by
Satish Dhawan

Jointly Published by the Indian Academy of Sciences and Raman Research Institute

CONTENTS

Introduction

Evolution, Species, Occurrence, Pioneers of flight, The Scientists

What it takes to fly

The structure adapted for flight, Wings and feathers, The muscles, Flight control and navigation

Types of bird flight

Flapping flight – "power-on", Detailed observations of wing motion, Take-off and landing, Propeller action, Illustrations of flapping kinematics, Hovering flight, Gliding and soaring

Production of aerodynamic forces by the wings

Flow patterns and forces on airfoils, Circulation and lift, The finite wing, Downwash and induced drag, Linearised theory, Flapping amplitudes and frequency, Summary of discussion, Velocity and forces

Flight mechanics of the bird

Estimates of lift, Estimates of drag, Power required for flight, Discussion, Power for hovering flight, Transition to and from hover flight to forward flight, Gliding and soaring, Discussion, Effects of head and tail winds, Soaring flight, Turning flight, Dynamic soaring

Power available

Metabolic rate, Muscle power, Fuel and oxygen, Structure and action of muscles, Muscle action during flight, Wing frequency, Economy during gliding, Power output from muscles

Flight performance of birds

Flight characteristics, Performance estimates, Endurance and range, Discussion

Effects of size and shape

Scaling laws, Discussion, Wing shape

Price: India, Rs 100; Other countries, US $ 25

Copies now available. Please write to

The Circulation Department, Indian Academy of Sciences, C.V. Raman Avenue
Post Box No. 8005, Sadashivanagar Post, Bangalore 560 080

Fax: 91-80-3616094; E-mail: orders@ias.ernet.in