

## BIOGRAPHIES AND PORTRAITS OF BRITISH AND OTHER ASTRONOMERS

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**Abstract.** This paper originated as a document intended to serve as a general guide to the sources of biographies and portraits of astronomers for historians of astronomy and other researchers, particularly British astronomers. It was first compiled by the Librarian of the Royal Astronomical Society, Peter Hingley (1951-2012).

### 1. Introduction

You have written a paper or a book that includes some history of astronomy, which, the referee says, could be improved with additional background information about some of the actors in the drama which you recount. Also, the editor has asked for some illustrations. So you are looking for biographies and portraits of astronomers, including some rather obscure British figures. You stumble from the bright streets of London, from the bustle of Piccadilly, into the quiet gloom of the Library of the Royal Astronomical Society (RAS)<sup>1</sup> in Burlington House, and stand inside the door, gazing about at the books, blinking like an owl; the Librarian is nowhere to be seen. In another scenario leading to the same problem, you are working at your desk a long way from any well-stocked library of historical books about astronomy, but fortunately with a computer and an internet connection at your elbow. What next?

<sup>1</sup><http://www.ras.org.uk/library>

## 2. Biographical Sources

The chance of a successful search for useful material is improved if as much information as possible is assembled in advance; for example, the full name (correctly spelt!), nationality, approximate dates of birth and death, places of work, specialisms, society memberships, awards, and so on. Initial draft material, suitable for checking in the following editorially-certified sources, might be gathered from the World Wide Web through Google and Wikipedia (*caveat lector*). The sources below are arranged roughly in order of the prospect of finding useful information, tempered by accessibility. Some of the out-of-print versions of the books mentioned below are available on-line via Google Books<sup>2</sup> and second-hand copies can sometimes be bought from the usual sources; you can try to locate individual copies via Abebooks<sup>3</sup>.

### 2.1. IF THE SUBJECT IS ALIVE, OR DIED RECENTLY

Information on living astronomers, or those who have very recently died, can be the most difficult of all to obtain, as obituaries have not yet been published. Google is the first port of call, to locate news sources or death notices. Obvious current biographical sources for prominent British astronomers include *Who's Who* (available electronically)<sup>4</sup>, and the *Year Book of the Royal Society* (published annually, biographical information on every living FRS)<sup>5</sup>. Books by the subject may have biographical information on their covers or inside pages. The RAS does not give out addresses of its 4,000 living Fellows, although their contact details are available to other Fellows who can log in to a restricted access area of the RAS website<sup>6</sup>, and any Fellow can be written to by anyone c/o the Society. *Astronomy & Geophysics*, and its predecessor, the *Quarterly Journal*, report citations made on presentation of RAS awards, which may include biographical details, and *The Observatory* reports on meetings to commemorate distinguished Fellows. Awards with a wider appeal, such as appointments of Astronomers Royal, are often reported in journals such as *Nature* and *Astronomy Now*.

A list of 11,000 IAU members and their affiliations is publicly accessible on the International Astronomical Union's website<sup>7</sup>. US astronomers may be listed in *Who's Who in America*<sup>8</sup> and *American Men and Women of*

<sup>2</sup><http://books.google.com/?hl=EN>

<sup>3</sup><http://www.abebooks.co.uk/>

<sup>4</sup><http://www.ukwhoswho.com/>

<sup>5</sup><http://royalsocietypublishing.org/site/othertitles/yearbook.xhtml>

<sup>6</sup><http://www.ras.org.uk/>

<sup>7</sup><http://www.iau.org/administration/membership/individual/>

<sup>8</sup><http://www.marquiswhoswho.com/>

*Science*<sup>9</sup>. Some US astronomers omitted from the latter are included in the *American National Biography*<sup>10</sup> (the on-line version updated semi-annually; successor to *The Dictionary of American Biography*).

Information on living astronomers world-wide can also be gleaned by using the NASA Astrophysics Data System (ADS) website<sup>11</sup> to find their recent papers, and perhaps affiliation. ADS queries also point to the database *StarHeads*<sup>12</sup> of personal web pages of professional astronomers (Heck 1995).

## 2.2. IF THE SUBJECT IS DECEASED

If the subject is a deceased British astronomer, try *Who Was Who*<sup>13</sup> (biographies back to 1897). Or consult the *Dictionary of Scientific Biography*<sup>14</sup>, published between 1970-1980, supplemented by the *New Dictionary of Scientific Biography* and an electronic version called the *Complete Dictionary of Scientific Biography*<sup>15</sup> (2007) that merges both publications. This work includes short biographies of many past scientists and excellent bibliographies which can be used to find the significant literature on the subject up to the date of publication. For recent British and other European scientists try *Who's Who in Science in Europe*, last published in 1995 just before the publisher went into liquidation.

Many Australian figures feature in *Australian Astronomers* by Bhathal (1996) and *Explorers of the Southern Sky: A History of Australian Astronomy* by Haynes *et al.* (1996). Canadians figure in *Cold Light of Dawn: A History of Canadian Astronomy* by Jarrell (1988).

Pasachoff (2011) references the obituaries of members of the American Astronomical Society in OPSA I. NASA's *Astrophysics Data System (ADS)*<sup>16</sup> has a text-search facility operating with Optical Character Recognition software that has been well tuned to be slightly fuzzy and inclusive. It can be used to search for the name of the subject, to find obituaries and other mentions of the subject in the astronomical literature, often with the text available immediately on-line.

The following also contain information on scientists of earlier years: *American Men and Women of Science*; *American National Biography*; *Biographical Dictionary* by Abbott (1984), especially *Vol. 1, Astronomers*; and *World Who's Who in Science* by Debus (1968). For Russians, or citizens

<sup>9</sup>[http://en.wikipedia.org/wiki/American\\_Men\\_and\\_Women\\_of\\_Science](http://en.wikipedia.org/wiki/American_Men_and_Women_of_Science)

<sup>10</sup><http://www.anb.org/>

<sup>11</sup>[http://adsabs.harvard.edu/abstract\\_service.html](http://adsabs.harvard.edu/abstract_service.html)

<sup>12</sup><http://astro.u-strasbg.fr/~heck/sfheads.htm>

<sup>13</sup><http://www.oup.com/whoswho/about/whowaswho/>

<sup>14</sup>[http://en.wikipedia.org/wiki/Dictionary\\_of\\_Scientific\\_Biography](http://en.wikipedia.org/wiki/Dictionary_of_Scientific_Biography)

<sup>15</sup><http://www.gale.cengage.com/nds/about.htm>

<sup>16</sup><http://labs.adsabs.harvard.edu/fulltext/>

of countries in the former USSR, try *Soviet Men of Science* by Turkevich (1963). For Lithuanians, consult *Astronomers: Bibliographical Index* by Matulaityte (1965).

The *Encyclopedia of Astronomy and Astrophysics*, edited by Murdin (2001), has a number of short biographies of astronomers<sup>17</sup>.

### 2.3. GENERAL COLLECTIONS OF BIOGRAPHIES

The single most useful reference for biographies of about 1,000 astronomers born before about 1918 is the massive *Biographical Encyclopedia of Astronomers* edited by Hockey (2007). It exists in printed form and on-line, and a supplemented second edition is in preparation (in 2012).

The website *Astronomiae Historia/History of Astronomy*<sup>18</sup> provides information for historians of astronomy and related fields. It includes short biographies of 2,000 astronomers and a very comprehensive selection of links to biographical websites, organised into categories, including 9,000 obituaries. It was originally created for the Astronomische Gesellschaft. Since 1998 it has also been maintained on behalf of Commission 41 (History of Astronomy) of the International Astronomical Union.

The website *Astro Info Service*<sup>19</sup> was formed in 1982 by Dave Shayler, co-founder and chairman of the Midlands Spaceflight Society, to distribute information on human space exploration, including that from the former USSR, using official documentation from major space agencies. Their services include biographical profiles of astronauts and cosmonauts.

The *MacTutor History of Mathematics Archive*<sup>20</sup>, of the University of St Andrews, is a collection of over 1,000 biographies of mathematicians, including many astronomers, and historical articles of a mathematical nature. Features include birthplace maps, the facility to check mathematicians who were born or died on a given date, and the Davis Archive of women who graduated in mathematics from British and Irish universities prior to 1940. Portraits of many individuals are available.

The RAS library has a collection of biographical books and pamphlets, the majority of them about British astronomers. Look in the subject catalogue (a unique document available only to personal visitors), where such material is listed in alphabetical order of subject. Biographies of scientists in fields other than astronomy have also been put there for convenience in a single sequence. It might also be worth browsing through the QB 35 subject category, which lists collected biographical works.

<sup>17</sup><http://eaa.crcpress.com/>

<sup>18</sup><http://www.astro.uni-bonn.de/~pbrosche/astoria.html>

<sup>19</sup><http://www.astroinfoservice.co.uk/>

<sup>20</sup><http://www-history.mcs.st-and.ac.uk/>

It may be worth consulting the index to *The Times* (of London) for any valedictory notes on British astronomers. It exists in printed form and the paper itself is available on microfilm. The Times digital archive, available at major libraries, spans 1785-2006 and the text can be searched digitally<sup>21</sup> through not-always-reliable Optical Character Recognition software. Most large libraries have the *Encyclopaedia Britannica* 11<sup>th</sup> Ed. (1911), the best edition for pre-1910 history and biography, British and foreign; the last print edition was published in 2012, but the on-line edition continues<sup>22</sup>.

#### 2.4. RAS MEMBERS

Did the subject live beyond 1820 (when the RAS was founded)? Then if they were a member of the RAS (normally a Fellow, but possibly an Associate, *i.e.* a distinguished, foreign honorary fellow), they may have been recorded in the RAS journals by an obituary on their death.

An *Index to Obituary Notices of RAS Fellows and Associates*<sup>23</sup>, with links to the original papers, is available online. Mostly the obituaries appeared in the Society's own publications (*Quarterly Journal*, *Monthly Notices*, *Memoirs*, etc.) but links are also given to obituaries in other sources that are available online. In 1997 a new journal, *Astronomy & Geophysics*, replaced the RAS's *Quarterly Journal*. However, its obituaries are not as yet included in the *Index*.

For the majority of RAS Fellows (the exceptions being a few of the early ones) the Library should have the form or proposal for election, giving the address, titles, and sponsors. (Note that this information will normally only be given for Fellows who have been dead for at least 40 years.) As a double check against omissions, it may be worth consulting the lists of new members given in early volumes of *Monthly Notices* and *Memoirs*.

If an obituary exists, it normally indicates that the member was held in a certain esteem by the Society although, as in most journals, the number of published obituaries has declined over the years (see Lankford 1984<sup>24</sup>, "A Crisis in Documentation", for a description of this process). Obituaries generally give a good amount of personal and professional information, and may also give clues to other sources such as memberships of other societies.

The RAS Library's *Online Catalogue*<sup>25</sup> should be checked for books and pamphlets by and about the subject, and the *Catalogue of Archives and Manuscripts*<sup>26</sup> for any papers and correspondence held by the Library. A

<sup>21</sup><http://gale.cengage.co.uk/times.aspx/>

<sup>22</sup><http://www.britannica.com/>

<sup>23</sup><http://www.ras.org.uk/library/obituaries/1277-ras-obituaries-01>

<sup>24</sup><http://adsabs.harvard.edu/abs/1984BAAS...16..560L>

<sup>25</sup><http://ras.heritage4.com/>

<sup>26</sup><http://www.ras.org.uk/library/biographies/77>

supplement to the published Archive catalogue can be consulted in the Library. Detailed information and anecdotal accounts of many figures in the RAS's history to 1980 can be found in the two-volume *History of the Royal Astronomical Society* by Dreyer & Turner (1923) and Tayler (1987).

Another journal, associated with the Society but not published by it, is *The Observatory*. In its earlier years this included many biographical snippets, along with a few portraits and group photographs, and there are cumulative indexes up to Vol. 90 (1970). Links to obituaries published in *The Observatory* are included in the online RAS *Index to Obituary Notices*.

## 2.5. OBITUARIES IN OTHER SOURCES

If it is likely that the person was a Fellow of the Royal Society (FRS), the RS has produced an invaluable *List of Fellows*<sup>27</sup> from 1660 to date. The RS maintains the *Sackler Archive Resource*, a database<sup>28</sup> offering links and other access to biographical and bibliographical information on all Fellows. Obituaries were published from 1830 in the *Proceedings of the Royal Society* (1800-1932), the *Obituary Notices of Fellows of the Royal Society* (1932-1955), and the *Biographical Memoirs of Fellows of the Royal Society* (1955 to date; available on line<sup>29</sup>).

A *Finding List of Obituary Notes of Astronomers (1900-1997)*, compiled by Hilmar W. Duerbeck and Beatrix Ott, with contributions by Wolfgang R. Dick, is on the Web<sup>30</sup>.

Obituaries are also to be found in a number of other journals specialised by subject or nationality:

- The *Journal of the British Astronomical Association* contains obituaries of the BAA's members who died after 1890, particularly of amateur astronomers. There are published indices to Vols. 1-50 (1890-1940) and Vols. 51-100 (1940-1990). A.J. Kinder, Honorary Librarian of the British Astronomical Association, has compiled a list of all BAA members from 1890; he may be able to answer postal enquiries on particular names<sup>31</sup>.
- The *Astrophysical Journal* formerly included obituaries of internationally famous figures and those associated with the journal.
- *L'Astronomie* (formerly *Bulletin de la Société Astronomique de France*) has many obituaries since 1888, mainly of French astronomers, but some US/international ones also (in French); annual indices only.

<sup>27</sup>[http://royalsociety.org/uploadedFiles/Royal\\_Society\\_Content/about-us/fellowship/Fellows1660-2007.pdf](http://royalsociety.org/uploadedFiles/Royal_Society_Content/about-us/fellowship/Fellows1660-2007.pdf)

<sup>28</sup><http://royalsociety.org/library/collections/biographical-records/>

<sup>29</sup><http://rsbm.royalsocietypublishing.org/content/by/year>

<sup>30</sup><http://www.astro.uni-bonn.de/~pbrosche/persons/obit/index.html>

<sup>31</sup>A.J. Kinder, c/o BAA, Burlington House, Piccadilly, London W1J 0DU.

- The *Journal of the Association of Lunar & Planetary Observers* has some short notices; some years indexed, but not all.
- The *Publications of the Astronomical Society of the Pacific* regularly included obituaries up to Vol. 82 (1970; less regularly thereafter), with an emphasis on West Coast Americans, but also many British and European figures. Indexes exist for each 25 volumes then 76-82.

The above journals are indexed on the on-line bibliographical data base for astronomical references, ARIBIB<sup>32</sup>, as well as NASA's ADS<sup>11</sup>, with scanned versions of most articles.

## 2.6. MISCELLANEOUS BIOGRAPHICAL SOURCES

The Nobel<sup>33</sup> and Kavli<sup>34</sup> laureates for physics (including astronomers) and astrophysics respectively are well documented by biographies in the archives of the two organisations. Some of the recent astrophysicists write revealing autobiographical material.

For about 60,000 biographies of British figures of any period try the new *Oxford Dictionary of National Biography (ODNB)* edited by Lawrence Goldman (2012), whose 60 volumes and a supplement published in 2009 contain many revised biographies of British astronomers, up to date with subjects who died before 2004. The integrated online version is up to date to 2008<sup>35</sup>. This book is the successor to the *Dictionary of National Biography (DNB)* last published in 1908-1909, with a succession of supplements and spin-out editions up to 1996 (including *Missing Persons* 1993). A less well-known supplement to *DNB*, which is a fertile source of eighteenth and nineteenth century nonentities, is Boase's *Modern English Biography* (2000).

Eva Taylor's books on the *Mathematical Practitioners of Tudor and Stuart England* and the *Mathematical Practitioners of Hanoverian England to 1840* contain much information on instrument makers and others associated with astronomy but must be used with caution in the light of later research. These books have been supplanted for instrument makers, though not for other figures such as publishers, by Gloria Clifton's (1995) *Directory of British Scientific Instrument Makers* (see Crawforth's 1987 article "Makers and Dates" in the *Bulletin of the Scientific Instrument Society* for a guide to the use of this and other printed and manuscript sources on instrument makers). The Germanic equivalent of this book is Zinner's work (1967) on German and Dutch instrument makers.

<sup>32</sup><http://www.ari.uni-heidelberg.de/aribib/>

<sup>33</sup><http://www.nobelprize.org/nobelprizes/physics/laureates/>

<sup>34</sup><http://www.kavliprize.no/>

<sup>35</sup><http://www.oxforddnb.com/>

Two books of collected short essays contain a number of biographical notes and portraits including some obscure figures; Patrick Moore's (1984) *Armchair Astronomy* and Ashbrook's (1984) *Astronomical Scrapbook*.

Two less well-known sources of considerable use for minor British figures (especially clergymen) are Venn & Venn's *Alumni Cantabrigienses* (1922-1954), Foster's *Alumni Oxonienses* (1888-1892) and Emden's *Biographical Registers of the Universities of Oxford and Cambridge* (1963). Together these provide details on all Oxford and Cambridge graduates up to 1886 and 1900 respectively.

The Royal Commission on Historical Manuscripts' *The Manuscript Papers of British Scientists* (1982) is a useful source, as is Peter Harper's (1993) *Guide to the Manuscript Papers of British Scientists* catalogued by the Contemporary Scientific Archives Centre and the National Cataloguing Unit for the Archives of Contemporary Scientists, 1973-1993, although the originating organisation, the National Cataloguing Unit for the Archives of Contemporary Scientists, is now defunct. The Historical Manuscripts Commission has compiled a *UK National Register of Archives*<sup>36</sup>, which includes references to papers of persons and families relating to British history, plus connected records, in a network of locations in the UK and abroad.

Astronomers associated with survey work in India up to 1843 may be found in the numerous biographical notes in Phillimore's four-volume work on the *Historical Records of the Survey of India* (1945-1958), amplified by Markham's book (1871, 1878).

There are many biographical references in *Sky & Telescope* magazine (naturally strong on American astronomers). An unpublished biographical index to *Sky & Telescope*, last revised 2005, has been compiled by Kevin Krisciunas and can be accessed on his website<sup>37</sup>.

DeVorkin's (1982) bibliography *The History of Modern Mathematics* contains many references to biographical articles, including those where the influence of a subject's work is discussed in context. Also try Abbott's (1984) *Biographical Dictionary*, Debus's (1968) *World Who's Who in Science*, and Poggendorff's *Biographisch-Literarisches Handwörterbuch* (1863 to date).

For references to contemporary articles, obituaries and portraits in journals such as *Nature and Philosophical Magazine* up to about 1930, see Scott Barr (1973) *Index to Biographical Fragments in Unspecialized Scientific Journals*.

Records of French scientists may well be sought in the Academie des Sciences *Index Biographique*. Large quantities of biographical material are

<sup>36</sup><http://www.nationalarchives.gov.uk/nra/default.asp>

<sup>37</sup><http://faculty.physics.tamu.edu/krisciunas/st.html>

available on line through the website of the Bibliothèque Nationale de France's "Bibliothèque Numérique", *Gallica*<sup>38</sup>.

Belgian astronomers figure in the *Biographie Nationale* and *Nouvelle Biographie Nationale* of the Belgian Royal Academy<sup>39</sup> Prominent deceased American astronomers are the subjects of extensive biographies in the *Biographical Memoirs of the US National Academy of Sciences* (1877- )<sup>40</sup>.

## 2.7. BIBLIOGRAPHICAL MATERIALS USED AS BIOGRAPHICAL SOURCES

NASA's Astrophysics Data System (ADS)<sup>11</sup> includes free bibliographic access to astronomical and geophysical article abstracts, and direct access to many of the older papers; its coverage of older material is less comprehensive than ARIBIB<sup>32</sup>.

ARIBIB is the Astronomisches Rechen-Institut Heidelberg Bibliographical Database for Astronomical References . It is the most comprehensive, free, Web index to bibliographies of older astronomical material. It includes articles indexed by Houzeau & Lancaster (1964) and bibliographies of older astronomical material; also articles indexed by *Bibliographie Générale de l'Astronomie*, *Astronomischer Jahresbericht* and *Astronomy and Astrophysics Abstracts*. It does not (currently) include material published after 2000.

Bibliographical sources may be consulted to find books and articles by the subject and some may also reveal obituaries if the volumes near a known date of death are scrutinized. These include:

- Up to 1925: Royal Society *Catalogue of Scientific Papers*.
- Up to 1880: Houzeau & Lancaster (1964) *Bibliographie Générale de l'Astronomie* – consult the "biographie/necrologie" sections of Vols. I & II and the name index to Vol. I, in the 1964 edition. Covers material up to 1880. Included in ARIBIB index<sup>32</sup>.
- 1881-1898: Stroobant, P. and Belgian National Committee for Astronomy. *Bibliography of Astronomy 1881-1898*.
- 1899-1968: *Astronomischer Jahresbericht*. Biographical articles, perversely indexed under author not subject, necessary to look in biographical section. Included in ARIBIB index<sup>32</sup>.
- 1969-2000: *Astronomy and Astrophysics Abstracts*. Similarly look in sections 005/006/007 (Biography, Personal Notes, Obituaries); again, subjects' names are not indexed. Included in ARIBIB index<sup>32</sup>.

<sup>38</sup><http://gallica.bnf.fr/?lang=EN>

<sup>39</sup><http://www.academieroyale.be/cgi?usr=c6qkm8a2q4&lg=fr&pag=658&rec=0&frm=0&par=aybantu&id=4342&flux=2745919>

<sup>40</sup><http://www.nasonline.org/publications/biographical-memoirs/>

The *Isis Current Bibliography* is published annually as a fifth issue of *Isis*, the journal of the history of science. It is a bibliography of recent publications in the history of science and related fields, including books, book reviews, and journal articles. The bibliographies from 1913 to 1995 have been gathered into the *Isis Cumulative Bibliography* in four series.

COPAC<sup>41</sup> is a meta-catalogue providing free access to the merged online catalogues of the 70 largest university research libraries in the UK and Ireland, using records supplied by the Research Libraries UK (formerly the Consortium of Research Libraries). It can produce items not included on other bibliographical websites, *e.g.*, catalogues of items bequeathed by a particular person.

## 2.8. NOMENCLATURE FOR LUNAR FEATURES AND OTHER CELESTIAL OBJECTS

Requests are often received at the RAS as to the identity of people whose names are attached to lunar features, or for the location of a named feature. The following items will give a start. Menzel's (1971) *Report on Lunar Nomenclature* is an authoritative reference<sup>42</sup>. Recent works to illuminate this complex field include Cocks & Cocks' (1995) *Who's Who in the Moon*, and Ewen Whitaker's book (1999) *Mapping and Naming the Moon*. Earlier sources include the British Astronomical Association's *Who's Who in the Moon* and Wilkins & Moore's (1958) *The Moon*. Andersson & Whitaker's (1982) *NASA Catalogue of Lunar Nomenclature* gives a detailed list of names and positions, while Rukl's (1972) *Maps of Lunar Hemispheres* provides key maps.

The IAU's Committee on Small Body Nomenclature (CSBN) replaced the Working Group for Small Body Nomenclature (WGPSN) and authorises the naming of important features on the surface of planets and satellites. Their *Gazetteer of Planetary Nomenclature* is maintained by the United States Geological Survey<sup>43</sup>.

There are many astronomers, and others, whose achievements are recorded in the naming of a Minor Planet. Potted biographies are to be found in Lutz Schmadel's (2012) *Dictionary of Minor Planet Names* now in a sixth edition, with searchable CD-ROM and on-line versions. The JPL's Small Body Database Browser<sup>44</sup> briefly quotes the citations used to name minor planets, including one line biographies of large numbers of astronomers, many of them lesser-known figures in astronomy.

<sup>41</sup><http://copac.ac.uk/>

<sup>42</sup><http://adsabs.harvard.edu/abs/1971SSRv...12..136M/>

<sup>43</sup><http://planetarynames.wr.usgs.gov/>

<sup>44</sup><http://ssd.jpl.nasa.gov/sbdb.cgi>

There are a few objects which have non-systematic ‘customary’ names from astronomers, such as the Gum Nebula, or Barnard’s Star, and the best place to start to research these is in the various dictionaries of astronomy, such as Ian Ridpath’s (2012) *Dictionary of Astronomy*, or Jacqueline Mitton’s (2001, 2008) *Cambridge Dictionary of Astronomy* (the new edition is illustrated).

## 2.9. ARCHIVAL MATERIAL

There is not space here to list all the possible sources of manuscript material, and a research project of this kind is in any case a different matter from looking up printed references. The archives of the Royal Greenwich Observatory (held at the Cambridge University Library), of the RAS, and of the Royal Observatory Edinburgh contain much material of use to the would-be biographer. The *Catalogue of RAS Archives and Manuscripts*, compiled by J.A. Bennett and originally published in the *Memoirs* of the Royal Astronomical Society Vol. 85 (1978), is available on-line<sup>45</sup>, as is a catalogue of the Herschel Archive<sup>46</sup> of papers by William, John and Caroline Herschel. A scanned version of the full Herschel Archive is available from the RAS on CD and DVD.

A useful, but not exhaustive, guide to locations is provided by the RCHMs in a list of papers of British scientists; the latter holdings are included in the Historical Manuscripts Commission’s UK National Register of Archives<sup>47</sup> which includes references to papers of persons and families relating to British history, plus connected records, in a network of national and local record offices, university libraries and specialist repositories in the UK and abroad.

Other websites which may be of use include Archives Hub<sup>48</sup>, maintained on behalf of the Research Libraries UK, which provides a single point of access to descriptions of archives held in UK universities and colleges, and forms one part of the UK’s National Archives Network. Access to Archives (A2A)<sup>49</sup> is maintained at the Public Record Office, and contains catalogues of archives (largely local record offices) from all over England and includes section of web links for family historians.

<sup>45</sup><http://www.ras.org.uk/library/about-the-library/77?task=view>

<sup>46</sup><http://www.ras.org.uk/library/about-the-library/78?task=view>

<sup>47</sup><http://www.nationalarchives.gov.uk/nra/default.asp>

<sup>48</sup><http://archiveshub.ac.uk/>

<sup>49</sup><http://www.nationalarchives.gov.uk/a2a/>

### 3. Portraits

Google Images will find many on-line portraits. Though many portraits have been published, many more remain un-reproduced, and some searches may need recourse to original material. Some sources listed in Sect. 2.3 above, General Collections of Biographies, will also include portraits. For historical figures, the nature of material available will depend on when the subject lived.

Where portraits are required for reproduction the need to obtain permission to reproduce copyright images should be borne in mind. It is often necessary to pay a fee for the supply of the image and a fee for the reproduction rights; it is curious that authors often forget about this when signing contracts with publishers that require the author to pay for resources that should be part of the publication cost of a book.

It should also be borne in mind that there are some quite notable astronomical figures for whom no portrait has been traced, and it is quite likely that none ever will be. Examples include the notable solar astronomer, R.C. Carrington, and Newton's rival, Robert Hooke. Portraits may exist but it is rarely possible to identify the subject of a portrait if there is no label or provenance.

The obvious source for portraits of living or recently-deceased astronomers is the department, society or other institution to which they are, or were, affiliated.

#### 3.1. PUBLISHED SOURCES

Lucinda Douglas-Menzies (2009) has published a book of 38 formal black and white portrait photographs of British astronomers, available through the Emilio Segre Visual Archives<sup>50</sup>. Max Alexander's colour photographs<sup>51</sup> put about 50 British astronomers into attractive association with their science. Portraits of the Astronomers Royal are available at the National Maritime Museum<sup>52</sup>. A good, free and varied collection of about 100 pictures of astronomers (some duplicates) is available from the archival collections of the Institute of Astronomy, Cambridge<sup>53</sup>. It spans all nationalities and a range of historical epochs from Aratus and Copernicus to the modern day but is strongest on British astronomers, Cambridge astronomers in particular.

<sup>50</sup><http://photos.aip.org/>

<sup>51</sup><http://www.maxalexander.com/astronomy/astroNP1.html>

<sup>52</sup><http://www.rmg.co.uk/explore/astronomy-and-time/astronomy-facts/history/portraits-of-the-astronomers-royal>

<sup>53</sup><http://www.ast.cam.ac.uk/library/pictures/astronomers>

The Dibner Library of the History of Science and Technology at the Smithsonian Institution has publication-quality pictures of scientists at a high resolution: the scientists are classified by scientific discipline and include 200 astronomers<sup>54</sup> and a dozen astrologers<sup>55</sup> (some duplicates). The images may be freely downloaded for personal, research and study purposes, but there are reproduction fees.

Photographs of the Nobel<sup>33</sup> and Kavli<sup>34</sup> laureates for physics (including astronomers) and astrophysics respectively appear in the archives of the two organisations, often studio portraits, sometimes stiff pictures taken at the prize ceremonies.

There are many books and journal articles illustrated by portraits. Some books including numerous portrait illustrations are those by Hockey (2007), by Berendzen, Hart and Seeley (1976) (this book includes many modern astrophysicists), by Hoskin (1996) and by Learner (1981). The Astronomische Gesellschaft's collection of many small medallion portraits of astrophysicists (1904-1931) is worldwide in scope but strong on European figures.

The *MacTutor History of Mathematics Archive*<sup>56</sup> of the University of St Andrews shows many portraits of individuals, thought to be free of copyright, which can be downloaded as relatively low resolution images or posters. Jeff Miller's web pages include images of mathematicians on postage stamps<sup>57</sup>; Joachim Reinhardt's web pages exhibit stamps displaying physicists<sup>58</sup>; both collections show a number of astronomers. The database *StarHeads* of personal web pages of professional astronomers<sup>12</sup> is another sources of photographs for registered living and recently deceased astronomers.

Patrick Moore's *The Astronomy Encyclopedia* includes a number of portraits. Portrait photographs of BAA Presidents are often published in the *Journal of the British Astronomical Association* about the time of their presidency, as well as some other notable figures. In the case of astronomers noted for work in specific fields, it is well worth looking in books on that field, other than overtly historical ones, as they will often include an historical summary (for example, Cunningham's 1988 book on asteroids). Quite a few International Astronomical Union Symposia include such summaries.

For British sitters there is a 4-volume reference work, Ormond & Rogers' (1979-1981) *Dictionary of British Portraiture*, giving locations of many images. To this may be added Yung's (1981) *Catalogue of National Portrait*

<sup>54</sup>[http://www.sil.si.edu/digitalcollections/hst/scientific-identity/CF/by\\_discipline\\_display\\_results.cfm?ResearchDiscipline\\_1=Astronomy](http://www.sil.si.edu/digitalcollections/hst/scientific-identity/CF/by_discipline_display_results.cfm?ResearchDiscipline_1=Astronomy)

<sup>55</sup>[http://www.sil.si.edu/digitalcollections/hst/scientific-identity/CF/by\\_discipline\\_display\\_results.cfm?ResearchDiscipline\\_1=Astrology](http://www.sil.si.edu/digitalcollections/hst/scientific-identity/CF/by_discipline_display_results.cfm?ResearchDiscipline_1=Astrology)

<sup>56</sup><http://www-history.mcs.st-and.ac.uk/history/BiogIndex.html>

<sup>57</sup><http://jeff560.tripod.com/stamps.html>

<sup>58</sup><http://th.physik.uni-frankfurt.de/~jr/physstamps.html>

Gallery holdings (1981), Franklin's 1995 supplement to this, and the older work by O'Donoghue on the British Museum's holdings of portrait engravings.

The RAS has a collection of portraits, predominantly photographs but including some engravings and paintings; most date from between 1850 and 1940, but there is some older and newer material. Most of the Society's collection of portraits is available instantly for reproduction on line through the Science Photo Library<sup>59</sup>, which offers in total 1,500 portraits of astronomers for reproduction. A portrait is held of every President the Society has had. In the Library itself a card index exists of most of the collection, which is being progressively included in the supplement to the Archives catalogue. A Microsoft Word version of Bennett's (1978) *Catalogue of the RAS Archives* is available in the Library, together with a large draft addendum in which archives or portraits of individuals may be sought; the catalogue is online<sup>60</sup>. Original photographic portraits in the hands of the British Astronomical Association are included in the RAS card index, and may be viewed by permission of the Officers of the Association.

For scientists of sufficient eminence to be commemorated in Westminster Abbey, Hall's (1966) *The Abbey Scientists* indicates memorials, busts etc.

Some published lists will be a guide to sitters distinguished by nationality or Society. Portraits of Fellows of the Royal Society are catalogued in books by Robinson (1980) and Hammill (1976), and the older *Catalogue of Pictures and Medals* held by the Royal Society of 1912. Scots may well feature in Guthrie's (1950/1960) *List of Portraits in the Royal Society of Edinburgh*, while for Oxford figures there is Lane Poole's (1912-1926) *Catalogue of Portraits in the possession of the University, Colleges, City and County*.

NASA websites can be used to locate portraits of astronauts, and cosmonauts involved in US space missions. Images may be downloaded, often in multiple formats, including high-resolution versions suitable for printing. Publication-standard copies of NASA images may also be obtained by media representatives or NASA research partners by contacting the Public Affairs Office of the responsible NASA Center – a good one for portraits is the Johnson Space Center (JSC); they may also be purchased from certain commercial sources – those in the UK include the Science Photo Library<sup>59</sup> and the Hulton|Archive<sup>61</sup>. 'Off-the-peg' NASA images and products are available from local science centres and planetaria.

NASA's Multimedia Gallery<sup>62</sup> is the portal for the Agency's photo,

<sup>59</sup><http://www.sciencephoto.com/>

<sup>60</sup><http://www.ras.org.uk/library/about-the-library/77?task=view>

<sup>61</sup><http://www.gettyimages.com/creative/frontdoor/hultonarchive>

<sup>62</sup><http://www.nasa.gov/multimedia/>

video, audio and arts galleries, including the NASA Image eXchange. It is not a unified searchable data base.

### 3.2. PRIVATE SOURCES

There are several commercial picture agencies that supply relevant portrait material. Of course, they charge for access and for supply of material. Portraits of historical figures may be found in the *Mary Evans Picture Library*<sup>63</sup>. Similar sources potentially useful for more recent astronomers, astronauts, and cosmonauts include the Science Photo Library<sup>59</sup> and the Hulton|Archive<sup>61</sup>. Their stock includes portraits of astronauts and of cosmonauts from the period of collaboration between Russia and the USA. Pictures of cosmonauts from the USSR period can be ordered from the Russian Information Agency-Novosti (RIA-Novosti)<sup>64</sup>, whose London office retains an archive of photographs from the Soviet/Russian space programme. Finally, the British Interplanetary Society<sup>65</sup> is a potential source of space material, but is normally only open to its own members.

### 3.3. ARCHIVAL SOURCES

Many archival sources are privately run, and it is normal courtesy to make preliminary contact by letter (enclosing s.a.e.) or telephone to ascertain whether it is possible to visit. Information is sometimes available on the relevant website.

The National Portrait Gallery is the national repository of portraiture and has many portraits of British scientists. They can also supply references to portrait holdings in other repositories. Portraits in the Gallery's Primary Collection are held in the Picture Library<sup>66</sup>; the Heinz Archive and Library<sup>67</sup> should be contacted for more complex enquiries.

The *Image Library*<sup>68</sup> of the Museum of the History of Science holds a large collection of photographs, including portraits of scientists and instrument makers.

The Royal Greenwich Observatory archives<sup>69</sup> are now held by Cambridge University Library. These have a number of portraits including all the Astronomers Royal and some other figures connected with Greenwich Observatory.

<sup>63</sup><http://www.maryevans.com/>

<sup>64</sup><http://visualrian.ru/en/>

<sup>65</sup><http://www.bis-space.com/>

<sup>66</sup><http://www.npg.org.uk/collections.php>

<sup>67</sup><http://www.npg.org.uk/research/archive.php>

<sup>68</sup><http://www.mhs.ox.ac.uk/images/>

<sup>69</sup><http://www.lib.cam.ac.uk/deptserv/manuscripts/rgo.html>

The Royal Society<sup>70</sup> has numerous portraits, mainly of former Fellows (see Sect. 3.1).

The *Science & Society Picture Library*<sup>71</sup> has since 1998 represented the collections of the National Museum of Science and Industry, comprising the Science Museum, the National Museum of Photography, Film & Television, and the National Railway Museum. It holds numerous portraits (not restricted to British subjects).

A project to compile an international index of holdings of portraits of astronomers was begun at the Archenhold Observatory, prior to the rise of the WWW. The project is now indefinitely suspended, but a useful interim version of the catalogue was published by K. Friedrich (1984).

The archives of the Observatoire de Paris have portraits of about 50 astronomers available, mainly historical French astronomers associated with the Observatory<sup>72</sup>.

The American Institute of Physics<sup>73</sup> includes the Center for History of Physics containing the *Emilio Segre Visual Archives*<sup>50</sup>, focusing on portraits of 20<sup>th</sup> century American physicists and astronomers, but including many scientists in Europe and elsewhere, and in earlier times. Some of the most attractive pictures are not the formal portraits but pictures of the scientists at work.

The Caltech Archives contain the *Caltech Archives PhotoNet*<sup>74</sup>, an online database containing thousands of images, including portraits.

The NASA Johnson Space Center (JSC) Imagery Service contains the NASA *JSC Digital Image Collection*<sup>75</sup>, the most comprehensive NASA collection for portraits, which spans the whole manned space programme and includes portraits of cosmonauts for missions on which the USA and Russia collaborated.

An excellent source for portraits, especially 20th century and American figures, is the *Mary Lea Shane Archives*<sup>76</sup> of the Lick Observatory. A browseable index to this collection is available on their website<sup>77</sup>, and a dated paper copy is available at the RAS Library (Lick Observatory 1980).

San Diego State University's Malcolm A. Love Library<sup>78</sup> holds the *Ernst*

<sup>70</sup><http://royalsociety.org/>

<sup>71</sup><http://www.scienceandsociety.co.uk/>

<sup>72</sup>[http://alidade.obspm.fr/sdx/alidade/toc.xsp?id=FRBSPM-ALIDADE-PEIN00001\\_c-archdesc&fmt=alidade-peintures&idtoc=FRBSPM-ALIDADE-PEIN00001-pleadetoc&ss=true&as=true&ai=|peintures|](http://alidade.obspm.fr/sdx/alidade/toc.xsp?id=FRBSPM-ALIDADE-PEIN00001_c-archdesc&fmt=alidade-peintures&idtoc=FRBSPM-ALIDADE-PEIN00001-pleadetoc&ss=true&as=true&ai=|peintures|)

<sup>73</sup><http://www.aip.org/>

<sup>74</sup><http://archives.caltech.edu/collections/photos-images.html>

<sup>75</sup><http://images.jsc.nasa.gov/>

<sup>76</sup><http://library.ucsc.edu/speccoll/lick-observatory-archives>

<sup>77</sup><http://digitalcollections.ucsc.edu/cdm/landingpage/collection/p265101coll10>

<sup>78</sup><http://library.sdsu.edu/>

*Zinner Collection* of books, pictures and portraits, mainly of astronomers, though many are secondary copies. There is a printed catalogue by G. Johns (1975). High-resolution digital scans of the portraits are available for a small fee through contact with the Special Collections Archive at the Library.

### List of Abbreviations

A2A	Access to Archives
ARIBIB	Astronomisches Rechen-Institut Bibliographical Database for Astronomical References
BAA	British Astronomical Association
CSBN	Committee on Small Body Nomenclature of the IAU
CURL	Consortium of University Research Libraries (now Research Libraries UK)
DNB	Dictionary of National Biography
IAU	International Astronomical Union
ADS	NASA's Astrophysics Data System
RAS	Royal Astronomical Society
RCHMs	Royal Commission on Historical Manuscripts

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