# **ROTORCRAFT SECTION REPRINTS**

The following completes the list of Rotorcraft Section lectures published in the August issue of *The Aeronautical Journal*. Most of them are available as reprints.

Author	Title			Published
Mensforth, Sir Eric	The Future of Rotorcraft and Hovercraft			Jan. 1967
Cheeseman, I. C. and Seed, A. R.	The Application of Circulation Control by Blowing to Helicopter Rotors $\dots$		•••	July 1967
Hunt, G. J.	Autogyro Developments in North America	•••		Dec. 1967
Stratton, A.	The Principles and Objectives of Cost-Effectiveness Analysis		• • •	Jan. 1968
Culver, I. H.	Progress of the Rigid Rotor Concept		•••	Feb. 1968
Clarke, A. E. and Bramwell, A. R. S.	Selected Aspects of the Aerodynamics of Rotorcraft			Feb. 1968
Curties, M. C.	Helicopter All-Weather Operation—Equipment for the Transport Role	•••		March 1968
Meyersburg, R. B.	Experiences of City Heliport Operations	•••		June 1968
Payne, N. J.	Future City Centre Heliport	• - •		June 1968
Bristow, A. E.	Commercial Operation of Helicopters		••••	Aug. 1968
Borst, H. V.	Review of V/STOL Aircraft with Tilt-Propellers and Tilt-Rotors		••••	Sept. 1968
Kennedy, C. D. S.	Helicopter Armament for Land Operations			Oct. 1968
Silverleaf, A.	A Review of Hovercraft Research in Britain	•••		Dec. 1968
Carlson, R. M.	Possibilities of Compound Rotorcraft—Status 1968			Dec. 1968
Collomosse, H.	All-Weather Operation for Helicopters: Flight Control Systems for Helicopters			Feb. 1969
Legrand, L. F.	The Next Generation of French Helicopters	•••		July 1969
Crago, W. A.	Marine Safety Aspects of Helicopters	•••		Aug. 1969
Phillips, F. C.	The Canadalr CL-84 Tilt-Wing V/STOL Programme	•••		Aug. 1969

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#### SCANLON, J. and JONES, M. E. B.

#### Developments in Polymeric Materiais

Strictly many materials such as ceramics, cement and even metals should be classed as polymers since the atoms within them are bound by strong chemical bonds into large groups usually of indefinite size. This article will deal only with the synthetic organic polymers and, in fact, will consider mainly the plastics, little attention being given to rubbers and fibres.

#### The Aeronautical Journal RAeS September 1969

#### VALLAT, SIR FRANCIS

#### The Outer Space Treatles

The first earth satellite put into orbit by the Soviet Union in 1957 had immediate political and legal repercussions. Beginning in 1958, the UN General Assembly has adopted a series of resolutions culminating in the Declaration of Legal Principles Governing Outer Space Activities of 13th December 1963. International Interest in outer space is part of the general insistence on the development of science and unappropriated resources for the benefit of mankind as a whole, and on the protection of humanity from the threat of mass destruction.

It is against this background that we should consider the treaty on Principles Governing Outer Space Activities opened for signature in January 1967, and the Treaty on Rescue and Return of Astronauts opened for signature in April 1968. The intricate problems of liability for damage, though studied at length, have not been solved. Other matters not dealt with include control of "illegal" activities in outer space, the exploitation of celestial bodies, harmful effects to our environment, interference with civil aviation and the definition of outer space.

#### The Aeronautical Journal RAeS September 1969

SPEECHLEY, J.

#### Engineering Development in Helicopter Design-A Review

The purpose of the paper is to review the engineering developments that have taken place in the helicopter over the past two decades, since large-scale production began.

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The review will trace the development from the post-war period—the S51 Dragonfly—to the current engineering concepts employed in the WG13, the British designed share of the Anglo-French helicopter package deal.

The current operational anti-submarine helicopters have led to a state-of-the-art that will permit military and civil helicopters to operate in all but the worst of conditions. The integrated navigational facilities available now, together with the advanced concepts of automatic flight control systems are outlined, associated with the operational reliability and maintainability that will be essential to economic civil and military operations.

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FOZARD, J. W.

#### The Harrier—an Engineering Commentary

The lecture examines those engineering features of the design which have direct relevance to the specified role of the Harrier and which contribute to its unique operational capability.

A subject review covers the past 10 years of vectored thrust experience at HSA Kingston, illuminating the genealogy of the aircraft. This is followed by a brief discussion of the specification background and the apparent cost of providing V/STOL in a combat aircraft. Engineering features arising from the aircraft's V/STOL ability are covered in a detailed commentary on the landing gear and the control systems. This emphasises the special elements and design considerations which arise from the ability to operate at very low forward speeds from unprepared airfields. Some maintenance and reliability aspects of the complete weapons system are discussed in the light of the influence exercised by both the conventional and the V/STOL modes of flight and the consequent probable operational usage.

#### The Aeronautical Journal RAeS September 1969

#### YAGGY, P. F.

#### Future Rotorcraft Research in the USA

This lecture deals with research efforts planned and under active pursuit in the USA to develop rotorcraft of improved capability. Primary emphasis is placed on the aerodynamic and aeroelastic considerations with propernote being taken of the influence of advanced engine, structures and material technology. Problems and potential solutions of fluid dynamic and structural dynamic phenomena are reviewed in consideration of current and future investigations. The influence of these studies on the potential for increased performance, improved economy and reduction in rotor generated noise are discussed.

This lecture confines itself to a general discussion of the problem and does not deal in particular with any helicopter system. However, novel concepts for the exclusion, suppression, or deferment of limiting phenomena are discussed.

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#### MAJENDIE, A. M. A.

#### Air Transport-the Manning of an Expanding Industry

The establishment of an Industry Training Board for the Civil Air Transport Industry in March 1967 has provided, for the first time, a single central point of focus for the trained manpower needs of the Industry. The Industry coming within scope of the Board is described and analysed. The results of preliminary manpower surveys are presented and discussed and the likely growth of the Industry in relation to its future needs for trained manpower.

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DISBREY, Air Vice-Marshal W. D.

#### Operating Aircraft Engines in the RAF 1968 Sir Henry Royce Memorial Lecture

The paper deals with the views and ideas of a major customer of the British aero-engine industry—the RAF. It covers the main problems experienced in operating turbine engines, and requirements now and in the future. Particular reference is made to the special environmental conditions with which the RAF have to contend.

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#### Effectiveness in R & D

This is an abbreviated version of the Report of the Working Party set up by the Future Policy Committee of the Society in February 1968 to study ways of getting more cost effectiveness from R & D funds in the UK. The full Report, with data, is available in the Society's Library.



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