled in the perfection of flight, With hardly a wing beat he soars and wheels high up in the air for hours, watching the world below. He with his groups, patrols the streets, villages and burning ghats, clearing away all refuse from garbage piles and dumps, removing dead animal and bad decaying stuff left lying on the ground or even the floating corpses; thus keeping the air pure; without this bird, people in our country would not be able to exist. See how exceedingly useful this ugly looking bird is!

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Thieves - the crow : There is an old saying that 'familiarity breeds contempt'. With regard to the crow, this is certainly true, for, it is the most familiar of all our birds, from the large towns, railway stations right out into the heart of the country. His soft glossy black plumage of purple and green reflections, grey neck, and black cap, dark intelligent eyes, all tend to make it a beautiful bird. Though common he is not liked due to his nasty thieving habits. He feels delighted to steal from man, dog or other animal or even from his own kind. Grain, for sale in a shop or in the field or in bags in trucks or in railway wagons, is a great attraction for him. He is a notorious robber of nests - eggs and young birds are his main target - but who knows, he might be acting as a check to control the increase of certain birds - thus maintaining the balance of Nature. He has his good points too - he is intelligent and clever. Cleverness and intelligence outweigh his thievish propensities. The power of co-operation is highly developed among crows. You will get a great pleasure by watching his wily ways.

Policeman - the drongo : is a neat compact bird, in black glossy uniform with deeply forked tail. He visits every type of country and sits on an exposed perch, whether it is be a telegraph wire, stakes, upright twig, or animal back, for he has a great partiality for perching on the backs of cattle. He is a somewhat solitary bird, and does not fraternize much with other species, and jealously guards the post of vantage he regards as his own. From the look-out posts he surveys the countryside, and will not hesitate to attack a bird much larger than himself, when need arises. Timid birds like Orioles take advantage of the policeman's courage, and build their nests in the same tree as the drongos have.

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He protects the oriole's nest as well as his own. He not only guards the tree on which his own nest is situated, but exercises jurisdiction over all the trees in the neighbourhood. He is particularly hard on that egg-robber, the crow. But often he will deprive inoffensive birds of their food - watching from a perch, he will swoop down and snatch away the juicy morsel which myna or a hoopoe has just found - typical character of a policeman! But he is careful, however, not to levy such a heavy toll as to drive the birds away from the locality. He is the earliest bird to rise - as soon as the faintest glimmer of dawn breaks through the eastern sky, the sweet, far-reaching whistle of the drongo is sure to be heard heralding the morn.

Night Watchman - the Owl : After sleeping away the day-light hours, he opens his eyes as soon as the sun has gone down, and the kites and eagles went to retire. As the twilight deepens, he leaves his cosy corner and sits on a bough peering into the growing darkness, turning his big head from side to side. Then he opens his wings and goes about on his nightly round, skimming low down across the fields, barns and hedge-rows with noiseless flight, pouncing suddenly on mice, rats, or shrews who dare to steal grains. All night long he keeps a careful vigil over the countryside, as you lie snuggling in your bed. His hooked beak and strong curved talons help him in killing his victims.

Hunters - kites, eagles and hawks, are the fierce hunters of the day time. They live by killing the weaker folk of the animal world - also kill great quantities of field mice and squirrels that do enormous harm to the farmer's crops; they hunt on numberless harmful insects too. These hunters help to preserve the game birds by killing snakes and other creatures who devour

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eggs and young ones of ground birds. They are strong-clothed in firmx closely-fitting plumage. The flight is strong and swift. Sharp, hooked beaks and powerful talons help them to grasp and tear their yictim with ease.

Singer - Dhayal : This black and white bird is one of the most important singers. In cold weather he makes a low whistle but in the spring, sitting on the topmost twigs of a leafless tree or on a gatepost he pours out a fine range of melody floating in the morning air. On the exposed perched position he is a striking figure specially when the melody is punctured by a constant spreading and upward jerks of his white and black tail.

Idlers - Koel : is the harbinger of spring, who warns you to prepare for the long hot summer. The repeated 'kuhu--kuhu' of this bird must be a familiar call to you all. He never builds his own home - the eggs are laid in the nest of the crows. The crows hate the koel; this is well-known. The male koel is such a cunning fellow - he taunts the crows with bitter gibes and jests until the crows in desperation give chase to the enemy who flies off chuckling 'Catch me if you can'! The female who is not attired like her lord in glossy black, but is brown speckled with white, always keeps herself in the background; the moment her husband incites the crows to give him a chase, she slips in the nest when the path is clear and drops her egg in along with the crow's, and in doing so ridding herself of all maternal duties. The crows, in spite of being clever, never find out the trick - they hatch koel's eggs and rear the young ones as their own. When they grow up, they, of course, belong to the koel family!

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Dancers - Fair-tail fly catcher : She loves to dance in open country, groves, and gardens. There she flits from bough to bough with short, jerky flights. Hopping about among the boughs, or even on the ground - she suddenly stops - down drops her wings - up jerks her head and turning from side to side with mincing steps, she begins dancing - constantly opening and closing the rounded fan of the tail, flirting it from side to side, using it almost exactly as a lady uses her fan. A pretty little tinkling song is repeated at intervals. When some juicy insect attracts her attention, she interrupts her dancing and goes rolling and tumbling with the same grace as she dances. She is really a very dainty little creature altogether.

Weavers - Baya (weaver-bird) : This bird is about the size of a sparrow and very much the same shape. The male, in summer, is brown, with a yellow cap. The nest is just as neat a piece of bird architecture as that of the tailor bird. The nests are made of grass or palm-fibre, very strongly woven together and are in shape like a bulb suspended above by a short cord, and ending below in a long tube. Inside the nest, runs a partition which divides the spout from the chamber in which eggs are laid. The end of the spout is always left frayed out and untidy - do you know why? So that enemy may not get firm foothold. The birds do not try to hide the nests - as they always build in company, and the nests of all shapes and sizes are hung at the tips of branches or palm-~~groves~~ fronds, usually over water.

Butchers - Shrikes : they are sober coloured birds, having black, grey, rufous and white in their plumage. They are at once recognised as 'shrike' or butcher, by having a broad

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black streak running from the base of the bill through the eyes. The bird has a strange habit of impaling his prey on thorns - and keeps a regular larder well-stocked with surplus food impaled on thorns, and has in this way earned for himself the popular name of Butcher. He lives upon beetles and other winged insects, but does not hesitate to kill lizards and mice and pull them to pieces with his strong, hooked bill.

Travellers - Duck : All kinds of ducks of different shapes, sizes and colours come flocking in winter to our country from Europe, Africa, Ladakh, Tibet and so on. Flock after flock can be spotted on the marshes, jheels and on our large rivers. One of the commonest and beautiful travellers is the Brahminy duck - orange brown, with white, black and green on the wings.

Birds are the most perfect streamlined creatures in the world. Men who design aeroplanes have been studying the shape and flow of lines of a bird. But they have yet a long way to go producing a flying machine as efficient as the birds. And, of course, man will never be able to invent a covering - like bird's feathers, for his aeroplanes! There is nothing which combines such lightness and flexibility with strength. It is these wonderful feathers which make possible for such a heavy bird as swan to fly thousands of miles on migrating.

Each species has its special place or 'habitat'. Experience bird-watchers can look at a forest land, a meadow, a jheel, a swamp or field, and can predict almost exactly what he will find there. Birds also have geographic limits, beyond which they are not found. The 'ranges' of some birds are almost world-wide.

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Many birds range from coast to coast, while some are confined to a single State. It helps a great deal to know the seasons in which to expect certain birds.

Birds living in colder climate will be bigger than those living in a warmer climate. Size of birds - an important distinguishing feature - will vary according to latitude and altitude. From the Himalayas to Cape Comorin in a species birds will progressively become smaller. In the Himalayas and on other mountains, birds will be bigger in the codler upper regions and smaller in the foothills.

The other important feature is the colouration - will be deeper and darker in warm and humid areas and pale in cold dry areas - that is, birds in a species will be darker and deeper in the warm humid areas of Eastern and Southern India than in the dry cold areas of Northern and Western India.

After climate, the most important factor controlling the bird life is vegetation which in itself depends on latitude, temperature, rainfall and topography. To trace changes in bird life ~~life~~ according to changes in vegetation types will require space that cannot be given in this book. So we will limit it to three broad types :- forests; villages, orchards and parks; and cultivation.

Our forests are full of showy birds such as the large pied horn-bills - heavily built black and white arboreal bird, with a waxy yellow horn-shaped bill surmounted by a casque; then orioles dipped in gold, minivets ~~minarets~~ in scarlet black and yellow; Paradise flycatcher in silvery white coat and white tain hanging in streamers. Then little sunbirds - brilliantly coloured in purple, green, crimson, yellow. Chloropsis - in grass green and our

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National bird, the peacock, and so on.

Villages, orchards and parks are frequented by our familiar birds. You are sure to meet the sparrow in white brow and black bib. He likes to be near us because he knows he will find plenty of food there. Then there are numerous snuff-brown mynas, walking about half stooping and half stalking; then there are more active black and white birds - that is pied-mynas. Here you will find the singer - Dhayal (Magpie robin), flitting, and black and yellow tit swooping round trees.

Cultivation imposes a grass land vegetation by keeping out trees. So here you will find more ground birds (terrestrial) than tree birds(arboreal). Inconspicuously, buff and brown coloured pipits, larks and chats are numerous in cultivated fields.

But there are many more friendly little ones who actually seem to like our company and make themselves at home in our gardens and houses. They even come and build their nurseries in the verandah. You can watch them building their nests and feeding their young ones, but you must take care to keep still and not go too near them. If they feel disturbed they will desert the nest and fly off and start another at some safer place, where you won't be able to see them. You may take a peep at the babies when they are hatched and when their parents have gone to bring food for them. Never, never try to take one from the nest, baby birds are delicate little things and they can be injured easily. If you observe these few simple rules, your feathered friends will feel safe and free in your garden and will stay with you.

If you want to invite these birds to live near you, you have to fix up some nesting boxes, water to drink, and food tables. But of that, I shall tell you later.

Some birds like to live near meadows, marshes, edges of lakes, streams or rivers. The study of the water birds is much more difficult than that of the land birds. Many of them are large; some are very rare; all are usually shy and have keen eye sight - trained to see at a distance - in fact, many of them have to depend upon their vigilance for their very existence. Water birds should be studied from long range. Or, if you are careful, you can try to sneak up directly towards them, and you may be quite near them. It is this pitting your wits against the cunning of the birds that furnishes one-half of the interest in bird-watching. But water birds can be best observed from a small 'blind' near the water-edge.

III

Birds make a great impression not only upon the eye but also upon the ear. The soul of a bird is highly emotional, truly that of an aesthetic. An elaborate system of symbols has been built up, and compared to the limited range of experience of a bird, these symbols are as adequate as language is to humans. There is the ordinary call-note which serves as recognition between members of a species, for keeping the party or flock together. There is the alarm note - an expression of fear and a warning to keep their distance. And finally there is the love-note -- an important feature in courtship. They also sing from rivalry, and defiance, a great deal, and with such vehemence that they have been known to drop dead whilst engaged through rupturing some blood-vessel. Then there are harsh battle cries.

Some birds are of silent habit; others are noisy and seem to know a large variety of different notes. Some are good talkers like Hill Myna and parakeet - while some are accomplished songsters - and singing competitions are held amongst some of them. An interesting thing about song is that only birds and men have the power of stirring the emotions of their mind by means of its exercise. Many birds, apart from their own notes, mimic other birds of the neighbourhood. The drongos, starlings and the sedge-warblers are highly skilled imitators. Screams, grunts, wild cries, hootings, moanings and whistling are familiar notes of bird land. The stork makes a clattering noise with his mandibles; wood-peckers make a drumming noise by a rapid hammering of their bills against a tree. Other birds make a whirring or whistling note as they fly. The snipes make a loud bleating note in the air.

Without the power of producing varied and far-reaching messages, the birds would not have been able to maintain with efficiency their code of society. While travelling rapidly through the air, they keep in touch with their call-notes; otherwise, they could easily get separated. So there is very close inter-relationship between song and flight too.

The young birds have a baby language of their own, which is not used after they grow up! In this language they make known their wants, fears, and whereabouts to their parents. How young ones learn the songs and call-notes of their own species when they grow up? Well, the experiments have proved that some inherit them from their parents; others learn by imitating them.

I find children unanimously in the belief that birds sing with their bills. And in olden days bird fanciers used to split the tongues of some unfortunate birds to make them talk all the better! They were under the firm conviction that no bird could sing or talk unless its tongue divided. But bird notes are produced deep down the windpipe, at a point where it branches off into bronchial tubes, which conveys air to and from the lungs. A delicate little membrane is fixed at this point which produces the note of every bird. The variation in the size and skill of its possessor accounts for the wonderful differences in the sounds. It is difficult to believe that the hoarse caw of the crow, shrill whistle of the sandpiper, the rasping skirl of the partridge, and the liquid song of the thrush - are produced by the same kind of instrument. If you carefully notice a bird singing, you will find the neck is worked up and down, in order to give its different notes the proper pitch - and the throat feathers quivering as the air vibrations take place.

The loudest and best voices and songs are during the spring and early summer. The best time to hear Nature's choir is early in the morning, and again late in the afternoon. At about four o' clock on a fine still morning during the first week of April, when the air is cool and gentle, each bush and tree appears to possess its winged vocalist - pouring forth such an ever-lasting flood of music that the very air around seems to palpitate with joy. Take my advice, children, and go out to hear the birds sing their first morning hymn - it is the freshest of all the day! I have known many such grand mornings, and the glad remembrance of them is a priceless possession with me. It seems to be a rule of thumb that sombrely coloured birds are finest songsters, and are small in size, with a few exceptions, of course - thus lacking the showy plumage they advertise themselves vocally. Many brown, streaky birds of the fields climb into the sky to pour out their song, whereas brightly coloured birds use their gay patterns to attract attention.

The keenest bird-watchers depend more on their ears than on eyes, and about ninety per cent of their birds are found that way. On their walks they pause every few minute and listen intently the notes of a hidden bird. To identify birds by their call, you will have to go with someone who can tell you what they are.

IV

In breeding season territory is occupied, mates are wooed, rivals are fought, pairing takes place, and then duties of nesting and parenthood start.

In the spring time, when everything is filled with awakening life, the male members of many species drop the dull portions of their garments and don the gay and decorative plumes of the marriage season. At this time of the year, peculiar fineries are thrust into prominence - known as 'nuptial' plumage - like crests, wattles, frills, collars, elongated neck-plumes, tippets, trains, spurs, highly coloured patches of bare skin - and brightly hued bills, feet and legs. Even where there is no distinctive marriage dress, and no special ornamental plumage, the Birds are at least in their best feather at this time of the year. Even where there is no true song there is usually some special call associated with the season. In many species the females are without any ornamentation and their dress is somber and dissimilar in shade and pattern to that of their mate. In other species the female is decorated but to a lesser degree; while there are yet many more in which the sexes are alike. Some are conspicuous in their strongly contrasted shades, others are easily overlooked in having grey and brown costumes, merging closely in the surroundings. But it is always the males that gorgeously attire rather than the females. In most species, the male stakes his claim to a territory and has to court a female to become a partner and build a nest within it. So naturally he needs impressive clothes. On the other hand, the female sits on the nest and is exposed to predatory attacks. She has, therefore, the unprepossessing

clothes of the housewife. This medieval fashion (the wigs, whiskers, and colourful uniforms of the males of the medieval courts) does not apply to the Amazonian species - like button-quails, bustard quails and phalaropes (winter visitor). They have highly coloured females and dull-coloured males. The roles of males and females are reversed; the female marks out the territory, intimidates the other females, and courts the male. When the female has laid the eggs, it is the male who has to sit on them - and the whole care of the eggs and young ones devolves upon him - while his aggressive wife roams about!

During the courtship, the male shows off his good points before the female, in many ways to impress the would-be mate with the belief that he is the strongest, handsomest, and most desirable of all the competing males!

How many of you have carefully watched the familiar House Sparrow making love? Dressed smartly, with tail erect and fanned, throat distended, wings drooped to show the ashy patch of the rump, he bounces about in an airy fashion, now advancing, now retreating, taking playfully the 'blows', snubs and peckings of his expectant wife, before winning his way. His dancing antics, and clashes with his rival suitor, are most entertaining.

Have you ever seen the peacock - our National Bird, courting the female? It is a wonderful sight. He first majestically approaches the females. And in the same manner erects the fan of his immensely elongated and gorgeous tail coverts. What a beauty silky fringes, powdered with glittering gold dust, and near the tip of every plume, a beautiful spot of changing colours sparkling like a living 'eye'! The fan rises like a grand screen from the middle of his back; then the screen is pushed forward and the wings go

behind. He prances back and shows first the back of his screen - a huge shield of dull single tone. Suddenly, he turns around and confronts the females with all the glory of his brilliantly multihued screen. As he shakes the gorgeous train rapidly - all the eyes in the coverts laugh and sparkle - changing the colour from green to blue, from blue to bronze, from bronze to gold and from gold back to green again. In this attitude he displays his deep blue throat and breast as well, and in homage to his expectant partner, his head is bowed, adorned with delicate plumes.

Courtship performances differ greatly between one species and another. Some do aerial performances of acrobatic nature; in some, the wings are raised right above the back, and the tips of the wings begin to tremble - in this way the gleaming white undersides of the wings are effectively displayed; and the head bowed until the bill touches the ground. Those who have colourful legs, rise into the air and descend towards a female with legs dangling to attract attention. Some puff out their bright feathers and hover over the female. Many more birds that are in sober colour - have wing bars, spots, markings and patches to show off during display. Thus, the methods of display and attitudes assumed by the males during courtship are co-related with certain well-defined feathers or prominent physical features, as crests, long sweeping tail etc. These are a great many interesting and beautiful displays for the students to watch and record.

Display performances are not only meant to attract and captivate the female. There are various types of bird display: threat, while staking out territory; combat between rival males; pre-nuptial, nuptial, before nest building, and post-connubial display.

A bird does not build its nest anywhere. The site is chosen, and the territory nearabout is apportioned between rival claimants after much ceremonial display and symbolic fights. As a matter of fact, at first the colours and songs are used as a challenge and warning to rivals than to attract females. And it is the ground and the food it contains that is of primary importance; the hen comes next. An adequate feeding ground just round the nest becomes even more important for those birds who have to feed large broods of young in the nest for weeks.

Keeping this in mind the cock-bird starts with a plot of three or four acres with a number of favourite singing positions - may be a bush-top, branch or a gatepost - as territory usually centres round some focal point. Here the cock returns again and again to sing his challenging song. After a good deal of fighting and squabbling among rival birds of a feather, when he finally settles down the plot of land comes down to half of its size, as neighbouring males put down pressure on him - and the boundaries of the territories marked out. Once their disputes are settled down, and each cock-bird is now a property owner, a more peaceful state of affairs prevails. From the focal points, the cock birds play "king of the castle" as each loudly announces "keep off - this is my property".

Now the song and posture change into an advertisement of his being in possession of a territory - and that he is still single; the female recognises the singer as a bird of her own species and of the opposite sex. They get married and the focal point now serves as a rendezvous for the pair too.

V

There is a fierce struggle for existence constantly going on amongst wild birds, and the breeding season is the fullest of danger both to the brooding parents and to the contents of their nests. The eggs are a tasty and nutritious prey for many kinds of animals. Some lizards and snakes are eaters of eggs. Rats are clever and persistent thieves of eggs, specially of those that are to be found on the ground or in holes. Squirrels have a still greater range of destructiveness as they hunt on the ground as well as on the trees. Monkeys, and man himself, are still more crafty and diligent in seeking out nests. We have already seen that feathered thieves are by no means unknown. In almost every family there are some which will prey on the eggs and young of other birds. Crows, treepies, gulls and moorhens are notorious robbers. So it is natural for each species to make such a nest as will best suit its habits and ensure the greatest amount of safety to its eggs and helpless chicks.

The brood care actually begins with the selection of a suitable place for deposition of the eggs. For that various types of nests are built and cunningly placed. Some birds are content with very little preparation for the eggs, whilst in others the most elaborately constructed nests are prepared. Roughly they can be divided into six separate types:-

(1) <u>Open-topped nests</u> are sufficiently deep and cup-shaped to prevent the eggs or young from falling out. In many cases the materials are woven with great skill to produce a cup-shaped structure. A lining is often added of soft materials such as fibres, hair, wool and even soft feathers. Often open-topped nests belong to birds capable of defending their contents either in colonies or in pairs.

Crow, cormorant, stork, kite, vulture and dove and many more build this type of nests. As a rule, the nests are well hidden in evergreens, thick bushes and hedgerows.

(2) Covered nests are completely covered over by a domed roof, an enclosed chamber being thus formed with only a small opening left in one side. The chamber is often lined with a vast number of small feathers or hair collected by the builders.

(3) Nests in excavated tunnels : The diggers of tunnels and pits are the kingfisher, Bee-eater and the Sand Martin. They excavate the tunnels by cutting the earth of the river banks or tanks, with their bill. The tunnels are generally the deepest in the centre, just as if they had been made by a sharpened stick thrust i the bank. They vary in depth from ten to twelve inches to three to four feet. The size of the chamber and the quantity of nesting materials used also vary.

(4) Nests in natural holes : Builders in holes in trees, rocks, walls are the Wood-pecker, owl, nuthatch, parakeet, some mynas and kHornbill. They dig out holes in wood, or sand, or occupy holes already made. Hornbill makes very interesting nest in natural hole. When the hen hornbill begins to sit on her eggs in a hole in a tree, she is walled up by her mate; there she remains a prisoner until the chicks are fledged and ready to go out into the world. During all this period the male works hard to feed her from a small opening left for that purpose.

(5) Nests covered over by birds when leaving : The nests of Grebe, waterhen, duck, partridge and pheasant are all open-topped, but the parent birds, when leavigg them, take the wise precaution of carefully covering over the eggs. They do not make conspicuous-looking homes. The nests of Grebe are mere rafts of rotting water-

weeds and reed stems, and they look more like accidental collections of dead vegetation than nests. The waterhens hide their homes by bending down reeds, so as to prevent the eggs from being seen from above. The ducks and pheasants have been provided with an exceedingly interesting provision of Nature for their preservation. The male birds wear gaily-coloured showy dresses and are not allowed to take part in the important duties of incubation, as their brilliant plumage would only serve to advertise the whereabouts of their nests and eggs. On the other hand, their female companions are clad in sober brown plumage of varying shades, wonderfully arranged to look like a part of their natural surroundings. The hen pheasant, sitting on the nest, resembles sunlight and shadow, and her presence is often only revealed by her eye!

(6) Nests that are no nests at all : Terns, plovers, lapwings, ~~stork~~ stone-curlews, and others make no nest at all in the true sense. They breed upon the ground and their eggs resemble their surroundings very closely, and are difficult to find. Some plovers collect tiny shells and pebbles and place them at the bottom of a shallow crevice of a rocky shore, and lay their eggs upon the top of them. Some terns carry plenty of pebbles on to the grass above tide reach, and making a miniature of beach of their own, lay eggs upon it.

When the female is busy with her nest-building, the owner of the territory is kept busy chasing away every other male who dares to trespass on his property. When he is free from his police duties, he will often fly off and bring in some building materials. But his wife does not care much for his help - she is rather fussy about the material. So the partner of her choice,

for most of the part, keeps himself busy by keeping a watchful eye upon his home - or sings his best to cheer his busy mate.

When the nests are ready, the females place the eggs in them. Often it is the mother bird alone who sits on the eggs to keep them warm, but the devoted father is ever eager to help her in every way he can. Sometimes he takes turn and sits on the eggs, while she hops off to feed and stretch herself.

The eggs differ remarkably in shape, size and colour - and play a wonderful part in safety as well as in the future well-being of the chicks they contain. Not all eggs are egg-shaped. Some are almost spherical, some are elongated ovoids, with one end larger than the other, some eggs are pear-shaped.

Birds who lay eggs in a hole in a tree, rock, old ruin or some other similar places where the eggs have no chance of rolling about - have spherical, round-shaped eggs. Lapwings and other birds belonging to its family have pear-shaped eggs, placed in a circle with the pointed ends inwards, occupying the minimum of space, and are carefully covered by the sitting bird. And those of the swift have a narrow oval shape. A few birds who lay a large single egg on the top of flat rock or of an ocean cliff, has much elongated egg so that when stirred by a strong wind or by the parent bird suddenly leaving it, instead of rolling off like a marble, spins round on its own axis like a top!

The number of eggs laid by different species varies very much in accordance with the food supply procurable for the chicks, their defensive capacity, and habits. Some birds lay single egg; some two; same four, some smaller arboreal birds lay not more than four or five eggs. But the great majority of birds do not lay a fixed number of eggs. Eagles vary from one to four but

generally have two; ducks five or six to from eight to sixteen; partridges ten to eighteen or twenty - but normal clutch is of six to eight eggs; tits four to six, but upto a dozen have been found in a nest. Generally, the ground birds who fly poorly and are exposed to the dangers, lay upto twenty eggs. The ostrich (shutar murgi) is the extreme case - who lays about thirty eggs.

Most birds breed only once a year, but if the first brood be destroyed, they may lay a second time. Some rear two every year. The size of eggs varies from the pea like to that of ostrich, which weighs probably two lb!

The colour and markings of the egg shells are equally interesting, and play a very important part in their preservation. Woodpeckers, kingfishers, swifts, parakeets, owls and bee-eaters who lay eggs in holes or in covered nests, have pure white eggs, where the protective colouration is not needed, and there is a positive advantage to parent birds to see the white in the darkness of the holes! Many eggs are buff, green, blue, brown, purple or prim-rose. Some are of uniform colour or the ground may carry streaks, blotches, spots or irregular lines of different shades. Green or blue eggs are commonly laid by birds which have open nests among green foliage. Eggs laid near or on the ground are often brownish, like the soil, heavily blocked, speckled, spotted or lined - almost invisible against the broken earth of the ploughed fields. Again eggs which are found among the pebbles of the sea-shore, are from buffish stone to greenish grey with scrawls and spots of dark brown and purple markings - resembling the surroundings in an extra-ordinary fashion!

The surface of most eggs is smooth or even glossy. Some have highly burnished appearance; others are rough and chalky in texture.

When the eggs have been laid, the parent birds sharing equally or un-equally the domestic duties, keeping the eggs warm. But merely sitting on eggs does not ensure enough heat even, though the birds being more hot-blooded than the mammals. So the clever brooding bird parts off some abdominal feathers, and there may be one to four such bare patches - which is called 'brood-spots'. The sitting bird ~~body~~ shakes its body so that the bare patches come into contact comfortably with the eggs. Thus the eggs are kept warm at the temperatures needed for the whole period of incubation. The cooling for a short time, when the bird leaves the nest for food, does no harm. Incubation may take as little as eleven days in some small birds, and as long as eighty days in larger birds. That is, when the eggs are small, containing little ~~with~~ food-yolk, the young are hatched in an imperfect condition - the period of incubation is short in this case; and where the eggs are larger containing more food-yolk, the young are hatched in a more advanced condition - the period is longer. Most birds start incubation when the full clutch is complete, to give an equal start in life to all the young ones. Others like owl, hawk, herons and many other large birds start incubating from the day first egg is laid. In this case the young are hatched at intervals.

What a wealth of love and care is lavished by the parent-birds when the strange looking objects come out from the egg-shell. Almost every thought and action is for the welfare of their offspring. They work hardest to provide food to a nest full of hungry mouths. Soft-billed insect-eater birds, and the hard-billed seed-eaters, work from dawn to dusk searching for grubs, caterpillars, worms etc. for the babies. Many young are fed on food which parent-birds have partly digested and thrown up. Parakeets also first digest

the vegetable matter and then supply it to young. Storks break up frogs, worms etc., mix them with partly digested matter and throw on the edge of the nest for their young. The young pigeons thrust their bills into the mouth of the mother to take the 'pigeon's milk', which is partly digested food and partly a secretion from the crop. There is a bird called petrel - who secretes a kind of oil from the fish and discharges it by its bill into the mouth of the young. The osprey seizes a large fish in its talons, standing on the edge of its eyrie, tears pieces off and drops them into the widely-opened mouth of its chicks. Whatever method be adopted, the feeding of the young is a very tiring job indeed and goes on till they are big enough to help themselves.

The young of different species vary when they emerge from the shell. In the case of 'nest dwelling' or nidicolous, young such as sparrow, lark, thrush and similar birds, have their eyes closed when born, and are helpless. Without or very little down upon their bodies, they have only enough sense to open their mouths wide in appeal for food. Such young have to stay in their nests longer - from a week to a fortnight or even more until well grown. Here the parental care and protection are even greater. They take great care with the sanitation of the nest or of the breeding-hole. At first they themselves carry away the droppings of the young birds far away, later as they grow, the nestings are encouraged and trained to void their excretions over the edge of the nest. The 'nest-quitting' or nidifugous young - ducklings, chicken, baby plovers curlews and game birds, emerge from the eggs open-eyed, with a thick coat of soft down on their bodies. They possess an instinctive knowledge of the world and its ways - they moment they have seen the first-light of day. They are active, alert and leave the nest

directly they are hatched, and pick up their own food, run and swim! The 'nest quitting' young, as a rule are protectively coloured and in the presence of danger they lie close and motionless, and thus escape discovery. You must have noticed the chicken and duckling crouching flat if a kite happens to pass over head. Such is the way of Nature! The young birds of prey (kite, eagles etc.) have a curious habit of defending themselves by turning over on their backs and striking upwards with their powerful feet.

The action of parent birds differs widely when danger threatens their helpless children. In the case of those newly hatched young who are active and are able to feed themselves, one or both parents guard them. They exchange warning notes when danger comes near - and the young hasten to take shelter under the wings of their mother - this is so common amongst the domestic fowl. Or squat down. The squatting instinct is very strong in young plovers exposed on shingle beaches without cover or in game-birds on the sparse vegetation. At the warning cry from the mother bird or at the passing shadow, which may mean the swoop of a bird of prey, these chicks flatten themselves against the ground and remain still till the danger is out. The parent partridge decoys an intruder away from the presence of their offspring by feigning injury of broken limb or to be lame, and thus diverting attention of the enemy to herself. The intruder goes after in the almost certain hope of catching the wounded bird, which flops and tumbles along a yard or two in front of him. As soon as he has been enticed away a safe distance from the young - up she jumps, and mounting the air she flies off laughing at her disappointed dupe! Some defend their young by attacking their enemies in the most courageous manner.

They boldly attack an intruder and give a stinging blow upon the crown of his head. The size of a bird counts for very little in a passage of arms, specially in mid-air; for I have watched bulBul driving kite away from the neighbourhood of her children, by rushing up beneath, behind and on the back, pecking vigorously at him. The kite simply tore off for his life. Even I have received a stinging blow on the top of my head by the Indian Roller. I felt as if I had been struck by a smartly hurled pebble! In spite of all this watchful care and vigilance of parents - thousands and thousands of promising young members of the feathered world perish every year.

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VI

One of the greatest mysteries and adventures of bird life is migration or travelling. Migration covers the annual movement of birds from their breeding haunts in the northern regions of Asia, Europe and America to the warmer lands lying south during autumn and early winter, and the return journey back again during spring and early summer. During this period the bird population keeps on changing every few days with the constant coming and going of flocks of feathered travellers. Our winter friends come to spend their Christmas holidays with us after covering long distances through the air to reach their own particular place. When the nights grow warm, back they all flock to their breeding grounds. So forward and backward these travellers pass over the country twice in the year - autumn and spring. They are wonderful and punctual too - unless they are delayed by bad weather. We may calculate almost to a day when we may expect our bird friends to return from their summer holidays. How eagerly we watch for them and welcome the first visitor, carrying the winter on its back. Not only the birds are punctual but they are faithful souls as well. Many return year after year to their old haunts.

Another type is local migration. Some species move out of an area into another, not very far away. All birds have a certain amount of local movement, caused by the stresses of living and the variations in food supply. So local migration means a complete disappearance of a species from a particular area, and its simultaneous presence in another area, from where it had been absent formerly. This kind of movement is particularly noticeable in Northern India where the seasons are well marked and well defined. Allied to it is vertical movement, in which birds that spend the

summer in the higher reaches of mountains come down during the winter to the lower foothills or even the plains. This type is very common within India where the mighty Himalayas lie next door to the Indo-Gangetic plain. A number of birds which breed during summer at altitudes exceeding 10,000 feet become common all over the plains. In such cases, the local race mixes with those that have arrived from such distant lands as Siberia!.

The brave little voyagers take greatest risk while travelling long, long distances through the air over hill and dale, forest and plain, large stretches of water to reach the land of their heart's desire. They face many dangers and hardships on the way. Sudden storms arise and drive them far out of their course. Often they are blown right out to sea and sink down into the wild waves. Then at night bright lights often attract and confuse the birds - thousands of them dash against tall lighted buildings and monuments as they pass over towns and cities. And in a fog the birds may become hopelessly lost.

Migrating birds do not fly at their fastest. The migration speed is usually from 30 - 40 miles an hour and rarely exceeds 50. Small birds seldom exceed 30 miles per hour, most shore birds fly between 40 and 50 miles per hour, while many ducks travel at 50 to 60. Migrants generally fly at under 3,000 ft. But some travellers have been found on greater heights. Golden plover at 6,000 ft., lapwings at 6,500 ft., Rooks 11,000 ft., Godwit and curlew at 20,000 ft., and geese have been found flying at an altitude of 29,000 ft. above the sea.

Some birds make the long journey in easy stages, stopping to rest and picnic en the way. Others are in great hurry and fly enormous distances without pausing to rest and feed. Some fly

by day, some both by day and night, but most of them speed on their way through darkness after the sun has set. On many a soft autumn and spring nights we hear the faint, mysterious calls of winged travellers as they pass far above us.

Birds of gregarious habits travel usually in flocks. The 'V' shaped formation of cranes and geese attract much attention as they speed across the sky. Some birds start off alone, or with just one or two companions. When time for journey approaches nearer, the birds grow restless. Swallows, fly-catchers, warblers, shore-birds, water-birds begin to gather in flocks - each with their own kind - and after a great deal of excited fluttering, twittering, and calling, they rise up into the air and away all go. Usually the male birds go first to their breeding grounds in a bachelor's parties and the hen birds follow them in a few days. When leaving our country they put on their brightest costumes, for spring time in bird land is a courting time, and all wish to look their very best!

The movement of birds with the changing seasons is known from the earliest times. In Bible, the books of Jermiah and Job both contain references to the south-ward movement of Hawks and Cranes, and in the Iliad a similarity has been drawn between the movement of the Trojan Army and that of cranes during the winter.

But during the middle ages this ancient store-house of knowledge was ignored, and fantastic theories were built to explain the absence of a particular bird at a particular season. The fact that swallows gather in reed-beds and swamps before setting out on their autumnal travelling, was interpreted that these birds buried themselves in the mud and hibernated out the winter there. Again about the cuckoo who resembles the hawk, it was said that during the

winter all cuckoos are changed into hawks! Some suggested that the cuckoo flies away to the moon to escape the cold!

Very much later scientific studies of migration started. The first step was of the establishment of lighthouses - where lighthouse keepers spent their lonely hours by watching the flocks of birds that came and rested there - attracted by the light beams, specially in the foggy and stormy weather. It was they who first noticed the seasonal movements of particular species. From here onwards, scientific investigation moved along three distinct lines :- direct observation, rigging, and creating artificial condition to study their effect on migration.

Most of the information about bird movements, however, has come from the ringing of young and adult birds. Ringing is done by capturing a bird and putting on to the bird's leg a light band, may be of aluminium, metal, celluloid or plastic bearing registration number, date, identification mark, and the address to which the finder is requested to return the ring. The place where such bird is shot or captured or found dead, gives the locality to which it has migrated. To collect the facts about the birds' flight and destination, the bird-ringers have ringed millions of birds. The returns from these ringings are under ten per cent, but from many thousands of results which have been collected, it has now been possible to plot regular routes of flight and to indicate dates of arrival and departure with accuracy.

Bird ringing did not begin until 1740, when Johaun Leonhard Friseh of Berlin first tied red strings around the legs of swallows before the autumn migration. But real scientific bird ringing scheme was started in 1899 by Mortensen in Denmark, who used rings with a

complete address and identification marks, followed a few years later by schemes in Germany and Hungary. The United Kingdom entered the field in 1909, followed much later by the U.S.A. and the U.S.S.R. To-day the U.S.A. and the U.S.S.R. are the leaders in the field, doing ringing on a very large scale. Our own country has started this work comparatively recently in 1958 on a small scale, but has succeeded in obtaining some valuable results. Since 1959 the Bombay Natural History Society is conducting an organised work on ringing. From the records we gather that the United States and Canada, between them, mark about 6,00,000 birds every year. The U.S.S.R. and the British Isles have ringed more than three million birds, Germany about four million, the Holland and Sweden more than a million each, Japan and Switzerland more than 5,00,000 each. India has ringed about 80,000 birds so far.

From ringing it has been proved that the main migratory movement is generally north to south in the autumn and vice versa in the spring. Thus the main travellers come to India through the north-west, start from between Lake Baikal and the Sea of Aral in Siberia. But some storks do come over from as far west as Braunchweig in Germany. The other route used by birds from Mongolia and Chinese Turkestan is, over the passes in the North-Eastern Himalayas. The main routes of entry to India are through the passes on the North-Western and North-Eastern flanks of the Himalayas - but certain birds on the direct route fly straight across the main Himalayan Range and do not detour. Those birds are capable of flying at very great heights.

Ringing has also proved the large distances covered by birds. A bird called Arctic Tern flies from the Arctic Circle to the Antartic Circle, covering more than 11,000 miles each way. A snipe breeds in Japan and flies 3,000 miles non-stop over the ocean to spend the winter in Tasmania, and Eastern Australia. The wood cock on its winter movement flies from the Himalayas to the Nilgiris without pause, a distance of 1,500 miles. The wild duck comes to our jheels and tanks from Central Asia and Siberia - flying two to three thousand miles over the Himalayas. The white storks come from Germany and the Rosy Pastors from Eastern Europe or Central Asia. Wagtails, about the size of a sparrow, come from the Himalayan regions and Central Asia into the plains. Smallest of all, the willow warblers - half the size of a sparrow, cover as many as 2,000 miles to reach us every winter!.

Why do birds migrate in spite of heavy loss of life on the way? Primarily to escape low temperatures and a restricted food supply, which in the case of water-birds disappears altogether due to freezing, and the shorter time available for feeding due to the long winter nights. The main reason for the spring movement is the availability of nesting sites, and to escape summer heat.

The migration of birds is a fascinating study, indeed, and there are many unsolved problems which lie ahead. For example, how do the birds know when to start? How do they know their way over the sea without any land-marks? How they manage to return year after year to the same locality? How do the young cuckoos re-join the adult birds without previous experience, and without any guidance by any adult-cuckoo, who fly to India and Africa several weeks before the young cuckoos are ready to leave their foster-parents! And there are still many more, equally interesting problems which lie for you to solve!

VII

Even more fascinating is the body-structure of a bird and the usefulness of every part. Birds are animals that are covered with feathers. The skeleton of a bird is more like that of a man. They have two wings, two legs and a tail. The wings are made in such a way that they can be folded up easily in the shape of a 'Z', retaining freedom of movement at the shoulder. Actually the wing is just like the arm of a man, the main difference occurring at the 'hand', which in birds has become one large and elongated finger. Over these bones the wing-muscles and feathers are placed in such a way as to form the camber of a bird's wing. A glance at a bird's open wing will show you the curve upwards, umbrella fashion. If an open umbrella is pushed up and down quickly, you will find it much easier to push it up than down. Why? Because the camber of the umbrella seems to grip the air on the downward pull. This is roughly the principle that enables a bird to fly.

The wing feathers are grouped in clearly defined masses. Into the long finger or 'hand' are fitted the first flight feathers or 'primaries', usually ten in number, are used in steering. From the fore-arm grow the 'secondary' flight feathers - about 12 or 14 in number. The secondaries are of ~~the~~ most importance in the stork, as by them the air is gripped. The other groups serve to streamline the wing - build up its camber and give support to the flight feathers. At the junction of the wing and shoulder are a group of feathers called the 'scapular'. These feathers are quite large in most birds, and help in streamlining the lines of the wing to the body, as also cover the junction of wing and body when the wing is folded - thus preventing moisture from trickling down inside. The feathers are very light and overlap

each other, all pointing one way - acting like the tiles of a roof for draining water off, and enclosing air spaces to protect birds from rain, cold and heat.

Birds have strong, light and hollow bones strengthened with girders. The breast bone is borad with a ridge on it like the 'keel' of a boat. To this ridge are attached the powerful 'pectoral' muscles - the muscles of the breast, by means of which the bird moves its wings - and provide the power of the down stroke. These muscles are so strong that for a human being to have comparable strength his chest would have to be twelve feet deep! That gives you an idea of the tremendous power of these pectoral muscles.

The tail of a bird is formed in a fan of overlapping feathers, usually about 12 or 14. The central feather is on the 'top' of the tail, the others overlapping each other from 'beneath' it on each side. When the tail is closed, it is the central feathers you see, with the edges of the others receding beneath. The size and shape, and texture of a bird's tail feathers have a great deal to do with its mode and power of flight. Tails are capable of being expanded or closed, elevated or depressed, and they act as rudders to their wearers. Where the wings and tail are both ample, as in the sparrow hawk, the flight is easy and graceful; where the tail is short and the wings fairly long as in the snipe, the flight is generally rapid and impetuous; but where the tail is long and the wings are short and rounded, as in the treepie, the flight is a laborious flutter.

There are three types of flight :- (a) Flapping - this kind of flight is used by the great majority of birds.

(b) Gliding - is simple in method - the bird gets up enough speed and goes along without any movement of the wings.
(c) Sailing or soaring - is the most remarkable method. The bird gets along by prolonged circling without any active movement of the wings.

Wings vary greatly in shape and size according to the habits of their owners - and the size of the wing decreases with the weight of the body to be lifted. In eagles and vultures the wings have a rounded appearance, but the feathers being long, the birds fly well sailing round and round in majestic circles remaining in the air for long with ease. The birds that fly only in the open have long, narrow, pointed wings, and fly with remarkable rapidity, producing a loud musical 'sing' with the tips of their wings. Birds that live in woods have short-rounded wings, and make noise at the start of the flight. The loud 'whirr' of the rising domestic fowl is familiar. But the owl, though short-winged, has a silent flight, because the quills are covered by a sort of velvet pile over them - so the sound is muffled. And this silent flight is important for its existence, being a night hunter.

Wing beats vary in rapidity from about ninety per minute to as many as one hundred and eighty strokes in a minute. Many birds can be distinguished from a distance by their methods of flight. A pigeon can be easily identified from a crow by its much more rapid wing flaps. A wagtail from a swift, that files in waves by quickly flapping and closing the wings - while the swift dashes away in long sweeps and graceful curves. Different birds alight in different ways. Some depress their spread out tails and work the wings with the shoulders up and the tips pointing

to the ground, and as soon as they have touched the earth, fold them gracefully. The ducks draw their heads backwards, tilt the bodies upwards, throw the feet forward, and spreading and thrusting the tails forward, they alight. Some while alighting extend their wings straight out with the tips pointing skywards.

The flight of birds has had a great influence on the distribution of plant life, and many forests owe their existence in a great measure to seed-eating birds. In West Indies there is a plant which depends entirely upon birds to which it often overloads with seeds that the birds are unable to fly, and perish under the burden. The feet of partridges often get clogged with mud during the wet weather and the flight is reduced in speed with the additional weight of mud. By this means the seeds of various plants are carried from place to place. Once Professor Newton had sent a wounded partridge with a ball of mud attached to its legs to Darwin. Darwin kept the clod for three years, and was then broken up and watered. And do you know - no less than 82 plants sprang from it!

Birds are very particular about their feathers, and spend a good deal of time in cleaning, preening and oiling them. The oil-gland is at the base of the tail, from which the bird oils its bill when preening. Many birds have only one moult (casting off feathers) every year - and that takes place in the autumn when every feather, great and small, is cast off and replaced by a new one. Some have spring and autumn moult; some change their plumage partially or completely, thrice a year.

Bills are beautifully adapted to the way birds find and eat their food. The kites, eagles, hawks and falcons have

short, hooked bills, so that they may swiftly and easily tear and rend their prey. The herons have long spear-shaped, to spear slippery fish on it. Long, sensitive, probing bills of the waders, are thrust deep into the soft mud of the swamp to take out their food. The short conical bills of the sparrows and finches facilitate the husking and crushing of grain they eat. The broad, flat bills of ducks contain rows of small plates - like teeth to act as sieves, through which water is strained, and small particles of food being retained. The swallows and swifts possess short bills, but their mouths are of great width xxx to enable them to catch flying insects. The tiny sunbirds have slender curved bills to probe flowers for the nectar - which forms their staple diet. Then the powerful seed-cracking pincers of a parakeet (tota) and stout straight bill of a wood-pecker are well-known. The bill is like a hand to birds; with it the bird catches and picks up things; communicates; weaves; stitches; ministers to the needs of its young; kills its prey; defends itself and dresses. Therefore, the xxxxx neck of a bird is more flexible than that of any animal; so much so that they can turn their heads around completely. The bills are useful as different tools as well, like hammer, pincers, tweezers, pruning shears, nut-cracker, hook, spear and strainer!

The feet of birds are as different as their bills. Running, perching, scratching, wading and grasping are obvious functions of their feet. The first toe corresponds to our thumb and is at the back, the second on the inside and has two bones, the third is in the middle and has three joints, the fourth on the outside has four joints. This arrangement is the rule in almost

every sort of a bird. The scales on bird's legs are very similar to the scales of reptiles - most beautifully patterned and arranged in a decorative way. Feet are also used as hands. A kite grips its prey while tearing the flesh away. Parakeet holds the fruit firmly with its foot while eating. Some use their feet for attack or defence.

The birds which perch and hop on the ground have a long thumb or hind-toe in order to grasp the branch firmly. In ducks the three toes are joined by a web and the hind-toe is hardly seen. Herons have slender, widely spaced toes to keep them safe from sinking into the soft mud. The Jacana has enormously elongated slender toes to trot lightly over floating water-lily leaves. Larks and pipits of the field, have greatly enlarged hind-toe nails which act as braces. The swallows four fore-toes are together. The woodpeckers' toes are in pairs. The grazing bird - Ostrich has huge feet with only two toes!

All birds sleep in different positions - some tuck the head under the wing and then go to sleep; some sleep simply while sitting; some stand on one leg with eyes closed; others sleep in a nest. Baths vary too - some like to splash in water and others prefer rolling in the dust, but all birds keep themselves neat and clean. Small birds live only 10 to 13 years, eagles upto 20 years and some large birds as long as 90 years.

Birds have become highly specialized. Their blood is rich in oxygen, and considerably hotter than the blood of mammals. Their body temperature ranges from 104° to 110° (Fahrenheit). In man and in mammals generally, the body temperature in health is only 98.4° (Fahrenheit). At a temperature of 106° man would be in raging fever, and he would become delirious, and death would

take place before 110° were reached. This high body temperature of birds is due to the presence of a number of air sacs in the body. At each inspiration a large quantity of air rushes through the lungs into the air sacs. As there is hardly any exchange of gases in the air sacs, the air has still some oxygen to give up in its passage back through the lungs - thus the blood in the lung capillaries is oxygenated twice at each respiration. This high temperature is conserved by the feather covering and also by the rapid beat (amounting to over 120 per minute) of the four chambered heart. Thus, circulation, respiration, digestion and excretion are extremely active physiological processes in birds.

Aren't there a lot of exciting things to know about birds? You know, the more you watch and observe them, it is difficult to imagine any other living creatures who are so much the masters of every element. No wonder that all through the ages mankind has been fascinated by the study of bird-life. I have asked lots of boys and girls what they would like to be supposing they were not human beings. Pat came the answer - 'A bird, of course!' Why? I inquire. 'So that I could fly', they say. No doubt it would be exceedingly wonderfulx accomplishment. In fact, I have dreamed myself, every night that I am gliding over tree-tops, mountains, buildings and over sea.

After knowing so much, most of you would like to have them near about your house and garden - because a garden without birds is no garden at all. They will come near you, provided you place food for them, and simple nesting boxes, where they can build little nurseries and rear their children. If you do that they will become tame and will come close to you.

You can scatter some millet or other grain-seeds at a suitable spot in your garden. Conceal yourself carefully and be still. The little sparrow is bound to come hopping along. While approaching the food it will first cock its head to one side and then to the other, to make sure that the patch is clear. It may even fly off without eating, but do not get impatient (patience is the great art in bird-watching). Finally it will come back with a whole bunch of other sparrows whirring to the spot and settle down to feed. Soon this crowd will be joined by two or three brown birds with yellow legs and bills. These are common mynas. You will notice them bobbing their heads - saying something to each other. Well, they thank you and bow to you for your kindness.

If you lay your hands on a coconut, cut it in half with a saw, bore a hole in each half, put in some strong string and hang the two halves upside down in some tree or outside the window. This coconut provides a very good feast for the birds. The tits, specially are very fond of it. The most common one is the yellow-cheeked tit. You will at once recognise it by its western dress, namely a black top hat, blue coat, yellow waist-coat and a black tie. It certainly looks quite handsome. It comes along and suspends itself upside down on the coconut with its strong little feet and pecks away at the flesh inside, until it can eat no more. In the empty shell you can put bits of fat or cheese. This too will attract many birds.

One day bring a large hollow bone from a butcher's shop, clean it, put in some fat or mashed potatoes and hang it in a favourable place in a tree which you can visit now and then. The bone can be stuffed again and again when emptied.

You can also make two kinds of food tables. Take a board,

fasten it to a single leg which must be at least three feet high so that no cat can climb on to it. Stand it in some shady place and put some food, anything you like.

The second type is a board suspended by strings fastened to the branches of a tree; the string going through four holes at the four corners of the board. Do not forget to put water on the tables. The vessels containing water must be fastened to the table, else it will get upset soon. Birds drink very often and love splashing, specially in the summer. You can also plant some soft-fruited trees, shrubs etc., to provide them with food and shelter. Bread crumbs scatter attract birds who will come flocking even on your dining table.

Similarly you can build nesting boxes. But before building you have to take into account the following facts: the type of site they like for nesting; the kind of nests they build; the materials they use. Different species of birds differ in the above characteristics and your efforts will be wasted if the little houses do not suit the birds in your neighbourhood. If you carefully examine the cavities in trees and stumps which birds naturally use, you will find a wide variety in size, shape and location.

Now, here are a few simple rules on the making and placing of nesting boxes:-

(a) In the case of all the nest boxes the opening should be several inches above the floor, like a natural cavity in a tree.

(b) The nest boxes should be erected on poles from 10 to 30 feet above the ground, or fastened to the sides of trees whose branches do not block the view.

(c) All boxes should be taken down after the nesting season is over, and the old material removed, thus making them clean for the next season.

Nesting boxes need not be expensive; they can be easily made out of card-board, empty soap boxes and packing cases. You can make all the boxes yourself.

If you have any old or dead trees in your compound, please do not chop them off. In such trees you will find many natural holes and hallows which a number of birds like to use as a nursery. If a dead tree is removed, those birds which build nests in holes will go away from your compound in search of other trees like that, because they will not attempt to dig a nesting hole in a living tree.

If a dead or old tree spoils the look of your garden, you can plant some beautiful creepers near it, like the Bridal creeper, Bougainvillea, or Hiptage to cover up the tree. This will beautify your garden and the birds will stay with you too. In addition, you will find many other visiting your garden when the creepers are in bloom.

Now for some details about the nesting boxes. First and foremost they must be water-proof and well-ventilated. They should be painted in soft woodland tints like brown, grey or dull green.

The nesting boxes can be of various shapes, and their sizes should be according to the size of the birds for which they are meant. Thus for Myna, the box should have a floor about 6" x 6", 18" high; the entrance may be about 16" above the floor, and the entrance hole may be 2" in diameter. Similarly, for a sparrow, the height should be 6", and it should be open on all sides. For an owl, the floor may be 10" x 18", the height 18", the entrance

4" above floor level and 8" in diameter. For a woodpecker, the box should be 15" high, the entrance 12" above floor level and 2" in diameter.

These should be so placed that they are shaded during the heat of the day, but let in some sunlight in the mornings and evenings.

Providing food and nesting boxes for birds, you will notice many types of them, even the shyest one will come near you. And you will hear sweet music in the summer.

By providing these, you are setting up a bird refuge - commonly called a bird 'sanctuary' in your garden, where they will be safe from harm, protected from hunters and marauders, from hunger and thirst. It is you who will keep guard on them - and in no time will you be known as privately owned bird 'sanctuary' owner!

VIII

Now, to be able to identify birds you need a pair of good eyes and ears, a notebook, a pencil, and a good illustrated bird book, and some training in careful observation. And to be a successful bird-watcher, the beginner must imitate, in some respects, the behaviour of the fox - which is able to get near enough to wild birds to capture, that we human animals find difficult to get even slightly near them. How are the wild animals enabled to do this? Well, they are protectively coloured; their feet are softly padded and the movements noiseless; they go on all fours - crawling close to the ground keeping concealed in the cover as much as possible. Their movements are very slow. In all these things we can imitate them without much difficulty.

First of all, avoid black, white, or other strikingly coloured clothes. If you go in a gaily coloured dress, birds will at once spot you, as they have very sharp eye-sight, and will hide themselves in such a way that it will be very difficult, if not impossible, for you to see them - they are very cunning that way. For this purpose, a dull, dead leaf or dull green is the best colour. You can use violet too, since birds are incapable of seeing this colour. Put on such shoes as will make the least noise, with rubber on heel and toe are the best. Avoid walking on dead leaves or twigs as that makes a lot of noise and will frighten away the birds.

Next choose a spot - trees, shrubs, or grasses as cover, and sit there motionless. Do not turn your head about quickly, or swing your arms, or move about in pointing and gesticulating manner. All this antics seem menacing and fearsome to the shyer birds.

If you sit still, birds will come quite close to you, and that will help you in observing them well. It does not matter even if you have to advance only on hands, knees, or crawl like the serpent. When approaching birds in the open, a zig-zag, circular or side-long movement may bring you much nearer to them than a direct forward movement. Never make a quick movement and do not hurry - as birds flee for their lives from quick-moving creatures.

The expert who sees all the birds has to take lessons from the fox - he hunts alone! Alone, you have no one to talk to, and there is no interruption either. When watching birds you have to give your whole attention to it - as a matter of fact, bird-watching requires great physical control and concentration just to watch for long. But bird-watching is not all still life. In search of birds you may have to drive, fly, sail, cycle, row and walk. You may have to climb on rocks and trees and might be chased by a bull! Pecked and scratched by angry birds of all sizes. You may have to be up all night, wet, hot or cold. So bird-watching can be a picnic, a hobby, a quiet pastime or an arduous scientific pursuit.

Spring and early summer is a good time to begin identifying birds; they are easier to see and then there can be no confusion with winter visitors. July is the most interesting month in the bird calendar, for then many young birds are about.

Early mornings and late afternoons are usually the best times for observation, partly because most birds are then active and singing, and partly because there often is little wind movement - and the least motion is quickly noticed when the branches are still. But when the wind blows, birds are likely to be overlooked. Also birds are more shy and retiring on windy days when they can

spread their wings and be borne away with little effort. So days with strong winds are unfavourable for bird-study. Birds except water-fowl and shore-birds usually seek shelter during heavy rains, but are active during light, warm showers.

Those of you who have to be confined mainly to the city, can best observe the common birds in parks, orchards, gardens and cemeteries. Water birds may be found in ponds and jheels. You must learn to notice every sound and movement in the leafy trees or in fields. You also try to follow every strange note to its source, like an expert who usually hears a bird first before he sees it. Some birds are ventriloquists - when the bird is hidden by the leaves, the call seems to come first from one tree, then from another. The pass master in it is the Barbet - when calling the head is bobbed from side to side - thus producing ventriloquistic effect. Many birds sing so softly that they seem to be far away when really just at hand. So to find birds one must cultivate the senses of sight and hearing to the most.

Above are the few simple rules for every bird-watcher to follow.

In your note-book keep a record of the following items:- First of all, notedown the date; the time of day; weather conditions and wind; the name and type of locality, a very important point. Next, record the size of the bird. At first, it will be difficult for you to judge the size in inches. But you can always compare it with some well-known birds. Here is the size classification with the key birds: sparrow, bulbul, myna, crow and kite. You write down your key birds on the front page of the notebook as all these birds must be known to you. Use the initials of the key birds to denote the standard sizes, and then use the signs plus (+) or

minus (—) if the bird is bigger or smaller than the standard size, without reaching the next class. Thus, a bird slightly bigger than the sparrow, will be indicated by S(+) or a bird slightly smaller than the Myna will be indicated by M(—). By making frequent and proper use of such a scale, you can become quite proficient in judging the comparative sizes of birds.

Then record the shape of the bird, that is, whether the bird as a whole is slim or stout. Some allowance may be made as to how the body feathers are carried at the time - because all birds can raise or lower the feathers of the body at will.

Then, the bill - whether it is large, straight, pointed, curved, slender, heavy, flat, well-hooked, small or conical. If you observe the shape of the bill carefully, you may be able to place the bird in the family to which it belongs. Thus if you see a small bird with a short conical bill, it is probably a sparrow. If it is a little smaller than the sparrow and has short, slender, a triple-curved bill, probably it is a warbler, or it belongs to some other insect-eating family. The colour of the bill should also be noted down.

Next, the size and the structure of the legs. Observe whether the bird has long or short legs. If it has long legs, then it must be a wader. Similarly, if the feet are webbed, it must be a duck. The colour is also useful.

The length and the shape of the tail is important too. Notice if the tail is short, forked, notched, square-tipped, round-tipped, pointed or racket. Does the bird cock its tail up, or does it hold it down? Does it wag its tail? For example, if you see a large mottled brown bird with a hooked bill and a slightly forked tail, it is probably a kite. Again, if you see

a bird with a long straight pointed brown and yellow bill, a short tail, long legs with earthy brown and white plumage, it must be a Heron.

Observe if the bird has a crest, and if so what colour and shape.

The colour of the body, or the 'trade marks of Nature' is very important; it is about the only feature ordinarily observed. First, notice whether the bird is brightly coloured or sober in hue, and which is the predominating colour. Then note down the colour of the upper part, i.e. the head, back, backwings and upper tail; next that of the underparts - throat, breast and belly, and under tail. Remember the breast and belly often will seem darker than they really are, on account of being in shade; thus a pure white will seem grey. Be careful to note just where each colour actually is. Then note any conspicuous mark - the most useful point to look for, is the breast - plain (unmarked), spotted, streaked or striped? Does the tail have a band at the tips, or white spots or white sides? Does the bird have a rump-patch? Do the wings have light wing-bars, or are they plain? The presence and absence of these bars is very important in small goups of birds like fly-catchers and warblers. Does the bird have a 'stripe' over the eye, or a ring around the eye? Is the crown striped, or is there a patch on the crown? The wings of water birds are very important. Notice if they have 'black tips'; or light 'patches', 'stripes', or solidly coloured. For such a mark alone, with the size of the bird often is enough to establish its identity. If you are good at sketching so much the better - then the bird can be best dealt with by a field sketch; showing the 'principal parts' of it, as well as details of plumage, legs, bill and eyes.

The bird's voice is often the best, some times the only clue to its identity in the field. Some have sweet songs; some have harsh call, some have warbling notes and so on. The cuckoos and nightjars are identified by their calls alone. You should try to describe all notes uttered by the unknown bird in words - what the bird seems to say as you hear it at that time: like 'chew-weet', 'tee-tee-ka-na', 'cheer-you-cheer-you', 'tree-tree', 'phik-phik-phihar', 'wet-my-lips', 'Bo-bo-link', and so on. And say if the call was 'musical'; 'metallic', 'harsh', 'soft' or thrilling.

Then finally study the food habits and the manner of eating. Then note the nature of the place where seen, e.g. Marsh, riverbeds, gardens, groves, jungles, cultivated fields etc.

Now, notice if the bird sits on trees, across the branch or along it. If it sits on an exposed perch, does it dart out after an insect and return? If on the tree, does it climb upwards in spirals, like a creeper, or in jerks, using the tail as a brace, like a woodpecker, or does it go down head first, like a Nuthatch? If the bird is on the ground, does it run, walk or hop, like a sparrow? Does it rummage about among the dead leaves? Does it travel in flocks, or goes about singly or in pairs? In the air, is the flight fast or slow; are the wing-beats rapid or not; does it wheel, sail, soar, or hover? If in the water, does it swim well and can it dive, or does it dabble and tip up? Can it take off from the water easily or does it pattern over the surface before getting into the air? In the air, does it dip up and down or have a straight arrow-like flight, like a dove, or flies erratically - lurching this way or that? Does it skim like a swallow? Or soar like a hawk? Does it beat its wings quickly like a duck? Or

slowly like a heron? Does it go with an even wing-beat or with several flaps? Does it go hover in one spot and then dive head first into the water, like a kingfisher? Or does it wade? Is it a long-legged bird that spends much of its time standing motionless like a heron or runs along the muddy margin like a sandpiper? Does it probe in the mud with its bill or pick at things?

Later on, when you are able to know your birds, you can take up the identification of nests and eggs, equally important part of bird-watching, Studies of the incubation, hatching, fledging of birds are very interesting, indeed. As your powers of observation develop, you will begin to tackle many field problems yourself. For example, in what sort of habitats your local birds are distributed; number of birds; how many birds are nesting in or around you; what food bird eats at different seasons and in different places, daily habits, display, and courtship are all fascinating games of skill between the bird and the watcher!

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	English Name		Hindi Name
1.	Crow	...	Kowa
2.	Treepie	...	Motri
3.	Tit	...	Ramgangra
4.	Nuthatch	...	Siri
5.	Bulbul	...	Phinkro
6.	Chat	...	Pidha
7.	Magpie Robin	...	Dhayal
8.	Paradise Flycatcher	...	Doodhraj
9.	Fantail Flycatcher	...	Chakdil
10.	Shrike	...	Lahtora
11.	Minivet	...	Lalchasm
12.	Drongo	...	Kotwal or Bhuchenga
13.	Tailor Bird	...	Durzee
14.	Warbler	...	Phudki
15.	Oriole	...	Pirola or Pilak
16.	Hill Myna	...	Pahari Myna
17.	Rosy Pastor	...	Gulabi Myna
18.	Starling	...	Tilgiri
19.	Common Myna	...	Desi Myna
20.	Pied Myna	...	Ablak Myna
21.	Finch	...	Tuti
22.	Sparrow	...	Gouriya
23.	Sand-Martin	...	Abali
24.	Swallow	...	Ababeel
25.	Wagtail	...	Dhobin or Khanjan
26.	Pipit	...	Sengur or Bageri

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	English Name		Hindi Name
27.	Lark	...	Bhurut
28.	Sunbird	...	Phulchubhi
29.	Woodpecker	...	Katphorwa
30.	Barbet	...	Koturwa
31.	Cuckoo	...	Papiha
32.	Parakeet	...	Totaz
33.	Indian Roller	...	Nilkant
34.	Bee-eater	...	Patringa
35.	Common Kingfisher	...	Machli-lokwa
36.	Pied Hornbill	...	Bara-Dhanesh
37.	Swift	...	Babila
38.	Owl	...	Ullu
39.	Osprey	...	Machlimar
40.	Vulture	...	Gidh
41.	Falcon	...	Laggar
42.	Eagle	...	Baz
43.	Kite	...	Cheel
44.	Hawk	...	Basha
45.	Pigeon	...	Kabutar
46.	Dove	...	Panduk
47.	Peacock	...	Mor
48.	Fowl	...	Murghi
49.	Pheasant	...	Chaman (kulu)
50.	Partridge	...	Teetar
51.	Bustard-Quail	...	Gulu
52.	Button-quail	...	Lawa

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	English Name		Hindi Name
53.	Water hen	...	Banmurgi
54.	Moorhen	...	Kalim
55.	Jacana	...	Kattori
56.	Snipe	...	Chaha
57.	Crane	...	Khut-khata
58.	Stone-curlew	...	Barsiria ?
59.	Gull	...	Dhomra
60.	Tern	...	Titihri
61.	Plover	...	Zirrea
62.	Golden-plover	...	Battan ?
63.	Lapwing	...	Titiri
64.	Curlew	...	Gulinda
65.	Godwit	...	Malgujha ?
66.	Sandpiper	...	Tutwari
67.	Phalarope	...	Tuhi
68.	Cormorant	...	Pan-kawa
69.	Stork	...	Haji-lag-lag
70.	Heron	...	Anjan
71.	Duck	...	Batakh
72.	Teal	...	Girri
73.	Goose	...	Hans
74.	Grebe	...	Pandubi.

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