



SLOW BURNER

NAME CALLING

Alvis seems to have adopted an eccentric attitude to naming. The origin of the name itself is much disputed. A popular belief that it derives from "Al" for aluminium and "Vis" from the Latin for strength, was strongly denied by Geoffrey de Freville, who named the company. He maintained the word was meaningless. Avro may have had misgivings about its similarity. They forced Alvis to change its logo as A.V. Roe felt it could be easily confused with his own.

Alvis engines were named after slightly obscure Greek heroes. Pelides was the son of Achilles, Alcides is a little-known naming of Hercules and Maeonides a seldom-used alternative for Homer.

Leonides is slightly more problematic. The only reference the author has been able to find is to St Leonides of Alexandria, an early Christian martyr. Suggestions by more learned or informed persons for an alternative origin would be most welcome!

The starboard Alvis Leonides of the Pembroke, with timing disc in place. Both engines have been deep-stripped, fully overhauled and modified. The aircraft is now complete and awaiting a CAA inspection and sign-off.

Photo: Jem Shaw

Alvis can never be accused of rushing headlong into aero engine development, and the Leonides that powers our Twin Pioneer and Pembroke had a particularly long gestation.

The company's roots were put forth in 1919 with the formation of T.G. John and Company. Originally building engine components, stationary engines and small motor cycles, the company moved on to complete motor cars in 1920 with a 30bhp two-seat tourer. changed its name to Alvis - a name of disputed origins - and moved to Coventry, where it began manufacture of the Buckingham motor car under licence in 1922.

Although Alvis built radial engines under licence from Gnome et Rhône, it was not until 1936 that it designed its own unit. Basing its design on experience gained from the licensed engines, and with considerable help from Gnome et Rhône, Alvis conceived the Alvis Pelides radial engine. The French DNA was readily apparent, with the Pelides retaining metric cylinder dimensions, though fixings were all changed to use the somewhat less orderly British Standard Fine (BSF) and Whitworth standards.

The Pelides was successfully tested by the Air Ministry in 1937, in which it produced 1,065hp over a fifty-hour test. Despite this encouraging start, it was to become an engine with no airframe to match it, and production was abandoned after only fifteen units.

At the time, the Alvis design office held the promise of a range of of radials, scaling up from the Pelides with the 1,300hp Alcides and down with the 650hp Maeonides. None of these designs was to be completed.

ENTER LEONIDES

Also in design was a lighter engine, which went to prototype in 1936. Identified as 9ARS, the engine ran successfully, developing 450hp for only 693lb of weight. Airspeed provided

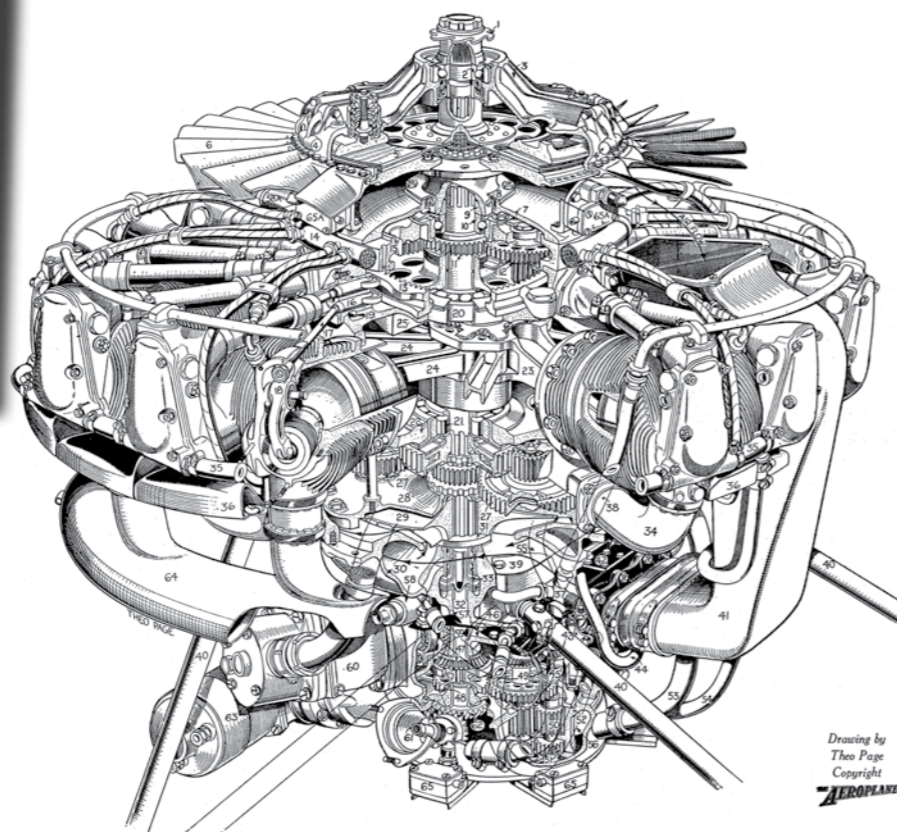
a modified Bristol Bulldog biplane for test flights, and all seemed well for the new power unit, which was christened Leonides. World War Two saw little development of the unit, however, as Alvis was heavily committed to engine production for Rolls-Royce. The severe damage to the factory during the Coventry air raids in 1940 will also have virtually halted any activity not seen as vital.

Post-war, further flight trials were carried out in an Oxford and its post-war variant, the Consul, both provided by Airspeed. Both of these aircraft were usually fitted with Armstrong-Siddeley Cheetahs, similar to the Anson. The Leonides showed a 100hp power advantage for less than 60lb weight penalty.

The Leonides was launched to the market in 1947, over a decade after the first run of its prototype. Two model series were developed, the 500 for fixed-wing and 520 for helicopters. First to take on the 500 series was Percival Aircraft, with its attractive and advanced Prince. This is the aircraft that would later be developed for the RAF as the Pembroke. Meanwhile, Westland installed the 520 series in its licence-built Sikorsky S-51, replacing the Pratt & Whitney unit used in the original design. Westland developed the S-51 into its own version, with the introduction of the Leonides-powered Dragonfly in 1950. This used an uprated engine, rated at 500hp, later raised further to 540hp.

The 530 Series appeared in 1959. This saw the stroke increased from 4.4 to 4.8 inches, upping power output to 650hp. This series, used to power the Scottish Aviation Twin Pioneer, continued in production until 1966.

ALVIS LEONIDES 523 HM



Cutaway courtesy of Kelsey Publishing



The Leonides 520 Series was modified for use in helicopters. Most visible among the modifications was fan cooling, designed to compensate for the lack of airflow caused by its vertical mounting. Most 520 Series engines were direct drive, with the rotor rotating at crankshaft speed, rather than geared down as was normal for propeller use.

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|---|---|
| 1. Coupling plate to helicopter drive shaft | 34. Inlet pipes |
| 2. Clutch main bearing | 35. Rocker drain oil pipes |
| 3. Clutch housing casting | 36. Intercylinder baffle plates |
| 4. Clutch bobweights | 37. Union connection for top and bottom fire extinguisher spray rings |
| 5. Clutch plates | 38. Connection pipe to top spray ring |
| 6. Cooling fan blades | 39. Engine mounting ring |
| 7. Top cover plate | 40. Engine mounting struts |
| 8. Oil retainer seal | 41. Air intake duct |
| 9. Split cone to clutch driving flange | 42. Throttle housing |
| 10. Top engine thrust bearing | 43. Throttle control |
| 11. Timing gear main drive | 44. Oil feed pipe to tappets and rocker arms |
| 12. Satellite drive gear | 45. Main scavenge oil pipe to throttle housing |
| 13. Cam disc | 46. Main oil feed to engine in casting |
| 14. Ignition harness | 47. Magneto spring drive |
| 15. Timing case | 48. Oil pump driving gear |
| 16. Tappet rollers housing unit | 49. Driving bevel and oil pump, intermediate gear |
| 17. Hollow push rods | 50. Scavenge oil pump |
| 18. Rocker arms | 51. Pressure oil pump |
| 19. top half crankcase casting | 52. Rear cover bottom half casting |
| 20. Top main roller bearing | 53. Crankcase drain to bottom half |
| 21. Bottom main roller bearing | 54. Rocker oil drain |
| 22. Bottom half crankcase casting | 55. Boost pressure pipe |
| 23. Master connecting rod | 56. Oil feed pipe to boost control unit |
| 24. Articulated connecting rods | 57. Boost control unit |
| 25. Balance weights | 58. Lower engine breather. 58A Top engine breather |
| 26. Supercharger spring drive | 59. Magneto drive |
| 27. Centrifugal clutch | 60. Magneto (BTH C9B/1) |
| 28. Supercharger gear casing/diffuser | 61. RPM generator (Smith's MkVIII) |
| 29. Impeller | 62. Starter and RPM main drive |
| 30. Rear cover top half | 63. Starter (Rotax, hand & electric Type C.0251) |
| 31. Fuel slinger ring | 64. Main exhaust pipe |
| 32. Internal drive shaft | 65. Flame switches, bottom. 65A Flame switches, top |
| 33. Thrust washers | |



This page, from top: Bristol Bulldog, original flying testbed for the Leonides engine Airspeed Oxford. This and the Consul were used for post-war testing. Percival Prince, first production mounting. This one belonged to Standard Motors, hence the Standard Vanguard in the foreground. Westland Dragonfly, developed from the Sikorsky S-51 Opposite: Twin Pin G-APRS on approach Inset: Pembroke G-BXES is now flight-ready and awaiting CAA inspection.