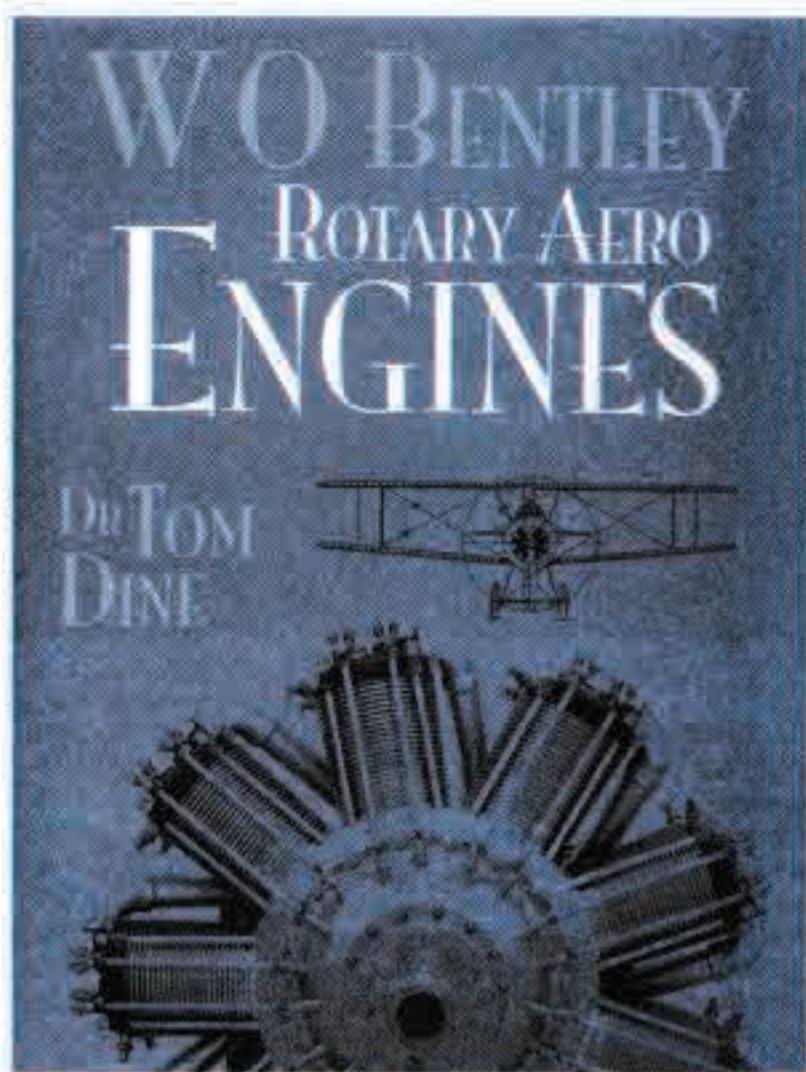


Book Reviews

WO Bentley Rotary Aero Engines
 By Dr Tom Dine
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Reviewed by Ian Craighead



The subject of rotary aero engines is not one that usually gets much coverage. These were simple machines, but their strength was in their simplicity and light weight and this was why the early aviators were drawn to them. It is refreshing, therefore, that this new book by Dr Tom Dine should cover not just the engines of Walter Owen Bentley, but serves as a good summary of those others who had pioneered the engine genus.

Of course, the main emphasis is upon the engines from Bentley. The initial rotary design was the A.R.1 (Admiralty Rotary Mark One), which was very soon changed (officially) to be known as the B.R.1 (Bentley Rotary Mark One). This was a 17.3 litre, 150 hp, 9-cylinder rotary which was installed in a variety of aircraft, the most famous of which was the Sopwith Camel. Deliveries began in May 1917 and the 'Bentley Camels' were in action by July 1917. The B.R.2 was the next development which was larger at 24.938 litres producing 230 hp and production started in early 1918.

The rotary concept, however, has a limiting characteristic. In order to develop more power the engine must be made larger either by increasing the size or number of cylinders. The cylinders revolve around a static crankshaft, creating a large rotating mass. The

larger the engine the greater the gyroscopic effects and subsequent loads exerted on the airframe. This makes flying the aircraft very challenging as each control movement in pitch, roll or yaw results in a gyroscopic reaction in an opposing direction. This, in effect, limited the usefulness of the rotary design making way for the radial and in-line configurations to deliver greater power output. One other side effect, not widely known, was the pilot was liberally doused with castor oil (lubricant flung from the cylinders and whipped by the slipstream into the pilot's face and mouth. Castor oil is a well-known laxative and its effects are mildly mitigated by consumption of alcohol. Not something that the CAA would condone in this day and age!

The B.R.1 and B.R.2 were used in many aircraft applications and these are listed and illustrated with many rare photographs from the archives of the W.O. Bentley Memorial Foundation. Of special note is the fact that the B.R.2 was used as the engine for a number of very early helicopter designs in the 1920s.

There is no aspect of the Bentley rotaries that is left untouched; from the various factories where they were made to the few surviving engines that are left today. It is a very complete volume. Once you have read this



| General Characteristics | |
|-------------------------|------------------------------|
| Type | SE |
| Length | 100 ft 0 in |
| Wingspan | 90 ft |
| Height | 10 ft 6 in |
| Wing Area | 1,000 sq ft |
| Wing Loading | 15 lb/sq ft |
| Empty Weight | 1,400 lb |
| Maximum | 2,000 lb (with 100 gal fuel) |
| Performance | |
| Maximum Speed | 110 mph |
| Cruise | 85 mph |
| Range | 1,000 mi |
| Service Ceiling | 10,000 ft |
| Max Altitude | 12,000 ft |

Tom Dine
 The new book is a comprehensive and detailed history of the Bentley rotary engine, covering the development of the engine from its inception in 1908 to its final use in the 1920s. The book is written in a clear and concise style, making it accessible to both enthusiasts and newcomers to the subject.

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Left: a page detailing the Avro 504L, a three-seat sea plane equipped with a BR1
 Below: W.O Bentley in his record breaking DFP in 1914 and Admiralty Rotary 1

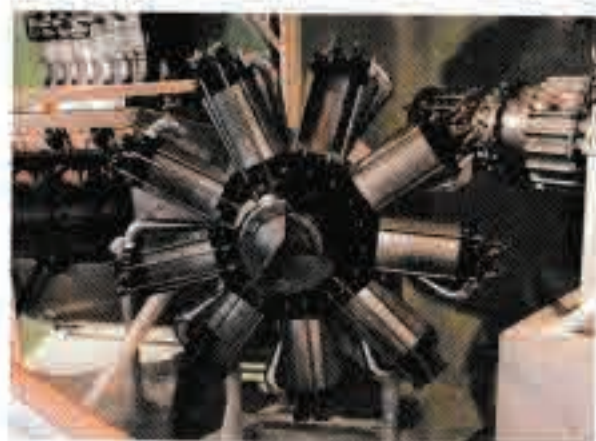
book, you will fully appreciate the workings of the rotary. The crisp reproductions of original drawings are beautifully presented and a separate pull-out of the A.R.1 cross-section shows the internal workings with detailed annotations. The photographs benefit greatly from the large format and the paper quality lets each photo exude detail. There is an accompanying CD containing appendices of engine manuals and documents and even some videos of the B.R.2 powered Sopwith Snipe in operation and flight with Kermit Weeks and views of the Snipe at the Shuttleworth collection.

The book has been well researched and is clean and crisp in its presentation. It has benefitted from an enthusiastic and committed author whose passion for the subject can be felt in his words. A thoroughly recommended read, not only for those whose interest has been stirred by the centenary of World War One, but anyone with an interest in engineering.

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Admiralty Rotary 1
 (Courtesy of the Bentley Memorial Foundation)