BOOK REVIEW

Aircraft Carburetion, by Robert H. Thorner
(John Wiley & Sons, New York, 1946
393 pages, 196 illustrations, 5⅝ x 8⅜, $3.50)

THE BOOK has developed from a series of lectures given by the author under the E.M.S.W.T. at the University of Michigan. Leading manufacturers of aircraft carbureters and aircraft engines cooperated in the compilation and selection of material presented.

The book fills a long-felt need for a specialized treatment of the principles of carburetion as applied to aircraft engines.

The carbureters of aircraft engines have become rather intricate devices and their proper care and operation requires insight into the working principles. Unlike the ignition system which functions completely automatically and without control from pilot or flight engineer, the carbureter requires skillful manipulation. The book is, therefore, written for pilots, flight engineers, mechanics, development engineers and supervisory personnel.

Pilots and flight engineers are mainly concerned with the problem of mixture control and its effect on engine power, fuel consumption and cooling. The mechanic and field engineer are interested in the function of the components of the carbureter and control system.

Emphasis is on the general and fundamental principles underlying the functioning of all carbureters. Discussion of specific types is intended as illustration of these general principles. The book does not deal with servicing and overhaul of carbureters since these operations are adequately covered by manufacturers' manuals.

In presenting fundamental principles the problem arises as to how far back to start in explaining the basic physical concepts. The author is wise in not taking too much for granted. He starts by defining important terms such as: volume, specific gravity, density, illustrating them with a few numerical examples each. Engineers will not be altogether happy about some details of these definitions (e.g. that of "mass"), but this reviewer feels that they will do the job.

Measurement of pressure and pressure conversions are treated in great detail, again making generous use of numerical examples and simple diagrams.

The section on "fluid flow" deals with flow through orifices and jets in various combinations. The material presented here is what was particularly lacking in treatises on carbureters before this book.

A mixture ratio chart coordinates fuel-air ratio, air-fuel ratio and operating condition.

Chapter II treats the basic requirements for a carbureter: to provide proper mixture under all operating conditions. Then follows a discussion of the main components: main metering system, idling system, etc. In discussing the action of these components, many simple but well chosen plots, such as venturi suction vs. air-flow, showing idle, cruise and power range, are presented.

The chapter ends with discussions of air induction systems and fuel systems.

Chapter III takes up the Stromberg injection carbureter, followed by a description of the Chandler-Evans pressure carbureter (Chapter VI). Each one of these chapters on carbureter types is illustrated by photographs, exploded views and diagrams pertaining to the particular mechanism.

Chapter VII presents a comparison of float and pressure carbureters. It serves as a summary of the preceding chapters and emphasizes briefly (18 pages) common features and differences.

Chapter VIII deals with the principles of carbureter testing and also shows how carbureter specifications are arrived at by carbureter and engine manufacturers.

Chapter IX discusses flight operation and is especially intended for pilots and flight engineers. As would be expected, fuel economy is given very careful consideration and takes up most of the chapter.

This reviewer feels that, somewhere in the book, the question of fuel injection, both into the manifold and into the cylinder should have been discussed. If restrictions made it impossible to treat the subject in detail, it would have been well to point out why this form of carburetion may be needed in the future.

Throughout, the book is carefully prepared and shows a background of sound teaching experience. The pages are well subdivided and headings, bold type and italics are generously used. Thus important items stand out. Another detail shows good teaching practice; where items are enumerated, they are actually numbered. For example:

The fuel pump has several functions
(1) It maintains a continuous supply . . . . . etc.
(2) It maintains the pressure . . . . . etc.
(3) It transfers fuel . . . . . etc.

This technique make important items stand out and facilitates reading.

The reviewer is gratified to find no gremlins, Donald Ducks and other cartoons which have become popular in technical manuals.

Reviewed by Peter Kyropoulos

When carburetors are used in aircraft with piston engines, special designs and features are needed to prevent fuel starvation during inverted flight. Later engines used an early form of fuel injection known as a pressure carburetor.Â Some small propeller-driven aircraft engines still use the updraft carburetor design. Outboard motor carburetors are typically sidedraft, because they must be stacked one on top of the other in order to feed the cylinders in a vertically oriented cylinder block. Sponsored. Aircraft carburetor intake AIR box AIR inlet. Pre-Owned. C $189.96.Â AIRCRAFT CARBURETION Robert Thorner Hardcover AIRPLANE CARBURETORS ENGINEERING. Pre-Owned. C $48.74. In Aircraft Carburetion, by Robert H. Thorner, the author uses the formula one hp per 7.0 lb air, as his assumption is that one horsepower per hour will consume one pound of fuel and 7 lb of air.[95] The displacement of the engine, therefore, is not as important as the throttle setting, from idle up to 100% throttle, as for each.Â Endnotes. [91] Cessna 152 Information Manual, p 3-7. [92] Aircraft Carburetion, pp 35-38. [93] Aircraft Carburetion, pp 35-38. [94] NACA Memorandum Report No. L4L18, p 14. Aircraft Mechanic School Study Supplement for Future Aviation Maintenance Technicians. Home. AMT Training.Â Carburetion Principles. Filed Under: Engine Fuel and Fuel Metering Systems. Venturi Principles. Most aircraft of the 1920s and 1930s had a float-type carburetor. They are adequate for civil aircraft which normally fly upright, but present a problem for aircraft which fly upside-down or are subject to a negative g-force, especially military fighters and aerobatic aircraft.Â Pratt & Whitney R-4360 Wasp Major. The pressure carburetor is the black box on top of the crankcase at the rear of the engine. Pressure carburetors were used on many piston engines of 1940s vintage used in World War II aircraft.