

"LEFT-HANDEDNESS" IN PARROTS¹

BY HERBERT FRIEDMANN AND MALCOLM DAVIS

HAVING frequently observed the parrots in the bird house of the National Zoological Park in Washington at time of feeding, it occurred to us that many of the birds had a marked tendency to use the left foot almost exclusively in the grasping of food. It was thought worth seeing if this peculiarity were individual, specific, or characteristic of psittacine birds generally. In captivity, a parrot, if fed on the floor of the cage, will descend from the perch, grasp the bit of food desired (such as a small piece of apple or carrot) with one foot, and then climb to the perch with the morsel held tightly in the foot, using the bill as a grasping organ to aid in climbing. Upon reaching the perch, the bird then will raise the food to the beak, holding it all the while with the toes, and proceed to eat in this fashion. This mode of feeding is common to parrots generally, and is a familiar act to observers of these birds.

In order to determine the degree of left- or right-handedness, if any such differential use of the foot exists, we selected twenty birds, all caged under uniform conditions. At the morning feeding time (nine o'clock) we introduced into each of the cages a slice of apple about two inches long and a quarter of an inch wide. This food was placed on the floor in the front center of the cages where it was equally approachable by the birds from both the right and the left sides. We then stepped back and recorded the action of the birds. It should be said at this point that none of the birds was shy or nervous; all were used to people and to the regular feeding methods. Several days later the test was repeated, using the same birds but substituting an equivalent slice of carrot for the apple. Parrots chew and obtain the juice from carrots, and it is practically necessary for them to use the feet when eating. About a year later another series of tests was given (two of the birds had died in the interval) with very similar results. In no case did we observe any shifting of food from one foot to the other. Once the food is grasped, it is eaten from the original foot or is dropped on the floor of the cage. Both the apple and the carrot feedings were repeated, so that in all each bird was given 20 tests. On one occasion bread was used, but this proved unsatisfactory, as parrots soak bread in water before eating it, and the birds took the bread in the bill, not in one foot, walked to the drinking fountain, submerged the food in the water, and ate using the bill only.

The twenty individuals tested represented sixteen forms, all typical, hardy, "zoo parrots," species commonly found in collections. The birds used, and their reactions, are tabulated herewith.

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<i>Species</i>	<i>Number of times tested</i>	<i>Number of times used left foot</i>	<i>Percentage of left- handedness</i>
<i>Amazona amazonica</i>	20	15	75
<i>Amazona auropalliata</i>	20	14	70
<i>Amazona auropalliata</i>	20	13	65
<i>Amazona auropalliata</i>	20	19	95
<i>Amazona auropalliata</i>	20	17	85
<i>Amazona oratrix</i>	20	15	75
<i>Amazona festiva</i>	20	7	35
<i>Amazona barbadensis</i>	10	5	50
<i>Amazona albifrons</i>	20	12	60
<i>Amazona viridigenalis</i>	20	19	95
<i>Coracopsis nigra</i>	20	6	30
<i>Psittacula longicauda</i>	20	13	65
<i>Ara severa</i>	20	16	80
<i>Ara maracana</i>	20	12	60
<i>Ara macao</i>	20	20	100
<i>Aratinga leucophthalmus</i>	10	10	100
<i>Tanygnathus megalorhynchos</i>	20	1	5
<i>Brotogeris jugularis</i>	20	20	100
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From this table it may be seen that the percentage of left-handedness exhibited by the birds as a whole is 72.2 per cent, that three-quarters of the individuals showed a definite left-"handed" tendency; that one species, represented by three individuals, *Brotogeris jugularis*, was 100 per cent left-handed. One of us (M. D.) has one of these little parrots in his home. It is very tame and is an ideal pet. A very large number of feeding observations show it to be consistently 100 per cent left-"handed." Of the genus *Amazona*, seven species show 66.97 per cent left-handedness, while the ten individuals involved are 70.5 per cent left-"handed." Of the genus *Ara*, three individuals representing as many species are 80 per cent left-"handed." *Tanygnathus* was the most right-"handed" of the birds observed, using its right foot in 95 per cent of the feedings.

Parson ('Lefthandedness, a new interpretation,' 1924, especially chapters V and VI, pp. 45-69) reviews all the theories that have been put forth to explain handedness in humans. Briefly, the factors that have been assumed to be important in these explanations are as follows (many obviously not applicable to birds at all): (1) habit, (2) nursing and early education, (3) visceral distribution and the displacement of the center of gravity, (4) primitive warfare (weapon held in right hand—in itself a result rather than an explanation of right-handedness!), (5) inequality of blood supply of the brain, (6) asymmetrical origin of the subclavian arteries, (7) superior development of one cerebral hemisphere, (8) ocular dominance (handedness de-

pendant upon eyedness). He gives a very extensive bibliography and it is significant that very few of the titles relate to any animals but human. Although Parson inclines to favor the theory of ocular dominance, the evidence, even in humans, is by no means one-sided, and we may be consoled with the conclusion of earlier writers that, “. . . no solution is better than one or several that are erroneous.”

Washington, D. C.