

# Present Status of the RGO Archive

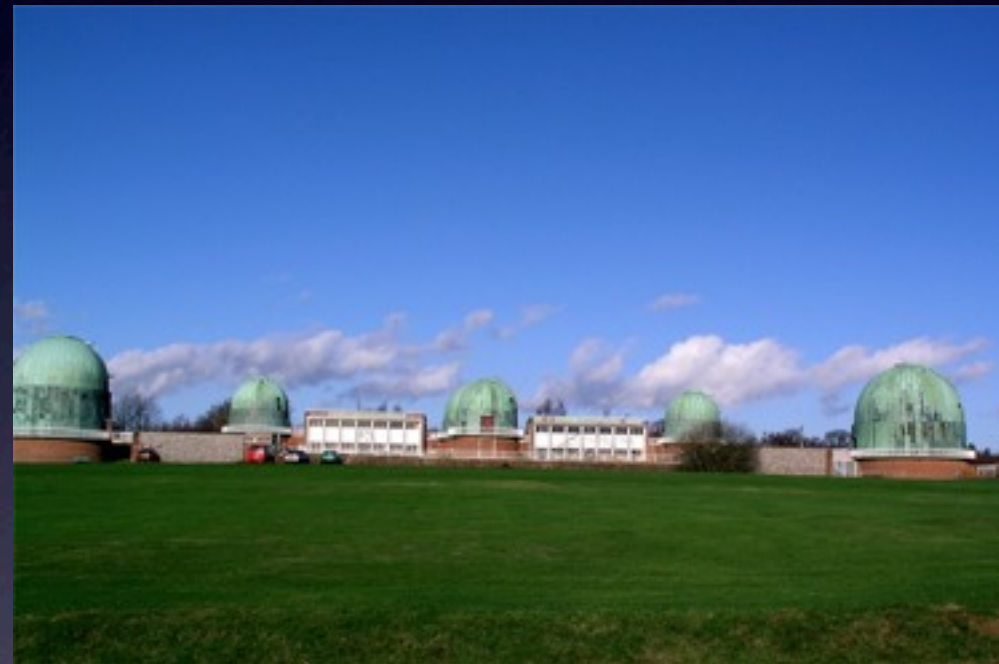
Carl Murray, Nick Cooper  
Queen Mary, University of London

Derek Jones  
Institute of Astronomy, Cambridge

# The Royal Greenwich Observatory



Greenwich  
1675–1947



Herstmonceux  
1947–1990



Cambridge  
1990–1998



# Astrometric observations of Neptune and Triton obtained in 1988 and comparison with theory

D.B. Taylor<sup>1</sup>, D.H.P. Jones<sup>1</sup>, L.V. Morrison<sup>1</sup>, C.D. Murray<sup>2</sup>, and I.P. Williams<sup>2</sup>

<sup>1</sup> Royal Greenwich Observatory, Herstmonceux Castle, Hailsham, East Sussex, BN27 1RP, UK

<sup>2</sup> School of Mathematical Sciences, Queen Mary College, Mile End Road, London E1 4NS, UK

Received October 12, accepted November 14, 1989

Astron. Astrophys. 232, 565–569 (1990)

**Abstract.** Astrometric observations are given of Neptune and its major satellite Triton. These were obtained using the photographic Wide Field Camera on the 1.0m Jacobus Kapteyn Telescope at the Observatorio del Roque de los Muchachos on La Palma. Further Triton positions relative to Neptune were obtained using the CCD Camera. The techniques used in determining the positions are described. Residuals for these observations are computed and discussed, and in particular the Neptune residuals are compared with those obtained from observations made with the Carlsberg Automatic Meridian Circle on La Palma.

# The RGO Plates

- All of the solar plates were scanned a few years ago by MSSL (paid for by a Japanese grant)
- 165,000 plates
- Plates are currently in crates in a warehouse in London
- It is known which plates are in which crate
- There are records for each telescope, date taken, etc. but not necessarily what is on each plate
- Plates *should* be moved to curated facility of Oxford's Bodleian Library at Swindon in 2012



# Summary Listing of Plates, etc. (Feb. 2000)

## Pre-Archive Solar Plates

Solar plates, 16cm 26 inch

Curtis Schmidt / Cerro Tololo

Stonyhurst Discs, 8.5 inch, 4 boxes

Small glass Kottamia Spectra 8, Radcliffe Spectra 2 and

65 AAO Schmidt plates

Observation cards

16cm Eros Series plates

16cm INT Astrograph

INT Small Plates

30 inch in 26 inch dome

30 inch in 26 inch dome, Spectra

Spectra 36 inch I and III Prism slit spectrographs

Slitless 36 inch spectrograph

Various Reseaux scale etc, No3 sq yellow filter and copies

Miscellaneous, Ottawa Rotation spectra, spot and eclipse spectra

16cm, 30 inch Greenwich

16cm, 26 inch Greenwich Observers books

16cm, 26 inch - 4 unnumbered Greenwich notebooks

Thompson Equatorial & Astrographic Equatorial logbooks

16cm, 26 inch Herstmonceux

Small plates, Greenwich 1897-1898

Small plates, Franklin Adams Greenwich Astrographic 'D' 26 inch

Small plates

Small plates, Radcliffe

36 inch B dome focus test plates, Saturn fields with 24 inch

Maclean

Wide angle plates, B, Y and V, various fields

24 inch Radcliffe, KA, South Africa, B & V plates, Bingham

Cape 40 inch astrometric camera, V plates, various fields I and III

Cordoba plates

Cape plates

Special South African

Kapetyn Area Plates

Cape Astrographic plates

Cape Maclean twin 24 and 18 inch, BV and a few P

Radcliffe notebooks / proper motions / Hartmann cards

Cape Overlap CPC2

Greenwich 13 inch Astrographic plates

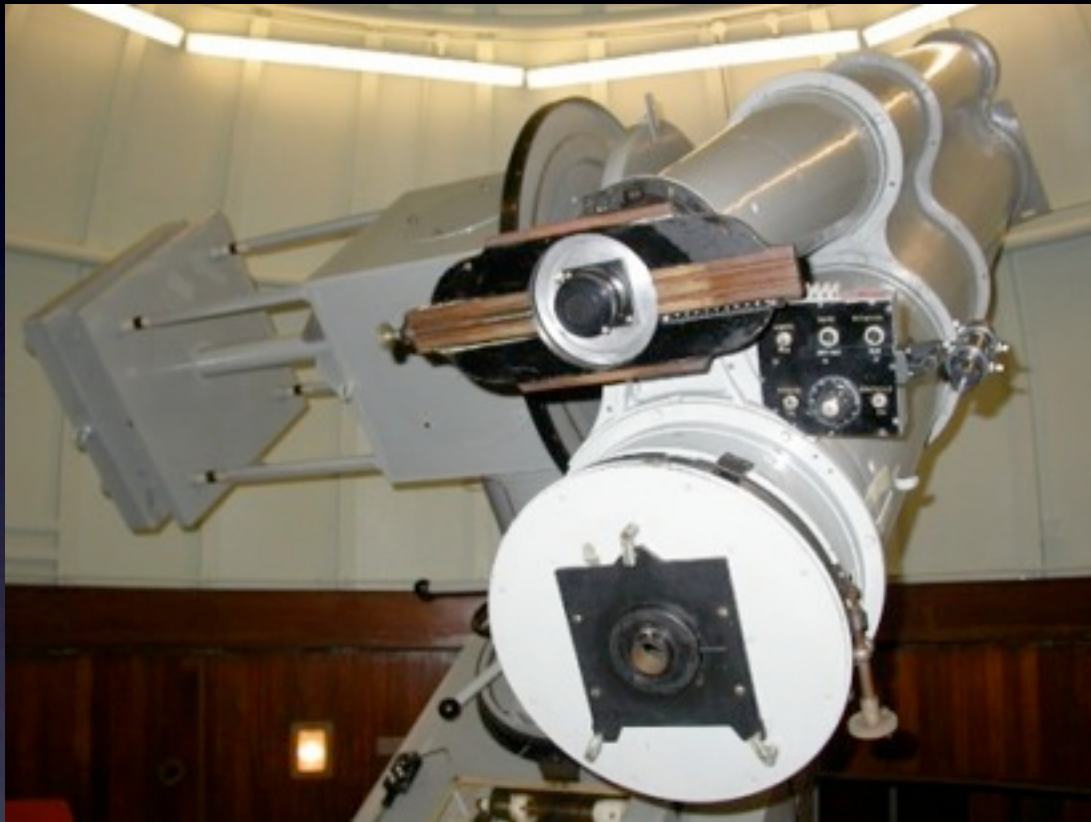
Herstmonceux 13 inch Astrographic plates

Greenwich 13 inch Astrograph notebooks

Oxford Astrographic plates

Moon 16cm plates

# The RGO's 13" and 26" Refractors



13" astrographic refractor built in 1890.  
Focal length: 3.43m  
16,085 plates



Thompson 26" refracting telescope built in 1896.  
Focal length: 5.44m  
12,169 plates



13”

A041	7	1890	06	02E	G13W	M	13	----	16	37	50	+36	40	6	PAG	CL	
A041	25	1890	12	13E	G13W	02	15	+65	----					16	MAW	AC	
A041	45	1891	03	03E	G13W	08	06	+66	1E					30	MAW	AC	
A041	47	1891	03	04E	G13W	08	06	+66	7E					30	MAW	AC	
A041	48	1891	03	04E	G13W	08	06	+66	28W					6	MAW	AC	
A041	90	1891	05	28E	G13W	15	00	+66	73W					40	ILF	AC	
A041	201	1891	11	13E	G13W	POLARIS			47W	01	18	57	+88	44	10	MAW	90
A041	204	1891	11	27E	G13W	22	39	+65	32W					6	MAW	AC	
A041	206	1891	12	02E	G13W	01	50	+67	55E					6	STE	AC	
A041	207	1891	12	02E	G13W	02	06	+66	17E					6	STE	AC	
A041	208	1891	12	02E	G13W	02	24	+66	9W					6	CAS	AC	
A041	215	1891	12	17E	G13W	00	09	+65	11E					6	STE	AC	
A041	218	1891	12	17E	G13E	PLEIADES			22E	03	37	44	+23	31	66	STE	CL
A041	222	1891	12	19E	G13W	02	06	+66	7W					40	STE	AC	
A041	223	1891	12	19E	G13W	02	06	+66	34W					6	STE	AC	
A041	224	1891	12	19E	G13W	02	24	+66	47W					6	STE	AC	
A041	225	1891	12	19E	G13W	03	45	+65	14W					6	STE	AC	
A041	226	1891	12	19E	G13W	04	03	+65	29W					6	STE	AC	
A041	227	1891	12	21E	G13W	00	54	+66	27W					40	STE	AC	
A041	228	1891	12	21E	G13W	02	24	+66	16W					40	STE	AC	
A041	230	1891	12	31E	G13E	PLEIADES			132W	03	37	44	+23	31	42	STE	CL
A041	241	1892	01	19E	G13W	05	10	+67	14W					40	STE	AC	
A041	242	1892	01	19E	G13W	05	10	+67	41W					6	STE	AC	
A041	243	1892	01	20E	G13E	PLEIADES			102W	03	37	44	+23	31	26	ILF	CL
A041	244	1892	02	01E	G13E	PLEIADES			24W	03	37	44	+23	31	42	STE	CL
A041	245	1892	02	01E	G13E	PLEIADES			97W	03	37	44	+23	31	26	STE	CL
A041	246	1892	02	01E	G13E	PLEIADES			133W	03	37	44	+23	31	17	LUM	CL
A041	252	1892	02	03E	G13E	PLEIADES			22E	03	37	44	+23	31	42	LUM	CL
A041	253	1892	02	03E	G13E	PLEIADES			18W	03	37	44	+23	31	26	LUM	CL
A041	254	1892	02	03E	G13E	PLEIADES			54W	03	37	44	+23	31	17	LUM	AC
A041	260	1892	02	12E	G13E	PLEIADES			95W	03	37	44	+23	31	42	ILF	CL
A041	261	1892	02	12E	G13E	PLEIADES			142W	03	37	44	+23	31	26	ILF	AC
A041	268	1892	02	18E	G13E	PLEIADES			52W	03	37	44	+23	31	42	ILF	CL
A041	269	1892	02	18E	G13E	PLEIADES			94W	03	37	44	+23	31	26	ILF	CL
A041	270	1892	02	18E	G13E	PLEIADES			126W	03	37	44	+23	31	17	ILF	CL
A041	274	1892	02	22E	G13E	THETA ORI			22E	05	30	10	-05	25	60	STE	NB



26”

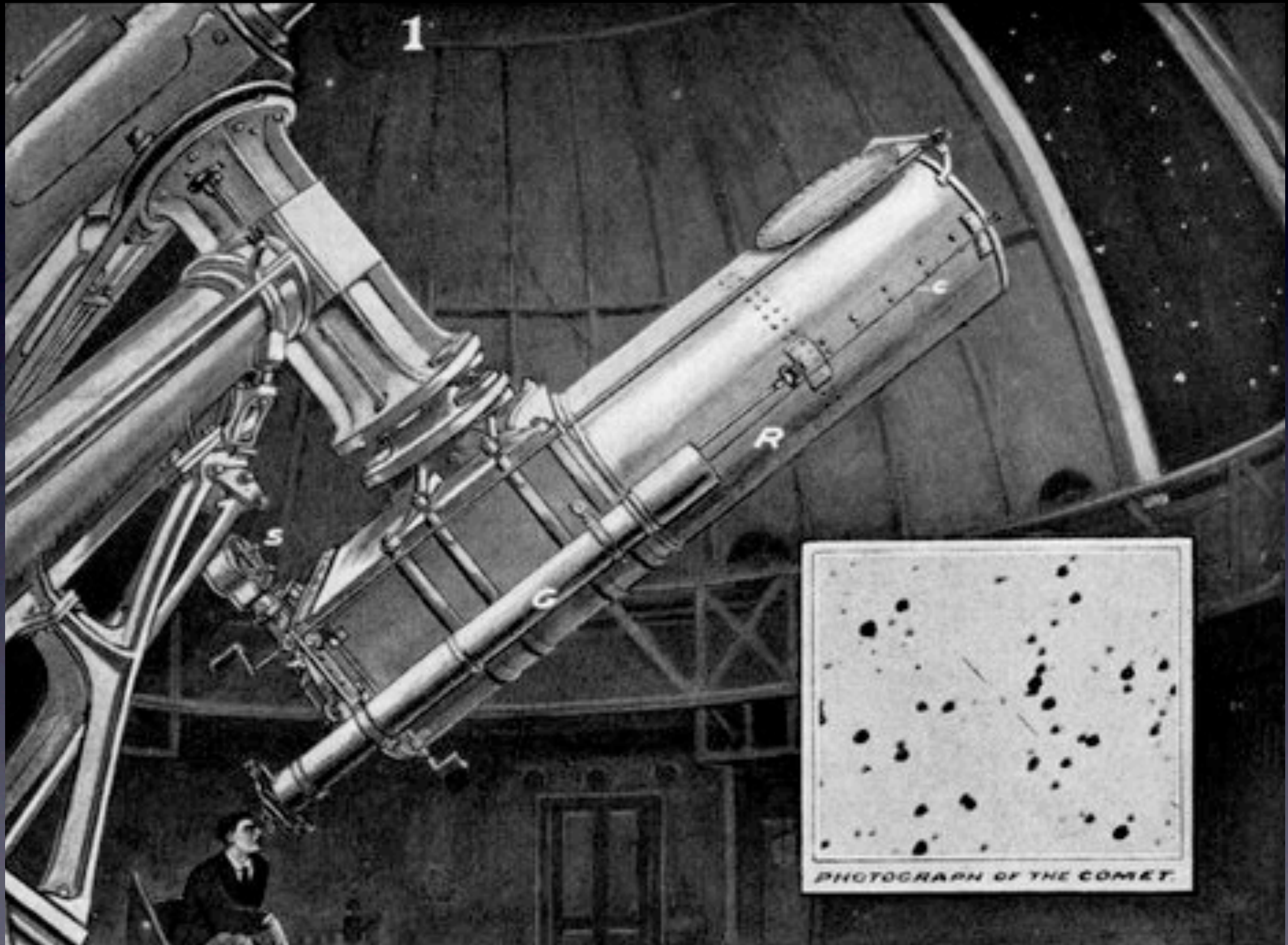
A042	261	1899	01	25E	G26W	NEPTUNE	34E	05	26	57	+21	54	20	S	ISR	PL
A042	268	1899	01	27E	G26W	NEPTUNE	65E	05	26	48	+21	54	15	S	ISR	PL
A042	271	1899	02	02E	G26W	NEPTUNE	59E	05	26	22	+21	54	20	S	ISR	PL
A042	280	1899	02	17E	G26W	NEPTUNE	20E	05	25	37	+21	54	17	S	ISR	PL
A042	281	1899	02	17E	G26W	PROCYON	----	07	34	03	+05	29	10	S	ISR	
A042	295	1899	02	24E	G26W	MARS	85W	07	26	41	+25	47	10	S	ISR	PL
A042	298	1899	02	25E	G26W	NEPTUNE	90W	05	25	26	+21	54	20	S	ISR	PL
A042	302	1899	02	26E	G26W	MARS	16W	07	26	27	+25	43	10	S	ISR	PL
A042	325	1899	03	07E	G26W	NEPTUNE	94W	05	25	25	+21	55	8	S	ISR	PL
A042	328	1899	03	09E	G26W	NEPTUNE	149W	05	25	27	+21	55	20	S	ISR	PL
A042	331	1899	03	09E	G26W	NGC 4147	34E	12	04	00	+19	06	60		ISR	CL
A042	334	1899	03	10E	G26W	M 67	60W	08	45	00	+12	11	60		ISR	CL
A042	335	1899	03	10E	G26W	ALPHA CNC	118W	08	53	01	+12	15	6	S	ISR	
A042	339	1899	03	13E	G26W	NEPTUNE	206W	05	25	32	+21	55	15	S	ISR	PL
A042	344	1899	03	14E	G26W	NEPTUNE	179W	05	25	33	+21	55	15	S	ISR	PL
A042	345	1899	03	14E	G26W	ALPHA CNC	----	08	53	01	+12	15	8			
A042	352	1899	03	15E	G26W	NEPTUNE	216W	05	25	35	+21	55	15	S	ISR	PL
A042	363	1899	03	23E	G26W	NEPTUNE	198W	05	25	54	+21	56	15	S	ISR	PL
A042	374	1899	03	27E	G26W	NEPTUNE	258W	05	26	07	+21	56	20	S	ISR	
A042	404	1899	05	03E	G26W	M 3	62W	13	38	00	+28	59	60		ISR	CL
A042	406	1899	05	04E	G26E	M 3	32E	13	38	00	+28	59	55		ISR	CL
A042	407	1899	05	05E	G26W	M 3	50W	13	38	00	+28	59	61		ISR	CL
A042	423	1899	05	28M	G26W	URANUS	7W	16	16	40	-21	14	30		ISR	4PL
A042	431	1899	06	02E	G26W	URANUS	16W	16	15	38	-21	11	30		ISR	4PL
A042	435	1899	06	06E	G26W	M 13	11W	16	37	58	+36	41	60		ISR	CL
A042	446	1899	06	14E	G26W	ALPHA HER	----	17	10	06	+14	30	20		ISR	4
A042	450	1899	06	16E	G26W	ALPHA HER	----	17	10	06	+14	30	25	S	ISR	4
A042	456	1899	07	11E	G26W	ALPHA HER	----	17	10	06	+14	30	20	S	ISR	4
A042	463	1899	07	27E	G26W	ZETA LYR	88W	18	41	00	+37	30	40		ISR	4
A042	464	1899	07	27E	G26W	ZETA AQL	----	19	00	50	+13	43	10		ISR	4
A042	467	1899	08	01E	G26W	ALPHA LYR	----	18	33	35	+38	42	20	S	ISR	4



# Planetary Plates

	Mars	Jupiter	Saturn	Uranus	Neptune
13''	4 (1894–1980)	1 (1980)	70 (1972–1981)	5 (1926–1976)	4 (1968–1979)
26''	10 (1899–1973)	0	105 (1970–1980)	6 (1899–1901)	49 (1899–1906)

# The RGO's 30-inch Reflector





# 30-inch Observations

1904 Comets

1905 Comets & Minor Planets

1906

J6 1905 Aug 23 - 1906 Feb 15 86 Obs

J7 1905 Oct 22 - 1906 Jan 26 19 obs

1907

J6 1906 Aug 28 - 1907 Apr 6 56 obs

J7 1906 Nov 17 - 1907 Feb 11 12 obs

Phoebe 1907 Aug 10 - Dec 6 16 obs

1908

J6 1907 Nov 13 - 1908 April 24 38 obs

J7 1907 Dec 5 - 1908 Apr 24 21 obs

**J8 1908 Jan 27 - 1908 April 24 13 obs**

J8 1909 Jan 16 - May 10 17 obs

Phoebe 1908 Jul 31 - Sep 7 23 obs

1909

J6 1909 Feb 12 - May 20, 27 obs

J7 1909 Feb 12 - April 21 8 obs

J8 1909 Jan 16 - May 10 17 obs

Phoebe 1909 Oct 5 - 1910 Jan 10 12 obs

1910

J8 1910 Jan 19 - April 28 9 obs

Phoebe 1910 Sep 27 - Nov 7 7 obs

1911 - 1916 None

## Astronomer Royal's Report for year ending 1908 May 10:

Thompson Equatorial. With the 26-inch refractor, 31 photographs of Neptune and its satellite have been taken on 16 nights.

... occulting shutter ...

In connection with the observations of Saturn & Jupiter's distant satellites, 27 photographs of Saturn on 17 nights, and 7 of Jupiter on been taken on six nights ... position with reference to the stars used in the reductions of the observations of the Satellites.

A new faint and very distant satellite of Jupiter has been discovered by Mr. Melotte with the 30-inch reflector ... Jan 27 ... April 24

... 12 photographs.

With the 30-inch reflector... 16 photographs of Saturn and satellite IX on 16 nights, 38 photographs of Jupiter and Satellite

VI on 30 nights ... 22 ... Satellite VII on 21 nights ... 12

... satellite VIII on 12 nights ... minor planets ... comets but not

Halley's ... published in the MN ... Jupiter, Satellite VIII, 1908, 11

photographs, ... Saturn IX, 1907, 16 photographs, Triton 1906-7 29

photographs ... comets ... minor planets

Halley's comet ... Cowell & Crommelin ... perihelion 1910 April

8. ... searched without success ... published in the MN for Dec, Jan,

Mar, Apr and May.



F. 11. 12

ASTRONOMICAL  
AND  
MAGNETICAL AND METEOROLOGICAL  
OBSERVATIONS

MADE AT

THE ROYAL OBSERVATORY, GREENWICH,

IN THE YEAR

1908

UNDER THE DIRECTION OF

SIR W. H. M. CHRISTIE, K.C.B., M.A., D.Sc., F.R.S.,

ASTRONOMER ROYAL.

PUBLISHED BY ORDER OF THE BOARD OF ADMIRALTY, IN OBEDIENCE TO HIS MAJESTY'S COMMAND.





ROYAL OBSERVATORY, GREENWICH.

---

OBSERVATIONS OF  
JUPITER'S SIXTH, SEVENTH AND EIGHTH SATELLITES

FROM PHOTOGRAPHS

TAKEN WITH THE

30-INCH REFLECTOR OF THE THOMPSON EQUATORIAL

DURING THE OPPOSITION

1907 - 8.



OBSERVATIONS OF JUPITER'S SIXTH, SEVENTH AND EIGHTH SATELLITES, FROM PHOTOGRAPHS TAKEN WITH THE 30-INCH REFLECTOR, DURING THE OPPOSITION 1907-1908.

SATELLITE VI.

Date and G.M.T.	Apparent R.A.	Apparent Dec.	Reduction to Apparent Place.		Sat. VI.—Jupiter.		Exposure.	Remarks.
			R.A.	Dec.	R.A.	Dec.		
1907.								
	d h m s	h m s	° ' "	"	m s	" "	m	
Nov.	13 13 47 48	8 59 54.16	+ 17 27 6.2	+ 1.87	- 10.0	- 3 10.90	+ 3 40.9	60
	15 14 57 56	9 0 11.88	17 24 54.3	1.91	10.4	3 18.89	+ 2 52.2	70
Dec.	5 14 15 39	9 0 38.63	17 15 14.9	2.61	13.0	4 14.48	- 5 24.2	40
	5 16 1 42	9 0 38.31	17 15 15.7	2.60	13.3	4 14.52	5 25.6	140
	10 15 7 15	9 0 2.87	17 16 17.9	2.76	13.9	4 21.25	7 34.7	66
	13 13 14 46	8 59 34.29	17 17 34.1	2.86	14.3	4 23.89	8 49.6	13
	14 14 48 51	8 59 22.64	17 18 7.9	2.89	14.4	4 24.44	9 17.8	120
1908.								
Jan.	3 13 11 37	8 53 41.16	17 39 26.7	0.10	2.6	4 7.05	17 29.6	120
	9 12 41 51	8 51 20.86	17 49 11.6	0.24	3.0	3 51.03	19 36.9	16
	11 13 10 38	8 50 30.68	17 52 44.3	0.28	3.2	3 44.50	20 17.8	90
	11 14 12 50	8 50 29.61	17 52 48.9	0.28	3.2	3 44.35	20 18.6	15
	27 12 41 23	8 43 24.62	18 23 58.9	0.55	3.8	2 35.64	24 20.6	65
Feb.	1 11 52 3	8 41 9.34	18 34 15.4	0.60	3.9	2 9.24	25 2.8	112
	1 13 13 33	8 41 7.84	18 34 22.5	0.60	3.9	2 8.92	25 3.1	15
	3 10 27 20	8 40 17.18	18 38 17.2	0.61	3.9	1 58.46	25 13.3	80
	3 11 28 24	8 40 16.09	18 38 21.9	0.61	3.9	1 58.18	25 14.2	25
	6 11 35 23	8 38 56.58	18 44 32.9	0.61	3.9	1 41.12	25 26.0	30
	12 8 16 48	8 36 28.09	18 56 20.2	0.65	3.8	1 6.66	25 29.5	10
	12 9 25 6	8 36 26.91	18 56 28.1	0.65	3.8	1 6.39	25 27.2	10
	22 10 56 34	8 32 40.70	19 15 22.3	0.64	3.4	0 6.44	24 26.3	100
	23 8 33 49	8 32 22.58	19 16 57.2	0.63	3.4	- 0 1.20	24 16.8	42
		8 31 50.88	19 18 58.7	0.63	3.3	+ 0 5.55	24 2.5	60

Out of focus.



OBSERVATIONS OF  
THE SATELLITE OF NEPTUNE,  
FROM PHOTOGRAPHS

TAKEN WITH THE

26-INCH REFRACTOR OF THE THOMPSON EQUATORIAL,

DURING THE OPPOSITION

1907-8.



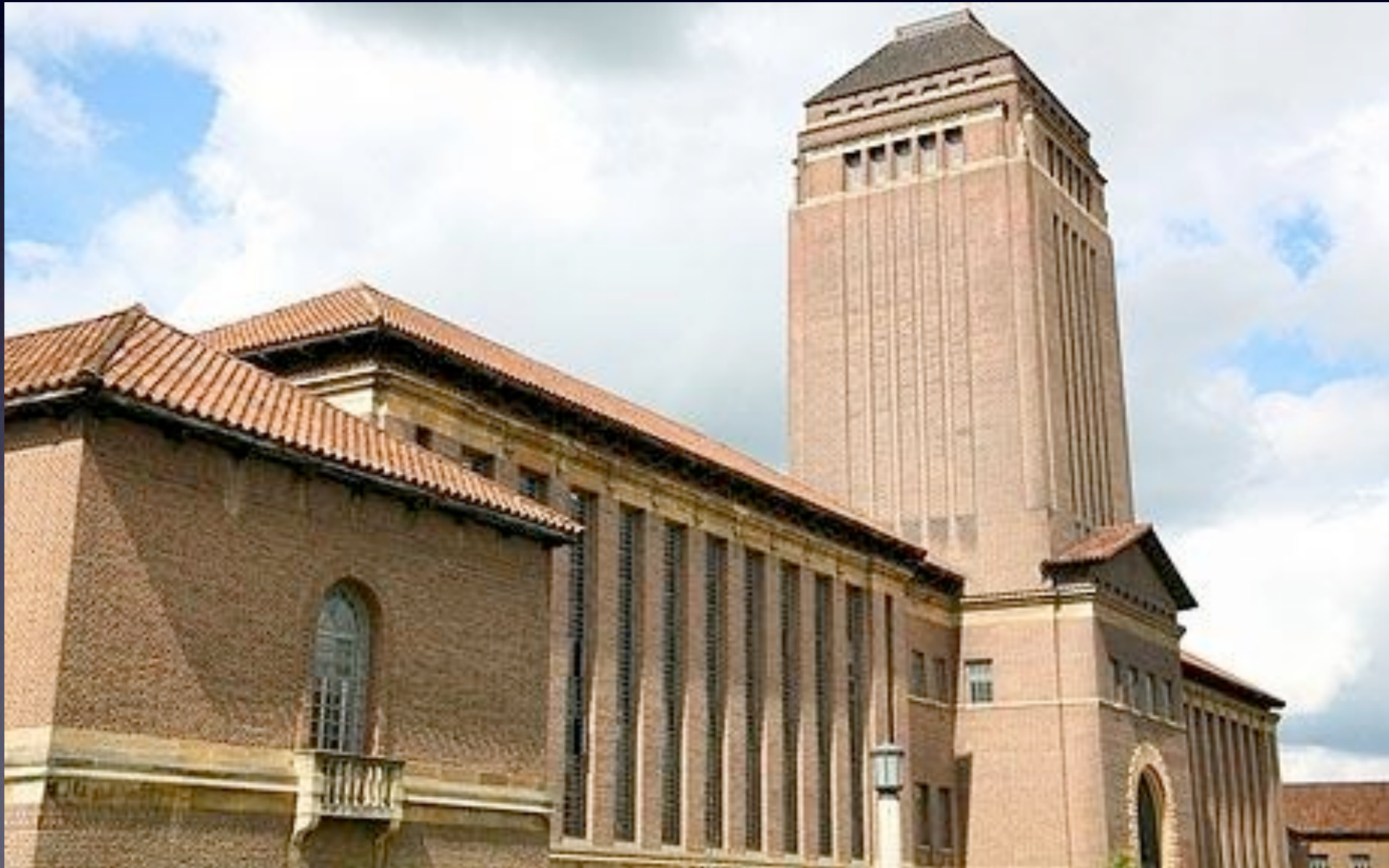
OBSERVATIONS OF THE SATELLITE OF NEPTUNE, FROM PHOTOGRAPHS TAKEN WITH THE 26-INCH REFRACTOR,  
DURING THE OPPOSITION 1907-1908.

Date and G.M.T.	Position Angle.			Distance.			Exposure.	Remarks.
	Observed.	Tabular.	Tab.—Obs.	Observed.	Tabular.	Tab.—Obs.		
1907.								
Dec. 10 13 47 48	241'68	243'99	+ 1'41	13'82	14'00	+ 0'18	15	
14 12 49 34	341'31	339'89	= 1'41	12'04	11'93	= 0'11	20	
14 13 15 59	338'86	338'36	= 9'59	11'88	12'02	+ 0'14	20	
1908.								
Jan. 3 11 35 18	217'98	215'22	(= 2'68)	11'16	11'86	(+ 0'70)	25	Very poor photograph, Very diffused.
4 11 13 40	132'17	134'64	+ 2'47	13'35	13'97	+ 0'62	20	
4 11 39 10	133'36	133'58	+ 9'32	13'75	14'09	+ 0'34	20	
9 11 58 11	292'98	293'38	+ 9'49	19'87	11'37	+ 0'50	20	Windy.
11 11 27 45	82'99	83'75	+ 9'76	16'36	16'28	= 0'08	20	
11 11 53 29	82'34	82'99	+ 9'75	16'39	16'22	= 0'08	20	
27 9 49 5	179'83	178'98	= 9'95	19'79	11'20	+ 0'59	20	Very windy.
27 10 13 39	175'19	179'59	+ 1'31	11'34	11'23	= 0'11	20	Very windy.
Feb.								
3 9 15 21	198'18	198'29	+ 9'11	16'25	16'42	+ 0'17	20	Very faint.
9 10 2 5	285'98	284'32	= 9'76	16'23	16'62	+ 0'39	30	Poor photograph; satellite faint.
9 10 35 58	282'49	283'37	+ 9'97	16'29	16'67	+ 0'38	30	Satellite very faint.
10 10 9 38	53'51	54'88	+ 1'37	13'08	13'35	+ 0'27	12	Satellite diffused.
10 10 23 22	52'81	53'86	+ 1'95	13'33	13'25	= 0'08	20	
10 10 43 9	51'44	53'99	+ 1'56	13'16	13'17	+ 0'01	26	
18 9 18 23	275'88	275'48	= 9'49	16'50	16'72	+ 0'22	16	
18 9 41 43	274'99	274'83	= 9'16	16'66	16'72	+ 0'06	20	
18 10 5 24	272'87	274'15	+ 1'28	16'31	16'71	+ 0'40	15	
Mar.								
5 8 1 6	23'12	23'92	+ 9'80	11'29	11'24	+ 0'04	30	Sky very hazy.
5 8 33 32	19'93	21'95	+ 2'02	11'11	11'18	+ 0'07	25	Satellite faint. Sky very hazy.
14 9 9 29	189'41	182'81	+ 2'49	19'55	19'91	+ 0'36	30	Very diffused.
14 9 49 10	177'86	189'31	+ 2'45	19'61	19'93	+ 0'32	20	
19 10 39 41	243'84	245'23	+ 1'39	13'97	14'21	+ 0'24	20	
19 11 4 17	243'49	244'28	+ 9'79	14'06	14'11	+ 0'05	20	



# Cambridge University Library

Probable home of RGO observer log books  
but the vast majority of the archive has not  
been catalogued





# The Last Paper To Leave the RGO

## CCD astrometry of Saturn's satellites in 1995 and 1997\*

D. Harper<sup>1,2,\*\*</sup>, K. Beurle<sup>2</sup>, I.P. Williams<sup>2</sup>, C.D. Murray<sup>2</sup>, D.B. Taylor<sup>1</sup>, A. Fitzsimmons<sup>3</sup>, and I.M. Cartwright<sup>3</sup>

<sup>1</sup> Royal Greenwich Observatory<sup>\*\*\*</sup>, Madingley Road, Cambridge CB3 0EZ, UK

<sup>2</sup> Astronomy Unit, Queen Mary and Westfield College, University of London, Mile End Road, London E1 4NS, UK

<sup>3</sup> Astrophysics and Planetary Science Division, School of Mathematics and Physics, The Queen's University of Belfast, Belfast BT7 1NN, Northern Ireland

Received November 2; accepted November 24, 1998

**Abstract.** In this paper, we publish measurements of 1514 positions of the major satellites of Saturn made in 1995 and 1997 using CCD detectors attached to the 1-metre Jacobus Kapteyn Telescope on the island of La Palma. Analysis of the data as inter-satellite positions shows that the observations of Tethys, Dione, Rhea and Titan have root-mean-square residuals of  $0''.08$  in 1995 and  $0''.10$  in 1997.

**Key words:** satellites of Saturn — astrometry

Table 1. Number of images of each satellite

Satellite	1995	1997	Total
Mimas	14	1	15
Enceladus	56	63	119
Tethys	78	193	271
Dione	67	145	212
Rhea	84	171	255
Titan	67	194	261
Hyperion	57	135	192
Iapetus	-	189	189
TOTAL	423	1091	1514

# The Last Paper To Leave the RGO

## Appendix A: The Royal Greenwich Observatory, 1675–1998

The Royal Greenwich Observatory was founded in 1675 by decree of King Charles II. The first Astronomer Royal, John Flamsteed, was charged *“to apply himself with the most exact care and diligence to the rectifying of the tables of the motions of the heavens, and the places of the fixed stars, so as to find out the so much desired longitude of places for the perfecting of the art of navigation”*.

In its 323-year history, the Royal Greenwich Observatory maintained a tradition of high-precision astrometry of planets and satellites and was always at the forefront of technology and observational techniques. This paper is a continuation of that proud tradition.

The Royal Greenwich Observatory was closed on 31 October 1998 by the UK Particle Physics and Astronomy Research Council.