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The Archives of Armagh Observatory, 1789-1916

(The text of a paper published in the Journal for the History of Astronomy, Vol. 18, p 295 - 307, 1987, ammended in some details.)

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Historical Introduction

Armagh Observatory was founded in 1789 in the historic Irish city of Armagh on the initiative of Archbishop [Richard Robinson](#), who endowed it and appointed a board of *Governors and Guardians*, many of whom were (and are) members of the Chapter of Armagh Cathedral. It was established by an [Act of Parliament](#) in 1791 and therefore permanent in status - unlike other observatories in Ireland such as those of Lord Rosse at [Birr Castle](#) and of Colonel Edward Cooper at Markree Castle, observatories that fell into ruin when the estates passed

to less enthusiastic descendents.

Armagh Observatory has always enjoyed official esteem, but all too often this has not been translated into the giving of financial support. Today, the Observatory, being neither a university activity nor an institution under the direction of the Science and Engineering Research Council, is supported from public funds through the Department of Education in Northern Ireland. Its history, therefore, has been chequered, its achievements heavily dependent upon the quality of the Director both as observer and as administrator. Nevertheless, as an eighteenth-century foundation it occupies an important place in the history of Irish astronomy.

Our purpose here is to list the surviving archives from the eighteenth and nineteenth centuries—more exactly, from the period down to 1916, when [J. L. E. Dreyer](#) resigned as Director - in order to make them known to historians of the period. The first Director, the Rev. James Archibald Hamilton, was appointed in 1790. Unfortunately, Archbishop Robinson died in 1794, before the finances of the infant observatory were secure. Nevertheless, his successors could not prevent the delivery in 1795 of the one instrument of quality the observatory was to possess for many years: [an equatorial by Troughton](#) of 2 inches aperture and 3 ft focal length.

The observatory clocks, too, were outstanding, two being by the great London maker [Thomas Earnshaw](#). With the equatorial and a locally-made transit instrument, Hamilton and the assistants he employed made a variety of observations, but of these only a few found their way into print. Hamilton died in 1815, and was succeeded by the Rev. William Davenport, whose ineffectual reign ended with his suicide in 1823. He was succeeded by a Director of formidable abilities and energy, the Rev. [Thomas Romney Robinson](#), who, astonishingly, ruled for no less than 59 years. Robinson was fortunate in that at the outset his patron, Lord John George Beresford, was an archbishop of the same mold as Archbishop Robinson. With Beresford's help a [transit instrument](#) by Thomas Jones of London was installed in 1827, a [mural circle](#) by Jones in 1831, and a [15-inch Grubb reflector](#) in 1835.

Using the transit instrument and the mural circle, Robinson and his assistants compiled the Armagh catalogue under the title *Places of 5,345 stars observed from 1828 to 1854, at the Armagh Observatory (Dublin, 1859)*. From the observations of Robinson's later years came a list of still more accurate positions, *On the places of 1000 stars observed at the Armagh Observatory*, published in 1879 in Transactions of the Royal Dublin Society. Robinson died in 1882, and was succeeded by a young Danish assistant at Dunsink, John Louis Emil Dreyer. Astronomy was now undergoing transformation, but Dreyer began by publishing the last fruits of Robinson's many years as Director: *The Second Armagh catalogue of 3300 stars* (Dublin, 1886). Meanwhile he secured contributions in memory of Robinson to help pay for a [10-inch equatorial](#) by Grubb, which was installed in 1885. Dreyer, who had earlier been assistant in charge of Lord Rosse's great telescopes, was an experienced observer of nebulae, and at the invitation of the Royal Astronomical Society he prepared the *New General Catalogue of Nebulae and Clusters of Stars* (or N.G.C.), published in 1888 and a standard work ever since. Many of the nebulae were re-observed with the Grubb refractor. Two supplements followed, in 1895 and 1910, but Dreyer was being diverted into history of astronomy by his veneration for his fellow-countryman, Tycho Brahe. He published a life of Tycho in 1890, a history of early planetary theory in 1906, and a two-volume edition of the works of William Herschel in 1912; and in 1913 there appeared the first of what were to be fifteen volumes of the *Opera Omnia* of Tycho. Soon these historical interests took priority over astronomy in Dreyer's mind, and in 1916 he resigned so as to devote himself to history.

We list below the surviving archives of Armagh Observatory in the period down to the resignation of Dreyer. Those wishing for further information on them should write to:

The Librarian,
Armagh Observatory,
College Hill,
Armagh, BT61 9DG
Northern Ireland.

The standard account of the history of the Observatory is *Church, State and Astronomy in Ireland - 200 Years of Armagh Observatory* by J.A. Bennett, and published by The Institute of Irish Studies, Queen's University, Belfast and Armagh Observatory. Available in paperback from Armagh Observatory price 7.95 pounds plus postage.

Acknowledgements

We wish to thank Mr [M. Murphy](#) and Mr B. McOscar of Armagh Observatory for their assistance in preparing this manuscript. Michael Hoskin thanks the Royal Society for a travel grant in support of this work.

A. DOCUMENTS RELATING TO THE ADMINISTRATION OF THE OBSERVATORY

(i) The Government of The Observatory

M93 Printed [Act of Irish Parliament](#) setting up the Observatory, 1790 with 1938 amendment.

M56

- .1 Deed by Primate Robinson appointing Dean Hamilton to act on his behalf as a Governor of the Observatory, 6 April 1790. (2pp)

M149 Minutes of Governors Meetings, 1790, 1825, 1882, 1887, 1915, 1920. (9pp)

M59 Case of the Sovereign and Jury of Armagh with Dr J. A. Hamilton and the Governors and Guardians

of the Observatory with respect to tax exemption and the billeting of soldiers at the Observatory, 31 March 1799. (3pp)

M136 Minutes Books, 2 vols, 1820-1958, 1958-74. Contain accounts of annual visitation by Governors and Guardians and annual reports of the Directors. (c. 800pp)

M38 Manuscript copy of Minutes Book by Dreyer donated by him to the Observatory, Aug 1916. Covers the period 1820-65. (86pp)

M49

- .1 Printed report by Dr T. R. Robinson for the Board of Governors, 1842. (12pp, 2 copies). Lists George III collection and proposed observations.
- .2 Printed report by Dreyer, 1883-96. (7pp).
- .3 Printed report by Dreyer, 1897-1910. (7pp, 2 copies).

M87 Legal documents relating to power of attorney, commissions from the Primate etc., 1824, 1850, 1873, 1884, 1885, 1886, 1888, 1904.

M151

- .1 Minutes and Report of Financial Committee, 1872. (3pp)

M172 ["An historical account of the Armagh Observatory"](#), J. L. E. Dreyer, printed for private circulation, 1883. (20pp + photograph)

(ii) The Staffing of the Observatory

M56

- .2 Appointment of J. A. Hamilton to post of Astronomer and Keeper of Observatory and Museum by the Primate, 31 July 1790. (2pp)
- .3 Bond by J. A. Hamilton to Governors and Guardians, 24 Aug 1790. (2pp)

M86

- .6 Letter from E. Stoppard concerning Hamilton's Bond, 1823.
- .8 Hamilton's Certificate from Maskelyne, 1790.

M55

- .1 Bond for William Gimingham as Assistant to J. A. Hamilton, 18 July 1795. (2pp)
- .2 Same for Rev. Robert Hogg, 1 Feb 1799. (2pp)

M166 Acknowledgement of salaries, 1800-1919. (418pp)

M57 Appointment of T. R. Robinson by Primate Beresford, 14 Aug 1823. (lp)

M86

- .1 Draft of T. R. Robinson's appointment, 1823.
- .4 Robinson's Bond to the Governors and Guardians plus 3 letters, 1823.

M85 Bonds to Observatory for Assistants; Charles Faris, 1868, Neal McNeal Edmondson, 1837, W. R. Rambaut, 1864.

M86

- .2 Draft of Dreyer's appointment corrected by I. T. Ball, 1882.
- .3 Note from Dean Reeves to Dreyer concerning date of appointment and Dreyer's reply.
- .5 Document of appointment of Dreyer as Director of the Observatory, 1882.

M72 Certificate of recommendation for Dreyer as Astronomer at Armagh by Christie Astronomer Royal for England, 9 May 1882. (lp)

M39 Notebook with inscription "Sallie D. Procter, Washington DC, July 24 '88" on flyleaf, widow of R. A. Procter, nee Thompson. Contains biographical and family notes of Rev. John

Thompson, born Muckamore Abbey near Belfast.
Copied from "A History of St Marks Parish,
Culpepper, Co. Va.", by Rev. Phillip Slaughter
D.D., Rector of Emmanuel Church, Culpepper, Co.
Va. 1877. (6pp)

- M40 Letters and papers concerning R. A. Procter,
astronomer.
- .1 Report copied from The press, 23
Oct 1880 giving details of the life and work of
R.A. Procter. (7pp)
 - .2 Printed memorial to Rt Hon. W. H. Smith M.P.,
First Lord of the Treasury, concerning
R. A. Procter B.A. with list of signatures and
list of works. (4pp)
 - .3 Manuscript copy of article from Knowledge
concerning transit of Venus, dated 17 Feb 1882.
(14pp)
 - .4 Notes concerning the publication, Knowledge,
founded by R. A. Procter (4pp)

M89 Rules, undated. Note on duties of Assistant
Astronomer and payment of Faris (Assistant) 1884.
(lp) List of suggested rules for assistants, 24
Aug 1917. (4pp)

M150 Employment of John Kennedy, gardener, 1882.
(2pp)

See A(iii) M58 and A(vii) M60.

(iii) The Financing of the Observatory

- M62
- .2 Indenture, possibly a lease for land at
Carlingford, 1591.
 - .1 Lease for land at Carlingford, 1614,
on parchment.

M101 Large volume of vouchers, receipts and
correspondence concerning the Observatory's
estates at Derrynaught, Tullynure and Carlingford,
1790-1910. Deposited with the Public Record
Office, Belfast.

M58 Endowment of an Assistant Astronomer by
Primate Robinson, 1 Jan 1793.

- M53
- .1 Document by Governors empowering J. A.
Hamilton to treat and compromise with tenants of
land at Derrynaught, 22 Aug 1795. (2pp)
 - .2 List of tenants and rentals for lands at
Derrynaught, c. 1800. (lp)
 - .3 Copy of Carlingford rental, 1838-39. (6pp)

M82 Collection of 21 leases, tithes and various
legal documents concerning the Observatory's
estates at Derrynaught, Tullynure and Carlingford,
1801-73.

M 118 Volume of Observatory accounts, 1813-86.
(124pp)

- M91
- .2 List of Primate Beresford's gifts to the
Observatory plus income.

M6 Draft letter from the Governors and Guardians
of Armagh Observatory to the Right Honourable
First Lord of the Treasury outlining the pecuniary
state of the Observatory following the
disestablishment of the Church of Ireland and the
fixing of fair rents by the Land Court. Amended by
several of the Governors, c. 1870 (4pp), plus
draft by Robinson, 31 May 1869. (3pp)

- M169 Correspondence regarding Observatory's
estates.
- .2 Three letters regarding the School
House at Derrynaught, 1836, 1836, 1882.
 - .1 Example letter from Evans (agent) to
E. Tipping regarding the civic duty of land-
owners to pay tithes for the support of the
Observatory, 1837.

- .3 Contract for land agent, 1873.
- .4 Agreement on tithes, 1873.
- .5 Three tithe-rent-charge purchase agreements, 1874.

M153 Report by Drs Robinson and Reeves on the investment of 1246 pounds, 1874. (2pp)

M80

- .1 Draft memorial to Disraeli, Lord Beaconsfield, requesting government support for the Observatory, signed by the Governors, 1874, plus three appendices containing: an inventory of instruments, income and expenditure of the Observatory, and a list of Primate Beresford's gifts. (7pp)
- .2 Letter from Robinson to Dean accompanying draft memorial outlining future requirements of the Observatory, 11 April 1879. (3pp)
- .3 Robinson's draft of 80.1. (3pp)

M81 Twenty-two letters between the Observatory and the Treasury concerning request for a capital grant for Armagh Observatory, 1883-87. Plus letter from Mr Gladstone regarding same, 15 June 1883 (2pp), and from the Lord Lieutenant, Dublin, 12 June 1883. (2pp)

M154 Investment of Government grant, 1884-85. (13pp)

M76

- .1 Collection of 16 letters to Dreyer and the Archbishop of Armagh concerning the application to the Government for support of Armagh Observatory. Including letters from Dreyer, Barton, Archbishop of Armagh, G. W. Balfour, Schornberg McDonnell (Foreign Office), Royal Society, H. R. W. Hanbury (Treasury), Christie (RGO), E. J. Stone (Oxford), Robert Ball (Cambridge), and Lord Kelvin (Glasgow), 1897-98.
- .2 Printed memorial to the Government, 1897.
- .3 Report on income of Observatory, 1897.
- .4 Letter from Dreyer to Dean regarding leases and tithes, 1905.
- .5 Offer of Government grant by Royal Society for purchase of measuring machine, 28 May 1898.
- .6 Copy of letter from R. J. Hamilton on maintenance of Observatory, 1905.

M155

- .1 Statements on sale of Observatory estates, 1906. (11 pp)
- .2 Letters and reports regarding investments, 1874-1932. (62pp)
- .3 Notes and copy of letter regarding sustentation fund for parish of Kildarton, Oct 1915.

(SPP)

- .4 General account of income and expenditure, 1916. (lp)

See A(vi) M83; E M69; F M71.

(iv) The Instruments of the Observatory

M92

- .2 Modern correspondence regarding Short and his telescope. Plus [an old page of instructions](#) for using the 2ft reflecting telescope-undated, possibly by Short.

[M138 Instructions by Sir W. Herschel for assembly of the 10ft reflector and care of speculum mirrors, undated.](#) With footnote by Dreyer (1911), identifying the above as being written by Caroline Herschel.

M140

- .1 Letters concerning the adjustment of Troughton's Equatorial. Hamilton and Waugh, 1795, 1796.
- .2 Paper by Hamilton on "Comparative observations

made with different kinds of micrometer",
submitted to R.I.A. with tables, c.1795.

M17

- .2 To adjust Troughton's Equatorial. J. E. Troughton, c. 1800. (3pp)
- .3 Collimation and adjustment of Troughton's Equatorial, c. 1800.(4pp)
- .4 Adjustments of the Equatorial probably by Hamilton. (4pp)

M91

- .1 Inventories of furniture, apparatus, instruments and books belonging to Armagh Observatory and Museum, c. 1796, c. 1815, c. 1820, 1825, 1918, 1937, 1974, 1975. .3 List of instruments from the Kew Observatory.

M48 Typed copy of extracts from Earnshaw's "Appeal" relating to his clocks made for Armagh Observatory. (3pp)

M45 Account for instruments transferred to Observatory by Representatives of the late Dean Hamilton, 8 Jan 1817, signed by William Davenport. (2pp).

M44

- .1 Account from "Thomas Jones" London to Primate of Ireland for supply of 5ft transit instrument and a 4'8" mural circle 2 April 1827. (2pp)
- .2 Accounts from Thomas Grubb, Dublin, for supply of 15" equatorial Cassegrain telescope, eyepieces, mirror fittings etc., 1837-44.

M14 Account of the Transit Instrument, Robinson, undated. (48pp)

M156 Accounts for supply of miscellaneous instruments including telescopes, mirrors, lenses, eyepieces, and parts for anemometers, clocks etc., 1838-1944. (67pp)

M111 Correspondence and notes concerning the transfer of instruments from the George Collection at Kew to Armagh, containing letters from Sir James South (21), Colonel Rawden (7), Lord Duncannon (4), Lord Mountneagle (1), T. R. Robinson (3), Archbishop of Armagh (4), c. 1841. Includes a 31-page "Narrative of events" in the "Kew instrument affair" by South plus modern correspondence and historical notes by E. M. Lindsay.

M43 List of the instruments of the Observatory, Robinson, 1853. (7pp)

M92

- .7 Lists and correspondence concerning the collection of instruments from Kew, 1851- 1951, and other historical instruments at Armagh.

M100

- .2 Rating of Dent Chronometer by RGO, 1858.
- .3 Correspondence regarding the purchase of a chronometer, 1891.

M17

- .1 Methods adopted at Armagh Observatory for making, recording and reducing observations, Robinson, 1868. (24pp)

M171 Wiring diagram for clocks, chronograph etc. in Transit and Mural Circle Rooms, 1882.

M10 Collection of 27 letters to Dreyer that accompanied contributions to the Robinson Memorial Fund.

M88

- .1 Appeal by Dreyer for the T. R. Robinson Memorial Fund, 1882-83.
- .2 List of subscribers.
- .3 Reports by G. Johnstone Stoney, R. S. Ball and J. L. E. Dreyer regarding the relative merits of a refractor or Grubb's own design for Robinson Memorial Telescope, 1884.

M109 Contracts between H. Grubb and the Governors for the erection of the Robinson Memorial Dome and Telescope with plans, 1884, plus estimates, invoices and receipts, 1884- 1909.

M157 Letter from Dreyer to Dr Irwin regarding electrical illumination of telescope, 1890.

M92

- .1 Six letters from W. A. F. Weatherfield regarding the purchase of Shelton Bracket Clock Graham and Shelton "case piece" and Vulliamy mechanism, 1918.

M92

- .11 Correspondence regarding the loan of telescopes to Lady Robert's Field Glass Fund, 1918.

M92

- .9 Correspondence regarding the historical clocks at Armagh Observatory, 1926-68.

See A(vii) M41 for repairs and changes to instruments; B(i) M 12, B(i) M 129 for description of Earnshaw clocks and setting up of Troughton Equatorial, C for meteorology instruments; and the important Maskelyne, Troughton and Earnshaw letters in D M51.

(v) Documents concerning Railways

M 107 Manuscript copy of "Minutes of evidence" House of Commons Session, 1853, London and North Western (Tring and Oxford) Railway Bill. Evidence by Proposer Robinson, Sir Francis Beaufort and Professor Johnson, 31 May 1853. (30pp)

M61

- .1 Letter from Newry and Enniskillen Railway, 4 Nov 1856, concerning their plans to build a line near Armagh. (Ip)
- .2 Draft petition by the Governors and Guardians of Armagh Observatory to Parliament against the Railway Bill, 1857. (4pp)
- .3 Draft Act of Parliament regarding Newry and Enniskillen Railway, 21 July 1845. (13pp)
- .4 Printed ditto. (4pp)

M77 Papers and letters concerning the construction of the Newry and Armagh Railway.

- .1 9 Letters from Newry and Armagh Railway, April-Aug 1873 + map.
- .2 3 letters from Robinson to the Archbishop and Dean respectively concerning Newry and Armagh Railway, April-June 1873.
- .3 Legal opinion by J. J. Ball Q.C. on Newry and Armagh Railway.
- .4 Petition to Parliament (not as 61.2) against a railway extension, signed by Governors undated (2pp) + draft of same by Robinson.
- .5 Letters from the Governors to Newry and Armagh Railway giving permission for laying lines.
- .6 Draft request for legal opinion on proposed railway, by Robinson, undated.
- .7 Receipt for land purchased by Newry and Armagh Railway, 5 Sept 1873.
- .8 Draft Parliamentary Bill regarding Newry and Armagh Railway, 1859.
- .9 Letter from Archbishop to Dean regarding railways, 2 July 1873.

M75 Copy of letter from Governors and Guardians giving Newry and Armagh Railway permission to encroach within 760 yards of the Observatory provided speed does not exceed 5 mph. Plus 3 coloured maps showing the relative position of the Observatory and the proposed station and lines, 1874.

(vi) Miscellaneous Administrative Documents

M163 Library accounts and related documents, 1800-1946. (310pp)

M42 Book of incidental expenses and library accounts, 1883-1916. (65pp)

M83 Drafts for summary of the history of the townland of Derrynaught by Dr Reeves, Dean of Armagh, later Bishop of Down and Connor. (3pp, plus copy, 4pp, and notes 3pp)

M137

- .1 Letter from Mrs Robinson, n.d., possibly to Dean Reeves, apologizing for a remark, undated.
- .2 Letter from Dr Robinson to Dean Reeves concerning maps of Observatory estates and proceedings at Synod, 1873.
- .3 Robinson to Reeves regarding accounts and Leclanche cells, 26 Feb 1879.

M73 Death certificate for William Edward Meade, Protestant Bishop of Cork, 12 Oct 1912.

M165 Observatory accounts, 1824-1905. (67pp)

M167 Documents concerning taxes, rates and charitable status, 1904-37. (28pp)

(vii) Documents concerning Observatory Buildings, Grounds and Services

D10 Plan of Observatory site at Knockamell Townland, 3 Oct 1789. (framed)

M54

- .1 Surrender of land by Dean Hamilton to the Lord Primate. Four acres of land for Observatory, 23 June 1790. (3pp)
- .2 Surrender of land by Mr McCann and Singleton to the Governors and Guardians of the Observatory, 23 June 1790. (3pp)
- .3 Surrender of land by Thomas Stringer to Thomas McCann. Land for the use of the Lord Primate etc., Sept 1789. (1p)
- .4 Surrender of land by the Primate to Richard Upton for use by the Observatory with map of Observatory grounds, 1 July 1790.

M60 List of indentures concerning the transfer of land to the Governors and appointment of J A. Hamilton as Astronomer with dates, c. 1790. (2pp)

M158

- .1 Insurance policies, 1794, 1807, 1888. (6pp)
- .2 Correspondence and receipts regarding insurance, 1804-1945. (116pp)

M160

- .1 Letter from John Stanley farmer, to Robinson, 25 Nov 1851, undertaking to replace the stones forming the old meridian marker, if requested to do so.
- .2 Copies of two letters from the Secretary of the Church Temporalities Commission to John Stanley concerning the purchase of a perpetuity on property in Tullynure, 1872 (for meridian markers).
- .3 Invoices and receipts concerning the meridian markers, 1802-64. (9pp)

[M41 "Journal of work and repairs etc.", 1867-1915. Contains details of decoration, repair and changes to Observatory buildings and equipment plus an outline of observations made and publications. Entries by Robinson, Dreyer and assistants \(68pp\). With plan of basement on N.E. side of Observatory, tunnel and sewers.](#)

M68 Written specifications for the erection of a meteorological house, in 1867, at the expense of the Meteorological Office, London, 21 Sept 1867 (10pp), with four coloured drawings of same. This building was erected to house automatic recording meteorological instruments.

M74

- .1 Ten plans of the Observatory, possibly from Dreyer's time, showing the layout of the buildings, tunnel, rooms, furniture etc.

D8 Plan of Observatory and grounds, scale 1/500, showing layout of gardens, grounds etc., 5 Aug 1862 (in colour).

M161

- .1 Two letters from Charles Faris (Assistant) to Dean Reeves concerning the maintenance of buildings, 1882, 1887.

M159

- .1 Chemical composition of water supply, 1889. (Ip)

M162

- .2 Accounts and correspondence concerning repairs to buildings etc., 1800-1919. (602pp)

M164 Accounts for electricity, 1890-94. (5pp)

D7 Plan of the Observatory, 1953, showing modifications to the old meteorological building and the position of the anemometer box on the roof.

B. DOCUMENTS RELATING TO OBSERVATIONS

(i) Series of Systematic Observations of Positions of Stars with the Mural or Transit Circle, and Reductions

M12 Collection of observation record books, 1782-1840, containing observations of stars, planets and comets.

- .1 Correction for errors of division of the Mural Circle. (79pp)
- .2 Clock corrections, 1830-39. (79pp)
- .3 Reductions of R.A., 1831 Sept 28 to 1832 May 12. (93pp)
- .4 Reductions of R.A., 1831 April I to Sept 21. (97pp)
- .5 Old working list, 1839-lists of observations of stars and comets (including Halley's). (48pp)
- .6 Supplements ?, 1856. (13pp)
- .7 Reductions of R.A., 1829 Feb 23 to Dec 8. (94pp)
- .8 Reductions of R.A., 1829 Dec 15 to 1830 Sept 28. (94pp)
- .9 Observations with Mural Circle, 1832, 1833, 1834. (95pp)
- .10 Observations of NPD for various stars, 1811. (23pp)
- .11 Observations of NPD with Troughton Equatorial, 1809. (17pp)
- .12 Book of computations? (193pp)
- .13 Observations of NPD, 1807, 1808. (5pp)
- .14 Observations of NPD, 1800-3. (50pp)
- .15 Observation record book, 1782. (12pp)
- .16 Observations of NPD, 1805. (27pp)
- .17 Equatorial observations, 1813- 15. (36pp)
- .18 Observations of unknown date. (86pp)

M129 Observation record book 1793-96 with journal of events relating to the setting up and adjustment of clocks and instruments at Armagh Observatory. Also contains drawings of Jupiter, 1795. (153pp)

M97 Eight notebooks of observations (mainly astronomical, occasionally topographical, magnetic variation etc.) made by Dr Hamilton 1792-1810. Plus four sheets of observations, 1794-95. (175PP)

M 126 Fifteen Transit Circle record books, 1796-1882. (c. 5000pp)

M19 Record books for observations of stars, Sun, planets, comets etc.
.1 1803 NPD Troughton Equatorial (10pp)
.2 1804 ditto (14pp)
.3 1799-1800 ditto (21pp)
.4 1803 ditto (15pp)
.5 1824 ditto (32pp)
.6 1797-98 ditto (20pp) contains drawings of sunspots
.7 1797 ditto (20pp)
.8 1798 ditto (43pp) contains drawing of Cathedral weathercock
.9 1823-24 ditto (36pp) contains comments on observing procedure with Equatorial (Troughton)
.10 1825 NPD Troughton Equatorial (89pp)
.12 Reductions (34pp)
.13 ditto (36pp)
.14 Reductions of principal wires, 1851 (18pp)

M96
.3 Approximately thirty small bundles of notes containing observations, 1830-32.

M96
.1 Collection of 49 small notebooks containing reductions of observations of stars, 1832-60.

M131 Eight record books of observations of NPD, 1832-83. (c. 4000pp)

M132 Five RA record books, 1832-70. (c. 2000pp)

M 124 Five "Wire" record books, 1838-78. (c. 1900pp)

M125 Four Circle observation books, 1832-68. (c. 1750pp)

M70 Book of reductions of right ascensions for observations made, 29 Sept 1830 to 31 March 1831. (84pp)

M 135 Two books of corrections for Circle observations. (c. 400pp)

M127 Reductions for clock rates, refraction and constants. (c. 370pp)

M133 Six books of constants. (c. 1800pp)

M 128 Four books of "Index errors of Mural Circle". (c. 600pp)

M19
.11 Reduction for Circle divisions. (39pp)

M95 Box of tracings from electric chronograph for transits of stars observed, 1869-80.

M96
.4 Observations of NPD, 1869-72.

M96
.2 Two black covered notebooks containing observations, 1873-77 and 1877-83.
.5 Miniature tables for reduction of observations.
.6 Precession tables.

M134 Book of mean observations. (c. 750pp)

M130 Four reduction books. See D M28.

(ii) Miscellaneous Observations and Related Documents

M103 A catalogue of 153 of the principal fixed stars etc. for the year 1760 and the six following years with a general index. Handwritten catalogue, of 159 pages, possibly by Hamilton.

M25 Observations made at Cookstown, 1782 by J. A. Hamilton (14pp) plus some meteorological observations. (1p)

M22 Catalogue of stars with RA, NPD etc for 1 Jan 1790 together with catalogue (Herschel's ?) of nebulae, clusters and remarkable stars for Jan. 1796. (36pp)

M20

.3 Papers relating to solar eclipse of 28 Nov 1807, Hamilton. (1p)

M23 Stellar observation records, 1795-96. (49pp)

M24

.1 Miscellaneous observations from Armagh Observatory, 1796, with drawings of planets. (9pp)

M18

.1 Table of mean N. Polar Distance of 34 principal fixed stars, for the beginning of the year 1797, deduced from observations made at Armagh. (1p)

M139 Account of observations of the transit of Mercury Tuesday 12th [Aug 1782]. By J.A. Hamilton.

M20

.2 NPD observations of brightstars and comparisons between different observers, c. 1800. (6pp)

M24

.2 Observation of comet, Oct-Dec 1807. (1p)

M30 Book of manuscript observations and notes by W.Davenport, 1816-19. Contains a copy of Troughton's directions for adjustment of Equatorial. (141pp)

M100

.1 Observations of eclipse ? from Armagh and Markree, no date.
.2 Rating of Dent's Chronometer by RGO, 1858.

M116 Tables of refraction, by Robinson, 2 copies plus a set of tables for unknown purpose, 0° - 15° and xii to xxiii hours.

M13 Various working tables, c. 1840-60 and later, refraction tables and miscellaneous mathematical tables. (44pp)

M3 Comparison of standard stars with the Sun from 11 March 1841 to 28 July 1854, working notes. (72pp)

M2

.1 Places of Donati's Comet, 1858 and Comet 1861, No. 1 and No. 2, from observations made at Armagh Observatory by N. McN. Edmonson.

M4 Beta Cassiopeia, observations and corrections for parallax with the Twelve Microscope Mural Circle, March 1858. Using least squares to obtain equations of parallax and temperature combined, March 1858. (50pp)

M122 Astronomical Observations made with the 10-inch Grubb refractor at Armagh Observatory by J. L. E. Dreyer, 1885-1914. Includes observations of planets, nebulae, comets and sunspots, with drawings, and table for computing refraction.

M99 Notebook of 10-inch refractor observations made by Dreyer, 1898-1914. Includes observations of nebulae, stars, eclipses and comets, including Halley's Comet, 1910.

M98 Tables of reductions from Dreyer's time, c.1899.

M35 Notebooks containing micrometer measurements by Dreyer of photographic plates provided by Isaac Roberts.

.1 Measurements of stars in Pleiades on plate taken 22 Jan 1889, 1899. (65pp)
.2 Measurements of Messier 33, completed 13 April

1904. (84pp plus chart)

M92

- .3 Correspondence (1926-58) concerning Demainbury's account of the observation of the transit of Venus, 3 June 1769.

See B(i) M 129 for drawings of Jupiter 1795; G.

C. METEOROLOGICAL RECORDS AND RELATED DOCUMENTS

M20

- .1 Meteorological notes Dec 1783 - Jan 1784, Hamilton (Cookstown?). (4pp)

M31 Twelve charts of barometer readings for 6 mths, Jan-June 1788 for observatory (probably Cookstown, Co. Tyrone), Charlesfort, Co. Meath, Creggan, Co. Louth and Athlone, J. A. Hamilton?

M26 Barometrical and thermometrical observations made at Athlone by Sylvester Nowlan, Oct 1788 - April 1789. (7pp)

M117

- .1 Twenty-two volumes of meteorological records and charts for Armagh Observatory, July 1795 to May 1825.
- .2 Thirteen volumes of meteorological records for Armagh, 1833-1987. (c.5550pp)

M64

- .1 Meteorological observations taken at Armagh Observatory presented to Armagh Natural Historical Society by N. McN. Edmonson for the years leading up to and including the Famine Era, 1840-50.
- .2 Tables of mean monthly temperature and pressure, 1833-50. (4pp)

M32

- .1 Book of manuscript observations of meteorological conditions in Glendooen, Co. Donegal during the years 1846-68, with many comments on crops etc. (60pp)
- .2 Loose insert containing similar records for 1867-83. (75pp plus 4 graphs)
- .3 Study of 7- and 11-year cycles in weather records of Glendooen, 7 Jan 1883.

M123 Eleven Anemometer record books, 1852-1907. (c. 9000pp)

M2

- .1 Book of observations and computations, Robinson and Edmonson, 1858-61. (146pp)
Computation of heights from Mr Mallet's barometric observations made in the Kingdom of Naples in 1858. N. McN. Edmonson, Sept 1859. Corrections to values of solar semi-diameter given in the Nautical almanac, Robinson and Mc. N. Edmonson.

M67

- .1 Three notebooks containing recordings for Roof Thermometer, 1865-75. (27pp)
- .2 Table for converting wind speed determined by Robinson Anemometer.
- .3 Notebook containing tables and factors for Anemometer. (23pp)
- .4 Two working tables for the Anemometer.

M34

- .2 Copy of letter from F. J. Whipple of Kew Observatory, 17 Aug 1926 with description of errors in the Anemometer. (3pp)
- .3 Two reprints of papers on the theory and constants of the Anemometer, Robinson 1876 1878, with letter from W. B. Morton, Q.U.B., 30 Aug 1921.
- .4 Drawings of bearing of Cup Anemometer.

M141 Eighteen anemometer and thermograph reduction books, 1870-91.

M104 Seven photographically recorded thermograms, barograms and thermographs, c. 1870. Plus copy of paper by Robinson on the reduction of anemograms, 1875.

M34

- .1 Manuscript notebook containing records of experiments to determine the friction of the Kew Anemometer, 1877-79, including many tables (78pp)

M63 Collection of 13 letters, 1869-1939, to the Observatory concerning meteorological observations at Armagh. One to Ellison from F. J. W. Whipple, 23 April 1926, mentions return to Armagh of the original recording apparatus of the Robinson Anemometer.

M110 Correspondence with Meteorological Office regarding equipment at Armagh, 1838-1919, plus draft instructions for the use of Robinson Anemometer with Berkley Direction Recorder, 1 Jan 1920.

M120 Correspondence with Meteorological Office, 1911-15.

M92

- .4 Correspondence, 1915, regarding the loan of Robinson's original anemometer to the Science Museum.

M65 Historical notes on meteorological observations from Armagh by Lindsay. Includes highest and lowest monthly barometric pressures, 1796-1948. (10pp)

D. PAPERS OF J. A. HAMILTON

M51 Collection of letters to Hamilton.

- .1 Queries relative to the motions of fireballs of 18 Aug and 4 Oct 1783 and 19 Oct 1783- dated 1 Nov 1783, Greenwich. Gives guidelines for useful observations of meteors, such as timing, determination of apparent path and general physical characteristics (probably included with Maskelyne's letter of 27 Nov 1783). (2pp)
- .2 Letter from Maskelyne, 27 Nov 1783, Greenwich, concerning meteor observations- mentions question of whether combustion is observed and whether bodies might be solid or planetary in origin. (4pp)
- .3 Letter from Maskelyne to J. A. Hamilton, Bath, 22 April 1789, regarding purchase of Troughton Equatorial for Armagh and the possibility of procuring a clock for Armagh. (3pp)
- .4 Letter from Maskelyne to J. A. Hamilton, Creggan, Dundalk, 16 Feb 1790. Contains suggestions for the equipment of the new Observatory and details of clock Maskelyne tested for accuracy. Mentions clock by Earnshaw and the reliability of an Earnshaw watch possessed by Maskelyne and refers to claim by Earnshaw to have invented the detached escapement used by Arnold. (4pp)
- .5 Letter from J. Troughton, 17 Feb 1790, regarding the provision of an equatorial telescope and transit circle. (2pp)
- .6 Letter from J. Troughton, 10 Sept 1790, commenting on progress of the Equatorial and describing the "Meridian Circle", and its differences with respect to the common transit circle. (3pp)
- .7 Letter from J. Troughton, 7 July 1792. Gives details of supports and pillars required for the Equatorial, with drawings. (3pp)
- .8 Letter from Maskelyne, 13 Aug 1793. Mentions his trials of Earnshaw's two clocks and their excellent workmanship and accuracy. Conveys news of progress of Troughton with the Equatorial -a superior instrument. (1p)
- .9 Letter from Earnshaw, 22 Dec 1807. Requesting information on the rates of his clocks for a forthcoming publication. (3pp)

- .10 Letter from Earnshaw, 7 Jan 1808.
Thanks Hamilton for his letter regarding clock and mentions his unhappy state and his hope that Parliament will recognise his efforts. (2pp)
- .11 Letter from Maskelyne, 31 Dec 1782. Contains observation and correction for an observation of the transit of Mercury by Hamilton at Cookstown. (3pp)
- .12 Letter from Thomas Hurd, Admiralty Officer, 3 Dec 1814, regarding books ordered from the Board of Longitude. (1p)
- .13 Letter from Brinkley, Dunsink, 1 June 1805, giving the positions of minor planets Ceres, Pallas and Juno, 1805-6. Refers to state of alarm in Dublin after firing of canons at night. (3pp)
- .14 Letter from Brinkley, Dunsink, 22 Feb 1806. Concerning Hamilton's paper on comparison of micrometers. Mentions his discovery of a comet whilst at Greenwich and Earnshaw's discontent. (3pp)
- .15 Letter from Brinkley, Dunsink, 16 May 1806, concerning Hamilton's and Brinkley's methods for correcting R.A. observations. (2pp)
- .16 Letter from Brinkley, Dunsink, 16 May 1814. Comments on quality of Greenwich (Pond's) observations and effects of parallax. (4pp)
Requests observation of a Lyrae and a Aquilae by Hamilton and comments on Napoleonic Wars.

M15 Manuscript on the present state of astronomical certainty with regard to the quantity of the Earth's diameter, the distance of our planet from the Sun, and the absolute limit of the nearest possible interval from the Sun to any one of the fixed stars. Sent to the Bishop of Ossery to be communicated to the R.l.A., 24 April 1805. (19pp) Also letter to the R.l.A. through Brinkley, 1805, on the correspondence of micrometers, J. A. Hamilton. (12pp)

M16 An account by J. A. Hamilton of a method for obtaining the difference in longitude of two stations by the comparison of observations of the enlightened limb of the Moon with that of a fixed star on the same day, and its use to determine the difference in longitude of Armagh, Dunsink, Cookstown and Greenwich. Much of it a draft letter from Bath, 1794. (36pp)

M21 Letter to Director of Dunsink from Hamilton dated 1 March 1794, from Bath, amended version of M 16. Suggests cooperation in research between Armagh and Dunsink and gives account of observations and corrections for determining longitude from the relative position of the Moon's enlightened limb and the fixed stars, with tables, plus use of the method to determine the difference in longitude of Armagh, Dunsink, Cookstown and Greenwich. (21 pp)

- M28 Miscellaneous papers and tables, c.1780-1800.
- .1 Observations with meteorological notes, Nov 1783. (4pp)
 - .2 Observations of stars, Aug 1798 - April 1799. (4pp)
 - .3 Dates of observations of stars, 1794-98. (13pp)
 - .4 Observations of stars, 1794. (8pp)
 - .5 ditto, 1793-94. (9pp)
 - .6 Table for converting sidereal to mean time. (1p)
 - .7 Table of decimals of year. (2pp)
 - .8 Table for reduction of wires of Transit Circle. (2pp)

- M140
- .2 Paper by Hamilton on "Comparative observations with different kinds of micrometer" submitted to R.l.A. with tables, c. 1795.

See B(i) M 12, M 129; B(ii) pre- 1815 papers.

E. PAPERS OF T. R. ROBINSON

- M27 Miscellaneous papers by T. R. Robinson.
- .1 Observation of solar eclipse, 15 May 1836 at Armagh. (3pp)

- .2 Part of a paper presented to R.I.A. on the casting of speculum mirrors by Lord Rosse. (4pp numbered 5-8)

M33

- .1 Manuscript notebook containing the results of experiments with discharge lamps, undated, including many tables. (85pp)
.2 Printed copy of paper on luminous phenomena produced by discharge lamps etc. Robinson (Proc. R.I.A., Dec 1856). (14pp)

M36 Compendium of published and unpublished papers and newspaper reports of speeches made by T. R. Robinson. Found by Dr W. A. Osbourne of Melbourne University in a second-hand bookshop in Melbourne and presented by him to Armagh Observatory, 7 July 1919, with two letters from Osbourne and one from W. B. Morton, Dept of Physics, Q.U.B.

- p 5 Sermon Clogher visitation, 1823. (22pp plus 8pp notes)
p 37 Speech at Armagh (Col. Verner's election) 1826. (8pp)
p 46 Speech at Armagh "Concessions", 1827. (11pp)
p 58 Speech at Armagh in the Brunswick Club, 9 Oct 1828. (14pp)
p 73 Speech at Monaghan in the Brunswick Club, 10 Oct 1828. (11pp)
p 91 Proposing vote of thanks at York, 10 Oct 1831. (1p)
p 93 Constant of nutation, 1838. (6pp) p 102 Lord Oxmantown's telescope, 1840. (40pp)
p 143 Report of Annual Visitation of Observatory, 1842. (10pp)
p 155 Distribution of medals, Royal Dublin Society, 8 Dec 1842. (8pp)
p 163 Speech at Church Education Society, 1843. (9pp)
p 177 Captive balloons, 1843. (2pp)
p 179 Dr Coulter's obituary, 1844. (5pp)
p 185 Address Monaghan Literary Society, 1845. (20pp)
p 205 Annual motion of Earth's crust, 1846. (3pp)
p 209 Nebula 11 44, 1848. (2pp)
p 210 Bronze vessel in King's Co., 1848. (10pp)
p 220 Electricity, Lit. Soc in Monaghan, 1848. (2pp)
p 223 Moon lecture at Belfast, 1849. (8pp)
p 236 Speech at the Church Education Society, 1849. (9pp)
p 247 Address Brit. Assoc., Birmingham, 1849. (21pp)
p 268 Close of Brit. Assoc., Birmingham, 1849. (3pp)
p 266 Nebulae, 1849.
p 273 Sermon, St Peter's, Dublin, Protestant Schools, 1849. (10pp)
p 283 Dynamic effect of a turbine, 1848. (8pp)
p 293 Address-Chair R.I. Academy, 1851. (11pp)
p 309 Vicinity of a railroad, 1851. (6pp)
p 317 Address opening of Brit Assoc., Belfast, 1852. (5pp)
p 322 Conclusion, 1852. (9pp)
p 339 Sermon, Providence Home, Dublin, 1852. (22pp)
p 357 Errors of ear and eye, 1853. (7pp)
p 365 Cassegrain telescope, 1853. (9pp)
p 373 Speech R.I.A.-Library, 1854. (2pp)
p 376 Speech "Propagation of Gospel in foreign parts", 1854. (3pp)
p 379 Angular aperture, 1854. (10pp)
p 389 Electric discharge, Aberdeen, 1855. (1p)
p 390 Patent laws, Aberdeen, 1855. (1p)
p 393 Ruhmkorff Inductor. No. 1, 1856. (10pp)
p 401 Ruhmkorff Inductor. No. 11, 1856. (13pp)
p 415 Address, Nat. Hist. Soc., Armagh, 1857. (10pp)
p 417 Speculum, Nicol's Encyclopaedia of science, 1857. (11pp)
p 429 Address, Nat. Hist. Soc., Armagh, 1857. (10pp)
p 439 Stratification of electric light, 1859. (6pp)
p 447 Address, Armagh Philosophical Society, 1859. (6pp)
p 453 Letter to V. Christian in Clogher, 1860. (1p)
p 454 Address, Armagh Philosophical Society, 1860. (9pp)
p 463 Address, Armagh Philosophical Society, 1862. (6pp)
p 469 Astronomical instruments and glass (Mallet's journal), 1862. (11pp)
p 481 Letter from L. Shulhof (Bureau des Longitudes), 1882. (4pp)
p 483 Light-lecture in Dublin, 1862. (21pp)
p 504 Correspondence with Galloway, 1862. (2pp)
p 509 Lighthouse of Ireland, 1863. (8pp)
p 521 Fog signals, 1863. (6pp)
p 527 Mercurial gasometer and air-pump, 1864. (6pp)
p 535 Address, Armagh Philosophical Society, 1864. (10pp)
p 551 E. J. Cooper, 1864. (2pp)

p 553 Electricity by induction machines, 1864. (12pp)
 p 565 Address, Armagh Philosophical Society, 1867. (20pp)
 p 587 Reflecting Telescope at Melbourne, 1867. (3pp)
 p 591 Report of Committee on above, 1867. (4pp)
 p 597 Lord Rosse, 1868. (7pp)
 p 605 Convention, 1868. (3pp)
 p 608 Juries, 1873. (1p)
 p 613 Cup anemometer, 1875. (16pp)
 p 629 Reduction of anemograms, 1875. (4pp)
 p 633 Space-penetrating powers, 1877. (1p)
 p 635 Constants of cup anemometers, 1878. (7pp)
 p 643 Esther, 1878. (5pp)
 p 643(b) Notes on the character of John Hely
 Hutchinson, Provost of Trinity College Dublin,
 and the election of Brinkley as Andrews
 Professor of Astronomy. (4pp)
 p 644 Fair rent, 1881. (1p)
 p 645 W. Lassell, 1881. (3pp)
 p 648 Kew Observatory, 1881. (1p)
 p 649 Absorption of light, 1882. (1p)
 p 650 At the Convention, 1869. (8pp)
 Also note to Dr Huggins regarding spectra
 of aurora and three photographs of the garden
 and observatory in the 19th century.

M69 A collection of letters to and from Robinson
 mostly concerning financial matters. .
 .1 Fifty-seven letters from T. R. Robinson to
 Dr Reeves, Dean of Armagh, dated 1842-80
 containing comments on buildings, ecclesiastical and
 political matters.
 .2 Three letters, 1872, from Robinson to
 Leonard Dobbin, agent for Observatory lands.
 .3 Four letters from Dean Reeves, 1872-73,
 and one from M. G. Armagh (Beresford),
 15 Aug 1872, to Robinson.
 .4 Six letters to Robinson concerning tithes
 at Carlingford and notes on rents, 1872-73.
 .5 Four letters from J. A. Ball regarding
 case of the Observatory in Irish Churches Bill,
 .6 Letter from C. Rivers Wilson of 11 Downing Street
 to Sir Edward Sabine, 9 Aug 1872
 and copy of a letter from Robinson to Ball,
 18 March 1872, regarding same.
 .7 Copies of two letters from Robinson to Evans, 1838. (3pp)

M92
 .10 Correspondence concerning T. R. Robinson's
 part in setting up an early Canadian
 observatory, 1969.

M114 Copy of book of poems written by T. R. Robinson
 before the age of 12, Juvenile poems,
 T. R. Robinson, published privately, Belfast 1806.
 (108pp, plus list of subscribers, 22pp, and an
 account of the life of the author, 31pp)

F. PAPERS OF J. L. E. DREYER

M71 Draft of letter from Dreyer to Royal Society for grant
 towards publishing Second Armagh catalogue, Nov 1882. (I p)

M1
 .1 Manuscript of Second Armagh catalogue of 3300
 Stars, by J. L. E. Dreyer, 1886. (ISSpp)
 .2 Plus comparison of 2nd Armagh catalogue with
 Glasgow catalogue, c. 1886. (12pp)

M5 Manuscript, Heidelberg Nebulae Second Index
 Catalogue, Dreyer, undated. (100pp)

M105 Dreyer's copy of the New general catalogue
 of nebulae and clusters of stars annotated by the
 author with all corrections known to him, 1888.

M7 Manuscript of Tycho Brahe, 1880-90, Dreyer.
 (346pp, contents (9pp), bibliography (6pp))

M168 Collection of 22 letters from Dreyer, mostly to Irwin,
 1889-1905, concerning financial matters. (40pp)

M8 Manuscript of History of planetary systems from Thales to
 Kepler, 1905, Dreyer. (398pp, contents (6pp), index (17pp))

M9 Manuscript of A short account of Sir William Herschel's life and work, undated, Dreyer. (91pp plus appendix (19pp plus 15pp), index (7pp), contents (3pp), notes (18pp plus 7pp), plus a table and graph)

M11

- .1 Table for paper published by R.l.A., 1904, on calculation of x, y and z ,for 431 objects in Spiral Nebula

M33

- .3 April 1904, Dreyer.(9pp)
- .2 Tables for paper on "Pleiades", 1900, Dreyer. (5pp+ chart)

M35

- .3 Note concerning proper motion of nebulae and the importance of photographic measurements. (1p)

M142 Two postcards from Dreyer to Hardcastle, 1917.

See B(ii) M22, M35.

G. ASTRONOMICAL DRAWINGS

(i) Pen and Ink Sketches of Lunar Craters by Evelyn M.Whitehead

D1 .1 Sinus, Pr La Place Tridum, 1911 June 6, 10pm.
.2 Fraestorius, 1911 May 1, 10pm.
.3 Proclus, 1911 May 8, 10pm.

D2 .1 Aristarchus.
.2 Aristarchus.
.3 Aristarchus/Herodotus.
.4 Herodotus.
.5 Herodotus.
.6 Schroder's Valley.

(ii) Drawings from Lord Rosse's Observatory, Birr Castle, Co. Offaly (H = Catalogue by John Herschel, 1833)

D3 Original sketches by W. H. Rambaut of nebulae at Parsonstown (white chalk and lead pencil on grey paper).
.1 Messier 99.
.2 Messier 97.
.3 H 731.
.4 Jupiter in Lord Rosse 6ft reflector, Feb 1848, signed WHR.
.5 Messier 64.
.6 Envelope of graph paper depicting unknown mechanism.

D4 Drawing, possibly made with Lord Rosse reflector, of Orion nebula, showing Trapezium. White on black-damaged.

D5 Drawing of Great Spiral Nebula M51. White chalk on grey paper, probably by Rambaut with Lord Rosse's Great Reflector.

D6 Eight large original sketches of astronomical objects.
.1 H84 and H86, group of globular objects, damaged.
.2 H1173= Messier 99, spiral galaxy, condition fair.
.3 H604, spiral galaxy, condition fair.
.4 H854 = Messier 65, spiral galaxy, condition fair.
.5 H2205, spiral galaxy, condition fair.
.6 H838 = Messier 97, Owl Nebula, condition good.
.7 H2098, edge-on galaxy, condition good.
.8 H1909, spiral galaxy, condition fair.

Last Revised: 2011 May 12th

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