

The Second World War Papers of Sir Bernard Lovell OBE FRS

Alfred Charles Bernard Lovell was born on 31 August 1913 in Oldland Common, Bristol, and was educated at Kingswood Grammar School and at the university in that city. Between 1936 and 1939 he was Assistant Lecturer in Physics at the University of Manchester, where he was closely associated with Professor Patrick Blackett, an influential government advisor on defence matters during the Second World War and a member of the Tizard Committee. Between 1939 and 1945, Lovell worked in the Air Ministry Research Establishment (AMRE) and its successor organizations, the Ministry of Aircraft Production Research Establishment (MAPRE) and the Telecommunications Research Establishment (TRE), where he collaborated in the development of the early airborne radar systems with A P Rowe, E G Bowen, P I Dee and other pioneers in the field. After the war, Lovell pursued a distinguished academic career at the University of Manchester, becoming Professor of Radio Astronomy there and Director of the Nuffield Radio Astronomy Laboratories at Jodrell Bank, Cheshire.

The papers donated by Sir Bernard to the Imperial War Museum relate mainly to the development of airborne radar systems for the Royal Air Force during the Second World War, in particular the AIF/AISF and H2S systems (night fighter 'lock-on' radar and navigational/blind-bombing radar, respectively). Many of the files are highly technical in content, others afford a more personal, 'unofficial' insight into the work of Lovell and his colleagues at TRE. Researchers who wish to obtain more background information concerning this subject are advised to consult Lovell's own accounts - the autobiography *Astronomer by Chance* (Basic Books, New York 1990) and *Echoes of War: The Story of H2S Radar* (Adam Hilger, Bristol 1991).

The Department of Documents also holds a small series of wartime papers donated to the Imperial War Museum by A P Rowe and B J O'Kane, who worked with Lovell at TRE on the airborne radar systems.

A collection of Sir Bernard Lovell's postwar papers, largely concerning his work at the Jodrell Bank radio astronomy laboratories between 1945 and 1981, is lodged with the John Rylands University Library, University of Manchester.

The Lovell Papers:

- BL 1/1:** RAF Form 1740, containing a 'scrapbook' (85pp) documenting the development and operational use of H2S and ASV (Air to Surface Vessel) radar; it was compiled during 1944 - 1946 and includes, in addition to a narrative of events, copies of official documents and photographs showing the radar equipment, the aircraft into which it was installed, aerial photographs of targets on which H2S was used, and photographs showing personnel involved with the development of airborne radar at TRE in Great Malvern, Worcestershire.
- 1/2:** Folder of loose papers associated with the 'scrapbook'.
- BL 2:** Official diary (576pp, ts) kept at TRE by Lovell, May 1943 - February 1945, recording in some detail daily activities and discussions at the Establishment with regard to radar development.

- BL3:** Six notebooks (circa 500pp, ms) covering the period October 1939 - April 1941, containing measurements and notes on the development of Air-Interception Radar at Perth, St Athan, Worth Matravers and Swanage.
- BL4:** 16 files containing photocopies and duplicate carbon copies of technical papers relating to airborne radar development at TRE, 1940 - 1945, comprising:
- 4/1. Report on absorption of electromagnetic waves by various materials, 8.7.1940 (2pp)
 - 4/2. Additional report on absorption of 10cm waves, July 1940 (1p); letters to the Royal Aircraft Establishment, Farnborough, concerning material to be used on the nose of Blenheim N.3522, August - September 1940 (6pp)
 - 4/3. Preliminary report on the production of narrow 10cm beams with particular reference to AIS (Air- Interception radar with spiral scanning), 13.8.1940 (29pp)
 - 4/4. Report on paraboloids, 3.10.1940 (12pp)
 - 4/5. The paraboloid as an aerial system, 3.2.1941 (11pp)
 - 4/6. Split aerial for T & R (transmitting & receiving) on one paraboloid, 10.2.1941 (4pp)
 - 4/7. The effect on ultimate range of fast and slow scanning systems on cm waves, 21.3.1941 (4pp)
 - 4/8. British cm AI (Air-Interception radar) systems, June 1941 (39pp)
 - 4/9. Preliminary note on the high speed fading of 10cm aircraft echoes, 10.8.1941 (5pp)
 - 4/10. The fading of 9cm aircraft echoes (Part 1), 19.8.1941 (14pp)
 - 4/11. The fading of 9cm aircraft echoes (Part 2 - Analysis for Automatic Following), 26.9.1941 (10pp)
 - 4/12. The random motions of a Beaufighter in normal flight, 29.10.1941 (5pp)
 - 4/13. Blind firing on AIS(F), first report, 13.1.1942 (5pp)
 - 4/14. Blind firing on AIS(F), second report, 30.5.1942 (3pp)
 - 4/15. The radar battle of the Bay of Biscay, 1942 - 1944 (7pp)

- 4/16.** Historical note on H2S by Lovell, Summer 1944 (14pp); with copy of an off-print from IEE Proceedings vol 132, October 1985 (3pp); and three associated photographs of radar images.
- BL 5/1:** Six files containing working papers, correspondence and drawings concerning the development of the AISF/AIF night fighter 'lock-on' radar system, 1941 - 1942 (see Lovell, Echoes of War, chapter 7); the bulk of the documentation is composed of technical drawings, but files 1 and 2 also contain carbon copies of correspondence with and notes of meetings at Metropolitan-Vickers and Ferranti.
- 5/2:** Three files of reports and graphs concerning the development of the AISF/AIF system (circa 200pp).
- 5/3:** Folder of miscellaneous documents (circa 300pp) relating to the development of the AISF/AIF system, including TRE Report 12/92 on 'Automatic Following Systems', dated December 1941; Metropolitan Vickers reports on 'The stability of certain linear systems', November 1940, and 'The metadyne system of remote power control etc', September 1940; photocopy of Lovell's memorandum 'The present position of following systems for AIF', dated 19 June 1941; and TRE Report 1544, 'AI Mark IX Report No 5', 1943.
- 5/4:** Folder of graphs and reports concerning blind firing trials of AISF/AIF, 1941 (circa 150pp).
- 5/5:** Folder of miscellaneous printed items relating to the development of AISF/AIF, comprising: copies from The Engineer (1937), 'The principles and practice of automatic control' (30pp); two papers on automatic curve following devices, Proceedings of the Cambridge Philosophical Society Vol XXXV Pt III, 1939 (17pp); two articles on amplidyne generators from the General Electric Review, March 1940 (16pp).
- 5/6:** Folder of miscellaneous notes on radar, largely compiled from secondary sources (1930s) (circa 250pp).
- 5/7:** RAF Sketch Book (Form 27) containing graphs about 1943 bombing sorties using the H2S system, and H2S serviceability.
- BL 6:** Folder containing: a) Memorandum and annexes from Lovell to P I Dee (9pp, ts/ms), dated 31 August 1943, concerning the postwar organisation of scientific research; b) Reprint (4pp, ts) of an address given by Lovell at TRE on 'How best, in peace-time, we can attain for the betterment of mankind as a whole, the same spirit of self-sacrifice and of living for a cause that we have in war' (9 October 1944); c) Resum, of an interview conducted by J D Scott with P I Dee (7pp, ts, with associated correspondence), July 1945, concerning the early development of airborne radar at TRE; d) Photocopy of Lovell's 'Historical note on H2S' (14pp, ts).

- BL 7/1:** Two files of miscellaneous TRE correspondence and papers, 1941 - 1945 (circa 150pp); the first file is marked 'Personal Correspondence File Dr Lovell' and includes letters from Group Captain Dudley Saward, chief signals officer at Bomber Command HQ, as does the second file, containing a variety of correspondence about the scientific and personnel aspects of TRE.
- 7/2:** Two files of miscellaneous correspondence and papers, 1941 - 1945 (circa 150pp), one concerning the TRE library, the other TRE canteen and welfare matters.
- BL 8/1:** Folder of miscellaneous postwar papers, comprising: a) items relating to the death of A P Rowe in 1976 (17pp), including a letter to Lovell by Rowe's widow and a copy of the funeral address given by J A Ratcliffe FRS; b) correspondence (22pp, ms/ts) dated 1987, arising from Lovell's criticism of an article by Correlli Barnett in The Times (5 March 1987) concerning the state of Research and Development in wartime Britain.
- 8/2:** Folder of correspondence and associated papers (circa 200pp, ts/ms) between Lovell and R van der Hulst, an academic working in France, dated 1981 - 1983, containing much useful information on the early development of centimetre radar, with photocopies of pertinent contemporary documents.
- 8/3:** Substantial file of miscellaneous correspondence (circa 800pp) from the period June 1987 - July 1993 concerning diverse aspects of wartime radar.
- 8/4:** File of correspondence and related material (circa 50pp), dated May - June 1992, resulting from the controversy surrounding the unveiling of the statue of Marshal of the RAF Sir Arthur Harris in London.
- 8/5:** File of correspondence and related material (circa 200pp), dated February 1992 - July 1994, concerning the Radar Research Squadron memorial window in the chapel of Goodrich Castle, Ross-on-Wye.
- 8/6:** File of correspondence and related material (circa 200pp), dated June 1992 - November 1993, concerning Lovell's contribution to High Flyers, published to mark the 75th anniversary of the RAF.
- 8/7:** File of correspondence and related material (circa 300pp), dated May 1990 - August 1994, concerning the activities of the World War Two Air Forces Radar Reunion.
- BL 9:** Correspondence concerning the writing and publication of Echoes of War:
- 9/1:** With Adam Hilger, publishers (circa 800pp), February 1988 - July 1994;
- 9/2:** With Professor W E Burcham CBE FRS (circa 300pp), October 1989 - February 1992;
- 9/3:** With Dr B J O'Kane (circa 100pp), January 1990 - April 1991:

9/4: With Sir Alan Hodgkin and Dr J R Atkinson (circa 300pp), October 1988 - August 1992;

9/5: With Dr F J U Ritson and W H Sleight (circa 300pp), October 1990 - January 1992;

9/6: Two files of miscellaneous correspondence (circa 800pp), September 1987 - May 1994.

BL 10: Wilfred Bennett Lewis 1908-1987, monograph by Sir Bernard Lovell and D G Hurst (Biographical Memoirs of Fellows of the Royal Society, Volume 34, 1988). Associated papers are to be found amongst the Lovell papers held in the John Rylands University Library, University of Manchester.