THE ORNITHOLOGY OF THE ANCIENTS

PAUL W. SCHWALBE

Ornithology as a modern discipline did not come into being until about 1900, and the first modern text written in this country explicitly as a textbook of ornithology did not appear until 1955, although a laboratory manual by Pettingill had been published in 1946. In view of this, one might think that birds were one of the last groups of living things to receive the attention of man, but this is far from the truth. Birds were important to the ancients in many ways. The ancients not only watched birds, — they used them for food and for procuring food, they used them for sport, they held some of them in religious significance, and they used some for military and national symbols and standards. And, ornithology to some extent was recorded in the writings of the ancient peoples.

The dwellings of Neolithic man in Spain were decorated with crude drawings of birds six to eight thousand years ago. Among these sketches are found several recognizable kinds of birds. One sketch is of a flock of geese in exact formation prepared for take-off. Very good carvings of the Great Horned Owl, King Vulture and Ocellated Turkey were left by the Mayas of Central America, who, like the Aztecs, worshipped the Quetzal (Wallace, 1955).

The eagle was used much for military and national emblems. It was found on the seal of the King of Ur, was used on the seal of Lagash, a city of Sumeria in 3000 B.C., and was also carried by their army as a military standard. The Hittites used a double-headed form in their art. The eagle was the messenger of Zeus to the early Greeks, was to them the only bird that dwelt in heaven, and was used by the Romans on the standards of their legions (Wetmore, 1932).

In the Far East, the ancient Chinese also were influenced by the birds. The wild goose and the "bluebird" were legendary message-carriers of the early orientals. They also figured prominently on the stamps of the Chinese Imperial Post, and on wall paintings and tapestries (Wallace, 1955).

Most of this information has come to us through drawings on the walls of caves, carvings and artifacts brought to light by archaeologists. Important as these findings may be, we perhaps can obtain a much better understanding of the knowledge the ancient peoples had of ornithology from their writings. Some of the oldest published observations of birds can be found in the Bible. In Job 39: 13-14, we find:

> Gavest thou the goodly wings unto peacock? or wings and feathers unto the ostrich? Which leaveth her eggs in the earth and warmeth them in dust.

Also in verses 26-29:

> Doth the hawk fly by thy wisdom, and stretch her wings toward the

south? Doth the eagle mount up at thy command, and make her nest on high? She dwelleth and abideth on the rock, upon the crag of the rock, and the strong place. From thence she seeketh the prey, and her eyes behold afar off.

According to Ussher (1917), these observations were made about 1520 B.C. From around 600 B.C. we find in Jeremiah 8:7:

> Yea, the stork in the heaven knoweth her appointed times; and the turtle and the crane and the swallow observe the time of their coming, but my people know not the judgment of the Lord.

Wallace (1955) tabulates the many biblical references to birds as follows: "About 30 species are designated by name. Birds in general are mentioned 113 times, and particular kinds specified 177 times, with doves (35 times), eagles (32 times), and ravens (12 times) referred to most frequently".

According to Chapman (1943), characters involving at least 16 species of birds were used in the hieroglyphic writings of ancient Egypt. There were of course other general observations made on birds, some recorded in writing and others not, but the more critical and classical studies had their origin with the Grecian scholars, especially Aristotle. When Aristotle is compared with some of these earlier writers there is no doubt as to the accuracy of this statement. Wallace says that Aristotle recognized or accounted for 170 kinds of birds and that another author determined the number to be 140 birds. Pliny the Elder also wrote considerably on ornithology, but much of his writing reads as though it were taken directly from Aristotle, and the original information which he contributed is mostly unreliable, much of it being merely what he had heard from travelers and countryfolk. He was apparently credulous to the extreme.

Since our principal source for ancient ornithology — many consider Aristotle as the great forerunner of modern scientists, and not as the interpreter of ancient science — is the *Historia Animalium* of Aristotle and the *Naturalis Historia* of Pliny, we will be concerned primarily with their writings. All further reference to these two authors will be to these respective works.

Aristotle placed all birds into one large genus, but within this genus he recognized many differences. He gave much importance to the structure of the feet, recognizing birds with talons, with webbed feet, and with four toes. The four-toed birds he divided into those with three toes in front and one behind, and those with two in front and two behind. Because of this distinction he was able to recognize that the Wryneck was a relative of the woodpeckers, which is in agreement with modern classification. The bird's tongue also seemed to be important to Aristotle. He claimed that those kinds with a broad, thin, delicate tongue were very articulate in their sounds, while those with a long, narrow tongue were not so articulate. Singer (1931) suggests the following as Aristotle's classifications of the birds:

a. Birds of prey with talons.
b. Swimmers with webbed feet.
c. Pigeons, doves, etc.
d. Swifts, martins, etc.
e. Other birds.

Pliny distinguished among the birds as those having hooked talons, those with claws, and those with webbed feet. Apparently he classified all birds according to this tripartite grouping. The birds with claws he divided into song-birds and plumage-birds. In addition to this, he believed that some birds possessed real teeth.

Another manner in which Aristotle classified the birds was according to their feeding habits. He stated: "The whole genus of birds may be pretty well divided into such as procure their food on dry land, such as frequent rivers and lakes, and such as live on or by the sea." He also separated the carnivorous birds into those with crooked talons and those without. The eagles, hawks and owls were of course those with crooked talons, while the swallows, titmice, wrens, some finches, and the Rook were the carnivorous birds without the crooked talons. Other groupings found in his writings are the herbivorous and omnivorous birds. He was aware of the fact that most birds of prey rarely drink water.

In connection with food, Aristotle observed that birds had definite territories. This is probably the earliest reference to territories as exhibited by birds. It is mentioned in two different places, one being in reference to the eagle: "The fact is that a pair of eagles demands an extensive space for its maintenance, and consequently cannot allow other birds to quarter themselves in close neighborhood." Pliny interpreted this as, ". . . a single pair of eagles in order to get enough food requires a large tract of country to hunt over; consequently they mark out districts, and do not poach on their neighbor's preserves." Aristotle's second reference concerns the Raven: "In narrow circumscribed districts where the food would be insufficient for more birds than two, ravens are only found in pairs; when their young are old enough to fly, the parent couple first ejects them from the nest, and by and by chases them from the neighborhood."

An interesting account is given by Pliny of a hawk, apparently the Marsh-harrier, which secures some of its food by dropping tortoises to break their shells. The poet, Aeschylus, was supposed to have been killed by this hawk dropping a tortoise on his head.

In regard to bird songs and notes, Aristotle had considerable to say. He recognized that the male and female of a species may or may not have the same notes. Another observation which he made was that in some species of birds, if the young are raised in the absence of adults of their kind but hear the songs of other species, they will learn the songs of the latter. This was demonstrated by experimentation in the British Isles in the late eighteenth

century. In this case an English Robin sang like a Nightingale, and another individual of the same species sang like a Linnet which had been raised with a Skylark, and therefor actually sang like the Skylark (Lack, 1943).

Pliny had more in general to say about bird song. He went to great length in describing the song of the Nightingale and was quite amazed with the length and variation of song coming from such a small bird. Pliny was also interested in the ability of some birds to imitate the human voice. He accredits parrots, magpies, thrushes, starlings, nightingales, ravens and crows as among those birds with this ability.

The reproduction and nesting of birds, especially of the pigeon, was considered in detail by Aristotle. He realized that copulation took place in the reproduction of birds, but thought that some were fertilized through other means as well. The female partridge, for example, could be impregnated during the mating season in any of the following ways: if she were to the leeward of the male, by the voice of the male; or by the male breathing down on her as he flew overhead.

Aristotle believed that most birds nested in the spring and early summer with one exception, — the Halcyon (Kingfisher), which bred only during the winter solstice. To accomodate the bird, this season was supposed to be marked with calm weather for seven days preceding (for nest building), and for seven days following (for the laying and hatching of the eggs) the solstice, the bird of course nesting on the sea shore. Its nest was supposed to be constructed of a material like sea-foam or sponge, and was shaped like a long-necked gourd.

Infertile eggs were known as "wind-eggs" or "zephyr-eggs". Aristotle claimed that these eggs were smaller, more liquid and less palatable than fertile eggs. They were caused apparently by the hens inhaling the spring breezes. Pliny repeated practically everything that Aristotle remarked about reproduction and nesting, including "wind-eggs", but he claimed that they were produced by hens mating with one another.

Migration has probably been to mankind one of the most interesting and mystifying of all bird phenomena. Aristotle noted that pelicans, swans, geese, quail, doves, rails and other birds migrate, with the crane traveling from the steppes of Scythia to the marshlands at the source of the Nile. In addition to this he is probably the originator of the belief that birds in general practice hibernation. This idea became so firmly established in folklore that Dr. Elliott Coues (Lincoln, 1950) was able to list 182 papers dealing with the hibernation of swallows. Aristotle's list of hibernating birds includes not only swallows, but also kites, ouzels, turtle-doves, larks, starlings and thrushes. He claimed that in some species certain individuals would migrate while others would hibernate, depending upon how far they had to go. If the distance seemed too great, these stay-at-home individuals would simply go into hibernation.

Early naturalists in this country claimed that when fishermen in northern waters drew up their nets they would sometimes have both fish and hibernating swallows in them. In the early seventeen-hundreds, one writer gave the probable solution to the question of where birds spend the winter, as being on the moon. There was also the prevalent idea that the smaller species of birds, too weak to make long journeys, would ride on the backs of such larger birds as storks and cranes. Pliny added some material to Aristotle's thoughts on migration. He stated that the "seasons" of birds fell into four categories: those that remain the year around; those that stay for six months; those that stay for three months; and those that leave at the end of their nesting period.

Transmutation was still another theory which Aristotle may have originated. One of his examples is the Cuckoo and the Merlin. The Cuckoo would change from the Merlin in the spring and back to the Merlin again for the winter season. Pliny supported this idea of the Cuckoo being a hawk with a changed shape for a certain time of the year. He was, in fact, more convinced of this particular transmutation than was Aristotle.

As mentioned heretofore, Aristotle recognized about 170 different kinds of birds. Considering the times in which he lived and the materials he lacked which the modern ornithologist takes for granted, he must be credited with keen powers of observation. Of the five species of pigeons and doves now found in Greece, he recognized four; of the wagtails, he knew all three species; and of the eagles, hawks, owls, woodpeckers and others, he named many which we now recognize.

In summary, birds as such played an important role in the lives of the ancients, but they were important only in the particular role in which they had a part. The world had to await the time of Aristotle before birds were studied to any degree for themselves alone. This Greek scientist was the leader in ornithology up to and through the Classical Period. Pliny was second in importance, but much of his material was mixed with superstition and hearsay. Probably more ornithology was known by Aristotle than by any other man in the European countries through the Dark Ages. During this period, together with the other sciences, ornithology suffered a relapse from which it did not recover until the development of falconry in the twelfth century and the later Renaissance.

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