

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
	Synopsis: The Life of Ruby Payne-Scott	1
	The Legacy of Ruby Payne-Scott	7
	Recognition	8
	Additional Note	10
<b>2</b>	<b>A Brief, Basic Guide to Terms and Concepts of Solar Radio Astronomy</b>	<b>13</b>
	The Astronomers' Sun	13
	Sunspots	17
	Flares	19
	Chromosphere	21
	Corona	23
	Tools of the Radio Astronomer	26
	Yagi Antenna	28
	Broadside Array	29
	Parabolic Reflector	32
	Michelson Interferometer	34
	Solar Grating-Array	35
	Mills Cross	36
	Culgoora Radioheliograph	36
	The Parkes Radio Telescope: The Dish	38
	Karl G. Jansky Very Large Array: The VLA	38
	Frequency Agile Solar Radiotelescope: FASR	41
<b>3</b>	<b>Ruby Payne-Scott's Ancestors and Her Early Childhood</b>	<b>43</b>
	Ruby Payne-Scott's Paternal Ancestors in the UK	43
	Emigration to Australia by Hubert and Agnes Scott	45
	Ruby's Early Childhood	49

<b>4</b>	<b>Ruby Payne-Scott's Education and Early Employment . . . . .</b>	<b>53</b>
	Secondary School Education: Sydney . . . . .	53
	Bachelor of Science in Physics at the University of Sydney . . . . .	57
	Master of Science and the Cancer Research Committee at the University of Sydney . . . . .	58
	Woodlands Glenelg Church of England Girls' Grammar School, Adelaide . . . . .	61
	AWA- Amalgamated Wireless, Australasia: 1939–1941 . . . . .	64
	Additional Note . . . . .	66
<b>5</b>	<b>Wartime Research by Ruby Payne-Scott at the Radiophysics Laboratory . . . . .</b>	<b>67</b>
	New Career Opportunities for Australian Women, World War II . . . . .	67
	Payne-Scott Joins the Radiophysics Laboratory in 1941 . . . . .	71
	Payne-Scott's War-Time Research . . . . .	75
	Calibration of S Band Radar Receivers . . . . .	76
	Equality of Pay for Women Ruling: September 1944 . . . . .	81
	Light Weight Aircraft Warning-Height 25 cm Radar Display . . . . .	82
	Additional Notes . . . . .	85
<b>6</b>	<b>1944–1945: Ruby Payne-Scott – The First Woman Radio Astronomer . . . . .</b>	<b>87</b>
	Propagation Committee at Radiophysics Laboratory: 1944–1954 . . . . .	87
	Proto-Radio Astronomer, Ruby Payne-Scott . . . . .	88
	Post-war Activities at RPL: 1945- How This Impacted the Role of Payne-Scott . . . . .	91
	RPL's First Observations of Solar Noise- Role of Payne-Scott . . . . .	95
	The First Summary Paper in Radio Astronomy: December 1945 Author Payne-Scott . . . . .	96
	Symposium on Radar, 5–7 December 1945: Payne-Scott Was Present . . . . .	99
	Additional Note . . . . .	101
<b>7</b>	<b>1945–1946: Early Radio Astronomy at Dover Heights . . . . .</b>	<b>103</b>
	The Collaroy Campaign: October 1945: First Solar Radio Astronomy in Australia . . . . .	105
	Ground-Breaking Developments in Solar Noise Research and Techniques of Interferometry: February 1946, Dover Heights . . . . .	113
	Publication of Dover Heights Research and Interferometry Techniques: Proceedings of the Royal Society, 12 August 1947 . . . . .	124
	Additional Notes . . . . .	126
<b>8</b>	<b>1946–1947: Personal Tragedy and Professional Triumph . . . . .</b>	<b>129</b>
	Payne-Scott as Solo Scientist at Dover Heights, Mid-1946 . . . . .	129
	Miscarriage and Missed Work: Late 1946–June 1947 . . . . .	133
	The Behemoth Type II Burst of March 1947: Payne-Scott, Yabsley and Bolton Observe an Amazing Event . . . . .	137

Plans for Pawsey’s Departure Abroad: September 1947 . . . . .	142
Payne-Scott Winds Down at Dover Heights: Late 1947 . . . . .	144
Additional Notes . . . . .	145
<b>9 1948: Hornsby Field Station: Daily Observations . . . . .</b>	<b>147</b>
Move from Dover Heights to Hornsby . . . . .	147
Payne-Scott Has Doubts at Hornsby: Advice from Pawsey . . . . .	155
Publication of the Hornsby Observations . . . . .	158
Additional Notes . . . . .	165
<b>10 1949–1951: Radio Astronomy Blossoms as a Field, but Ruby Must Resign from the Radiophysics Laboratory . . . . .</b>	<b>167</b>
Payne-Scott’s Career in 1948, Choice of the Swept-Lobe Interferometer Site . . . . .	167
Early Testing of the 97 MHz Interferometer . . . . .	174
Publication of the Results at 97 MHz: Paper I- The Instrument . . . . .	180
Paper II- Noise Storms (Type I) . . . . .	182
Paper III- Outbursts. Type IV . . . . .	185
Red Ruby: The Difficulty of Communist Ideology in Post-war Australia . . . . .	190
Transition from CSIR to CSIRO; Discovery by CSIRO of Marriage of 1944 . . . . .	192
Payne-Scott’s Resignation in July 1951 . . . . .	196
Additional Notes . . . . .	198
<b>11 1952: Ruby Payne-Scott’s Last Experience as a Radio Astronomer at the International Union of Radio Science . . . . .</b>	<b>201</b>
Additional Notes . . . . .	212
<b>12 The Married Life and Motherhood of Ruby Payne-Scott . . . . .</b>	<b>215</b>
A Remarkable Family: Bill and Ruby Hall . . . . .	215
Bill Hall . . . . .	215
Peter Hall: Mathematician . . . . .	223
Fiona Hall: Artist . . . . .	225
Additional Note . . . . .	233
<b>13 1963–1974: Employment at Danebank School . . . . .</b>	<b>235</b>
<b>14 The Last Years and Legacy of Ruby Payne-Scott . . . . .</b>	<b>239</b>
Last Years . . . . .	239
Ruby Payne-Scott’s Legacy; Why Did She Not Return to RPL in the 1960s? . . . . .	241
<b>Bibliography for Making Waves . . . . .</b>	<b>245</b>
<b>Biographical Sketch of the Author . . . . .</b>	<b>253</b>
<b>Index . . . . .</b>	<b>255</b>