An Anthology of Visual Double Stars

Modern telescopes of even modest aperture can show thousands of double stars. Many are faint and unremarkable but hundreds are worth searching out. Veteran double star observer Bob Argyle and his co-authors take a close-up look at their selection of 175 of the night sky's most interesting double and multiple stars. The history of each system is laid out from the original discovery to what we know at the present time about the stars. Wide-field finder charts are presented for each system along with plots of the apparent orbits and predicted future positions for the orbital systems. Recent measurements of each system are included, which will help you to decide whether they can be seen in your telescope as well as giving advice on the aperture needed. Double star observers of all levels of experience will treasure the level of detail given in this guide to these jewels of the night sky.

Bob Argyle has observed double stars since 1966. He has been Director of the Webb Deep-Sky Society's Double Star Section since 1970. He edited *Observing and Measuring Visual Double Stars* (Springer 2012) and writes monthly columns on double stars for *Astronomy Now* and the Webb Society. He is a Fellow of the Royal Astronomical Society, a Member of the International Astronomical Union, and Editor of *Observatory* magazine.

Mike Swan worked for the Ordnance Survey in England. He has extensive experience in computer graphics and uranography and was solely responsible for the *Webb Society Star Atlas*. He is currently completing a two-part *Atlas of Galactic Clusters*. For the present volume he has produced the finder charts, the all-sky charts, and the orbital plots.

Andrew James has been interested in double stars since the late 1970s. He is a long-term member, and past President, of the Astronomical Society of New South Wales (ASNSW), and formed its Double Star Section in 1979. His interests include the historical backgrounds and works of various discoverers of southern double stars.

An Anthology of Visual Double Stars

Bob Argyle
University of Cambridge

Mike Swan
Webb Deep-Sky Society

Andrew James
Astronomical Society of New South Wales

CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India

79 Anson Road, #06–04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781316629253
DOI: 10.1017/9781316823163

First published 2019

Printed in the United Kingdom by TJ International Ltd. Padstow Cornwall

A catalogue record for this publication is available from the British Library.

Library of Congress Cataloging-in-Publication Data
Names: Argyle, Robert W., author. | Swan, Mike, 1952– author. | James, Andrew (Astronomer), author.
Title: An anthology of visual double stars / Robert W. Argyle (University of Cambridge), Mike Swan (Webb Deep-Sky Society), Andrew James (Astronomical Society of New South Wales).
Description: Cambridge ; New York, NY : Cambridge University Press, 2019. | Chiefly a catalog of double stars. | Includes bibliographical references and index.
Identifiers: LCCN 2018061697 | ISBN 9781316629253 (pbk. : alk. paper)
Subjects: LCSH: Double stars–Catalogs. | Double stars–Observers' manuals. | Astronomy–Observers' manuals. | Amateur astronomy.
Classification: LCC QB821 .A74 2019 | DDC 523.8/41–dc23
LC record available at https://lccn.loc.gov/2018061697

ISBN 978-1-316-62925-3 Paperback

Dedicated to Angela Argyle, Angela Kelly, and the memory of
Catherine McMahon (1964–2001)

CONTENTS

ABOUT THE AUTHORS

Bob Argyle

I have been observing double stars ever since I acquired a telescope in 1966. To this day I do not know what prompted me to give them special attention but I do know that using a copy of *Norton's Star Atlas* which was given to me by an early mentor, Frank Acfield of Newcastle-upon-Tyne, had an effect. I suspect it was the lack of up-to-date information about the separation and position angles included in the lists which accompanied each of the star maps that prompted me to start making observations, by eye at first. In my copy (the 15th edition of 1964), for example, the date of the given position angle and separation for the bright binaries was no later than 1938 and many of the wider pairs were 20 or 30 years older than that. This gave me the distinct impression that here was something useful that could be done, and I remember thinking that I must get a micrometer in order to do some of this work properly. At that time, however, micrometers were rare and expensive objects and I never did come across one to use on my 10-inch reflector.

Around this time I bought a copy of Webb's *Celestial Objects for Common Telescopes*, Volume 2, which was available then in the paperback reproduction issued by Dover. It is a little treasure chest of double stars and considerably expanded the number available to a small telescope compared to the lists in *Norton*. As a subscriber to *The Astronomer* magazine I followed the columns of 'From the Night Sky' written by John Larard, which described his observations of double stars made at Mill Hill using an 8-inch Cooke refractor.

John spent much, perhaps too much, of his energy bringing the Webb Society into being as he felt there was a distinct lack of direction in deep-sky and double star observation amongst the amateur community.

I joined the Webb Society in 1968 and was soon sending in observations of double stars to John, who was then Director of the Double Star Section. After a reorganisation in 1970 John became Director of the Nebulae and Clusters Section, and I was asked to direct the Double Star Section. I'm still doing it.

Figure 0.1 The 8-inch (20-cm) Thorrowgood Cooke refractor at the Observatories, Cambridge. It was delivered to Dawes in 1865 and was left to the Royal Astronomical Society in 1927. It has been at the Institute of Astronomy, Cambridge, since 1929 (R. W. Argyle)

The 8-inch refractor at Cambridge Observatories is an historic instrument. Measurements started in 1990 and the programme continues to this day – 29 years on. This volume contains some results of these observations.

Mike Swan

I was employed as a cartographer with the Ordnance Survey (OS) for over 25 years, working in Southampton and Birmingham. Nearly 20 years of that time was spent working in all aspects of digital mapping. I retired from the OS early and moved to the dark skies of western Ireland.

Combining cartography with an enthusiasm for astronomy, it was only natural that I became a uranographer. I started creating maps of the stars from the mid 1970s, producing them professionally for various books and publications, most notably the 18th and 19th editions of Norton's *Star Atlas*. With the advent of home computing, and easy access to databases and software programs, it became easier and quicker to create maps of the stars. I have produced the *Webb Star Atlas* for the Webb Deep-Sky Society and I am currently working on Volume 2 of my two-part publication, *Atlas of Open Star Clusters*, the first part of which is now available.

For this present volume I produced the all-sky charts, the finder charts, and the orbital plots.

Andrew James

I have been interested in double stars since the late 1970s. I am a long-term member, and past President, of the Astronomical Society of New South Wales (ASNSW) and formed its Double Star Section in 1979. I presented many papers on double stars to the National Australian Convention of Amateur Astronomy (NACAA) between 1980 and 2014. In recent times I have focussed on southern double stars and the historical backgrounds and works of various discoverers in Australia, including James Dunlop and Charles Rümker, who made the first southern double star catalogues.

Another associated interest is the astronomer Henry Chamberlain Russell, and various observational assistants, who found and measured many new doubles within the Sydney Observatory Double Star Programme between 1870 and 1900.

Further current investigations have recently extended to a new examination of Sir Thomas Brisbane's Paramatta Star Catalogue, created during the 1820s at Sydney, and its important connection to the discovery of double stars and deep-sky objects.

General southern historical accounts and information on double stars and some selected double stars also appear on my website, Southern Astronomical Delights `www.southastrodel.com`. I am still active in the local astronomical scene in Sydney, and between 2013 and 2015 I acted as a consultant to the design revamp of Sydney Observatory's new East Dome, used by the public – especially aimed for access by the disabled and seniors. My astronomical experience also extends to lecturing on the subject to Evening Colleges, and I have presented many talks over a large range of subjects. I am presently the Planetary Nebulae and Deep-Sky Section Leader of the ASNSW.

ACKNOWLEDGEMENTS

The data in this book relies heavily on several sources. The *WDS Catalog*, maintained by the United States Naval Observatory, is the clearing house for all observations of visual double stars. This database has been managed for a number of years by Dr Brian Mason and Dr Bill Hartkopf, whose prompt and generous cooperation with requests for data has been much appreciated.

When it was released the Hipparcos catalogue contained high-quality astrometric data for about 118,000 bright stars down to $V = 11$ or so. In particular the trigonometrical parallaxes were most welcome, especially in the case of binary stars where estimates of the total stellar mass in the system could be appreciably improved. In addition, photometry in two colours was also taken and that data has been used in this catalogue.

In April 2018, the Gaia project [682] released its second interim catalogue (*DR2*). This unprecedented compilation lists positions, proper motions, and parallaxes for about 1.6 billion stars, and, for a subset of these, radial velocities are also available. The astrometry of many bright, close, visual binaries will not be available until *DR3*, which is expected to be issued in 2020. The catalogue in this book uses *DR2* data wherever possible.

This work has made use of data from the European Space Agency (ESA) mission Gaia, `www.cosmos.esa.int/web/gaia`, processed by the Gaia Data Processing and Analysis Consortium (DPAC), `www.cosmos.esa.int/web/gaia/dpac/consortium`. Funding for the DPAC has been provided by national institutions, in particular the institutions participating in the Gaia Multilateral Agreement.

The authors are also indebted to the compilers of the SIMBAD catalogue, which has been invaluable, especially for checking references to papers on each system discussed.

RWA also would like to thank Christopher Taylor for permission to reproduce entries from his observing logbook, Michael Greaney for the conversion table in the Appendix, and Drs Henry Zirm and Jack Drummond for high-resolution images for inclusion in the text.

Throughout the course of this project, Mark Hurn, Librarian at the Institute of Astronomy, has been a reliable and sympathetic source of help, especially in locating the most obscure references.

Continuous help and encouragement from staff at CUP, notably Esther Miguéliz Obanos and Vince Higgs, is gratefully acknowledged.