

AUSTRALIAN JOINT COPYING PROJECT

LAWRENCE HARGRAVE

Papers, 1866-1915

Reels M367-72

**Royal Aeronautical Society
4 Hamilton Place
London W1**

**National Library of Australia
State Library of New South Wales**

Filmed: 1957

BIOGRAPHICAL NOTE

Lawrence Hargrave (1850-1915) was born in London and educated at Queen Elizabeth's School in Kirkby Lonsdale, Westmoreland. In 1865 he sailed to Sydney to join his father, who was a judge of the Supreme Court of New South Wales. In 1867 he was apprenticed to the engineering workshops of the Australasian Steam Navigation Company, where he worked for five years. Between 1872 and 1877 he took part in a number of exploring expeditions to New Guinea, including the *Neva* expedition led by the Italian naturalist Luigi D'Albertis. He was elected a member of the Royal Society of New South Wales in 1877. From 1879 to 1883 he worked as an observer at the Sydney Observatory under H.C. Russell, the Government Astronomer.

Justice Hargrave died in 1885. On account of his shrewd property investments, Lawrence Hargrave was able to give up paid employment and take on the role of a gentleman-inventor. He developed a passionate interest in the possibility of flight and his first paper on the construction of flying-machines was presented to the Royal Society of New South Wales in 1884. He constructed several types of engines and in 1889 built the compressed air engine powered by three rotating cylinders. In the 1890s his experiments led to the invention of the box kite, which he believed had greater stability and lift than monoplanes. He continued his aviation experiments for many years, designing engines and working on the curvature of supporting surfaces, but his work was overtaken by the success of the flights carried out by the Wright brothers from December 1903 onwards. (Hargrave had a long correspondence with the Chicago engineer Octave Chanute, who was closely associated with the Wrights.) Nevertheless, Hargrave took a strong interest in aviation developments until the end of his life.

In his later years Hargrave campaigned against the patenting system and also formulated his Lope de Vega theory, believing that two Spanish ships had discovered Sydney Harbour at the end of the sixteenth century.

HARGRAVE PAPERS

Lawrence Hargrave's 'journals' of research notes, drawings, correspondence and other papers, dating from 1865 to 1915, were donated to the Royal Aeronautical Society by Margaret Hargrave in the 1920s. In 1963 the Society transferred them to the Museum of Applied Arts and Sciences in Sydney. The Museum's name was changed to the Powerhouse Museum in 1988. At some point, the six volumes were disbound and rebound in four volumes, so there is no longer an exact correspondence between the volumes on the microfilm and the volumes held in the Powerhouse Museum.

LAWRENCE HARGRAVE

The six volumes, which Hargrave called 'journals', are paginated. However, many of the images on the film contain no page numbers and it would seem that originally a great number of printed documents and other papers were loosely inserted in the volumes. The total number of images is therefore far greater than the page numbers suggest.

The volumes were not filmed in chronological order. The three earliest volumes were filmed on reels M370-72 and are preceded by two of the later volumes on reels M367-69. Within each volume the papers are filed chronologically, with the exception of the geographical-astronomical volume which is divided into thematic sections. Altogether, it is a remarkably comprehensive collection, with a complete record of Hargrave's study and work on aviation from 1870 until his death in 1915.

Reel M367

1. Flying machine work, Aug. 1892 - Sept. 1895 (263pp)

A volume of correspondence, manuscripts, drawings, designs, research notes, specifications, financial papers, newspaper cuttings, circulars, patents and other printed items relating to Hargrave's aviation research and the work of other researchers in Australia and overseas.

The correspondents include B. Baden-Powell (London), T.J. Bennett (Oxford), Octave Chanute (Chicago), R.W. Chapman (Adelaide), W.J. Dayton (Sydney), William Eddy (Bayonne, USA), H. Hervé (Paris), Sidney Hollands (Old Charlton, Kent, UK), C.F. Langley (Melbourne), A.L. McCredie (Sydney), William McNamara (Sydney), George C. Maryon (London), W. Masters (Sydney), James Means (Boston), G. Pellissier (Paris), J. Arthur Pollock (Sydney), Franz Reinhold (Halberstadt, Germany), H.C. Russell (Sydney), G.C. Taylor (Helsby, UK), James Thomson (Sydney), Prof. Richard Threlfall (Sydney), Prof. Albert Zahn (Notre Dame, USA), the Engineering Association of New South Wales and the Royal Society of New South Wales. In addition to the in-coming letters, there are copies or drafts of Hargrave's letters.

The volume also contains a paper on flying machine motors and cellular kites (pp 75-85) and the manuscript and reprint of his paper entitled 'Flying-machine work and the ½ h.p. steam motor weighing 3¼ lbs' (Royal Society of NSW, Aug. 1892).

There is an index at the end of the volume.

2 Flying-machine work, October 1895 – April 1909 (pp 1-139, 1895-98)

The volume contains correspondence, manuscripts, reports, drawings, calculations, research notes, financial papers, photographs, newspaper cuttings, reprints and other printed items relating to Hargrave's aviation research and overseas developments. The subjects include trials of engines,

flying machines and kites, experiments with balloons, and Hargrave's efforts to find a permanent home for his models.

The correspondents include Alexander Adams (Sydney), B. Baden-Powell (London), Edmund Barton (Sydney), F.W. Brearey (London), Octave Chanute (Chicago), William Eddy (Bayonne, USA), H. Hervé (Paris), Sidney Hollands (Old Charlton and Coventry, UK), J.C. Maryon (London), Sir Hiram Maxim (London), James Means (Boston), Albert Merrill (Boston), Hermann Moedebeck (Strasbourg), J. Arthur Pollock (Sydney), H.C. Russell (Sydney), G.C. Taylor (Helsby, UK), James Thomson (Sydney), Professor Richard Threlfall (Sydney), Prof. Albert Zahn (Washington), the Boston Aeronautical Society, the Engineering Association of New South Wales and the Royal Society of New South Wales. There are also copies of Hargrave's letters.

The volume contains reprints of Hargrave's articles 'On the cellular kite' (Aug. 1896), 'Aeronautics (June 1898) and 'Soaring machines' (Nov. 1898), which were all published by the Royal Society of New South Wales.

There is an index at the beginning of the volume.

Reel M368

2 Flying-machine work, October 1895 – April 1909 (continued, pp 140-289)

The correspondents in this part of the volume, which covers the period August 1898 – September 1904, include W.E. Abbott (Sydney), B. Baden-Powell (London), Alexander Graham Bell (Washington), Edward Birdsall (New York), John L. Bruce (Sydney), A.A. Cox (Broken Hill), Octave Chanute (Chicago), William Eddy (Bayonne, USA), Samuel Ewing (Brisbane), James Fitzmaurice (Sydney), Herbert Fyfe (London), Charles Hitchins (London), Sidney Hollands (Coventry and Sheffield, UK), S.P. Langley (Washington), J.H. Maiden (Sydney), W. Masters (Sydney), H.W.L. Moedebeck (Munich), W.R. Pidgeon (Salisbury, UK), Prof. J. Arthur Pollock (Sydney), H.C. Russell (Sydney), S.H.R. Salmon (London), Professor Richard Threlfall (Sydney), Alfred Walker (Bradford, UK), Charles Whittell (Sydney), Wilbur Wright (Dayton, USA), C. Zimmerman (Frederick, USA), the Boston Aeronautical Society and the Royal Society of New South Wales. Among the copies of Hargrave's own letters are many sent to the editors of newspapers and journals.

The volume contains articles by Octave Chanute, H.W.L. Moedebeck, William G. Walker and C. Zimmerman, among others.

Reel M369

2 Flying-machine work, October 1905 – April 1909 (continued, pp 290-349)

The last part of the volume, which covers the period September 1904 – April 1909, contains correspondence from S. Henry Barraclough (Sydney), J.N.O. Byatt (Melbourne), Octave Chanute (Chicago), Prof. T.W. Edgeworth David (Sydney), H.R. Edwards (Glasgow), Karl Hiendlmayr (Sydney), Sidney Hollands (London), H.A. Hunt (Melbourne), Kelso King (Sydney), Rev. W.G. Lawes (Sydney),

James Means (Boston), W.R. Pidgeon (London), C.F. Richmond (Sydney), Rev. E. Baxter Riley (Thursday Island), James Thomson (Sydney), Charles Whittell (Sydney), Harry Williams (Sydney), the Aeronautical Society of Great Britain and the Royal Society of New South Wales.

Among the published papers is an article by Hargrave entitled 'Port Sydney' (Sept. 1906).

Reel M370

3 Geographical and astronomical work, November 1865 – October 1891 (377pp)

This volume was put together by Hargrave at a later date. It contains newspaper cuttings, correspondence, notes, drawings and printed items relating to some of Hargrave's early interests and activities in the years before he became preoccupied with flying-machines. In particular, there are papers relating to the voyage of the *Ellesmere* around Australia in 1866, the exploration of New Guinea between 1871 and 1891, and astronomical matters arising from Hargrave's work in the Sydney Observatory.

The New Guinea material includes an account and related papers of the New Guinea Prospecting Expedition (1871-74), and papers on the expeditions led by William J. Macleay (1875), Octavius Stone (1875-76), Luigi D'Albertis (1876-77) and H.C. Everill (1885-86). There is a copy of E. Marin La Meslée. *Past explorations in New Guinea: a project for the scientific exploration of the great island* (1883) and numerous letters from Hargrave to newspapers on New Guinea exploration.

The astronomical papers, which mainly date from 1877-87, comprise letters, newspaper cuttings and other papers on the 1884 Krakatoa volcanic eruption, red sunsets, solar eclipses, equatorial telescopes and other subjects, as well as notes, tables and drawings on the planetary system.

The correspondents include Theodore Bevan (Sydney), H.S.W. Crummer (Sydney), Luigi D'Albertis, John Hargrave (Hargrave's father), E. Marin La Meslée, Sir William MacGregor (Port Moresby), Capt. Arthur Onslow (Camden), H.C. Russell (Sydney), Octavius Stone (Nuneaton), James Wilcox (Dallinga, NSW), A.G. Wise (Sydney) and the Geographical Society of Australasia.

4 Flying-machines, April 1909 – June 1915 (pp 1-81)

The last volume in the series of aviation 'journals' contains some papers relating to Hargrave's continued research on flying-machines. Most of the papers, however, relate to aviation generally, including the design and construction of aircraft, airships, air routes, aerial exhibitions, air safety and the Aerial League of Australia. There are also papers relating to Hargrave's efforts to dispose of his collection of models, which ended when they were acquired by the Deutsches Museum in Munich in 1910.

The first part of the volume, covering the period April 1909-February 1913, includes letters from S. Henry Barraclough (Sydney), Sir Edmund Barton (Sydney), T.F. Begg (Sydney), Prof. T.W. Edgeworth David (Sydney), H. Deane (Sydney), W.M. Garling (Sydney), H.W.L. Moedebeck (Munich), C.F. Richmond (Sydney), Norman Selfe (Sydney), Bruce Smith (Sydney), G.C. Taylor (Helsby and London),

George A. Taylor (Sydney), A.W. Vogan (Sydney), Emile Wenz (Reims), Jean Wenz (Melbourne), Prof. Albert Zahn (Washington), the Aerial League of Australia, the Astronomical Society of Great Britain, the Deutsches Museum (Munich) and the Technological Museum (Sydney).

In addition to letters, there are research notes, calculations, newspaper cuttings and photographs. There is a reprint of a paper by Hargrave, 'Rigid stable aeroplanes' (Dec. 1909), published by the Royal Society of New South Wales.

There is an index at the beginning of the volume.

Reel M371

4 Flying-machines, April 1909 – June 1915 (continued, pp 82-99)

The final part of the volume, dating from March 1913 to June 1915, contains correspondence, drawings, newspaper cuttings and photographs. The correspondents include T.W. Heney (Sydney), Ernest Hosking (Sydney), E.A. Petherick (Melbourne), Prof. J. Arthur Pollock (Sydney), George A. Taylor (Sydney), Emile Wenz (Reims), the Aerial League of Australia, the Aeronautical Society of Great Britain and the Deutsches Museum. Hargrave's own letters include many sent to newspapers.

5 Mechanical and aeronautical work, 1872-92 (423pp)

This volume was put together by Hargrave at a later date. The papers, which mostly date from 1880 onwards, comprise correspondence, manuscripts, research notes, drawings, tables, diagrams, calculations, newspaper cuttings and photographs of models. They document Hargrave's early work on the design and construction of flying-machines. In particular, there are notes on wave movements, wave propelled models, trochoided plane principle, air compressing pump, engines, flying-machines powered by rubber bands and compressed air, and a list of expenditure on flying machine experiments.

There are reprints of several papers by Hargrave, all of which were published by the Royal Society of New South Wales: 'Notes on flying-machines' (June 1885), 'Notes on a model showing one form of serpentine progression' (June 1886), 'On a form of a flying-machine' (Dec. 1885), 'Recent work on flying-machines' (June 1887), 'Autographic instruments used in the development of flying-machines' (Dec. 1887), and 'Flying-machine memoranda' (Aug. 1889).

The correspondents include Commodore J.E. Erskine (Sydney), Prof. Archibald Liversidge (Sydney), Henry Maclaurin (Sydney), Hiram Maxim (London), Cooper Penrose (Sydney), J. Arthur Pollock (Sydney), H.C. Russell (Sydney), Norman Selfe (Sydney), John Storer (Sydney), James Thomson (Sydney), C.G. Thorp (Sydney and Wollongong), Prof. Richard Threlfall (Sydney), Rev. H. Walker Taylor (Bulli) and the Royal Society of New South Wales. Among the many letters written by Hargrave are a number sent to editors of Sydney newspapers and engineering journals.

There is an index at the beginning of the volume.

Reel M372

6 Flying-machine work, March 1890 – July 1892 (558pp)

The papers in this volume comprise correspondence, manuscripts, notes, drawings, newspaper cuttings, photographs and publications.

There are reprints of two papers by Hargrave published by the Royal Society of New South Wales: 'On the 74 oz. compressed-air flying-machine' (Dec. 1890) and 'Nos. 13 and 14 compressed-air flying-machines' (July 1891).

In this period Hargrave began to correspond with a growing number of overseas engineers and designers. The correspondents include W. Carroll (Bathurst), Octave Chanute (Chicago), S.P. Langley (Washington), J.H. Maiden (Sydney), J. Arthur Pollock (Sydney), H.C. Russell (Sydney), Robert Schloesser (Gilberton, Queensland), John Storer (Sydney), G.C. Taylor (Helsby, UK), Prof. Richard Threlfall (Sydney), J.E. Watkins (Sydney), the Engineering Association of New South Wales and the Royal Society of New South Wales.

There is an index at the end of the volume.