

when the crops are maturing in the only area under cultivation at that season, and few, if any, migrate along the coast.

EMBERIZA CAESIA* Cretzschmar. Cretzschmar's Bunting.

1 ♂, 14 February 1953, Wadi Adi Barbo, coast.

Winter visitor to coastal grain-fields in large flocks, but not appearing until February in any year.

EMBERIZA CINEREA SEMENOWI Sar. Cinereous Bunting.

1 ♂, 10 February 1952, Jebel Halibai, northern coast.

Very scarce winter visitor, coast; small parties pass through on migration north in mid-March.

FRINGILLARIA STRIOLATA STRIOLATA* (Licht.). House-bunting.

1 ♂, 4 January 1952, Archico, near Massawa.

Inhabits rocky hills at base of eastern escarpment, Sudan border to Massawa and probably further. Has no association with houses at all. The specimen obtained was in breeding condition.

SUMMARY.

A number of genera and lower taxonomic categories have recently been added to the Eritrean list. Distributional and field-notes are given on these and on other birds rarely recorded in Eritrea. The observations on *Comatibis eremita* are noteworthy.

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THE SPEED AND ALTITUDE OF BIRD FLIGHT (WITH NOTES ON OTHER ANIMALS).

By R. MEINERTZHAGEN.

Received on 24 April 1954.

BIRD SPEEDS.

In 1921 I published some preliminary remarks on the velocity of bird flight; since then, a large number of scattered notes have appeared in various publications recording bird speed in flight. The more important of these will be found in a bibliography at the end of this paper; the other records, over 200 in number, are referred to by reference number, the original source being available for anyone interested. I have omitted many records based on guesswork or on inaccurate calculations.

In 1921 I thought that the speed attained by birds when on migration was not greater than normal cruising speed. Harrison (1931) quite rightly questioned this and I am now convinced that I was wrong. In most cases migratory speed is greater than normal flight, as can be seen from many cases quoted in Table A. But there are exceptions. My experience of Accipitrine migration is that they dawdle when on passage, even the falcons not exceeding normal cruising rate; the same can be said of the Laridae or gulls. But among nearly all other groups, migratory flight exceeds normal speed and is best equalled by "going-to-roost" speed; local movement for food is never so fast as flying with a purpose, hurrying to get somewhere.

It would appear that homing pigeons use "migration" speed. Their velocity naturally depends on wind, distance, and may be affected by stimulants, flying under the jealousy and widowhood systems, or when breeding and incubating. When racing they appear to start fast on release, then go slower, then cover the main flight in spurts of fast and slow speeds which tend to break up the flock. Other incentives to high speeds are instanced in Table A by the House Martin, Blackbird, Thrush and Swallow, all acting under the stimulus of parenthood.

Many birds use maximum speeds in courtship flight such as the Lapwing or when playing in crazy flight such as Swifts and many Swallows.

Another interesting fact emerges from Table A. Many birds, even when frightened or pressed by a motor car, do not appear to be able to attain maximum migration speed. Donald (73) found that Indian Crows, whose normal cruising rate is about 25 m.p.h. when near trees, accelerate to 30 and 35 m.p.h. in open country where there is a risk of attack by predators.

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TABLE C.—Continued.

Species	Place	Beats per minute	Remarks
Common Gull	U.K.	252	Rising from ground.
do.	U.K.	168-192	Slow to rapid cruising.
Black-headed Gull	U.K.	156-186	Normal cruising.
Hemprich's Gull	Red Sea	162-192	Slow to rapid cruising.
Kittiwake	U.K.	192, 210	Higher figure at 15 m.p.h.
<i>Rissa</i>			
Sandwich Tern	U.K.	134, 150	Cruising.
Tern	India	134-150	Cruising.
<i>Sterna melanogaster</i>			
Puffin	U.K.	388, 400	Rising from water.
do.	U.K.	371	Hurrying across bows of ship.
do.	U.K.	320-360	Cruising.
Guillemot	U.K.	348	Rising from water.
do.	U.K.	270	Cruising.
Black Guillemot	U.K.	482	Cruising.
do.	Ireland	324	Cruising.
Coot	Ireland	350	Cruising.
Pheasant	Ireland	540	Rising.
Capercaillie	Scotland	270, 276	Males taking off from trees.
<i>Tetrao urogallus</i>			
do.	Scotland	258-272	Level flight during "shoot".

APPENDIX.

Velocity of mammal movement.

Ref.	Species	Place	Ground speed m.p.h.	Remarks
98	African Elephant	Africa	24	Stop-watch; animal scared over distance of 120 yards.
98	African Rhinoceros	Africa	28, 35	Speedometer: 2 counts.
R.M.	do.	Africa	32-35	Speedometer; galloping. Charging a motor car.
R.M.	do.	Africa	27.2	Stop-watch. Trotting. (Chasing a Masai.)

APPENDIX.—Continued.

Ref.	Species	Place	Ground speed m.p.h.	Remarks
R.M.	Cheetah <i>Aciconyx jubatus</i>	London	44	Stop-watch: 3 counts. Chasing electric hare on dog race-track.
190	Fox	Ireland	25-28	Speedometer: maximum.
157	Mongolian Wolf <i>Canis lupus</i>	Mongolia	36	Speedometer. Chased by motor car.
152	Greyhound	U.K.	40	Stop-watch on race track. Maximum speed.
R.M.	African Wild Dog <i>Lycan pictus</i>	Uganda	38	Speedometer. Chased by car on road.
R.M.	Atlantic Seal <i>Halichoerus grypus</i>	London Zoo	4.3-4.9	Stop-watch. Under-water movement over 26 feet after food; an immature beast.
R.M.	Californian Sea Lion <i>Zalophus californianus</i>	London Zoo	10.2-10.6	Stop-watch. Under-water movement over 75 feet after food.
155	Dolphin <i>Delphinus</i> sp.	—	20-25	Checked by ship's speed.
R.M.,	English Hare <i>Lepus timidus</i>	U.K.	34-38, 45	Speedometer. Pressed by motor car.
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152	Race Horse	U.K.	40-41	Stop-watch. Flat race, carrying 7-8 stone.
152	do.	Grand National	28-82	Stop-watch. Carrying 12 stone.
152	do.	Derby Stakes	36	The Derby winner in 1936.
157	Wild Ass <i>Equus hemionus</i>	Mongolia	36-40	Speedometer. Maximum speed when pressed.
98	Antelope sp.	Gobi Desert	60	Speedometer. Going full out over short distance.
R.M.	Coke's Haartebeeste <i>Alcelaphus buselaphus</i>	Kenya	37-38	Speedometer: 2 counts. Going full out in front of car over a mile.
R.M.	Blue Wildebeeste <i>Connochaetes taurinus</i>	Kenya	34	do.: 1 count.
154	Bat sp.	U.S.A.	10	Instruments. Flying.
R.M.	Man	Kenya	18.4	Stop-watch. A Masai warrior with spear and shield chased by a rhinoceros.
187	do.	U.S.A.	21.9	World's record by Patton for 100 yards in 1948.
187	do.	Sweden	14.9	World's record by Haegg for one mile in 1945.