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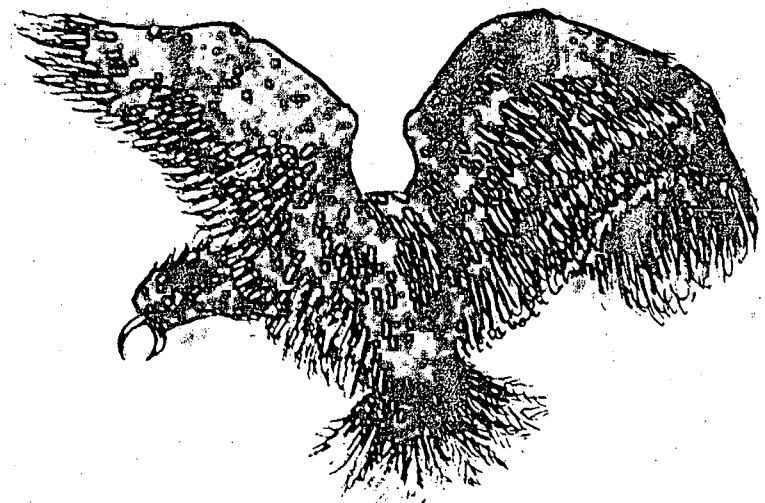
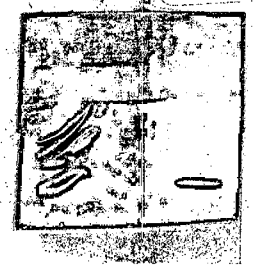
Printed by Clunies Ross Press Bournemouth

ISBN 0 906492 08 4



Zoology for Everybody 2 Birds

Eugen Kolisko



1st Edition 1944
Reprinted 1979

ZOOLOGY II.

BIRDS.

THIS lecture is dedicated entirely to the study of *birds*. If we look at a peacock

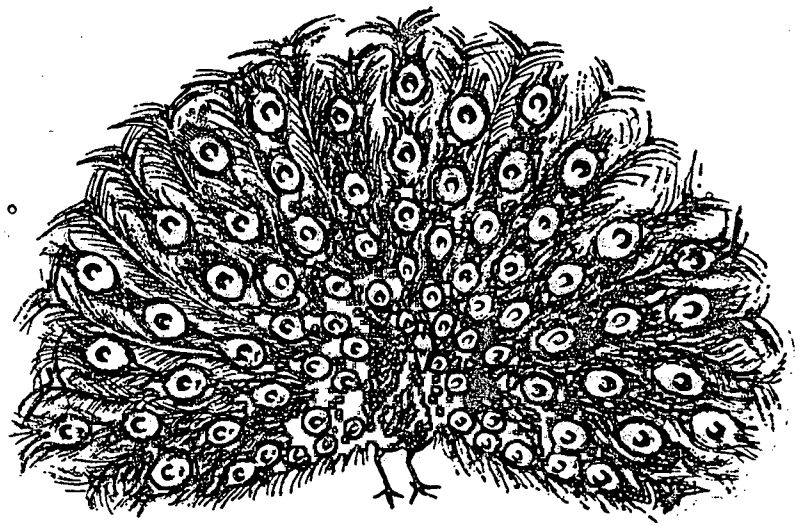


Fig. 1.—Peacock.

we immediately have the impression that we do not only see this bird, but are conscious of something permeated with life, which seems to surround it. We have a similar impression if we watch a big bird of prey, such as an eagle.

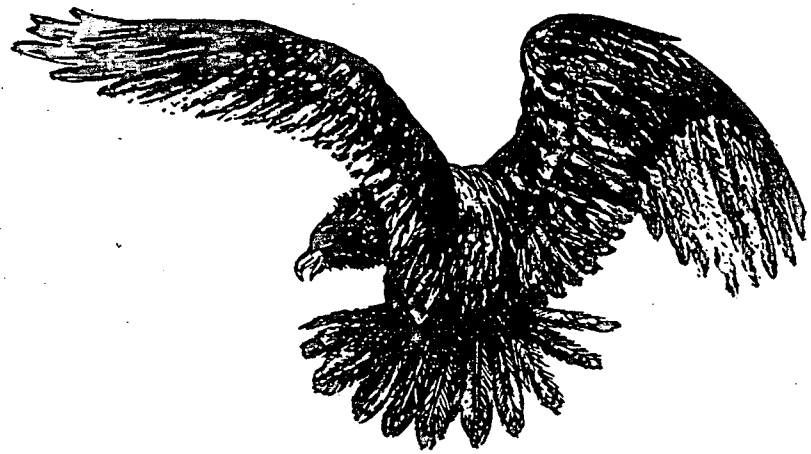


Fig. 2.—Golden Eagle.

The body itself is relatively small, but an enormous strength streams through the feathers into the wings, and even beyond them. The sphere of the bird is much larger than its body alone.

We will turn our attention to the *feather*. It has almost lost touch with the living organism and is no longer in a real contact with the metabolism. Many mineralised substances are deposited in it. It consists partly of horny material and partly of mineralised substances, salts. Some feathers, especially the stiff ones, the wing feathers, produce, when burnt, a large amount of ash, which, in certain cases, shows as much as 50% of silica. It is true to say that these feathers contain such a high percentage of silica, that we scarcely find a similar proportion in any other animal organ. When burnt, they leave a large residue of incombustible matter, and represent a kind of depository for silica. They may show a specific coloration, partly of metallic lustre, and those of the peacock bear strange markings like eyes. We gain the impression that the feathers have developed out of the skin—they are an epidermic growth—yet, they also seem to have the function of a sense organ. The sphere of sensibility of a bird reaches far out into space, far beyond the body, even much farther than that of any quadruped living on land. The feathers only indicate this capacity slightly and are much mineralised and separated from life. The semi-transparent base is the quill; it has two apertures, one at the bottom and one at the top, where the branches begin. (See Fig. 3).

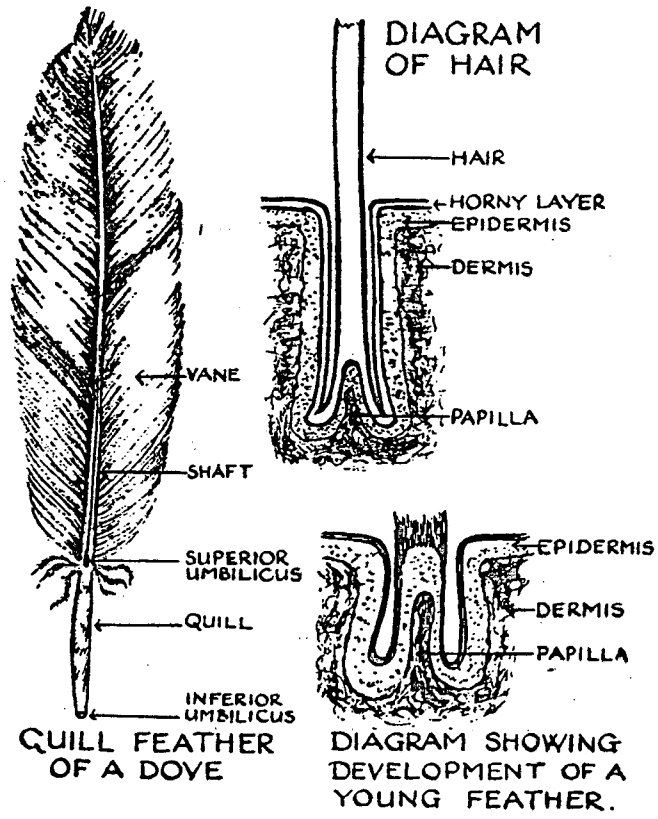


Fig. 3.

At the lower opening the papilla enters to give nourishment, and, if a young feather is taken, the quill will be found full of blood. When the quill is dry and hollow, the feather is more or less a dead thing. Hair, which covers mammals, has a close relationship to the blood and is specially permeated by it in the region of the hair-roots, whereas feathers are more separated from this connection. Of course there are intermediary stages between the mammals' hair and the birds' feathers; for instance in the feather coat of the ostrich, of the Australian emu, or the kiwi,

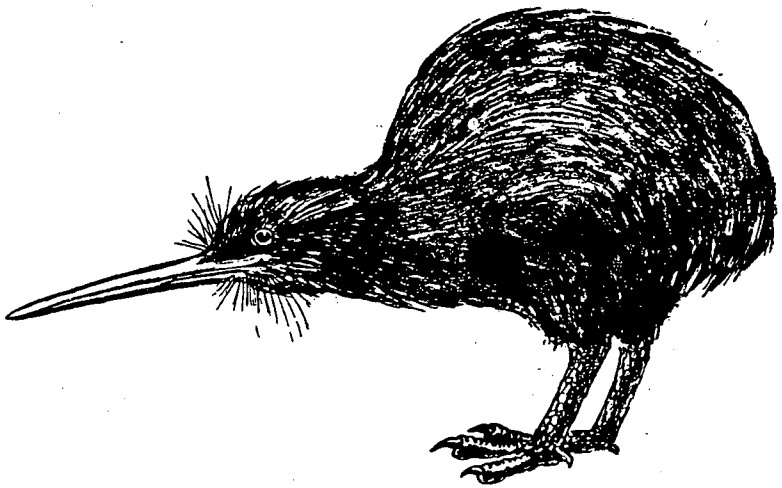


Fig. 4.—Kiwi.

which has no real feathers, but bristles. They are permeated much more with blood. Feathers which do not serve the purpose of flying but of running, are nearer to the earth. If we imagine this process continued we find contraction from the feather to the bristle, and ultimately arrive at the hair, which is formed by a still further contraction. The porcupine represents a transitional stage. The bristles contract still further and at the same time become softer, and then the hair is formed. Thus we might say that the feather is a prolonged hair formation, which has spread out and mineralised. Hair enters more deeply into the blood stream. It grows on a soil which is more permeated with blood than is the case with the bird. Observe a bird and you will see that everything forming the peripheral parts has spread out, become dry, more sensitive, stiffer, and has taken in silicic acid. Although the bird has feathers, it looks emaciated and consists only of skin and bones. The enormous expansion of the feathers sometimes gives the feeling, that something like a mass of vegetation or grass is growing on the bird; we see this in the *ostrich*.

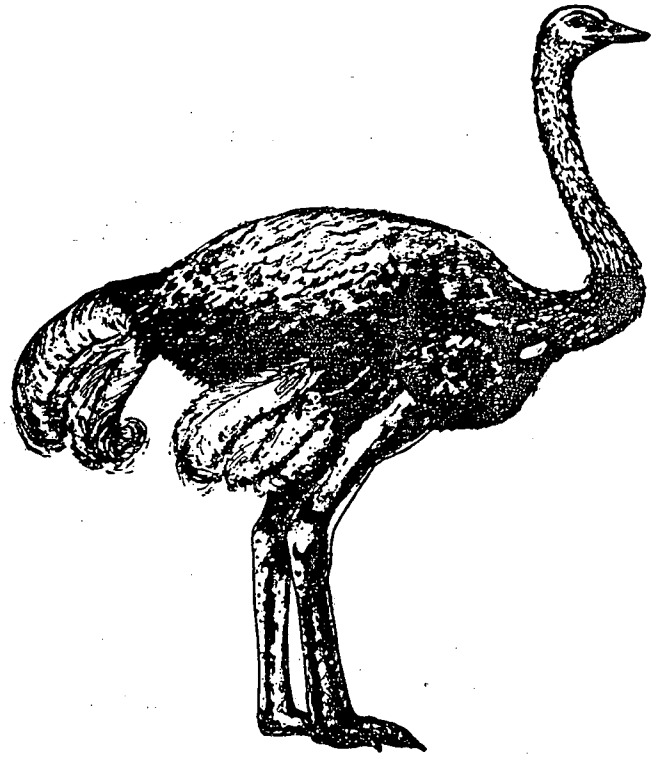


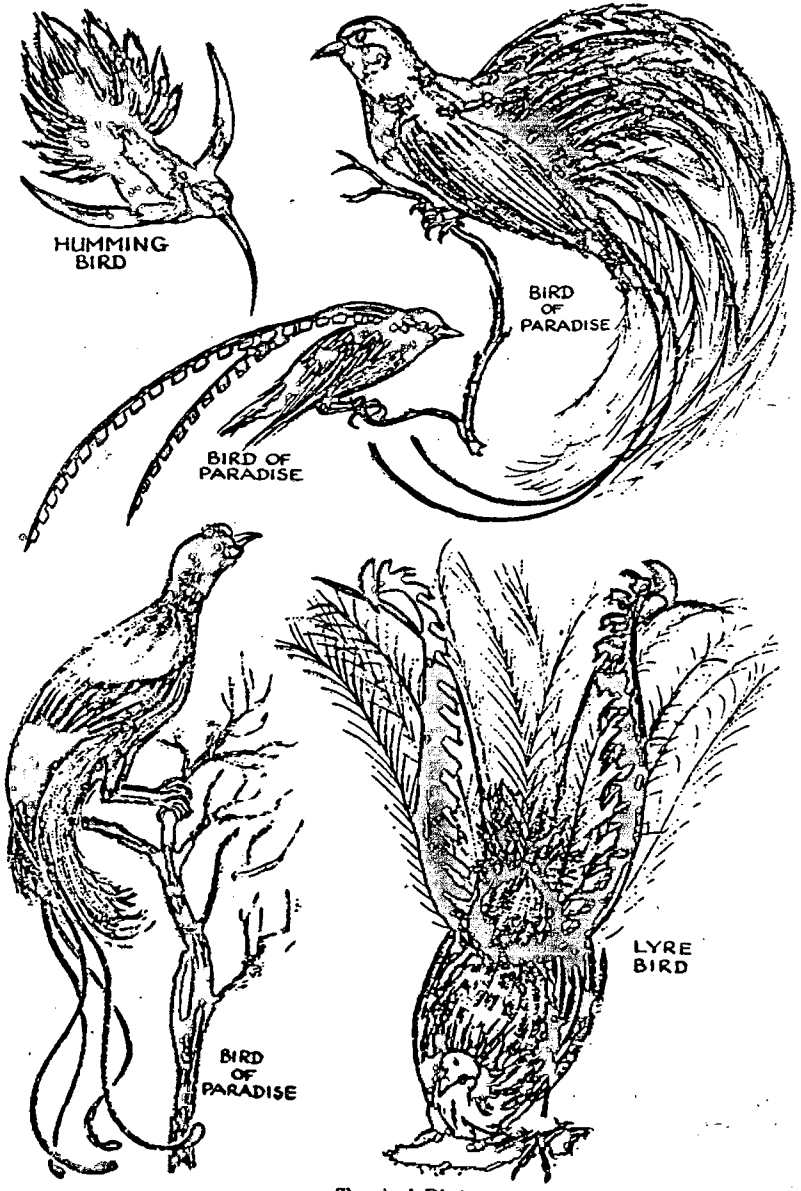
Fig. 5.—Ostrich.

Often we may have the impression, especially when watching tropical birds, that they carry with them a kind of dried vegetation, which has been extracted from the bird organism and has come under the influence of air (see Plate I). The blood can have very little effect upon the feathers.

Birds show, through the fact that their capacity of expansion in the feathers has become so enormous, that they are much more influenced by forces streaming in from outside, which at the same time draw them away from the earth. This makes the whole organism of the bird light.

Let us take another peculiarity of the birds: the *skeleton*. The bones of a bird are different from those of the mammals or

PLATE I.



Tropical Birds.

man. If you study a bird's skeleton you will notice that it is extremely light, and all the bones, especially those of the skull, seem penetrated by air. The same number of bones is there as in other animals, but their structure is different. They are almost without weight.

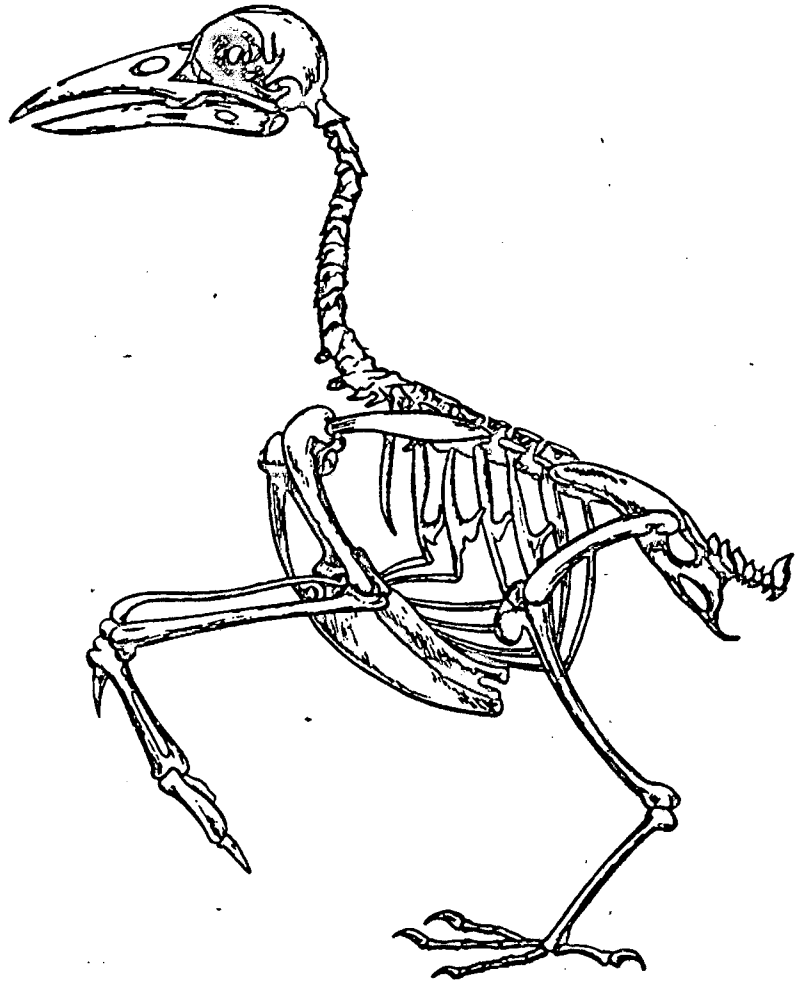


Fig. 6.—Skeleton of a Raven.

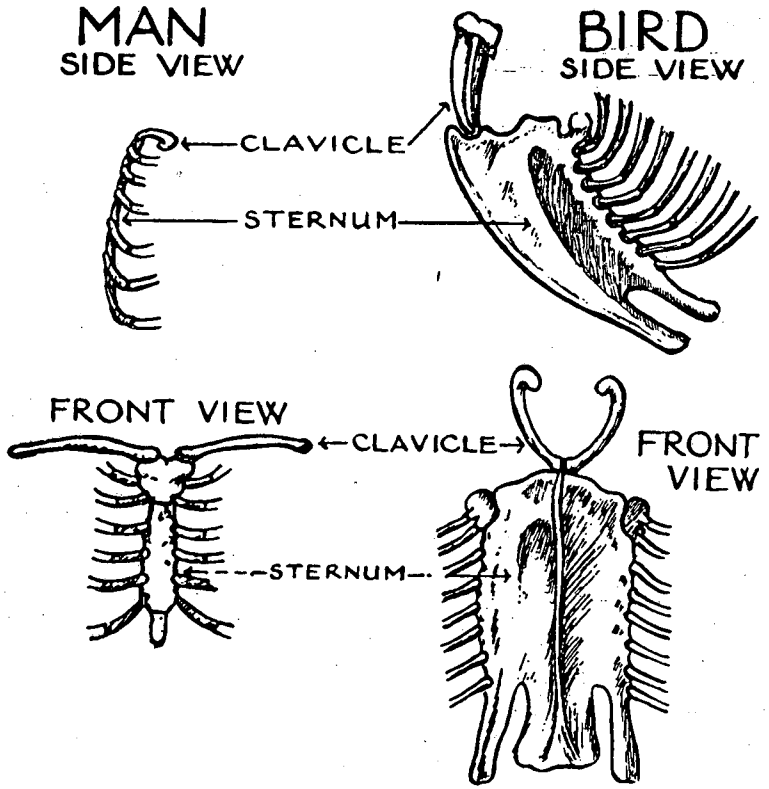


Fig. 7.—Diagram demonstrating the difference between a human breastbone and the breastbone of a bird.

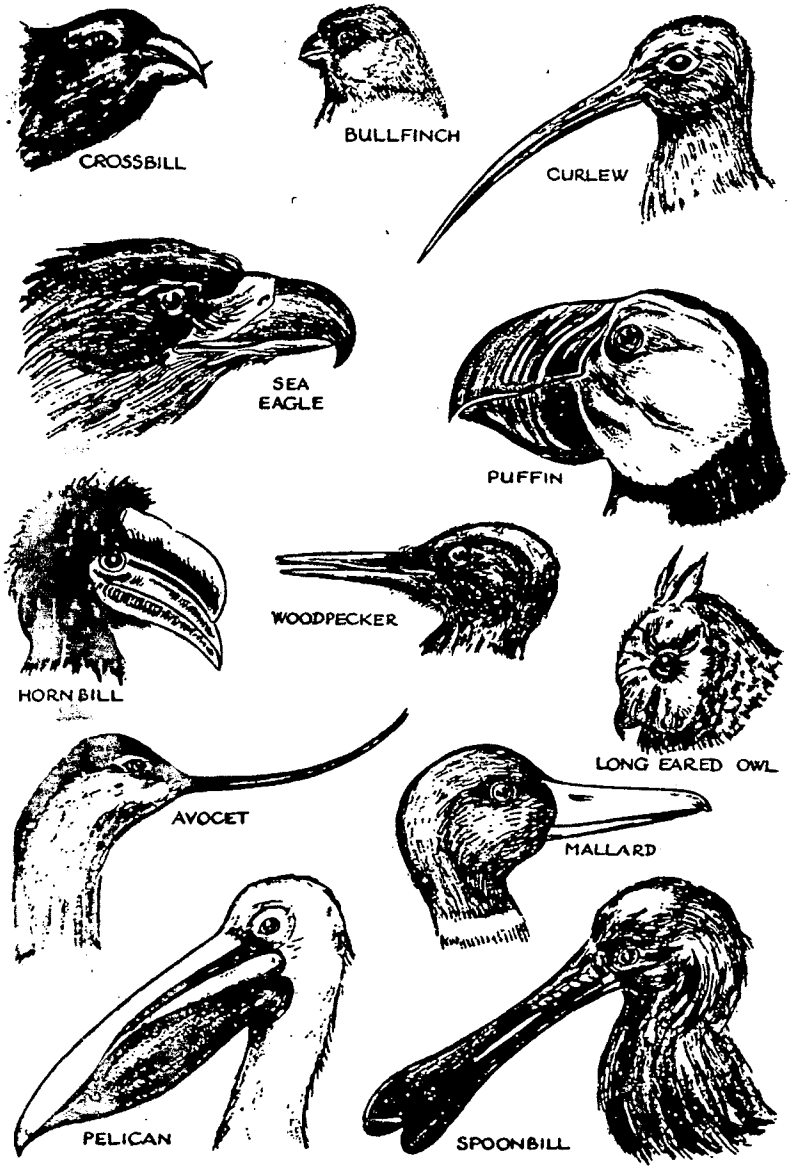
Then we notice that their substance is also different. The bones of birds are whiter and contain more calcium. They are more brittle and more dense than those of other animals. Very early they lose their content of blood and marrow (that part of the bony system which is permeated with blood). The marrow shrinks and its place is taken by a space filled with air. This is not the case with the ostriches. They possess bones with marrow and so do all other birds which run. The better a bird flies, the more its bones are permeated with air. Life in the air makes the bones dry,

brittle and filled with air instead of blood. Neither red nor yellow marrow is to be found in birds' bones.

Studying a bird's bone, we come to the conclusion that it has the qualities that other bones acquire in old age. A bird's skull is a very fragile object. You can easily break it between your fingers, since it is so brittle. The skulls of young birds have some elasticity, but soon the single bones grow together and form an undivided chalice. If we study the skull of a human being we find that until the 25th year the single bones fall asunder. In the bird the bones contract very early. A phenomenon which appears only in old age in all the other animals and in man, appears immediately in the bird. *It has a senile skeleton.* What we consider in man as hardening of the bones, sclerosis, happens quite naturally in birds right from the beginning. But since the birds' bones are so light, it does not matter.

Now we have already found two quite remarkable things: the feathers have their high silica-content, and the horny substance in them becomes more mineralised, than we find for instance in the materials of the horns or antlers of mammals. Thus feathers acquire a more inorganic character; the skin proceeds to something spreading out extensively in the periphery of the bird's organism in the production of the feathers. The silica substance enters there and also the skeleton hardens early. Right from the beginning it looks whiter, and is permeated by air, so that it is hollow and brittle. The two most important parts in the organism of a bird are the feathers and the skeleton. Everything becomes light and gives the bird buoyancy, while simultaneously the organism is hardened.

PLATE II.



Various Beak Formations.

This fact becomes still clearer if we look at the beak (see Plate II), representing a complete hardening of the horny substance. What in other animals we find as calcium in the teeth formation, is entirely absent, and instead, originating from the skin, the beak is formed. The whole face is in a way transformed from the skin into horny substance. Taking such an extreme example as the *Toucan*

Fig. 8.—Toucan

which seems to consist only of a beak, we can see this tendency in its most fantastic development. The horny beak is the only really formed part of the whole face. The head of the Toucan tends to be shaped like a triangle, and this, too, points to an enormous hardening.

The *peacock* shows in a rather extreme way a tiny head, completely hardened, giving us the unmistakable impression that there is not much to be found in it, notwithstanding all the beauty displayed in its feathers.

We proceed to the study of the *sense organs*. Birds develop these to a very high degree. The scientist *Oken* called the birds "sense animals" because they develop various senses exceedingly well: especially the *eye* and the *ear*. The senses of smell and taste are less developed. But mammals especially develop these latter senses in great refinement. Birds are more concerned with the development of their eyes and ears. In proportion to the small head, the eye seems unusually big, even more so if we look at the eye sockets in a skeleton. They are surrounded by a bony ring. The hard skin which is usually formed in the eye, the sclera, thickens to a ring consisting of 12—30 little bones arranged in a circle. The second characteristic feature in a bird's eye is the *pecten* or "fan."

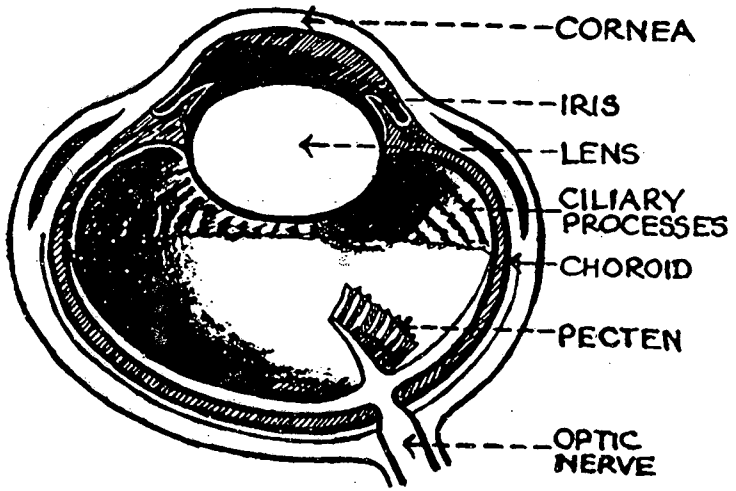


Fig. 9.—Eye of a typical Bird

This is a muscular organ springing from the entrance of the optic nerve, spreading like a fan, well supplied with blood and leading towards the lens. In the human eye it corresponds to the corpus ciliaris, but it is more strongly developed in birds. It makes the eye much more mobile, being so well supplied with blood from the interior, whereas outside it is more hardened. This hardening isolates the eye to a certain extent and thus it can function independently. Everyone knows what extensive sight the birds of prey possess. High up in the sky a buzzard notices a tiny mouse and strikes down instantaneously. We feel that a buzzard or eagle reaches much farther with its sight than any human being ever can.

In the eye of a bird is a much greater limb-activity. Because it is so well provided with muscles and a ring of bones, it acts more like a limb than an eye. It is not only a physical apparatus to receive light, but also an organ co-ordinated with the limb-system. A bird of prey looks and strikes: the activity of its eyes is followed immediately by a reaction of the wings and beak. These activities cannot be separated from each other. We really can say that the eye functions similarly to a limb, through the process of hardening up and the increased mobility and blood supply. The glance of a bird, even of a small one, is piercing. It radiates much towards the outside world, just as we noticed in the feather coat, that something streams further into the surroundings beyond the limits of the bird's physical body.

The *ear* has to be studied together with the larynx. These are independent organs, but belong to each other. The ear can never be used separately, without having the larynx in action at the same time and vice versa. This relationship between the two organs can be studied especially well in birds. They even possess two larynxes, the one situated above as usual, and a second one below in the chest, called the *syrinx*.

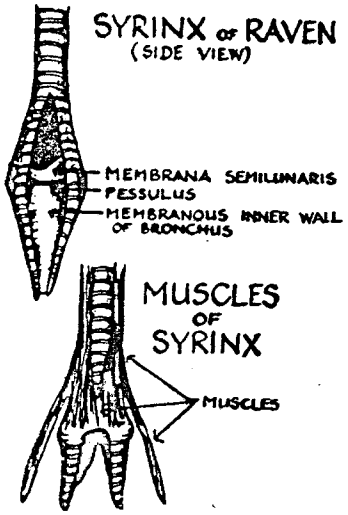


Fig. 10.

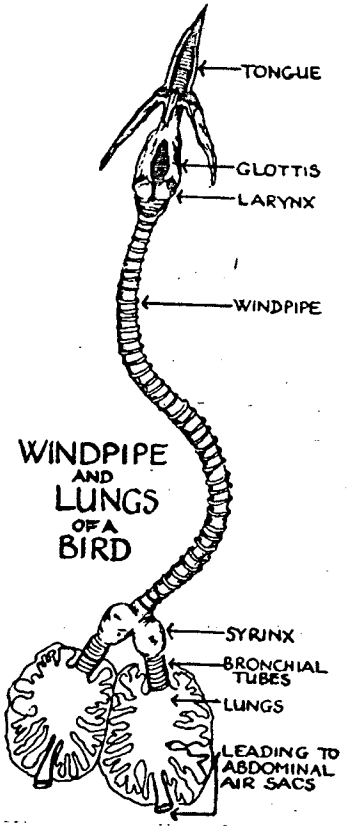


Fig. 11.

The windpipe sometimes describes a loop, descends and ascends again; and below is the second larynx. Then there are peculiar muscles to move the windpipe which lead towards the ear. Singing birds have their song-and-ear organisation closely connected and powerfully developed. But there is no properly developed external ear. It does not open towards the outside world, but turns to the inside. It is strongly linked up with the breathing apparatus; it is more or less interwoven with the whole singing and flying activity.

The eye functions very much like a limb and the ear is linked with the whole organism, more than is usually the case.

Birds have not developed the *cochlea*, instead they have a slightly curved bone to which the name of lagena has been given.

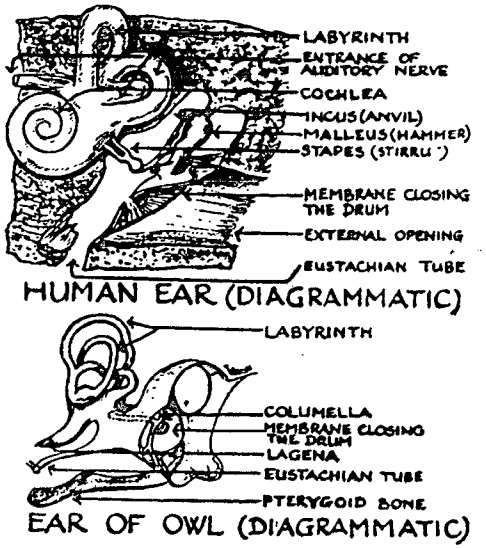


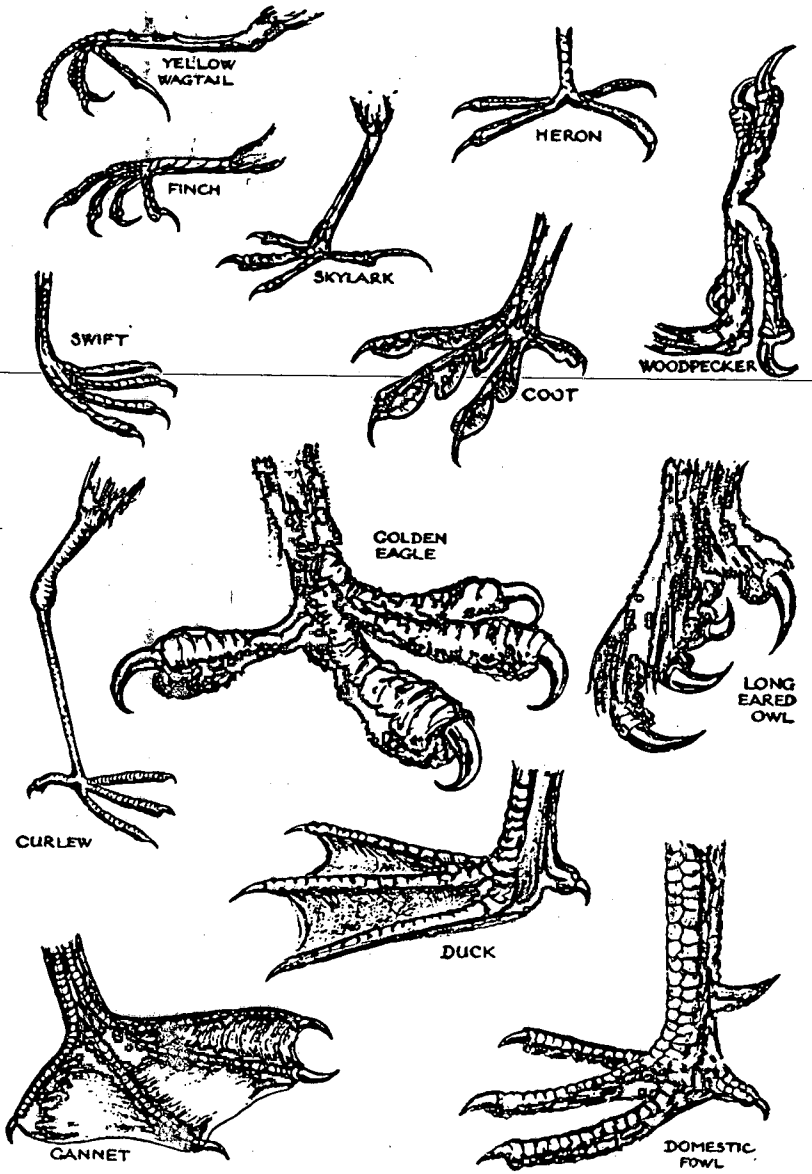
Fig. 12.

The development of the earbones is incomplete. The three bones which convey the vibrations of sound from the membrane which forms the outer wall of the drum of the ear to the inner membrane that forms a window in the bony labyrinth are represented in birds by one bone, the columella.

The organ of Corti is also absent. We may say that this part of the ear is not so subtly built and formed; it has withdrawn more to the inside and is intimately linked to the breathing system.

The sense of *touch* is strongly developed, but has moved towards the periphery. It is embedded in the feather coat. It is not connected with the skin, but radiates out through the feathers in a high degree. We might consider the whole feather coat as a kind of sense organ with which the birds can feel two things: the condition of the air and their own motion. Birds have a marvellously developed sense of *motion*, a feeling for their own movements, especially in the chest region where the large wings originate. The breast muscles are most powerful, while those of the back are not well developed.

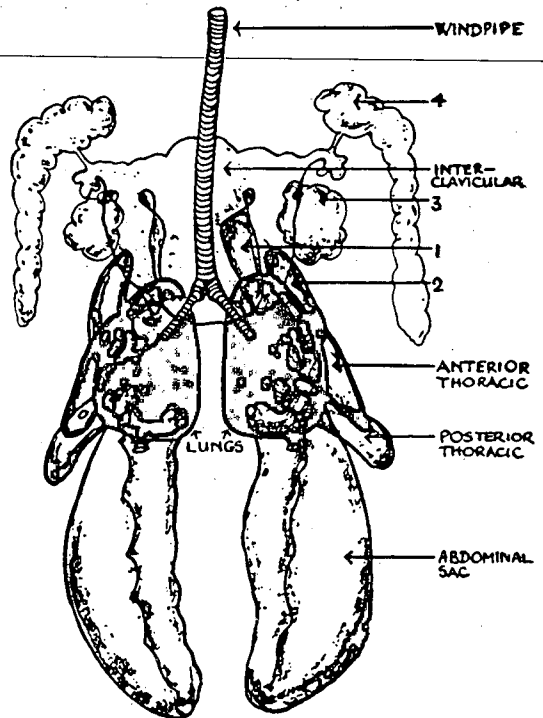
PLATE III.



Various Leg Formations

As far as the *legs* are concerned, they are not even completely covered; this makes them look skinny, and skeleton-like (Plate III). The lack of muscles is rather peculiar in birds. All the muscles are concentrated in the breast. There is a terrific strength in the wings of birds of prey, a concentrated strength which consequently must be missing in the rest of the muscular system. The lower parts of the body must be stunted.

The birds are thus very sensitive to conditions in the atmosphere through which they fly; they are attuned to the activity of the winds and air currents. They have an extremely well developed muscular sense, a sense of motion, a sense for their own movements and at the same time a sense of touch. These various sense-functions cannot easily be discriminated. The whole



AIR SACS (EXCEPTING THE CERVICAL).
1,2,3 AND 4 ARE EXTENSIONS OF THE INTER-CLAVICULAR

Fig. 13.

consciousness of the bird is in the periphery, outside its organism. We do not get the impression that birds develop those senses which are more directed towards the interior, like the sense of smell, taste or inner life-activity. They develop much more everything directed towards the outside world.

The third remarkable feature in birds is the development of the *breathing system*. Birds have huge lungs, reaching as far below as the belly. The *diaphragm* is missing. From the lungs branch off air-sacs, entering the bones and the wings.

Some of those branches enter even into the feathers, so that the bird is everywhere surrounded and embedded in air. There is, so to say, a metabolism of air reaching even into the bones. The activity of the lungs extends to the bony system and therefore permeates the blood directly. The bird breathes much more vigorously than other animals. It breathes most intensively, therefore it takes much more oxygen into its organism and the processes of combustion are enhanced. That is the reason why it mineralises so many substances, why it deposits so much ash. Internal combustion is so lively, that, as it were, everywhere ashes fly away into its feathers. It is imbued with an indestructible life-process which continually pulverises into mineral substance. Therefore the necessity arises for excessive movement.

Birds have a high blood temperature—about 40°C is not unusual. The pulse is much quicker—similar to man's in his earliest childhood: 120—140 beats a minute. Thus the heart beats quickly.

All these phenomena can be traced back to the intensive breathing. A *cow* also has a normal temperature of 39°C, but this is not due to intensive breathing, but to intensified metabolism. A cow has such a vigorous combustion because the metabolism is enhanced. In birds you may compare this process to kindling fire with bellows. In cows more fuel is present, in birds more respiration. The velocity originates from above and creates the great mobility and a certain restlessness.

The whole metabolism and *digestive-process* must function quickly. The digestion is rather careless. The bird cannot chew with its beak, therefore this process has to be done by its stomach. Those birds which feed on grains possess a stomach (the gizzard) fitted with many horny layers with which they grind the food. The gizzard acts like a grater. Many birds have to eat things they do not really need for food, to keep this grater going. If they do not get these substances, which are mineralised, they perish. The digestion is also an intensive one, for the digestive juices act

quickly. But they need mineral substances, solid substances to stimulate the process of digestion. They regurgitate these again partly as pellets. This is characteristic of their digestion.

The cow ruminates—it has a kind of devotional digestion—but the bird grates its food; it has a more destructive principle and needs mineralised substances to help. It excretes them again, but could not exist without them. The excretion has to be very quick. The kidneys are well developed as are also the lungs. The *large intestine* is missing. Therefore the excretion is not separated into liquid and solid, but is uniform. The bird has so to say, no time to prepare the excretion—it happens continuously. The large intestine represents an organ which began in animals living on the earth. Ostriches alone of all birds possess large intestines.

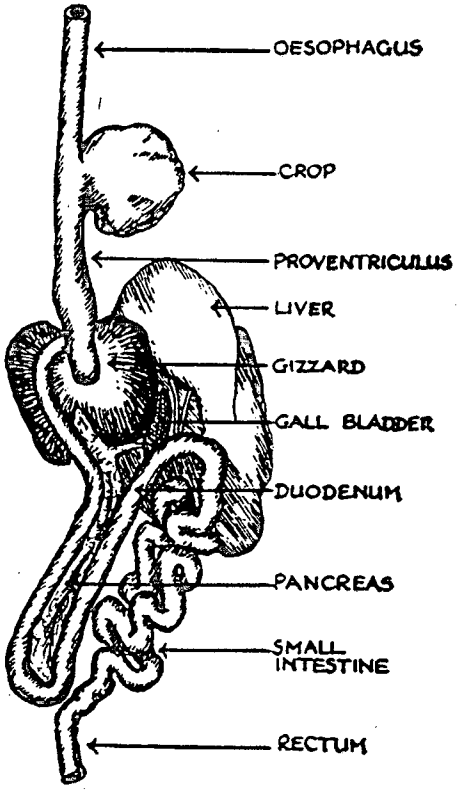


Fig. 14.

It may sound strange, nevertheless it is true, that large intestines may be considered as the legs of the small intestines. When animals began to live on land, they developed real legs, and at the same time large intestines. The true bird has no large intestines. It must have a quick process of digestion, to work with the breathing system. It must eat and pass the food quickly through its body. The metabolism chases through the bird. A similar thing appears in the case of a human being who derives little benefit from his food, because he has to move about too much.

Birds do not get tired easily. Their capacity for movement is enormous. They fly with great velocity, and 50 miles an hour is a moderate speed. Swallows achieve 110 miles an hour quite easily. They can fly many days without getting tired. Why? Because their flying organisation is linked intimately with their rhythmic system. They do not become fatigued, because the heart does not get tired, for they possess a powerful breathing organisation and fly in accordance with the rhythms of the atmosphere. This explains the amazing performances which cannot be found in any other animal species.

We know that the flight of birds is dependent on certain conditions of our planet earth. Some birds migrate and fly during winter to other countries with a definite regularity. They describe specific forms during their flight, for instance triangular forms, and they take their flight over certain districts in Winter. Some fly to southern Europe, some to Africa, some cross the Equator. These routes are fixed. One of them goes right across the Atlantic Ocean. Scientists have made many hypotheses and many theories have been worked out to explain these. A real explanation will only be found, when we form the conception that the birds are exceedingly sensitive to the great atmospheric air currents. The strange phenomenon of migration can be understood if we know that they only fly according to routes having certain ether configurations. They follow the way of rivers. Much has been written concerning the study of migrating birds but it shows the great mistake of looking for the explanation in the intellectual capacities of the birds, attributing much to their small brains. Their intelligence is spread out all over the atmosphere. We do not realise the various changes in the atmosphere, for we are not sufficiently sensitive, but the birds are. They migrate on those air currents where they sense certain ether configurations. They are in unison with the air.

Because a bird is entirely orientated towards the outside world its inner organism is comparatively uninteresting, for it is

empty and dried out. We can only understand it, if we think of it as being intimately connected with the periphery of the earth. To live on the earth, a bird would need a more intensified blood activity and all those organs which are linked with life on the earth would have to be transformed.

Now we turn to the *soul-life* of the bird. Everyone who observes birds, remarks that they are more alert than any other animals. They need very little sleep. Some species sleep scarcely one hour in the 24. They can be heard round about midnight and again at 1 o'clock in the morning. Since all their movements are rhythmic, they do not tire easily. Although birds are very much awake, they are very easily distracted. They certainly lack the capacity for concentration, for their inner life offers them no possibility for developing this quality. They are complete "scatter brains." Creatures endowed with feathers cannot really concentrate. Present day science cannot conceive the idea, that, if an animal looks like a bird, it cannot concentrate in its inner life but it must constantly be diverted by outside objects, it must in fact be "volatile." Singing birds react to every sense perception. They possess a sanguinic temperament, because the air penetrates so deeply into the blood, giving them mobility and such alert senses. During sleep every living organism is regenerated, and refreshed. This is especially true of the human being. The bird does not need sleep for this purpose. It is always in close contact with the whole cosmos, even when fully awake. The human being and all the animals living on earth need sleep, that the cosmic forces may restore the energy used up during waking hours. The bird has a different organisation and is more independent of sleep.

Another remarkable feature in birds is their artistic skill. In this connection we must consider that birds do not produce living young ones, but hatch eggs. They cannot develop in their own inner organism another living being; they are unable to produce the necessary internal warmth in their hardened bodies. Therefore this process must be turned towards the outside. The egg itself has a hardened shell and must be hatched by warmth from outside. While hatching eggs, a hen develops brood-fever, and her plumage undergoes a change. Many soft feathers appear; the strength which usually streams into the feathers is withheld and diverted to the hatching. The eggs of fishes or snakes are hatched by a force streaming in from the outside, the sun. This force is concentrated into the inside of the hen, but it is not strong enough to produce a living organism within her body. No embryo can be formed, the new organism has to be ejected at an early stage

of growth, and must complete its development through the hatching process.

The hen is a bird whose privilege it is to lay eggs, just as the cow has the privilege of milk production. One could express this as follows: the hen is organised for the function of egg laying, but the male bird, the cock, has instead the formation of the comb and the more aggressive temperament. We find a similar phenomenon in the bull. The cow concentrates her forces towards the internal function of milk production, while the bull expresses his energy in his head, and in his choleric temperament.

It is interesting to study the process of egg development. The egg needs exactly 21 days to mature. All the various stages are well known; they have been studied over and over again with the microscope, so that every detail has been found. I will mention only a few facts. On the third day the heart appears, on the seventh day the embryo is free and starts to swim in the amnion water. At that time the head has reached the same size as the rest of the body. On the ninth day a hardening process sets in, some of the cartilage turns into bone; on the fourteenth day the heart starts to beat in the normal rhythm, the limbs, first feathers and head are finished, ossification starts and the sex organs are formed; on the twenty-first day the chicken begins to move, the surrounding skin bursts and it leaves the egg.

We might draw a parallel and compare it with the development of the human being; only what means days in the development of a chicken, means years in the human being. What happens to the chicken in 14 days is analogous to what happens in the human being in 14 years. And the 21 days can be compared with the 21 years of human life. We may even find analogies, observing the more spiritual capacities in bird. After 21 days they become bodily free, and are independent individuals. The siskin starts to sing his own song when he is 21 days old. It is said: "They start to compose." A whole science exists about all these facts, but it is not much studied now-a-days. In the earlier editions of Brehm's Zoology many interesting details can be found.

We find similar rhythms in insect life. Bees follow a rhythm of 21 and 28 days respectively. In these animals what happens in days, we find as interesting yearly epochs in human life. I only mention these facts here to draw your attention to the interesting rhythms acting in the development of birds.

Another factor is the marked difference in the sexes. The male birds are much more beautiful and rich in colour than the female birds. The male sings better. What does this strange difference mean?

The male is more adapted to his surroundings. The feather coat is closely related to the action of *light*. Beautiful colours appear. Everything connected with the senses, with the development of voice and with the capacity of flight, is stronger in the male. This represents the action of light and sound, which enters from the cosmic spheres.

The female bird develops other capacities, such as the hatching of eggs. When the nest is being built, the male bird collects the various materials, the female usually weaves them together. The nest is like a cast of the activity of the birds. The edge has to be made with the beak. Certain parts of the bird's body must fit into the nest, as a cast into the mould. Male and female make the nest together. The male plays the active part, flying about and collecting materials for the female to use. The female lives more under the influence of gravity. Egg formation is connected with earthly conditions. Birds must propagate because they want to live on earth. Their home is where they propagate themselves; apart from this they are not bound to any one place on earth, but are citizens of the whole world.

There is an interesting link between capacity for egg production and leg development in birds. Domestic fowls produce numerous eggs, large in proportion to their bodies, and their legs are very strongly developed. Most other birds, which lay comparatively small eggs, are quite different in their anatomy. The technical terms for the two types are "nidifugous" and "nidicolous," or "insessorial" and "autophagous." All the birds with strongly developed legs, which run about on the earth are nidifugous; they produce large eggs. Those birds which lay small eggs need a nest where the young ones, because they leave the egg in an incomplete condition, may be guarded for some time. These are the nidicolous birds. The birds of prey belong to this group. They must be surrounded by an atmosphere created by their parents. Nest and egg form a contrast. Where there are big eggs, no nest is necessary; but one is essential when the eggs are tiny. Nest building originates in the artistic skill of the birds,* and is linked to the system of nerves and senses; the production of eggs is embedded in the metabolic system. These two activities are in contrast. We can understand that birds have the ability to build nests, because they are not limited to their physical bodies. They over-pass these boundaries in building a nest for their

*See Plate IV.

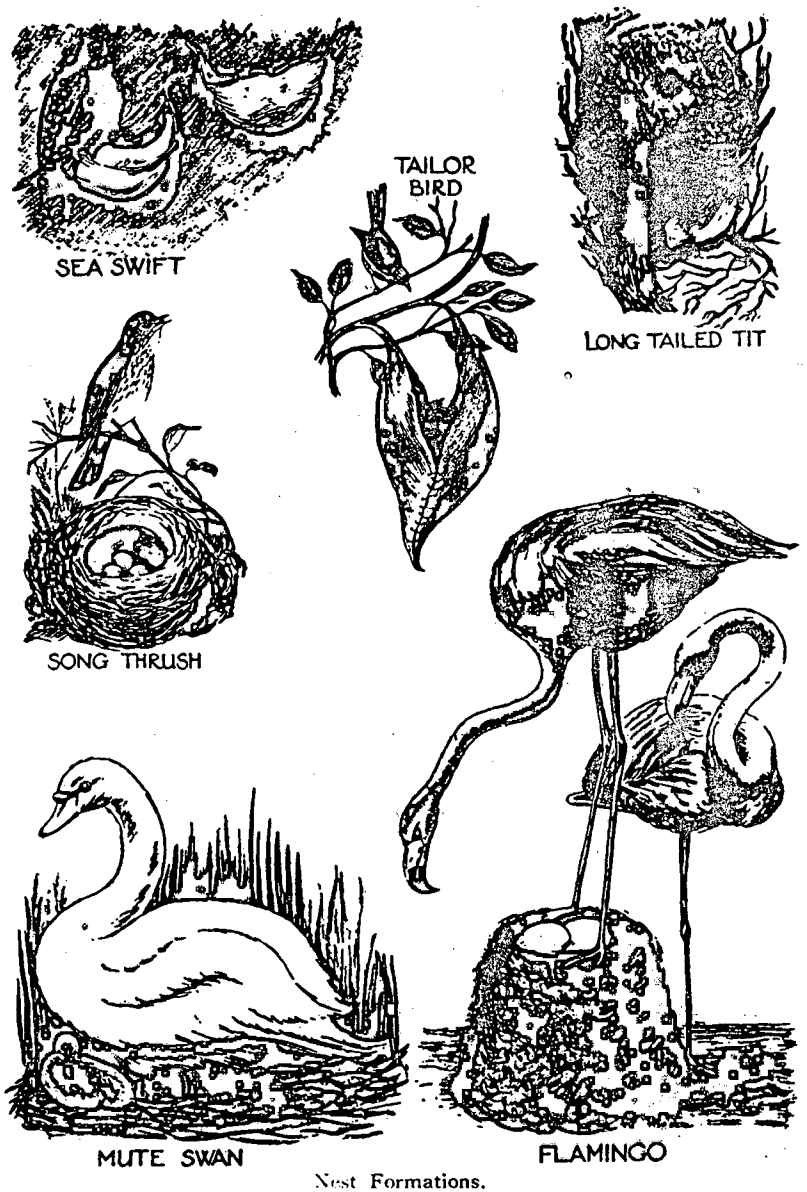
young ones. Make it quite clear to yourself: it could never be expected that a cow would build a nest! The cow includes in her own organism, within the peritoneum, the force which enters into the nest of the bird. The dryness and hardness of the bird is outwardly reflected in the formation of the nest. The more dissociated a bird is from the earth, the more advanced is its power of nest construction. The running birds which are more closely connected with the earth, lack this ability; some make no nests, although they produce huge eggs.

Sometimes people ask: where does this artistic skill arise in birds? What makes the bird so clever? The same forces act in birds when they build their various nests as act in the female mammals, when they develop, inside their bodies, the miraculous embryo.

In running birds these forces have been directed downwards. Consider for instance the contrast between an Ostrich (Fig. 5) with its strong, enormous legs, and a small singing bird, like a thrush (Plate IV) or a lark. In the former we are aware of weight and bulk, force concentrated earthwards; in the latter we see something small and light, but surrounded by cosmic energy. It is in reality an illusion that the singing bird looks so small and the ostrich so big. We must add to the outside appearance the whole activity of the animals, their atmosphere, everything that is surrounding them. We usually do not consider these connections. The artistic skill can be explained by this intimate relation with the outside world. The bird is more or less empty in its bodily organisation and everything tends towards the outside world; there it can build and form, and display artistic skill.

I want to make a few remarks concerning the bird's relationship with man. We have seen that birds develop certain senses to a very high degree, especially the senses of sight and hearing; we have seen how the coating of feathers is built up and we have noticed the peculiar, strongly developed breathing system. The other senses are dimmed down. If we try to compare this with the human being, we can only take the upper part and imagine the lower organisation of man stunted. There is a powerful formation of wings and lungs, and in the head only the middle part would develop as a kind of continuation of the lungs. A bird has a very small brain. It is astonishing that the brain is so small, considering the spiritual capacities. Not only the body, but also the head is empty! It is shocking to observe a peacock, to notice the beautiful plumage growing like a dry vegetation out of th skin, and then the small empty head. It is one of the most stupid

PLATE IV.



Nest Formations.

animals. The whole intelligence has slipped into the spreading tail. There the beautiful metallic lustre catches our admiring eyes —but everything has gone into bodily perfection and nothing has been left over for brain-formation.

In the birds of prey we find relatively more intelligence; still it is a different intelligence from that of a human being. We might ask: where are the forces which usually are connected with the formation of a brain, and appear in human intelligence? They have entered to a great extent into bodily perfections. Rudolf Steiner once remarked that the plumage of a bird is a direct image of thought-formation. Think of a very young bird, before it is fledged, a sparrow nestling for example, and notice how this woolly little creature, with its fluffy covering, straddles in all directions. It looks ridiculous, organically comical. We are reminded of a human being who is naive and, at the same time, in his thinking capacities is not exactly bright, yet full of humour. That is the expression conveyed to us through the plumage of a tiny sparrow.

An eagle is different. There are mighty, powerful thoughts, but only in the form of the beat of its wings. In the realm of birds, thoughts are expressed bodily. Looking with understanding at the various birds, we see the world of human thoughts transformed into organic substance. In a way it is easier to see the bodily connection between mammals and man; that the ruminants are more connected with the lower, metabolic system, the predacious animals with the middle or rhythmic system. It is less easy to say what is developed in birds, which may be compared to something in man, because the breathing system of birds reaches so far into the periphery; what is connected with the brain formation seems to pulverise, and enters into the feathers, so that birds lack intelligence. The flight of birds is the grandest intellectual achievement we can imagine. Slowly we approach this in making aeroplanes. We achieve, by using our intelligence, what is done organically by the bird, and is organically embedded in its organism. Try to study from this point of view the various plumage of birds. Look at a peacock, or a cock, or a hen, or a goose. The stupid goose, with feathers closely packed together is like a way of thinking—an organic way of thinking—which has become dull and obstinate, yet rushes to conclusions without much consideration. The various feather coats are extremely characteristic. It is possible to see in the plumage and flight of birds, much that is enacted in human thought life. Here are habits of mind materialised. Not only the

lungs, the breathing system, but also the nervous system, concentrated in the brain, streams out into the feathery covering There are sparrow-thoughts or eagle-thoughts. The formation of the feathers may be an image of thoughts which have little value, and are short-lived; or which have an eternal quality; and the same is reflected in the flight of birds.

We can classify birds into three main groups.

(1). Singing birds. They are small, and have a subtly built sense organisation. In them we find subtle processes transformed into music, into melodies, into harmonious organic happenings. There is no brain functioning, but a larynx deeper down in the organism, and there they sing under certain atmospheric conditions.

(2). The birds of prey. These are silent birds. They do not sing, but develop above all the capacity of flying. The whole being is centred in the flight.

(3). Running and swimming birds. The lower part is more developed. In a way this is grotesque in birds. In this group we find species with a tendency to extreme thinness, like the storks, or to the other extreme of fatness, like the goose. When birds adapt themselves to life in water they become fat and lose form. An exaggeration takes place, either in length or width; something grotesque appears. They all look like caricatures of birds.

These are the three great groups: singing birds, birds of prey, and those which develop the limb and metabolic system. In this last group we find three tendencies: first the tendency to have large eggs; secondly, disproportionate growth in the legs; and lastly, adaptation of the body to life in water.

There is another group which contains a mixture of all the above-mentioned types. These are the parrots, sometimes also called "winged monkeys" (Fig. 15). They merge the capacity for singing into shrill crying and chattering. They are quite mad. When entering the parrot house in a zoo, it is easy to imagine that one is entering a mad house. Everything seems out of harmony. There are clashing colours and shrieking voices. A parrot can turn its head in all directions, and assume every possible attitude of the body; it can even hang upside down. It is a crazy bird because in it all the three types are mixed. The union of the three produces a similarity to the human being, but in caricature. A parrot chatters without understanding, it imitates the human voice. There is something tragic about it. This bird also reminds

us of an ape, which approaches the human being, but does not succeed in the attempt.

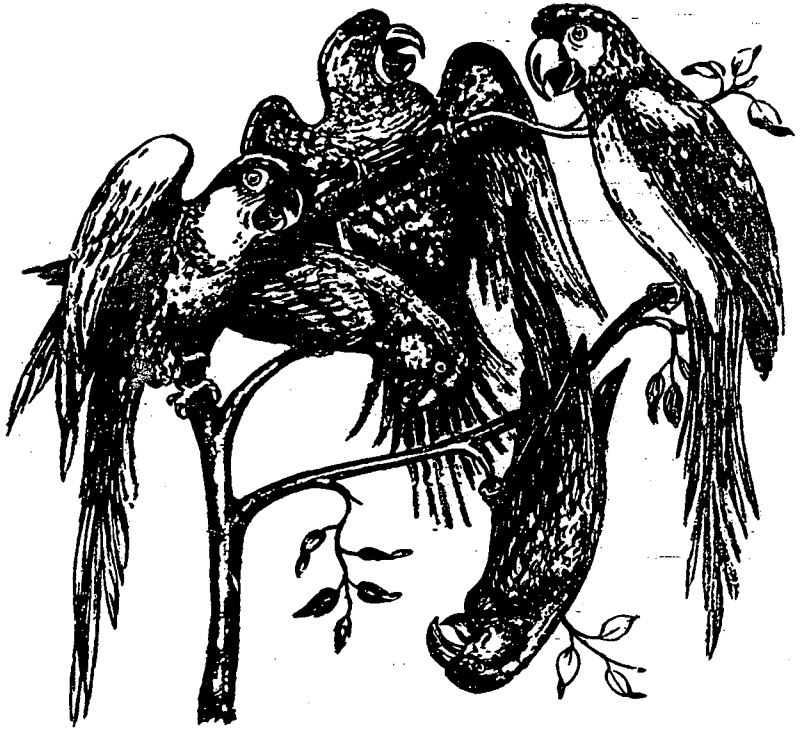


Fig. 15.—Parrots

Of course in addition to the above mentioned three main groups there are various intermediate types. For instance the ravens are between the singing birds and the birds of prey. Some parrots have a tendency towards the birds of prey. Humming birds are nearer to the singing birds, and there are types leading towards the running and swimming birds.

Thus we can divide birds into various groups. But, as a whole we can compare the bird with the upper part of man; or more precisely, with the breathing system and what tends towards spiritual activity in man, which is in birds turned towards bodily expansion in the feather coat. The bird possesses the upper

part of the human organism, but what man has in a spiritual sense, the bird expresses organically.

The bird materialises the spiritual to such a degree, that at the same time the upper organisation of the bird is completely unlike the human form. What is spread out in a bird is contracted in man and transformed into spiritual activity, into thoughts.

We see, in a strange way, the upper part of man: the head, arms and lungs completely transformed and adapted to a life far away from the earth and only touching it now and again. When a bird becomes connected more intimately with the earth, grotesque forms appear.

The bird represents the upper pole of the human organism and has, at the same time, an exceedingly strong relationship to the whole atmosphere of the earth. It has a hardened physical body, and so it depicts the union of the physical with the forces which stream in from the cosmos.

We understand birds if we imagine them as the upper part of the human organism transformed, endowed with wings, and brought into motion.

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EUGEN KOLISKO, one of Rudolf Steiner's most distinguished pupils, was educated at Vienna University as a doctor of medicine. He was also an authority on the Natural Sciences and History, and was a born teacher. As a lecturer in medicine, zoology, chemistry and history, he was much in demand, both in Europe and America. He died in London in 1939, at the age of 46.

Printed by
Clunies-Ross Press
Burley, Hants.

ISBN 0 906492 15 7

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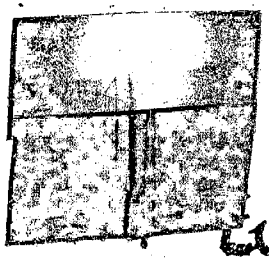

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