Foreword to the First Edition: xv
Foreword to the Second Edition: xix
Acknowledgments to the First Edition: xxi
Acknowledgments to the Second Edition: xxiii
Preface: xxv

CHAPTER 1
Introduction: 1

CHAPTER 2
Requirements: 3
  Fuels: 4
  Charge Heating: 5
  Radiator Development: Liquid-Cooled Engines: 5
  Air-Cooled Radial Engine Installation: 7
  Mounting: 8
  The Shakes!: 9
  Engine Vibration: 10
  Lubrication: 11
  Exhaust Systems: 14
  Ignition Systems: 16
  Turbo-Supercharging: 17
  Specifics: 18
  The Air-Cooled Radial versus Liquid-Cooled In-Line Controversy: 20
    Air-Cooled Radial Engines: 20
    Liquid-Cooled In-Line Engines: 21
## Contents

Manufacturing 22  
References 24  

**CHAPTER 3**  
The British Contribution 25  
References 27  

**CHAPTER 4**  
Rolls-Royce 29  

### Merlin 40  
Manufacturing 50  
Construction 52  
Applications 61  
Supermarine Spitfire and Seafire 79  
Service 80  
Hawker Hurricane 81  
Service 82  
North American P-51 Mustang 83  
Avro Lancaster 89  
Service 91  
De Havilland D.H.98 Mosquito 91  
Curtiss P-40F 94  
Fairey Barracuda 95  
Armstrong Whitworth Whitley 96  
Boulton Paul Defiant 97  
Power Augmentation 97  
Would Haves, Could Haves, Should Haves 97  
Other Interesting Applications 98  

### Griffon 99  
Applications 105  
Fairey Firefly 106  
Griffon-Powered Supermarine Spitfire and Seafire 106  
Supermarine Spiteful and Seafang 108  
Martin-Baker MB.5 110  
Paper Airplanes 111  

### Peregrine 111  
Application 111
## Contents

**Vulture** 113  
Applications 116  
Avro Manchester 116  
Blackburn B.20 116  
Other Applications 117  

**The Ones That Never Made It** 117  
Pennine 118  
Crecy 118  
Eagle 22 119  

**References** 123  

### CHAPTER 5

**Bristol** 125

**Poppet Valve Engines** 125

**Mercury** 128  
Applications 130  
Westland Lysander 130  
Miles M-25 Martinet and M-19 Master 130  
Airspeed Limited A.S.45 131  
Supermarine Sea Otter 131  
Bristol Blenheim 131  

**Pegasus** 133  
Applications 134  
Fairey Swordfish 134  
Supermarine Walrus 136  
Short Sunderland 137  

**Sleeve Valve Engines** 137

**Hercules** 140  
Applications 147  
Short Stirling 147  
Vickers Wellington 148  
Bristol Beaufighter 149  
Taurus 151  
Applications 151  
Bristol Beaufort 151  
Fairey Albacore 151  
Centaurus 152
CHAPTER 9

Pratt & Whitney

R-1340 Wasp
Manufacture
Applications
North American AT-6, Harvard, and SNJ

R-985 Wasp Jr.
Applications
Beechcraft AT-11 Kansan (Army Air Force Designation) and SNB-1
(Navy Designation)
Beechcraft C-45 Expeditor (Army Air Force Designation) and JRB
(Navy Designation)
Chance Vought OS2U Kingfisher

R-1535 Twin Wasp Jr.
Manufacture
Applications
Vought SB2U Vindicator
Bristol Bolingbroke

R-1830 Twin Wasp
Performance
Manufacture
Applications
Curtiss P-36 and 75 Hawk
Consolidated B-24 Liberator
Douglas C-47 and DC-3
Consolidated PBY Catalina
Grumman F4F-3 Wildcat

R-2000
Applications
Douglas C-54 Skymaster

R-2800 Double Wasp
Performance
Manufacture
Applications
Chance Vought F4U Corsair
Grumman F6F Hellcat
Grumman F7F Tigercat
Grumman F8F Bearcat
Republic P-47 Thunderbolt
Martin B-26 Marauder
Douglas A-26 Invader
Northrop P-61 Black Widow 275
Curtiss C-46 Commando 277
Northrop XP-56 Black Bullet 278

**R-4360 Wasp Major** 279
Applications 283
Goodyear F2G 283
Republic XP-72 284

**Summary** 288
**References** 288

## CHAPTER 10

**Allison** 291

**V-1710** 293
Early Applications 297
Curtiss XP-37 298
Manufacture 298
E- and F-Model V-1710 Engines 298
V-1710 E 298
V-1710 F 301
V-1710 G Model 302
Two-Stage Engines 302
Turbo-Compounding 303
Diesel Developments 303
Design Improvements 303
Applications 304
Curtiss P-40 309
*Construction (V-1710-Powered P-40s)* 310
Lockheed P-38 Lightning 313
*Construction Details* 314
Service 316
*North American P-51 Mustang, A-36 Apache, and F-6* 317
Construction 319
Service 319
North American P-51J 321
Bell P-39 Airacobra 321
*Construction* 322
Service 325
*Bell P-63 King Cobra* 325
Service 326
*Lockheed Vega XB-38 Flying Fortress* 327
*Curtiss XP-55 Ascender* 327

**V-3420** 328
CHAPTER 11

Wright Aeronautical Corporation 339

R-1820 Cyclone 343
  Manufacture 344
  Applications 344
    Boeing B-17 Flying Fortress 348
      Service 350
      Douglas SBD Dauntless 352
      Brewster F2A Buffalo 354
      Grumman F4F Wildcat 355
    Tank Engines 356

R-2600 Cyclone 14 356
  Applications 358
    North American B-25 Mitchell 360
    Douglas A-20 Havoc, Boston, P-70, F-3 362
    Martin PBM Mariner 364
    Service 364
      Grumman TBM/TfBF Avenger 364
    Service 366
      Curtiss SB2C Helldiver 366
      Short Stirling 368

R-3350 Cyclone 18 368
  Manufacture 372
  Performance 372
  Applications 372
    Boeing B-29 Superfortress 375
    Consolidated B-32 Dominator 379

R-4090 380

References 381
## CHAPTER 12

**Hyper Activity and Other Near Misses**  383

- Continental  383
- Lycoming  387
- Chrysler  389
- Wright Aeronautical Corporation  390
- Pratt & Whitney  395
- Summary  396
- References  396

## CHAPTER 13

**Conclusion**  399

Index  401