

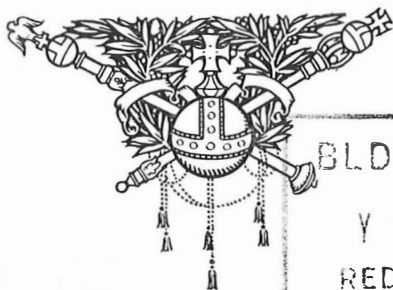


Claude Graham-White



# AVIATION

*by*  
CLAUDE GRAHAME-WHITE



BLDSC BOOKNE

Y 10 / 2242

REDISTRIBUTED  
MATERIAL



COLLINS' CLEAR-TYPE PRESS  
LONDON & GLASGOW

## PREFACE

SEVERAL courses are open to one who writes a book about flying. One can make it technical, for instance, and so appeal merely to the experts. In this way, one caters for a very limited audience. Or one can make it semi-technical, and endeavour to appeal to experts and to the ordinary individual as well. This I do not regard as a very happy compromise. Or the book may be made frankly non-technical, and so bid for the interest of all those readers who desire a knowledge of flying, but who do not wish any large amount of technical information.

From this third point of view I have written my book; and I hope that just the ordinary individual, who does not want to be bothered by stacks of facts and rows of figures, will find something in its pages that will really interest him.

If he does, I shall feel that my work has been amply repaid.

CLAUDE GRAHAME-WHITE.

LONDON, 1912.

# CONTENTS

## FIRST SECTION

### THE BEGINNINGS OF FLIGHT

	PAGE
I.—Sir George Cayley—Henson and Stringfellow—Stringfellow's steam-driven model monoplane—Formation of the Aeronautical Society . . .	13
II.—Phillips's model aeroplane—Otto Lilienthal commences his tests—The Lilienthal glider—Ader's <i>Avion</i> —Sir Hiram Maxim's big machine . . .	22
III.—Flapping-wing machines—Pilcher's work in England—Lilienthal's death—Chanute, Ferber, and Bleriot—The Wright Brothers begin their tests .	29
IV.—First power-driven flights—The Wrights' triumph—Announcement of their success in England—How they negotiated with France—Their need of a business manager—Wasting precious time—Professor Montgomery's novel gliding tests	39
V.—Successes in France—Santos Dumont's first flights—Henry Farman's great triumphs—His mile flight at Issy—The Wrights at last emerge from their obscurity—Wilbur Wright comes to France—His sensational flying—Two hours in the air . . . . .	47

## SECOND SECTION

### THE PIONEERS OF AVIATION : THEIR PERSONALITIES AND FLIGHTS

I.—The great flying season of 1909—The cross-Channel flight—Latham's bad luck—Bleriot's success—How his feat stimulated aviation—Progress in France—The wonderful Rheims meeting .	55
II.—More personalities—Bleriot—Henry Farman's new biplane—The Gnome motor—Its superiority over other engines—Farman's record at Rheims .	62
III.—Latham's daring—How Paulhan began to fly—His subsequent success—Rougier and Delagrangé—How 1909 ended—English successes . .	68
IV.—The flying season of 1910—Growth of cross-country flying—The flight from London to Manchester—Public interest in aviation—The flying schools . . . . .	73

	PAGE
V.—Some famous flights over land and sea—A double cross-Channel trip—350 miles across country—Daring high flights—From England to Ireland by aeroplane . . . . .	77
VI.—Fine flying in France—From Paris to Brussels and back—The Gordon-Bennett air race—An awkward predicament—M. Leblanc's wonderful escape—High-flying extraordinary—The £4000 cross-Channel prize—A tragedy of the sea . . . .	81
VII.—The air-races of 1911—The second <i>Daily Mail</i> £10,000 prize—The big contests in France—'Beaumont' and Vedrines—Why 'Beaumont' was so successful—What these races proved . . . .	85

### THIRD SECTION

#### A NON-TECHNICAL DESCRIPTION OF THE FIRST AEROPLANES.

I.—How does an aeroplane support itself in the air?—Some simple explanations—What Nature teaches us by means of the bird—The curved wing . . . .	88
II.—How an aeroplane wing exercises lifting power—The dual effect of a properly curved plane—How the 'lift' of a plane is calculated . . . . .	91
III.—The Wright biplane—Advantages of a biplane type of machine—The aeroplane propeller—How the Wright machine was controlled—Its launching mechanism—Advantages of a system of running wheels . . . . .	93
IV.—The Voisin biplane—Constructional details—The question of using one or two propellers—Metal v. wood in propeller construction—The perils of propeller breakage—Wood the favourite material . . . .	97
V.—The Voisin landing-gear—How the biplane was controlled—Its sideways balancing—The fitting of vertical balancing planes—Their disadvantages—Engine troubles . . . . .	101
VI.—The Bleriot monoplane—Its diminutive size—The small lifting planes—Its low-powered engine—Control of the machine—The landing-gear—The monoplane's portability—Its success when fitted with a fifty horse-power Gnome . . . .	104
VII.—The Antoinette monoplane—Its beauty in flight—Comparison with the Bleriot—Its intricate wing construction—Its featherweight engine—The landing-chassis and control—Problem of the Antoinette's lack of permanent success . . . .	107

# CONTENTS

9

	PAGE
VIII.—The Farman biplane—Details of construction—Its method of control—Use of 'ailerons,' or balancing planes—The Farman landing-gear—The pilot's levers . . . . .	113
IX.—The Curtiss biplane—A light, racing-type aircraft—Its method of control—A novelty in 'aileron' operation—The action described . . . . .	116

## FOURTH SECTION

### HOW TO BECOME AN AIRMAN.

I.—Early fallacies concerning the alleged difficulty of piloting an aeroplane—The Wright Brothers' first pupils—No rare qualifications needed to make a pilot, but caution and judgment always necessary—Points to remember . . . . .	119
II.—The choice of a flying school—Importance of a large, smooth-surfaced aerodrome—Need for plenty of machines and good instructors—The question of what machine to learn to fly—Advantages of the biplane . . . . .	122
III.—Special instructional aeroplanes—A system of dual control—How it is operated—A pupil's first stage—Lessons in aeroplane and engine construction—The novice's first flights—The <i>vol plané</i> . . . . .	125
IV.—Mistakes to avoid in the <i>vol plané</i> —A 'pancake' landing—Some amusing incidents—The forgetful pupil—The man with abnormal presence of mind . . . . .	129
V.—The actual controlling of a machine—What the novice has to learn—The need for good 'hands'—Tendency to overdo the controlling actions—'Switchbacking' in the air—A danger in starting . . . . .	133
VI.—Mistake of learning to fly in a hurry—Value of 'rolling' practice—Time necessary for a course of training—The question of cost . . . . .	136
VII.—The certificate of proficiency—How it is gained—Flights necessary, and the rules concerning them—Distance, altitude, and landing tests—Final advice for the would-be airman . . . . .	140

## FIFTH SECTION

### RISKS OF AVIATION: HOW THEY MAY BE AVOIDED—WITH ANALYSIS OF ACCIDENTS

I.—Popular belief in the perils of flying—Comparisons with the early days of trains and motor-cars—Need to approach the question of aeroplane accidents from a logical point of view . . . . .	144
--	-----

	PAGE
II.—The temperament of the airman—Its effect upon the risk of accident—Public misapprehension—How it arose—Some striking statistics . . .	147
III.—One of the gravest risks in flying—What an analysis proved—Dangers of hasty increases in flying speed—Inexperienced constructors—Difficulties of the early builders—The margin of safety	151
IV.—Risks of early-type high-speed monoplanes—Lessons the builders have learned—Fluctuating winds the airman's foes—Peril of abnormally strong gusts . . . . .	155
V.—How the chief risks of flying may be eliminated—Need for 'airworthy' machines—The growth of the pilot's skill—Each flight teaches some lesson—The human element in flying—No 'fool-proof' aeroplanes . . . . .	159
VI.—Engine failure and the risks of flying—The gliding powers of a machine—An example—Engine stoppage over a crowded centre—What the pilot does	163
VII.—Distances aeroplanes will glide—Few bad accidents through engine failure—Danger of low flying—Need for appreciable altitudes when crossing bad country—The two-engined biplane . . . . .	166
VIII.—Final conclusions—A summary of risks, and means for their prevention—Aerial navigation not essentially dangerous—The metal-built, powerfully-engined machine . . . . .	170

## *SIXTH SECTION*

### THE WAR AEROPLANE : ITS USES AND THE PROBLEMS IT PRESENTS.

I.—The new weapon—France's enthusiasm—The organisation of an air-fleet—The question of training, transport, and repairs . . . . .	172
II.—The value of the air-scout—How he can pierce the 'fog of war'—Position of reconnaissance before the advent of the aeroplane—What Napoleon wrote—Types of scouting aircraft—Question of the observer's outlook . . . . .	175
III.—Work of the air-scout described—Rapidity of an aerial reconnaissance—How the airmen make their notes—An actual example—A French officer-airman's report after an early-morning flight . . .	178



# CONTENTS

11

	PAGE
IV.—The French air-fleet—German activities— Statistics of other nations—What Britain is doing —Stinting of funds for aerial work—Our position as regards machines and men—Arousing public opinion—What is needed in future policy . . . . .	182
V.—Checkmating the air-scout—Construction of special artillery—Problem of the aeroplane's vulner- ability to land fire—The fighting aeroplane—Its use in war . . . . .	186
VI.—Problem of aerial fighting—The aeroplane 'destroyer'—How it will operate—Protecting the air-scout—The skill and nerve required to handle fighting aeroplanes . . . . .	190
VII.—Features of the war machine as set down by experts—The importance of speed—How an aero- plane's pace may be varied—Value of flexibility in speed . . . . .	194
VIII.—Quick rising—Its value in a military machine —Some examples—Need for an efficient landing- chassis—An exacting test—The question of start- ing a military aeroplane . . . . .	199
IX.—The naval aeroplane—What it can accomplish —Sea scouting from shore stations—Britain's need —The defensive aeroplane—Type of machine re- quired—An air-scout for use on the high seas . . . . .	202
X.—The aeroplane as an instrument of destruction —Attacks upon land forces and positions—The use of large numbers of offensive machines—The damage that could be done—Organisation the secret of success . . . . .	208

## SEVENTH SECTION

### MODERN TYPE AEROPLANES :

#### THE DEVELOPMENT OF THE 'WATER-PLANE'

I.—Increased comfort for pilot and passenger— Covered-in cabins—The latest type Farman— Biplanes which copy monoplane design . . . . .	212
II.—More powerful aeroplanes—500 horse-power machines now being designed—Heavy loads carried—Increase in biplane speed—Growing prac- ticability of machines . . . . .	216
III.—Wind resistance—How it is reduced in modern- type machines—Aeroplanes at the Paris Show— The racing monoplane—The building of 'water- planes'—The new sport . . . . .	220

	PAGE
IV.—Problems of the water-plane—The sea-going 'craft—Large-sized machines in contemplation—The ideal of the flying boat . . . . .	223

### *EIGHTH SECTION*

#### COMMERCIAL POSSIBILITIES OF THE AEROPLANE

I.—Complexities of the subject—Difficulties of the prophet—Some salient facts—Aeroplane passenger-carrying . . . . .	228
II.—Mail-carrying aeroplanes—Difficulty of flying at a precisely prearranged hour—What the present type machine will do—How an airman seizes a favourable opportunity for flight—The value of speed . . . . .	232
III.—An instance of quick transit by aeroplane—Questions of reliability—What will be required of the commercial machine—The manufacturer's optimism . . . . .	236
IV.—Sending goods by air mail—Special 'fares' for aeroplane passengers—London to Paris by air—surveying by aeroplane—Other possibilities for commercial machines—Question of the cost of air transit . . . . .	240

### *NINTH SECTION*

#### THE FUTURE OF FLYING : WITH SPECIAL REFERENCE TO THE DEVELOPMENT OF AIR- SHIPS

I.—The insistent demand for speed—Can train and steamship satisfy this demand?—The opportunity of the aeroplane—150 miles an hour by air . . . . .	245
II.—Laws of the air—Problems of international flights—Registration of aircraft—The ownership of the air—Conflicting opinions . . . . .	250
III.—The question of the airship—Its early difficulties and failures—Recent successes—What the airship can now do—Its present importance—Airship v. aeroplane . . . . .	254