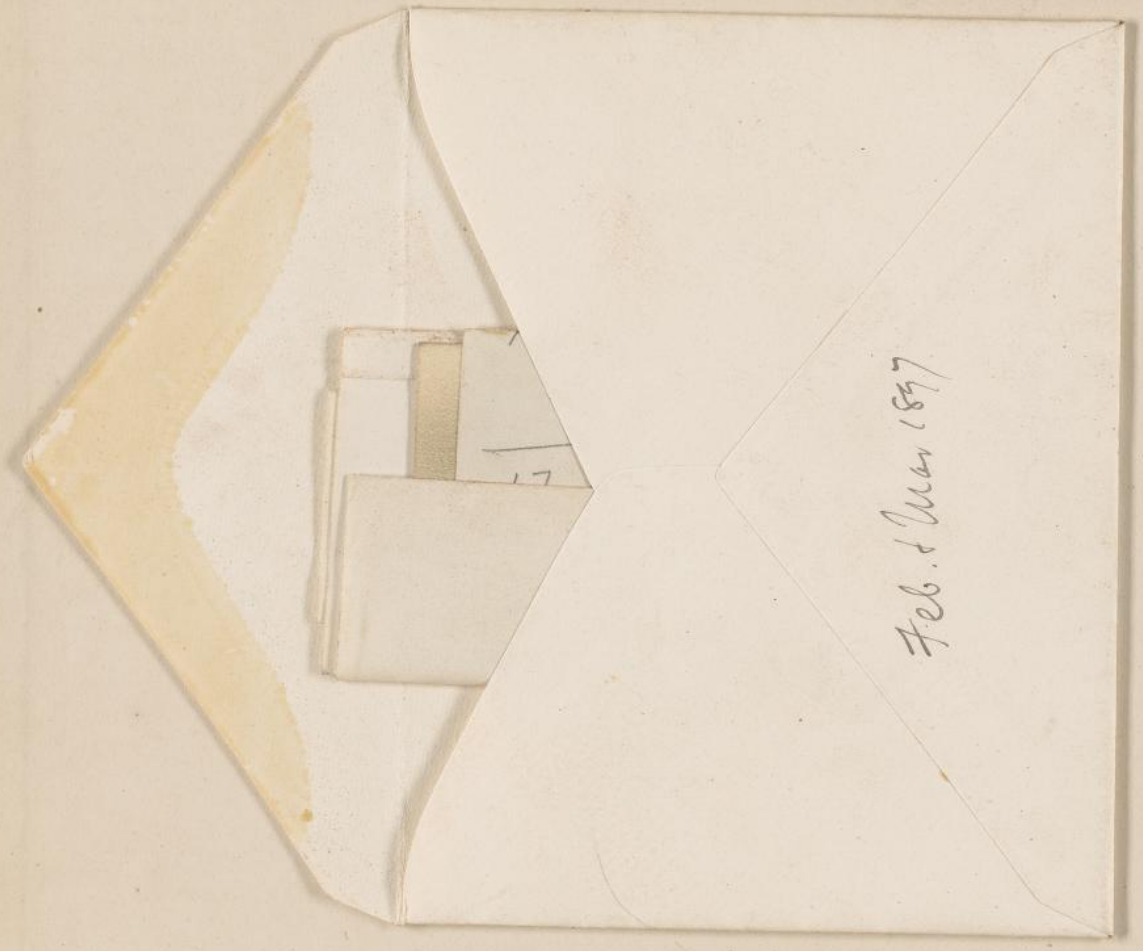
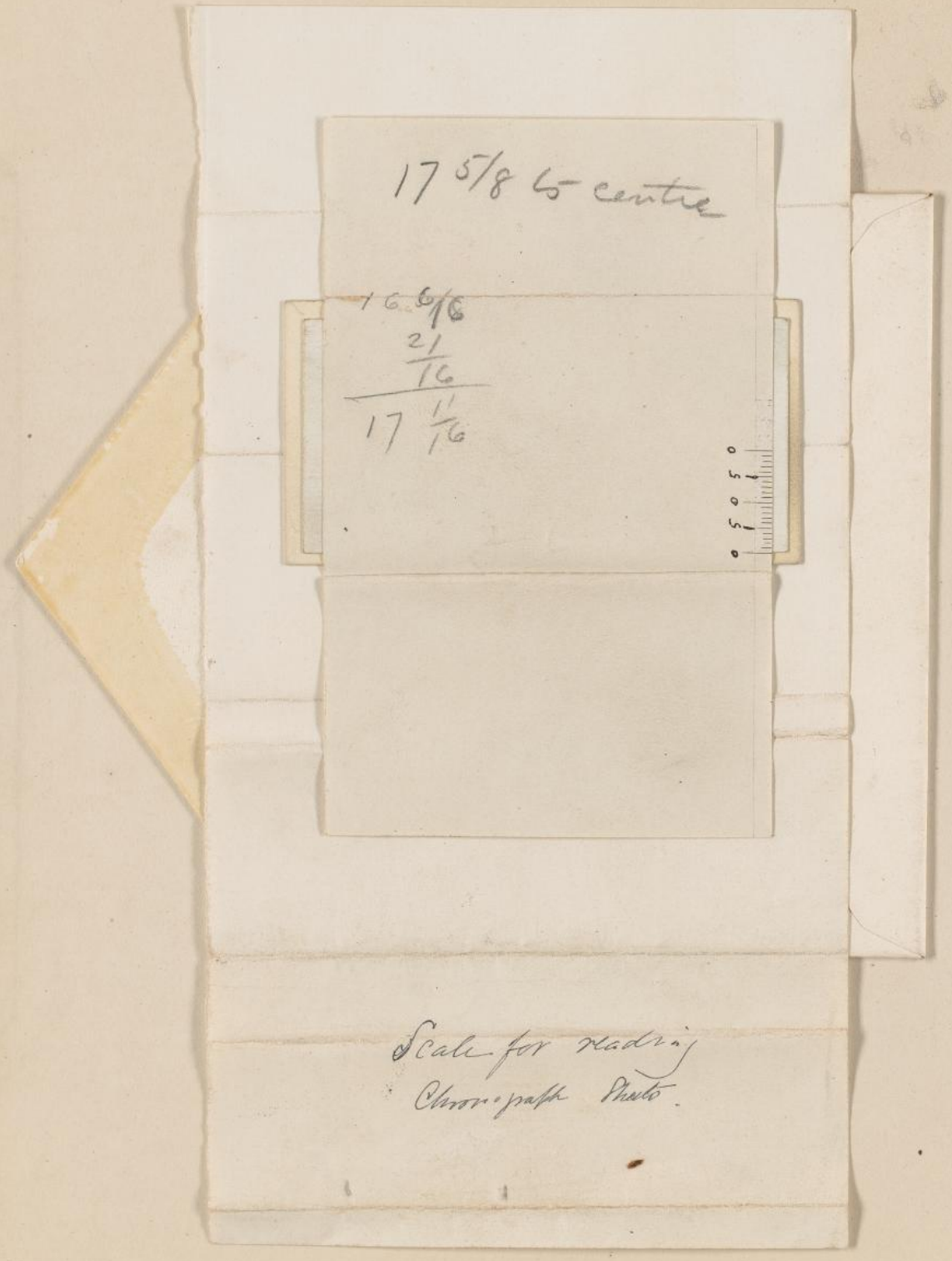
Absolute Work
Meridian Circle Obs 1879–1881
Note Book A.W.

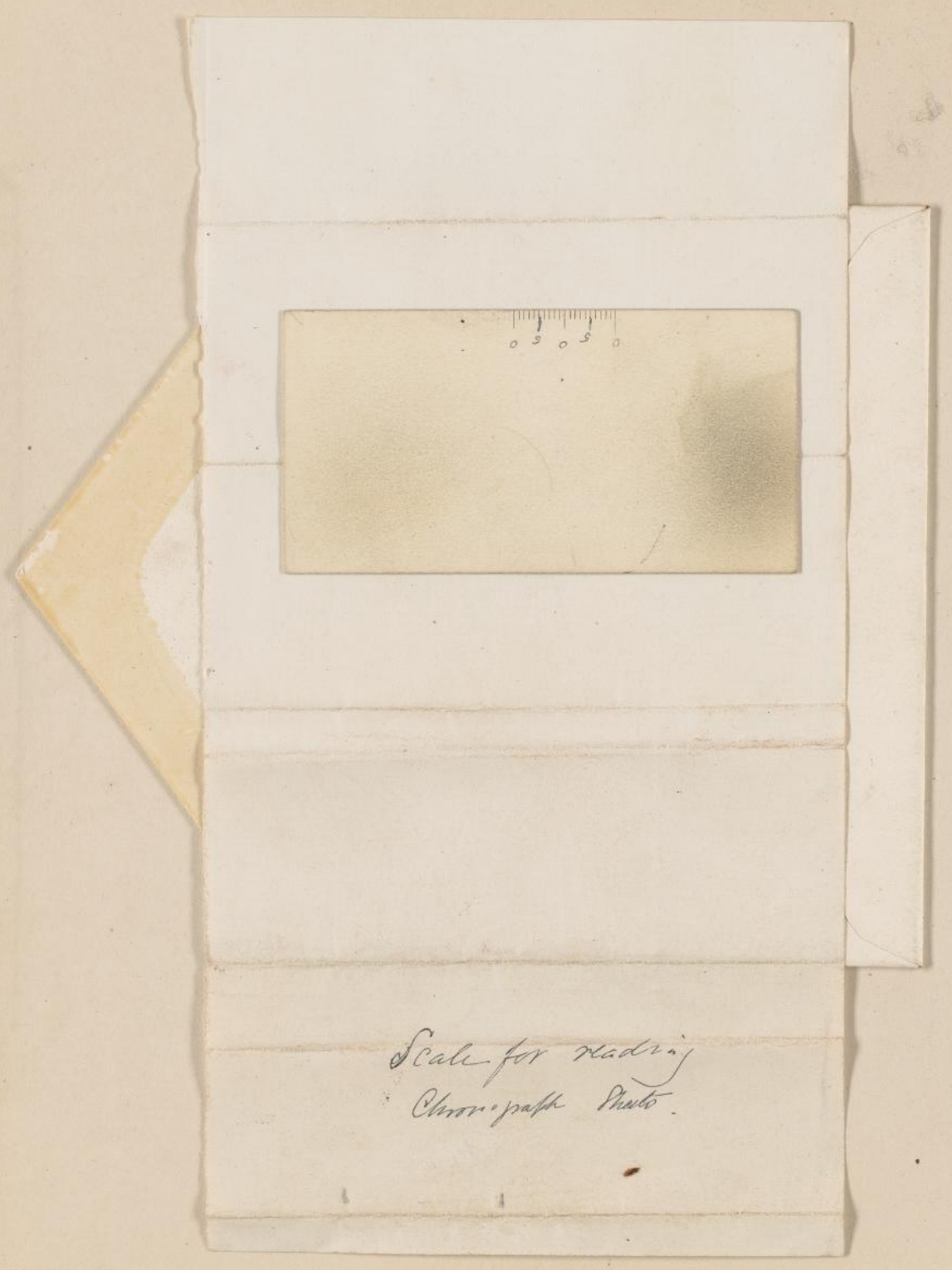
Scales for Reading
Chronographic Sheets
by Mr. Gerrish

Feb. & Mar 1879

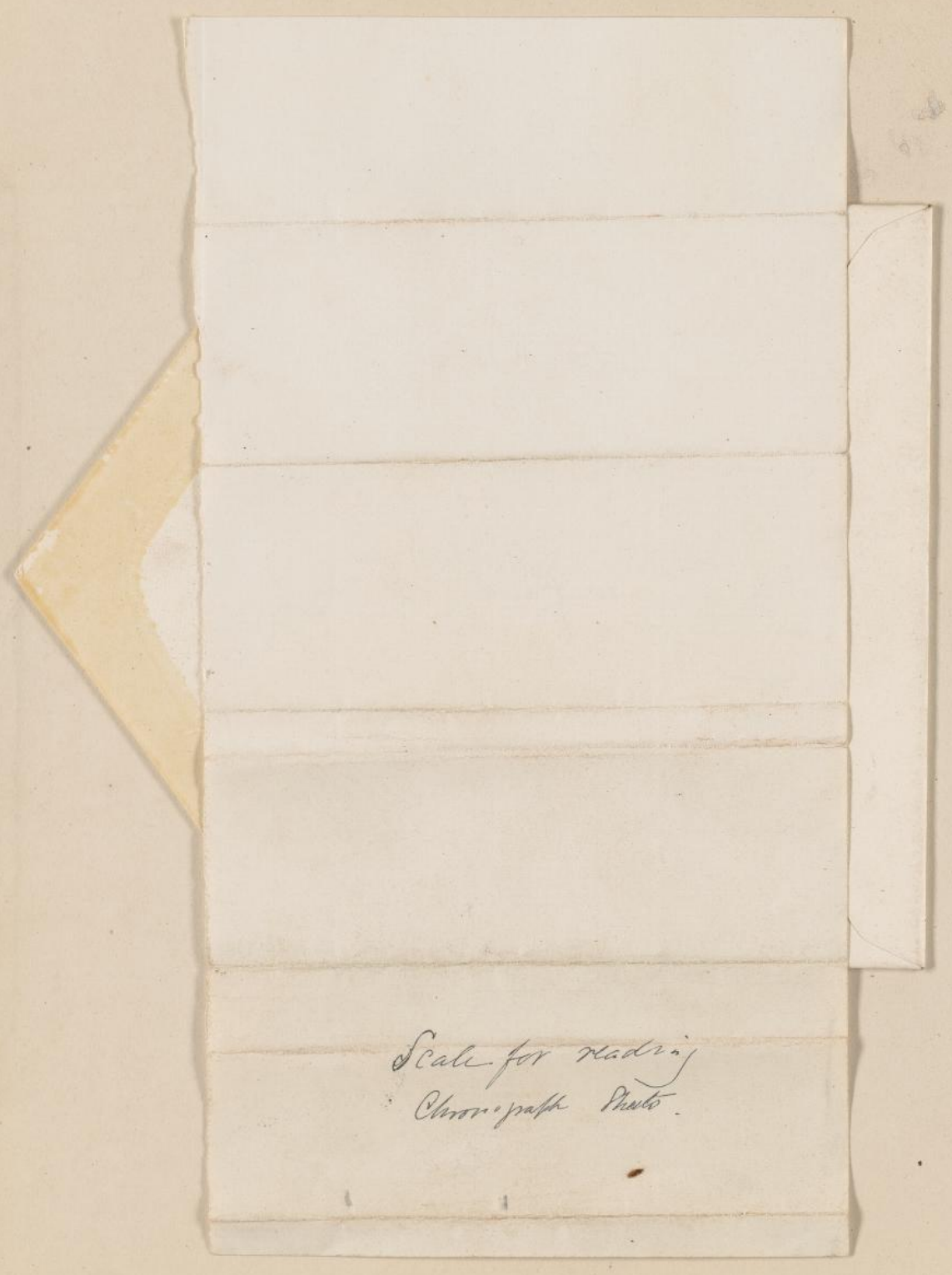




Scale for reading
Chronopaths Photo.



Scale for reading
Chronograph Photo.



Scale for reading
Chromosphere Photo.

-1881

AW is Anna Winlocke
at Observatory
1875-1903

)

Absolute Work 1879–1881

Meridian Circle

Note Book. (A.60)

Absolute Work with Meridian Circle
Note Book

Nov 16th 1896 Received list of (160 abstract) dates and vols for which the Chronograph sheets are to be re-read, for 1879 from Feb 15 to Dec 31st.

Dec 23 1896 Prof R. brought a supplemental list of dates and vols for 1879 also complete lists 1880-81

Jan 5th 1897 Read ⊙ from Feb 15 1879 to Sept 4th 1879
Prof R. took the book containing the ⊙ readings to Waterville

Mar 4th or 5th 1897 Returned to Waterville the 1879 list of dates vols to be reread

Feb 19 1897 Book containing the Readings for 1879 (from the above list) sent to Waterville

Feb 18 Star Readings for 1879 finished, made by L.W from Feb 15 to Dec 31 except supplemental list Feb 15 to June 22 which was read by L.W.

Mar 17 L.W. began to read Chronograph sheets for 1881

June 5 L.W finished examination of doubtful cases 1881

Feb 26 1897 A.W began to read Chronographic Sheets 1880

Mar 22 1897 1880 Ch. Sheets read to Mar 22

Mar 25 1897 Reread ⊙ for Sept 5 to end* in a new record book. Prof R. did not send (Mar 5) or bring (Mar 23) the ⊙ book 1879 with readings from Feb 15 to Sept 4th 1879 in it.

* Prof R meant to read 1879-1880-1881 ⊙ but did not have time;

" 26 Prof R. has decided to have the ⊙ Sheets sent to him to be reread later; he wants to work on Boss Polar Cat. Stars this vacation.

Apr 8th 1880 Ch. Sheets read to Apr 8th

Apr 13 Prof R. "not ready yet" for ⊙ Sheets.

May 6 ⊙ Sheets picked out from Sept 5th 1879 to Sept 9 1881 or as far as Stars were read for 1881

June 5 Read Ch. Sheets 1880 to Apr 20 (= to Apr 19 (9 micrometer nodes) Apr 19

June 5 ⊙ Sheets ready to send to Waterville from Sept 4 1879 all 1880 + 1881 as not from 5

Books for Chronographic readings of Stars 1879 - 1880 - 1881 made out by A.W. from lists received from Waterville on Nov 16th & Dec 23 1896

Waterville lists gave (1, 2) Name of Star
1) Date of obs
3) hours wanted

It had to be filled in.

(Miss Bond's work) Lists (received from Waterville) of Plates to read were arranged as follows:

my nos. + designation

I Preliminary Series 1879 destroyed by Prof R pp 1-6 1-2 1-4 1-5 3-6 = 20 Sheets

Feb 19 sent to Waterville { II Copy of the above " 1879
III Supplemental " 1879 }

IV Preliminary " 1880 pp 32-50 duplicate

V Copy " " 1880 pp 11-31

VI Supplemental " 1880 pp 51-68

VII One continuous " 1881

Notes on Chronographic Sheets

probably numbered wrong only { found no sheet numbered 11 = Feb 21 1879 (1879)
" 58 = Mar 9 "
" 327 see 331 corrected from 327, found also 325 326 326! 331 + 331'
~~" 516 Oct 20 Sheets numbered wrong?~~ }

Time wrong on sheet " 1881 492 should be 9h not 2h Oct 26 1881
" " " " " 518 " " 0h (at 0h) " 12h Nov 15 1881

see Nov 25 Sheets not read for ☉ from Sept 6th to Dec 29 1879
" " " " " for all 1880
" " " " " " 1881

Note on 6 unlettered record books received from Waterville with other books + mss relating to printed Vols XV XVI XXV XXXV XXXVI in May 1897. One = O20 old series, designated the others P1 P2 P3 P4 P5 — see letter book for contents.

List of dates of Observation of Sun 1879. (Feb - July 1879)
from Miss Bonds list = Preliminary Series 1879 = I

Was Miss Bonds first list destroyed by Prof R.? I found copy & too crowded. ⊙ dates & coincide. These off here from pieces.

1879	* limbs to be reread		
Feb 18	⊙ pr. limb.	Apr 26-27	
" 21	both "	May 1	
" 23	pr	1-2	
" 24	pr. + foll	4-5	
" 26	pr + foll	5-6	
" 27	pr + foll	6-7	
Mar 2	pr + foll	8-9	
3	pr + foll	11-12	
4	"	12-13	
7	foll	14-15	
12	pr	29-30	
13	foll	31	
18	both	June 1	
19	pr	2	
20	both	4-5	
23	pr.	7-8	
25	both	9-10	
Apr 6		13	
8		19	
9		20	
14		23	
16		24	
19-20		25	
20-21		26	
21-22		26-27	
22-23		30	
23-24			

* limbs were also given, but Prof R has decided to have all of R.A. of ⊙ reread

V = sent to W.O.R.

Waterville *

Dates of Obs. of ☉ 1879 from Chronograph Sheets

ch'kd ✓ (from Series I additional dates in red ink)

Series I–VII gives dates of ☉ from Feb 15 to Sept 30 1879 only

Date	☉'s RA	Sheet	Date	Obs Mean	Sheet
July 1			Sept 18	11 43	426 ✓
4			✓18–19	11 46	427 ✓
✓9	7 13	346	✓20–21	11 53	432 ✓
✓10	7 18	350	✓22–23	12 1	433 ✓
11			✓23–24	12 4	437 ✓
Aug 12	9 28	355	✓24–25	12 8	441 ✓
13			✓25–26	12	446 ✓
14			27	12 15	☉ not obs
15	9 39	365	27–28	12 19	451 ✓
✓19	9 54	366	29	12 22	453 ✓
✓20	9 57	370	29–30	12 26	458 ✓
✓21	10 1	374	Oct 1	12 29	463 ✓
22	10 5	376	1–2	12 33	468 ✓
✓24	10 12	381	2–3	12 37	471 ✓
4	10 52	☉ not observed ~~385~~ ended at 10 17 (☉ reread U. Jan 5 1897)	✓4–5	12 44	476 ✓
✓5	10 56	386 ☉ reread U. Mar 25 1897	6–7	12 51	478 ✓
6	11	☉ not obs. ✓	7–8	12 55	485 ✓
✓7	11 3	392 ✓	✓12–13	13 13	492 ✓
8	11 7	394 ✓	13–14	13 17	498 ✓
✓8–9	11 10	400 ✓	✓14–15	13 21	503 ✓
✓9–10	11 14	404 ✓	15–16	13 24	508 ✓
✓10–11	11 17	408 ✓	19–20	13 39	515 ✓
12	11 21	412 ✓	✓20–21	13 43	521 ✓
14	11 28	☉ not obs. ✓	22		☉ not obs.
15	11 32	417 ✓	23		☉ not obs.
16	11 35	☉ not obs ✓	24	13 55	☉ not obs see 526
17	11 39	421 ✓	25–26	14 2	530 ✓

☉ Book in Waterville in Sept
New Book – ☉ reread there

* Jan 5th Dates before July 9 on sheet 1 stuck in ☉ book 1879
Put R. took to Waterville

Dates of Obs. of ☉ 1879 1880 from Ch. Sheets

1879	☉'s Rt	Sheet
Oct 26-27	14h 6m	536 ✓
✓ 28-29	14	540 ✓
29-30	18	545 ✓
30-31	22	549 ✓
Nov 4	37	☉ outlds
6-7	49	553 ✓
7-8	53	554 ✓
9-10	15 1	557 ✓
10-11	5	561 ✓
15	22	☉ outlds
15-16	26	565 ✓
16-17	30	569 ✓
23-24	59	574 ✓
25-26	16 8	581 ✓
27	12	584 ✓
29	21	587 ✓
30-Dec 1	29	592 ✓
Dec 1-2	34	595 ✓
2-3	38	597 ✓
3-4	42	599 ✓
4-5	47	603 ✓
6-7	56	605 ✓
8-9	17 4	610 ✓
11-12	18	613 ✓
15-16	35	622 ✓
16-17	40	624 ✓
17-18	44	629 ✓

1879-1880	☉'s Rt	Sheet
Dec 20-21	17h 57m	633 ✓
25-26	18 20	638 ✓
28-29	33	641 ✓
30-31		☉ outlds
Jan 1 1880	47	☉ outlds
2	52	648 ✓
3		☉ outlds.
Feb 29-Mar 1	22 48	2 ✓
Mar 1-2		7 ✓
2-3		12 ✓
4		☉ outlds.
6		☉ outlds.
8	23 17	17 ✓
10	28	22 ✓
11	28	☉ outlds
12	32	26 ✓
15	43	☉ outlds
16	47	29 ✓
17	50	35 ✓
18	54	37 ✓
20	0 1	41 ✓
21	5	☉ outlds
22	9	46 ~~547~~ ✓
23	11	51 ✓
24	15	55 ✓
25	19	58 ✓

Dates of Obs. of ☉ 1880 from Chronograph Sheets

1880	☉'s RA	Sheet	
Mar 26	0h 22	66 ✓	no times given; 12h–13h in sheet; no stars on list or sheet except at 22m = ☉
28	29	☉ not obs	
29–30	33	70 ✓	
31	40	78 ✓	
Apr 1	44	80 ✓	
2	48	86 ✓	
4	55	88 ✓	
4–5		91 ✓	
6	1 2	94 ✓	
7		☉ not obs	
7–8		101 ✓	
8–9		105 ✓	
9–10		107 ✓	
10–11		110 ✓	
11–12		114 ✓	
12–13		119 ✓	
13–14	29	122 ✓	
14–15	33	124 ✓	
18	46	☉ not obs	
19	50	129 ✓	
20	54	☉ not obs	
20–21	58	133 ✓	
21–22	2 1	138 ✓	
22–23	2 5	144 ✓	
24	9	☉ not obs	
24–25	13	149 ✓	
26	16	☉ not obs	
26–27	20	155 ✓	
27	24	159 ✓	

1880	☉'s RA	Sheet
Apr 28–29	2h 28	162 ✓
29–30	32	163 ✓
May 2	39	☉ not obs
2–3	43	170 ✓
3–4	47	173 ✓
4–5	51	177 ✓
~~5~~–6	55	181 ✓
6–7	59	186 ✓
8	3 2	☉ not obs
8–9	6	188 ✓
9–10	10	193 ✓
10–11	14	197 ✓
12	18	☉ not obs
15	30	"
16	34	"
16–17	39	208 ✓
18–19	47	210 ✓
19–20	50	211 ✓
20–21	54	216 ✓
22	58	☉ not obs
23	2	"
23–24	7	221 ✓
24–25	10	227 ✓
26	14	☉ not obs
26–27	18	236 ✓

Note in box of 1880 sheets: "Sheets nos 236–251 missing"

Scales of Os. of O 1880 from Ch. Sheets

1880	O's Rt	Sheet
June 9	5h 11m	Outlds
9–10	15 & Perrei 3h 15m	255 read on this sheet
10–11	20	261
11	20	Outlds
12–13	28	265
13–14	32	269
14	32	Outlds
15	36	271
15–16	40	274
16–17	45	278
17–18	49	283
18–19	53	286
19–20	57	289
20–21	6 1	291
21–22	5	296
22–23	9	303
23–24	14	306
24–25	18	309
26	22	Outlds
26–27	26	312
27–28	30	317
28–29	34	322
~~29~~–30	39	325
June 30 – July 1	~~39~~ 43	328
~~July 1~~	43	Outlds
3–4	54	331

1880	O's Rt	Sheet
July 4–5	6h 59m	335
5–6	7 3	336
6–7	7	339
7–8	11	344
8–9	16	347
13	32	Outlds
13–14	36	352
14	36	Outlds
16	44	"
17	48	"
17–18	52	361
18–19	56	366
20–21	8 4	368
24–25	20	369
26	24	Outlds
27	28	"
27–28	32	372
28–29	36	377
29–30	40	380
~~Stet 31~~	43	~~Outlds~~ Stet
July 31–~~July~~ Aug 1	48 81	386
Aug 1–2	51	391
2–3	55	392
4–5	9 3	393
5–6	7	397
8–9	18	398

1880	⊙'s Rt	Sheet
Aug 9–10	9h 22	400 ✓
11	26	402 ✓
12	29	⊙ not obs
13	33	"
14–15	41	408 ✓
15–16	44	413 ✓
17	48	⊙ not obs
17–18	52	419 ✓
18	52	⊙ not obs
21	10 3	"
21–22	7	426 ✓
22	7	⊙ not obs
23	10	"
24	14	433 ✓
28	29	⊙ not obs
29–30	36	437 ✓
31	40	⊙ not obs
Sept 1	44	"
1–2	48	440 ✓
2–3	51	447 ✓
4–5	55	454 ✓
5–6	11 2	459 ✓
11	20	⊙ not obs
11–12	24	466 ✓
12–13	27	469 ✓
~~13~~	~~27~~	~~⊙ not obs~~
16	42	471 ✓

1880	⊙'s Rt	Sheet
Sept 16–17	11h 42m	475 ✓
18–19	49	479 ✓
19–20	52	480 ✓
20–21	56	482 ✓
22	12 0	487 ✓
22–23	3	491 ✓
24	7	496 ✓
25	10	498 ✓ no hour on sheet
26	14	⊙ not obs
27	18	506 ✓
28	21	⊙ not obs
28–29 stars also	25	512 ✓
29–30	28	518 ✓
30–Oct 1	32	523 ✓
Oct 2	36	525 ✓
2–3	39	528 ✓
4	43	532 ✓
5 ← contains β Arietis & Polaris	47	536 1h 66 1h 57
6	50	537 ✓
7	54	543 ✓
8	58	547 ✓
9	13 1	⊙ not obs.
9–10	13 5	552 ✓
11	9	554 ✓
11–12	12	558 ✓
12–13	16	564 ✓
13–14 glass	20	570 ✓

Dates of Observation of Sun 1880 + 1881

1880	☉'s Rt h	m	Sheet
Oct 16	13	27	Out obs
16–17		31	575 ✓
17–18		35	578 ✓
19 Plates also		39	582 ✓
19–20		42	584 ✓
20–21		46	588 ✓
22		50	589 ✓ from 12h 54
			Oct 22–23 (12h 55m) contains this (probably
23		54	Out obs
23–24		58	591 ✓
24–25	14	1	595 ✓
26		5	Out obs
28		13	601 ✓
31		25	Out obs
Nov 1		29	"
1–2		33	606 ✓
2–3		36	611 ✓
6		48	Out obs
6–7 1 star		52	617 ✓
7–8		56	621 ✓ ~~no hours on sheet~~
8–9	15	0	625 ✓ no hours on sheet
9–10		5	627 ✓
11		9	Out obs
11–12		13	632 ✓
13		17	Out obs
13–14		21	635 ✓
15		25	Out obs

1880	☉'s Rt h	m	Sheet
Nov 15–16	15	29	641 ✓
18		37	Out obs
18–19		42	649 ✓
20		46	Out obs
20–21		50	651 ✓
21–22		54	654 ✓
22–23		58	657 ✓
23–24	16	3	659 ✓
25		7	Out obs
27		15	"
28		20	"
29		24	"
29–30		28	666 ✓ no hours on sheet
Dec 1–2		37	668 ✓
6–7		54	669 ✓
8	17	3	Out obs
8–9		12	673 ✓
12		21	Out obs
13		25	"
13–14		30	679 ✓
14–15		34	682 ✓
15–16		39	684 ✓
16–17		43	689 ✓
18		47	Out obs
18–19		52	693 ✓
19–20		56	696 ✓

Sun Chronograph Sheets -

1880	☉'s RA	Sheet
Dec 21	18h 1m	☉ not obs
21–22	5	699 ✓
22–23	10	704 ✓
27	27	☉ not obs
28	32	"
29–30	41	712 ✓
30–31	45	716 ✓
1881		
Jan 1	50	☉ not obs
2	54	"
3	58	"
3–4	19 3	726 ✓
4–5	7	727 ✓
6	12	☉ not obs
6–7	16	729 ✓
8	20	☉ not obs
8–9	25	733 ✓
10	29	☉ not obs
11–12	38	734 ✓
12–13	42	738 ✓
14–15	51	739 ✓
15–16	55	743 ✓
17	59	☉ not obs
18	20 3	"
20	12	"
24	29	"

1881	☉'s RA	Sheet
Jan 25	20h 33m	☉ not obs
26	37	"
27	41	"
28	43	"
29	49	"
31	57	"
Feb 2	21 6	"
3	10	"
4	14	"
5	18	"
7	26	"
10–11	42	1 ✓
12–13	49	3 ✓
13–14	53	9 ✓
14–15	57	13 ✓
16	22 1	☉ not obs
16–17	5	20 ✓
19	13	☉ not obs
19–20	16	28 ✓
21	20	☉ not obs
21–22	24	33 ✓
23	28	☉ not obs
23–24	32	40 ✓
24–25	35	43 ✓
26	39	☉ not obs
Mar 5	23 5	"

Plates of Obs of ☉ 1881

1881	☉'s Rt	Sheet
Mar 7	23 13	☉ not obs
8	16	"
14	39	"
14–15	42	55 ✓
16	46	☉ not obs
20	0 0	"
21	4	65 ✓
21–22	8	71 ✓
22–23	11	74 ✓
23–24	15	79 ✓
25	19	85 ✓
26	22	☉ not obs
26–27	26	90 ✓
27–28	29	91 ✓
28–29	33	97 ✓
31	40	☉ not obs
Mar 31–Apr 1	44	100 ✓
Apr 2	48	103 ✓
2–3	51	107 ✓
3–4	55	113 ✓
4–5	59	119 ✓
5–6	1 2	120 ✓
6–7	6	122 ✓
7–8	10	128 ✓
9	13	130 ✓
10	17	☉ not obs
10–11	21	136 ✓

1881	☉'s Rt	Sheet
Apr 15	1h 35m	140 ✓
16	39	☉ not obs
16–17	43	144 ✓
17–18	46	149 ✓
18–19	50	155 ✓
19–20	54	159 ✓
20–21	58	163 ✓
23	2 5	☉ not obs
23–24	9	173 ✓
24–25	13	176 ✓
27	20	☉ not obs
27–28	24	180 ✓
30 ~~31~~	32	☉ not obs
Apr 30 May 1	35	185 ✓
May 1–2	39	187 ✓
2–3	43	190 ✓
3–4	47	195 ✓
4–5	51	200 ✓
7	59	☉ not obs
8	3 2	"
9	6	"
9–10	10	207 ✓
10–11	14	210 ✓
11–12	18	213 ✓
12–13	22	214 ✓
21–22	58	217 ✓

1881	O's RA	Sheet
May 22-23	4h 2m	219 ✓
23-24	6	223 ✓
24-25	10	227 ✓
25-26	14	228 ✓
26-27	18	232 ✓
30	30	Outlets
31	34	"
June 1	38	"
4	57	"
5	55	"
6	59	"
11	5h 20	"
14	32	"
14-15	36	242 ✓
15-16	40	245 ✓
16-17	45	247 ✓
18	49	Outlets
19	53	"
20-21	6 1	252 ✓
22	5	Outlets
22-23	9	256 ✓
24-25	18	259 ✓
27-28	30	261 ✓
29	34	Outlets
29-30	39	265 ✓
July 1	43	Outlets

1881	O's RA	Sheet
July 1-2	6h 47m	269 ✓
2-3	51	271 ✓
3-4	55	273 ✓
4-5	59	275 ✓
6	7 3	Outlets
6-7	7	279 ✓
7-8	11	282 ✓
8-9	16	282 ✓
10	20	Outlets
11-12	28	285 ✓
12-13	32	287 ✓
13-14	36	290 ✓
14-15	40	293 ✓
15-16	44	295 ✓
17	48	Outlets
18	52	"
19	56	"
19-20	8 0	299 ✓
20-21	4	301 ✓
24-25	20	303 ✓
27-28	32	305 ✓
31-Aug 1	47	306 ✓
Aug 8	9 14	Outlets
8-9	18	313 ✓
10	22	Outlets
10-11	26	327 ✓
20	59	Outlets

Scales of Os of ☉ 1881 from Ch. Sheets

1881	☉'s RA		Sheet
Aug 21	10h	3m	332 ✓
21–22		7	337 ✓
23		10	Outlier
24–25		18	344 ✓
25–26		21	345 ✓
26–27		25	346 ✓
28–29		32	348 ✓
29–30		36	351 ✓
30–31		40	356 ✓
Aug 31–Sept 1		43	359 ✓
Sept 6	11	1	Outlier
7		5	"
7–8		8	366 ✓
8–9		12	372 ✓
12		23	Outlier
12–13		26	377 ✓
13–14		30	382 ✓
14–15		34	384 ✓
16–17		41	387 ✓
18		44	393 ✓
18–19		48	394 ✓
19–20		52	395 ✓
20–21		55	404 ✓
21–22		59	407 ✓
22–23	12	2	409 ✓
24–25		10	410 ✓

1881	☉'s RA		Sheet
Sept 26	12h	~~13~~ 13m	Outlier
26–27		17	420 ✓
28		20	421 ✓
28–29		24	423 ✓
29–30		28	425 ✓
Sept 30–Oct 1		31	428 ✓
Oct 3		39	Outlier
4		42	"
4–5		46	439 ✓
5–6		49	444 ✓
6–7		53	448 ✓
7–8		57	450 ✓
8–9	13	0	452 ✓
9–10		4	455 ✓
10–11		8	459 ✓
11–12		12	462 ✓
12–13		15	465 ✓
13–14		19	470 ✓
15		23	Outlier
15–16		26	472 ✓
18		34 ✓	Outlier ✓
18–19		38	476 ✓
19–20		41	477 ✓
20–21		45	480 ✓
22–23		53	482 ✓
24–25	14	0	484 ✓

1881	☉'s RA h	m	Star
Oct 25-26	14	4	488 ✓
26-27		8	493 ✓
27-28		12	499 ✓
Nov 5		43	501 ✓
6		47	Outside
8-9		59	504 ✓
9-10	15	4	506 ✓
10-11		8	509 ✓
12		12	Outside
12-13		16	512 ✓
13-14		20	515 ✓
15		24	Outside
15-16		28	523 ✓
16-17		32	527 ✓
19		41	Outside
19-20		45	531 ✓
21		49	Outside
21-22		53	539 ✓
23-24	16	2	544 ✓
Dec 7		58	Outside
7-8	17	2	548 ✓
8-9		7	550 ✓
9-10		11	552 ✓
10-11		15	555 ✓
14		29	557 ✓
15		33	Outside

1881	☉'s RA h	m	Star
Dec 15-16	17	37	562 ✓
16-17		42	565 ✓
17-18		46	569 ✓
18-19		51	573 ✓
19-20		55	577 ✓
20-21	18	0	580 ✓
23		9	Outside
23-24		13	583 ✓
25		17	Outside
30		40	Outside
31		44	Outside

June 8th 1897 L.W began to read Ch. Sheets 1880 from Apr 20th with Miss H. Stevens recorder

June 10th 1897 When Prof. R. is ready for ⊙ sheets send from Sept 6 1879 1880 and 1881, send also copy of list of dates from pp 5–15 of this book

before sending:

√ 1) 1881 dates to be copied

√ 2) All copying of lists to be checked from July 9 1879 (Prof R has p 7)

√ 3) List to be compared with Chronograph sheets

* Sept 29 √ 4) Book containing ⊙ readings for Sept 5 1879 to be sent also

* 1881 Sept 29 5) Return original list of dates 1880, 1881

* Sept 29 √ 6) Send 1881 Star Readings

June 5 Asked Prof. R. if he was ready for 1881 Readings
June 7 letter from him does not mention them.

June 16 Examined difficult cases 1880 Apr + May
July 23 + 27 " " " " to Sept 25 inclusive

July 1897 No. Ds of ⊙ to be read = 384 approximately

July 21 L.W has read 1880 Ch. Sheets from Apr 20 to Sept 25 with Miss H. Stevens. inclusive

~~Oct 28~~
* Sept 29 Sent ⊙ sheets &c to Prof R. Waterville see letter book for list see also above*

Oct 12 ~~29~~ L.W. has finished reading stars 1880 from Sept 25 to end of year with Mrs H. S.

29 fin Examination of all difficult cases from Sept 25 to end 1880.

sent to Waterville
Oct 29 1880 Star readings
1880 original list of dates
539 Star list as near 1875 as possible = 1878
he has lost a page from his copy 1875
See letter book

Total List of Books & Ch. Sheets sent to Waterville

Sept 29 Chronograph Sheets containing readings of ⊙ 1879 from Sept 5 1880 and 1881 (not read)
" 1881 Star readings 1 Book
" 1881 original list dates rc'd from Waterville
" 1879 ⊙ reading from Sept 5 1 "
" "Waterville Measures Nov 15 1895 – Nov 26 1895" (long note book) = "On letter book"

Oct 29 1880 Star Readings
" 1880 original list dates
" 539 Star List 1878

Note Oct 29
Plate B16007 South Pole (30 S.P. Stars &c) marked & ready for Prof K not yet sent see Laboratory.

Estimated only

Approx. estimate of Obs. Work. * 212 pp in 1879, 229 1880, 201 1881 = 8,346

Re reading Ch. Stat. 13 stars on page

" 220 pp in each book (several pp inserted in 1880)

" 3 books

" " ⟹ 8,580 Observations of stars reread

" " 394 " ☉ July 9 79 to end 1881

55 sent to Waterville to be reread pp 5 &c

" " 54 Obs of ☉ reread in Camb. see pp 4.5

Prof. R had told me 150 Polaris (one series I think)

approx no. Obs = 9,178 assuming that the lists to be reread contained every star observed

Approx no stars from ∓94? = 118?

M 25 count

* Apr 27 1898 — No. stars 8,346 — p 29 7,307 – but no ∓88 not included

see p 29 — Polaris 79–80 398 (397 p 9 Prof R's Rept to Prof P 1879–80) — 464 (*) ∓88 (232 × 2) approx

" — ☉ 79–80–81 436

Approx no Obs. from re-readings — 9,180 — 7,771 approx no. obs from M25 with ∓88 added

Ext 1,609 This diff in count must be because all dates are not entered in M 25

Polaris 1881 not included in either count

(*) too large not always 2 stars on a page (= 250 see p 60)

How many Obs of Polaris in 1881?

Note Mar. 13 1898

Approx List of Stars 1879 Absolute-Work
from Wm Bonds copy of ones to be examined, destroyed by Prof R. Jan 1897

1	β Orionis	26	α Aurigae	51	α Ma. Maj
2	γ "		ε "		β " "
3	δ "		α Tauri		γ " "
4	ε "		β "		ε " "
5	ζ "		η "		η " "
6	ι "		α Columbae		θ " "
7	κ "		α Can Maj		μ " "
8	ν "		δ " "		ψ " "
9	α Aretis		ε " "		α Virginis
10	β "		α Can. Min		δ "
11	ζ Eridi		β " "		γ "
12	γ "		α Geminorum		ε "
13	δ "		β "		τ "
14	ε "		γ "		Gr 1564
15	γ Leonis		μ "		ι Argus
16	δ "		α Leo		α Bootis
17	α Leporis		β "		γ "
18	γ Pegasi		γ "		ε "
19	α Andromedae		δ "	69	η "
20	γ "		ε "		
21	α Persei		ζ "		
22	γ "		α Hydrae		
23	δ "		β Eridani		
24	ζ "		δ "		
25	α Cet	50	ε "		

Mar 14 1898 — Five boxes of Record Books Papers &c received from Waterville, Absolute Work with Meridian Circle 1879—1881 &c—

Mar 24 — Ten boxes containing Orig R's Machine for measuring Photographs Received including Stand for same.

Apr 16 — Last box from Waterville contains all the rest of papers & books of Absolute Work.

see note p 57

Mar 1898 List of Record Books received from Waterville

Circle Readings Fund Letter A	Circle Reads Polaris B	Gen. Merid. D	Flex. Lev. Rumsey E	Red. Fund F	Reductions of G = Polaris
20	3	20	1	67	1
21	4	21	2	68	2
22	5	22	3	69	3
23	6	23	4	70	4
~~24~~	7	24	5	71	5
25	8	25	8	72	6
26	9	26		73	7 (~~blank~~
27		27		74	8) (see p 33) ~~see~~ Vol. XVI
28		28		89	
29				90 blank that is the sheets not read	
30				91 (see p 33) dates only	
31				92 given	
32					
33					
34					
36					
37					
38					
39					
40					
43					
Tot. No 21	7	9	6	12	8

For rest of F. Series 75 to 88 see p 27 this book.

Notes made in Mar. 1901 D17 was not returned from Waterville in 1897 or 8 Al

	1870–1885	1877–1885		
	Chum Records	Insti. Cents	Invest. Dio Err.	Miscellaneous
I = Zone	G	K	L	M
1	7	24	1	22 1879
2	20		2	23 "
3	21		3	25 same as M 24
4	22		4	28 diam of Venus also M 29
5	23		5	33 Gen Record
6	24		6	42 " "
	25		7	
	26		8	
	27		9	
			10	
			11	
			12	
6	9	1	12	6 = 97

8 see letter; G 9 mentioned in M 42 is not in the above G List. was there such a no.?
If G 8 is included in Vol XVI G 9 must be.

Mar. 1878 Record Books

Joh No	A	21
"	B	7
"	D	9
"	E	6
"	F	12
"	G	8
"	I	6
"	J	9
"	K	1
"	L	12
"	M	6

" " 97 Lettered Record Books

6* Sun + Star Readings 1879–1881 + Reductions 1 book

11 Old lettered A and J {A 48–56 = 9 books; Ja Jb = 2 "}

4 Unlabelled (I labelled them P)

1 Measures of B5721 (photographic) made in 1895 (long note book)

" " 119

2 Blank Books.

* 1, 1879 Re readings of Chronograph Sheets Stars

1, 1880 " " "

1, 1881 " " "

2, 1879 " " Sun

? 1 Reductions of Absolute Work lettered J 94?

6 = Ch. Readings 1879–1880 and dates gds. in horizontal cols

Mar 1898 Library Books, Tables &c

1 ✓ Berlin ~~Stern Lexik~~ 1878
2 ✓ " Jahrbuch 1879
3 " Stat Lexik 1879
4 ✓ " Jahrbuch 1880
5 ✓ " Stat Lexik 1880
6 ✓ " Jahrbuch 1881
7 " Stat Lexik 1881
8 ✓ " Jahrbuch 1882
9 ✓ " " 1883
10 ✓ " Stat Lexik 1883
11 ✓ Second Melbourne Catalogue 1880
12 ✓ Cape Catalogue 1885
13 ✓ Handbook of the Stars Proctor
14 ✓ American Ephemeris 1879
15 ✓ " " 1880
16 ✓ " " 1881

Tables Vega Tables
" Glancdel & Lecoy
" Lecoy
" Gauss
21 Pub. XIV of Astronomische Nachrichten (unbound) (with extra pp 9–11) ? (pp 48–56 missing)
Runkers Catalogue 1836–1850 marked presented to Prof Rogers.
*Development of the perturbative Function &c by G. W. Hill (pamphlet)
✓ 2 Books for Library ✓ = Mr. Winkley put away
✓ 1 " of Prof. R.
2 Copies Vol XVIII X
✓ Ast. Nachr. pp 5–12 of No 2713 (incomplete, whatever it is)

* No Library number on this, it probably belongs to Prof R

Mar. 1898 Papers

see paper box (1) Chronograph Sheets ⊙

see large wooden box (2) MSS Vol XXV (?) + other Vols XV, XVI already printed

See smallest box (3) 30 South Polar Fundamental Stars. MSS + data

Mar 29 Papers not yet examined in detail.

" 30-31 Arranged miscellaneous MSS. + found a paper on (4) "Absolute Right Ascensions" MSS

Apr. (5) Letters from A.W. relating to South Polar work chiefly

See large wooden box (6) MSS + pamphlets * not relating to HCO work

" " " " (7) Miscellaneous MSS.

All MSS relating to Absolute work separated and put in paper box by itself + to be labelled after finally examined.

Apr 22 all but Absolute work papers have now been

v. large wooden box examined; the papers relating to Vols already printed have not been examined in detail and therefore are not classified & labelled

(8) MSS Resumé of Investigation of Division Errors.

(9) " Thread intervals from III Stars.

" 27 all papers examined except last box received about April 16th from Waterville.

May 4th at Mrs R's request { * Sent Prof Rs MSS. on "Standard Nucleus" to Prof Hull Colby University

see note p 57

Apr. 29th 1898 Last box of MSS. & Record Books contains

3 Unlettered

(1) Relating to Absolute Work (= "Collection of Results" May 3)

(2) " " (is blank May 3)

(3). Obs. for Longitude 1872 (Coast Survey) May 11th lettered this P10 Miscellaneous Series (Old records)

3 Copies H.C.O Tables.

L 75 Reductions Fund Plan?

76 "

77 "

78 "

79 "

80 "

81 "

82 "

83 "

84 "

85 "

86 " Put no this box 14 Record Books lettered

87 " 2 (1) & (3) above

88 " " " 16

14 Record Books

MSS. Relating to South Polar Fund Plan

" " " Absolute Work

" " " Vols already in print.

May 3rd Unpacked this box with Mrs Rogers

List Stars 1879–1880 from F— ?

Star			No. Obs 1879–1880	F.C
α Androm	$0^h\ 2^m$	$+28°\ 25'$	35	
β Cas			7	7
γ Peg			38	
γ Cas			17	12
δ "			19	9
β Arietis			30	
γ Androm			32	
α Arietis			63	
47 H Cephei			1	
α Ceti			22	
γ Persei			11	
α "			23	
☉ (foll)			74	
ε Erid			16	
δ Persei			13	
ι Erid			17	
η Tauri			20	
ζ Persei			26	
γ' Erid			8	
☉ (pr)			74	
α Tauri			21	
ι Aurigae			10	
β Erid			22	
α Aurigae			19	
β Orionis			35	
β Tauri			24	
γ Orionis			19	
δ "			37	
			733	761

no complete finish here
no need to
see M 25 se re

p 29
Abs. Note Book

Approx count no. Obs. M25 pp 52 – 60

p52	54	p56	p58	p60
10	19	14	11	22
8	10	8	27	27
8	11	19	16	21
13	12	11	16	22
13	15	19	12	22
9	7	20	15	15
7	14	15	19	15
6	20	15	23	20
17	15	7	20	20
15	17	10	19	26
17	19	12	20	5
8	16	10	19	17
6	15	23	17	21
15	19	11	18	18
7	21	11	19	19
17	23	25	17	9
9	~~20~~ 15	13	18	18
16	27	25	16	15
13	13	19	18	10
10	21	12	19	3
14	18	16	17	1
10	16	15	17	
17	18	16	17	
15	11		11	
20			15	
20			17	
12				
336	412	346	453	345

1881?
Oct 27 1883 re
188 not entered in M25 ∴ tot no obs not given.

Approx count of Abs. dates of Obs.

α Leporis 15
ι Orionis

For list of dates of Obs of Stars for Absolute positions see M25

M25 p 23 ~~2065~~ 119 Obs 1879, 62 Polar ~~Stars~~ included. Feb 15 –

"

" 1879 pp 22-23 1744 Fund Stars
" " 375 Polar " over 60°
" 143 ☉
1880 135 ☉
rest 1880–81 p 63. 158/136 ☉
" ~~1880~~ 1880–1881 p 72 1,999 Fund Stars
293 UC } Polaris not included
" 170 LC
" pp 52–53 3436
54–55 412
56–57 346
58–59 453
60–61 345
6909 1879–80–81 * Is 1881 complete?
pp 44–45 398 " " Polaris
7307

No. Stars 1879 = 128 for which dates of Obs are given
" Polar " 62 " " "
1880–81 ~~122~~ 116 " " " ~~Obs included~~ see p 72
118 including ☉ & Polaris see p 94?

* Note: dates of Obs 1881 after Oct 27 do not seem to be entered in M25 also Polaris dates 1881 not given

Stars for which I cos δ has been computed = i = aug. val. for mid. thread.

1 α Androm
2 β Cass NC + L.C.
3 γ Peg
4 γ Cass N.C also L.C.
5 δ " " "
6 β Arietis
7 γ Androm
8 α Ceti
9 ρ Persei
10 α Pers
11 ε Erid
12 δ Pers
13 δ Erid
14 η Tauri
15 ζ Persei
16 γ' Erid
17 α Tauri
18 ι Aurigæ
19 β Erid
20 α Aurigæ
21 β Orionis
22 β Tauri
23 γ Orionis
24 δ "
25 ν Leporis
26 ι Orionis
27 ε "
28 ζ "
29 α Columbæ
30 κ Orionis
31 α "
32 μ Gem
33 α Can Maj
34 ε "
35 δ "
36 β Can Min
37 α Gem
38 α Can Min
39 β Gem
40 (i) 15 Argus
41 α Hydræ
42 θ Can Maj
43 ε Leonis
44 α Leonis
45 ζ "
46 γ "
47 μ Ursæ Maj
48 β Ursæ Maj
49 α " "
50 ν " "

δ Leonis
b "
γ Ursæ Majr
ε Corvi
δ "
β "
γ Virginis
ε Ursæ Majr UCrLe
ε Virginis
α "
η Ursæ Majr
η Bootis
τ Virginis
α Draco
α Bootis
γ "
ε "
α Lyrae
β Ursæ Min UCrLe
β Bootis
β Lyrae
δ Bootis
g² Ursæ Majr UC
α Coronæ
α Serpentis

δ Scorpii
β "
δ Ophiuchi
γ Draco UCrLe
β Herc
3 Ophiuchi
4 Herc
η Ophiuchi
α' Herc
α Herc
β Draco
α Ophiuchi
γ Draco
η Serpentis
α Lyrae
3 Aquilæ
2 "
β Cyg
γ Aquilæ
α "
β " 1949
θ
α² Capricorni
γ Cyg
α "

101 ε Cygni
102 ζ "
3 α Cephei U.C. & L.C.
4 ρ Aquarii
5 β Cephei U.C. & L.C.
6 ε Pegasi
7 α Aquarii
8 η Pegasi
9 α Piscis Austr
10 α Pegasi 22^h 58^m
out of { ζ Gem 6^h 30
order { ~~β Aquilae 19 49~~ except this work
of pt (that is "2^d Set")

What is meant by "Second Set"? see ~~#11~~ 34141 of mss computation
Mrs Rogers did not know May 3 1898

111 = no. stars here (thread intervals computed from)

Apr 1 '98 F88 Oct 27 1880 to Jan 10 1882 no Obs i.e dates ^of Obs not entered in M25

Polaris 1881 from G4 G5 G6 not entered M25

G7 G8 = Polaris from Oct 9 1883 also F89 90 91 92 are blank no Obs read,?
from Ch. Sheets are out side of Absolute Work limits Feb 15 1879 – Jan 10 1882
or are already included in Vol XVI

No Obs. made with Mer. Circle from Jan 9th 11th see F88 to Jan 10 incl 1882 to Dec 4th 1882

Vol XVI includes observations before Jan 26 1879 and after Oct 9th 1883 (including these two dates)
No observations were made between Jan 9th 1882 and Dec 4th 1882, I find none also between Dec 4th 1882 = F88 and Feb 8th 1883 = F89
Observations have been made see F89, 90, 91, 92 from Feb 8th 1883 to Apr 30 1883 but Chron. Sheets not read
" June 2 1883 – June 23 1883 Longitude bet. Montreal & H.

Rept. of Mer. Circ. 1881 – 1882 says Prof R. found it "necessary to take a prolonged rest from night work" & "interrupted series will be resumed in Feb 1883"

Limiting Dates of Obs Abs. Pos. (?) Absolute Obs. extend from Feb 15 1879 to Jan 10th 1882 – and from Feb 8 1883 to ~~Apr 30~~ Oct 8th 1883. Did Prof R mean to include this last series in the discussion? Chronograph sheets not read Feb 8 – ~~Apr 30~~ Oct 8th 1883 nor for Polaris and see note p 44

Apr 30 1898 Statement of Absolute Work

The Observations were made from Feb 15 1879 to Jan 10th 1882 (inclusive) and from Feb 8th 1883 to ~~Oct 8th~~ 1883 but whether this last series was to be included in the discussion is uncertain. (think not)

All Observations before Jan 26 1879 and after Oct 9th 1883 (including these two dates) have been printed in Vol XVII, the Longitude determination between H.C.O and McGill extending from June 2 to June 23 1883 has also been printed in Vol XVIII, leaving the above two series of Observations the only part of Prof Rogers work unpublished see if any from Apr 30th 1883 to Oct 9th 1883 & Capt Longitude Obs see p 44 date May 21 1898 this book

About 120 Fundamental Stars were Observed and 60 Polar Stars in 1879 and about 116 in all in 1880-81 of which about 10,000? Obs have been made (7,771 made between Feb 15 1879 and Oct 27 1881 including 398 Obs of Polaris in 1879 see M25 see dates of Obs not entered) including 436? Observations of the Sun. 10,000 Obs = 180 hrs see p 15

Have not counted Obs. between Feb 8th & Apr 30 1883 (can estimate about)

The Chronograph Sheets have been read for Stars & Sun from Feb 15th 1879 to Jan 10th 1882 v. Series # 67–88 and doubtful cases reread of the v. Series Stars; it was intended that the Chronograph sheets for the Sun in Rt should be re read, this has been done from Feb 15 to Sept 5 1879 inclusive — not finished in Walterville.

Ch. Sheets have not been read from Feb 8 to Apr 30 1883

The means of the Rt. and Decl wires (v. # 67–88 and of the Circle Readings (v. # 20–34, 36–40 + 43) have been formed.

(# 38 = Nov 1883 but contains has obs. of ⊙ included? ∧, 39 obs of ⊙ ∧ 1884-5 1885-6 40 + ~~41?~~ no obs ⊙)
#43 = ?

Thread intervals have been found from 111 Stars (see MSS + un lettered record book) and the broken transits reduced (v #67–88 + 91–7)

The computation of the inclination has been made have final values been adopted?

The reduction to Hor. Wire has been begun from Feb 15 —

The reduction to the meridian of Polaris has also been begun?

Questions relating to Absolute work

Data — ask Mrs Rogers:

1) Was the Series of Obs. from Feb 8th 1883 to ~~Apr 30~~ Oct 8 1883 to be included?
If they were would not the Chronograph Sheets have been read for those dates? (v F89, 90, 91, 92 Feb 8th – Apr 30th 1883 no readings given)
2) Why were not the Chronograph Sheets read for the above dates F89–92?
(3) Are Obs of Sun after Oct 9 1883 to be included + reduced see A 38 39 + 37?
(4) Have the Sheets been re-read for the Sun from Sept 5 1879?
5) Have the re-readings Fund. Stars (v Series N.1–3) been examined and included in the adopted mean values of the Fund Stars

Fund Stars
6) Are the means of the R.A. wires checked in F67–88?
7) " " " " " Decl. " " "
8) " " broken transits reduced " "
9) " " means of the Circle Readings " A20–34 36 37

Polaris
10) " " Means of R.A. Polaris G1–G6 checked?
11) " " " Decl " " " ?
12) " " " Circle Readings B3–B9 " ?

13) Has the copying of the means of the Circle Readings of the Fund Stars from Series A and for Polaris from Series B been checked in the F books 67–88 for Fund Stars and in the G books 1–7 for Polaris?

a.10 Where is F93? not in Waterville lists see South Entry: No.
What is F94? letterm, doubtful*
"✓ ~~Where is A35 not in Waterville lists~~ " " yes = Mar 1883
"✓ ~~" " A41 " " "~~ " yes = 1885
"✓ Mark books which contain re-readings Stars + O. N, –5

Are F93 + 94 the two un lettered books in last box (Abr 16th) No

May 1st Do not find F93 + 94* ⟶ *

Answers.

by Mrs Rogers May 31 1898

1, 2, Yes, 1883 to be excluded

3, probably to be excluded also

4, No ($n_4 n_5 = 0$ Feb 15 to Sept 5 1879)

5, yes

6, yes, (where done in duplicate in red ink) this note applies to broken transits

7, probably * (because used in Comp. of Inclination A.W)

8, for the most part ↗ 51 H Cephei & Mrs Rs omitted by mistake to be included,

9, Mrs R has not used these books Series A

10, yes

11, probably

12, Mrs R has not used these books " B

13 " Rogers " " " " " " A & B, has noticed errors in minutes of Circle Readings in Comparing the reductions to Her wire. on M.S.S sheets when copying out Circle Readings from 967–973 which is as far as this work has been done.

* 994? Chronographic Readings in Horizontal columns and dates of Observations. 1879–1880

993 not found

Apr 1898
Discussion

Absolute Work. Questions continued)

1) Is the work on Thread Intervals complete?
2) " " " " Inclination "?
3) and where are the adopted values of i?
4) How much of red to hor. wire is done?
5) and is that the work now in ~~progress~~ progress?
6) Has any work been done on $\Delta T + m$
7) " " " " " n
8) " " " " " c
9) " " " " " Equator Point Corr
10) " " " " Constants of Runs
11) " " " " red to Mer. on the
12) Fund stars? and has been begun(?) on Polaris.

I have found old MSS. (era of blue ink) relating to Investigation of Division Errors of Circle.
Prof R had decided to repeat this investigation
(for old investigation see $\mathcal{L}_1$ - 12)
I have also found MSS. discussion of Thread Intervals from 111 stars done in duplicate.
12) Where did the data come from for this work? Is it 1879 only or 1879 and 1880 or 1881? and why was a "second set" done (see p 32 this book) for certain stars besides the duplicate comp?

$R_{mot} = 112.5 \sin 1'' \sin\delta \cos\delta (T_m - T_\delta)^2$
$\left(\frac{15^2}{2}\right)$

Answers by Mrs Rogers May 3 1898 called May 4

1, Mrs Rogers thinks it was
2, " " " She had begun to use it. *
3, See "Collection of Results" unlettered book
4, 767–847 85 partly in MSS 1879 1880 + 1881 to Book IV = 785 *
5, yes also Rmd and Inclination (angle i)
6 no
7, "
8, "
9, "
10, "
11, Rmd for Polar + Zenith Stars selected see below *
12 Rmd completed for Polaris in MSS data from 1–6

May 4th 1898 * MSS Computation has been made (not in 2 Books) on ruled sheets of reduction to Horizon
3, 4, 5, 11, of reduction to the meridian (Rmer) and of Inclination (i) after Rmd has been applied, to Chron readings has been done for Stars selected by Prof R for 1879 + 1880 (they seem to be Zenith and Polar Stars O.W) and has been carried through Book 4 1881 = 785

After Rmd has been applied, to the Circle readings for these Stars (Polaris Zenith + Polar) the values of Inclination (i) have been computed and compared with the values of (i) obtained from the equatorial Stars see unlettered book called "Collection of Results", the residuals from the LC + HC comparison have been plotted and curves drawn by Prof R 1879 1880 and for 1881 under his direction

are the curves for Polars + Equatorial Stars or Polaris? Polaris see MSS pr data

Rmd + Rd & Hor were not done for the other Stars (Equatorial) in 767–88 that is done only for the stars selected (Zenith + Polar I think)

Feb 15th 1879 to Oct 9 1883
(1st absolute date) (1st date of 1883 in Vol XVI)

Record Books which will surely have to be examined for absolute work data

		tot no. books	
Circle Readings of Fund Stars	A 20–34 + A 36 37	=17	+ June 19th 1898 note: A35, E6, 7, contain observations between Feb 15 1879 & Oct 9 1883
Circ. Reads Polaris	B 3 – 8 9	6 7	but were returned to the Observatory by Prof Rogers in May 1897 with two thirds of the vols already in print.
Bar Ther tc	D 20–28	9	
Flexure Level, Runs tc	E 1–5 + E 8 (see note)	6	
Red. Fund Stars	F 67–88	22 *	
Red. Polaris	G 1–7	7 *	
Incli Contents 1870–1885	K 24	1	72 Total
		69 68	
	Unlettered "Collection of Results"	1	69 73

* Approx count Obs of Fund Stars 22 books × 200 pp (232) × 2 (no. stars on page) = 8800

(see p 60 for the count from Reports) Polaris 6 . 1 ? ~~2400~~ 1200 ? → (not so many)

Record books which may have to be consulted for (Absolute work data).

A 38 (39) (1884–5 / 40) (1885–6 / 43) omit

B 9

J 20 – 27 (J 7) omit Chronograph Records

Div Errors 1877–1885 — £ 1–12 Div. Errors

M 22 23 25 28 33 42

"Statement" of Obs.
Tot = A 18 books
B 7
D 9
E 6
F 26
G 7
J 7
K 1
L 8
M 6
N 5
Unlettered 1
101

Ʒ 89–92 Ch sheets not read = Feb 8th – Obs 30 1883

G 8 in Vol XVI is after Oct 9 1883

N 1–5.

Of the above, list the foll A 39, 40, 43, B 9 J 7 £ (Div Errors) 5 books 8–12 G 8, (contains Obs) are after Oct 9th 1883, (12 books) and the results are in Vol XVI except Div. Errors of which a final discussion has not been made.

A 38 J 20–27 £ 1–7 M 22 23 25 28 33 42, Ʒ 89–92 N 1–5 (32 books) contain data between Feb 15th 1879 + Oct 9th 1883

69
32

101 Record Books cover the unprinted work of Prof. R. between ~~Feb 15th~~ Jan 26th 1879 + Oct 9th 1883) see Vol XVI for these limiting dates.

Apr 1898 Notes:

*Did not Prof R always print Mean of R.A. Wires or Mean of R.A. corr for aberration see Vol XII p

Was not red. to hor. wire usually computed before Rrs and Rnd applied? (I think so)

Prof R reports collimation Vol XVI p .

Was not Long Focus Collimator used for determining c?
" " Level better than Long Col ..? " .

Notes: May 24 1898 — Prof R reduces to mean wire not middle wire "assuming equality of threads" 1 interval = 2.62s

sec δ 86.5 Polaris = 16. about — Vol XVI p XXIV, "in no case was the reduction of any thread to the mean of all the threads found to exceed .006s"

sec δ eq star = 1. — Ask of Prof S: Δi = .04s?

* Vols X + XII (p XVII) — see p 56 this book — T_m = "Mean of RA. wires" corr for diurnal aberration (k)
XII, XVI — " " " not " " "

see Vol X p XXIV — Look up Vols X + XII data in mss books and

mean wire printed without corr Vol X — compare with print to make sure that "Mean of R.A. wires" in print has not been corrected

$T = T_m$ = mean corr for k — for a reduction to mean wire but for k only

see p 56 this book — look at a 9 + a 19 wire also ~~dass mean puts~~

Vol XVI → See if corr for k applied before ΔT + m computed or if omitted altogether + included in C? in Vol XVI

→ look up an obs of Polaris in Vol XVI, only 1 T5 + 1 Circ. Read printed but plenty of others given

looked up Polaris 1883 K not applied to printed "mean of Rt. wires". see note on p 42 Tim also on p 56

→ see Rpt 1879-80 pp 8-9 p 8 to determine "the variation of the
" 1880-81 p 9 instrumental constants".
1882-83 pp 8-9

→ For Vol XVI the corr. applied in cases examined in 1877 7 books is corr for diurnal aberration. and it has been applied in 1883 also (see Dec 6 1883 φ Persei 1h 36m 8.02s +50° 5′ 55.7″ star 24 Pub XVI "Mean of Rt wires" = 8.02s T = 8.00s) before ΔT + m computed. Mean of Rt. wires 8.02 printed, not T 8.00 because T includes K + in this volume (XVI) the mean of Rt wires uncorrected for diurnal aberration has been printed.

see also p 51

May 2 1898 Notes on Polaris:

There are Os. of Polaris to Oct 8th 1883 inclusive
Ch. sheets not read Mar 16 to July 14 1883
*read but not reduced Aug 27 .. Oct 8th 1883
no Os of Polaris (apparently) June 10th .. Mar 16 1883 see G6+7

Polaris books are G1–8
G6 = Polaris July 17 + 1881 to Mar 21 1883
7 = " Mar 22 1883 .. Nov 11 1883
from Oct 9th 1883 printed Vol XVI

May 2 Found that the observations were made of Fund. Stars and Polaris to Oct 8th 1883 Polaris books made out for the whole series but Fund Stars only to Apr 30th 1883 see F92 Chronograph Sheets not read ~~after~~ from Feb 8th 1883 F88 except the above* of Polaris

May 21st notes made after interview with Miss Rogers

"For complete Observations of Polaris in RA the means of A+1 + A–1 not included and not applied" (I think probably mean of the 3 A+1 A A–1 will have to be used. A.W.) I see a single sheet containing final mean values of RA wires for Polaris.
"For incomplete Os. (broken transits) A+1 + A–1 are included in final mean" see duplicate means in red ink.

For the 2d computation of the Inclination (which with the Red to Star wire (R_w) & Red to meridian (R_m) was the last work in progress) the stars to be used were selected by Prof Rogers for 1879 + 1880; for 1881 the stars were not selected by him

(owing to his illness) but were selected by Mrs Rogers according to the 1879 + 1880 list.
The 1st computation for Inclination at back (entitled "Collection of Results" seems to have been made from the Equatorial Stars and are called "adopted values of i", this 2d Computation upon which Prof R. was engaged seems to be for Zenith + Polar Stars.
A separate discussion of the values of the Inclination from Polaris U C + L. C Observations has been completed and a comparison made between these values and those obtained from the equatorial stars ~~Stars~~ viz the adopted values. Curves having been plotted with hor. arg = date, vert arg = diff between adopted i + i from Polaris, U.C + L. C. ~~curves~~ values plotted separately. MSS + not in books.
The work in progress viz:

(1) Red. to Hor. Wire = R_{i}
(2) Red. to Meridian = R_{md} *
(3) Comp of Inclination from Zenith + Polar Stars

has been done on Mss. Sheets and sent in the books F'67-88 and has now stopped at Book 4 1881 F' F85 data used being copied from F'67-88

Polaris. All the work R_{i}, R_{md}, and Comp of Inclination (after R_{md} applied) has been completed for Polaris G_1-6 + is also in MSS.

*R_{md} = 112."5 sin i sin δ cos δ $(T_m - T_S)^2$ see Vol XVI p

The 3 steps (1) (2) (3) ((1) Rm using adopted values of i, (2) Rmd (by formula) (3) Inclination from Zenith & Polar stars) have been done for the stars selected by Prof R: for 1879 1880 1881 to Book IV = 785 and for all of Polaris, in 1881 the reductions for 51 H Cephei and δ Urs Min have been omitted by mistake.

The Red to the (Rm) wire seems to have been done with some old value of i in part of the books 767-88 and will have to be recomputed for all stars with the "adopted values of i" except for the series of stars selected & done in MSS, & which seem to be Zenith & Polar ∴ there remains to be done of the above 3 steps

Rm for Zenith & Polar stars from 785-788 in MSS
Rmd " " " " " " "
(i) Inclination " " " " " " "
Rm for Equatorial " in 767-88
Rmd " " " "

For Polaris, Zenith & Polars, Rmd is applied before the computation of Inclination made

Whenever the minutes of Circle Readings differ look up in Record Books A, (Big Polaris)
Mrs Rogers says Polaris is done and remembers no cases of discordant minutes in the computation of the Inclination.

The work on MSS sheets has been checked through 1879 and also wherever the final results of differences of (c) for curves is done probably nearly all of 1880, 1881 not checked. Curves have been drawn for Polaris only. (make sure of this last see curves.) Polaris sure

Note. Prof R was reducing each wire to mean of wires for 51 Cephei Polaris & other polar stars I think.

Final Questions May 4th 1898

Has $i/\cos\delta$ i=(Eq thread interval) been applied to the complete Obs. of Polaris? see G, May 14 1879 or incomplete obs

G, p 68 May 14 1879 LC $i/\cos\delta = 355.3^s$
" UC " = 354.9

Of old mss on Absolute Rt's

What is sign of Inclination +?

How reduce broken transits of decl. wires? Estimate middle wire?

no Should not the curves be "Comparison of i from Polaris and Equatorial Stars" and not Polaris

See if the log i (equatorial interval) is the log of the values of i given in "Coll of Result" Book →
June 15th OK. Where I have put a red paper Star on each.

Unlettered so far "Collection of Results" contains results both of thread intervals and of inclination from Equatorial Stars adopted values &c.

answered by Mr Rogers. May 5th

i/cos has been applied to means in groups of 3 wires for incomplete observations only see note p. 44 this book

Mr R had done nothing with this of late

yes +

(look up records and See if Circle West
See Vol X p XIX)

Mr R estimated see ε Urs Min Feb 15 1879 767 + mes.

TU	16	56 16.0	T	62 21.5	
given I wire		55 56.7		2 1.5	
		19.3 →		20.0 →	ex how get?

(Polaris + not Polars see data, there are apparently no curves yet drawn for the other Polar Stars) a.w. looked up data on MSS for a date + plotted.

→ May 19th Tho Examine again, and find out where the intervals are for which the logs are given logs i/cos on MSS

June 15th Have examined, intervals used, + logs of same on MSS agree.

Notes on F67

Feb 15 1879

α Orionis $5^h 48^m 39^s.46$ app Rt. 1879 p197 Jahrbuch

+7 22 59.0 = .. Decl .. ..

α Orionis Feb 15 a correction +$.015^s$ has been applied to the "Mean of the Rt wires

δ Orionis Feb 15 a corr −$.006^s$ " .. .. .. Mean Rt wires

δ = 0° 24'

and for other stars, what is it?* Ask Mrs Rogers.

June 15 1898 Wrote to Mrs R. of this & suggested to her to ask the Waterville assistants. They did not know

Feb 18

ζ Urs Min c = 46.767 Is it coll? a similar value is

ζ Ophiuchi c = 46.767 entered occasionally throughout F67

⊖ are they not in Micrometer divisions?

Feb 19 ⊙ c = 46.767

= Settings of Coll.

ζ Leonis Apr 14 +.005

δ Corvi " +.005

δ Scorpii Feb 22 +.008 δ = −22 17

June 10th 1898

examine Records also Vol XVI Introduction When does Prof R begin to include κ in settings of C? after Aug 22 1877? also see note p66 this book →

* It is not κ (diurnal aberration) unless as suggested by Prof S. it is a correction to it on account of error of Setting, (but if so would it not apply to every Star on the date?)

For p 51
Abs Note Book

α 46

31.466
.064
31.53 ΔT+m corr for rate

.092 rate
.7
.0644

Aug 22 1877 Vol XVI
α Delphini = No 293, Pub XIV
20h 34m +15° 2′8

May 19 1898 Prof. S.

... data in Introduction of Vol XVI
... 22 1877 in R.t. + Comparison with MSS.

... α = 20h 34m δ = +15° 2′8 = No 293 Pub. XIV

20.6h ΔT+m = 31.45s on p 255 is that obtained from this particular star.
.092s at 19.9h
.136
.28

... place, see Ephemeris. (Are C terms included?)

Data from MSS. book —
There are 5 9 5 wires
Mean Rt Wires = 20h 34m 30.845s Mean Circle Readings 58′ 25.38″
R.A. 33 58.961 " " 59 13.15
+ 31.88 T-R.A.
+ 31.89 T-R.A. corr for K ? Yes June 10 1898 sec δ = 1.04 cos φ = .74

ΔT+m = −31.53s
h tan δ = − .38
Red to eff pl. = − 3.44
Σ = − 35.35
Mean Rt 1877 20h 33m 55.49s

−.021s × cos φ = −.015
K = −.021s cos φ sec δ = −.0156s
Vol X p xvii "Essential sign negative"
30.83s
58.96
T-Rt + corr K = 31.87 ∴ 31.89 is not T corr for K.
Ex
Ex again

p 182 John Rich 1877
Δα = +.021 cos φ cos (θ−α) sec δ

(diurnal aberration)
Subtract K from T or (T−Rt) if Rt < T
add K to Rt or (T−Rt) if RA > T
K = diurnal aberration increases Rt.

Computation from data in Introduction of Vol XVI
of a star for Aug 22 1877 in R.A. + Comparison with MSS.

Aug 22 1877 α Delphini $\alpha = 20^h\ 34^m$ $\delta = +15^\circ\ 28'$ = No 293 Pub. XIV

$\Delta T + m = -31^s.47$ (see Intro.) mean hour $20^h.6$

$.7^h \times .092 = -.06$ hourly rate $.092^s$ at $19^h.9$

n tan δ = − .38 n = −1.36

−31.91 tan δ = .28

$\Delta T + m = 31^s.45$ on p 255 is that obtained from this particular star.

Mean of 7 RA wires / Vol XVI p255	34 30.84
App RA	33 58.93
Mean RA 1877 / Vol XVI p255	33 55.49

$3^s.44$ = red. to app. place, see Ephemeris. (Are C terms included?)

Data from MSS. book —
There are 5 9 5 wires
Mean RA Wires = $20^h\ 34^m\ 30^s.845$ Mean Circle Readings 58′ 25″.38
R.A. 33 58.961 " " 59 13.15
+ 31.88 T − R.A.
+ 31.89 T − R.A. corr for K ? 7th June 10 1898

sec δ = 1.04 cos φ = .74 (abstract)

$-.021^s \times \cos\varphi = -.015$

$K = -.021^s \cos\varphi \sec\delta = -.0156^s$

Vol X p. XVII "Essential sign negative"

$\Delta T + m$ =	$-31^s.53$
n tan δ =	− .38
Red to app pl. =	− 3.44
Σ =	−35.35
Mean RA 1877	$20^h\ 33^m\ 55^s.49$

30.83^s
58.96
T − RA + corr K = 31.87 ∴ 31.89 is not T corr for K.
Ex

Ex again

p182 Jahrbuch 1877

$\Delta\alpha = +.021^s \cos\varphi \cos(\theta - \alpha) \sec\delta$

(diurnal aberration)
Subtract K from T or (T − RA) if RA < T
add K to RA or (T − RA) if RA > T

K = diurnal aberration increases RA.

June 3 1898

Notes on Journal 1879-1881 Observations, preparation of Copy.

Take data from F 67-88 for Fund Stars & Sun

Retain hundredths only of Rt. — yes (Prof. P.)

Put in Observed hour of Rt + not have an L.6 column.

Leave 1st space for current number, date or meantime?

June 6th Leave Col. — Put date at top & not leave column for date as in Vol XVI

Put ☉ or Sun in Design or Name Col? S

Leave 1 or 2 lines for ☉ as required & fill in data.

See Washington printed: — Observations of Sun (1880),

Sun I N — I = preceding limb

Sun II S — II = following limb

June 6th — Leave space for ☉ & not enter dates in copy (Prof. P.)

How indicate single wires of decl? Reduce to mean wire (Prof. P.)

Of Design of Stars: — All the Fund. Stars except 4 are in "List of 622 Stars" in Berlin Jahrbuch 1895, letter these 4

(1) = a	ζ Orionis	$5^h\ 34^m$	$-2°\ 0'$
(2) = b	λ Columbae	5 35	−34 8
(3) = c	γ' Leonis	10 13	+20 27
(4) = d	ε Bootis	14 39	+27 35

Prof. P. says — Include other occasionally observed stars such as

Saffords Star } letter these also (Prof. P.)

Comparison Star for (12 3) }

&c

Leave Column for Observer or recorder after Circle Readings?

no. because take means of like values.

Put in no of Obs of Circle Readings?

See Feb 15 1879 β Orionis — yes. when means are taken and state in introduction the no. commonly included when not given in table

(1)

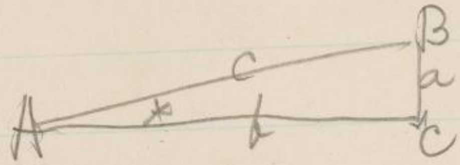
Journal not ready to copy because

(1) Certain stars have a correction to mean of Rt wires for example α + δ Orionis is Feb 15 1879 What is it? Corr to Berlin place?

(2) What circle readings to be retained? (all)
Reject single decl wires? no reduce to mean
Omit mean hour? there would be more than one, as observations were continuous throughout the 24h

Not group the Polar Stars as in Vol XVI and not give values of n except as in introduction Vol XVI ?

(1) try on Star 87 Feb 15 1879 for p 53 Abs. Note Book



$\tan A = \frac{a}{b}$. $b = a \cot A$

(1) 1879 Feb 15 F67 Star 87 β Orionis of 3" decl wire.
ans. get record — see diagram $a = T\delta_2 - T\delta_1$ b = diff of Circle Reads

(2) " F67 α Orionis of correction to Rt wires
Ans — possibly a corr to aberration, better ask Mr Rogers + the Waterville assistants.

(3) F67 Mar 9. 10. 11 dates for which Chronograph Sheets have not been read, why not read?
Ans — Omit, probably Ch. failed or sheet not clear
Have star nos filled in for them on copy? No.

Usual rule is ^{s}.000 of Rt +.00" decl or ^{s}.00 Rt +0" decl
Adopted Vol XVI = ^{s}.00 Rt +.00 decl

Journal not ready to copy because
(1) Certain stars have a correction to mean of Rt wires
for example α + δ Orionis Feb 15 1879 What is it?
Corr to Berlin place?

~~(2)~~ What circle readings to be retained? (all)
Reject single decl wires? no. reduce to mean
Omit mean hour? there would be more than one,
as observations were continuous throughout the 24h

Not group the Clock Stars as in Vol XVI and not give
values of n except as in introduction Vol XVI?

(2) Compare F67–88 with Series of A books and enter
any notes relating to wires observed especially
☉'s limbs whether preceding or following, North or South
+ of all L.C. Observations.

June 14th 1898 Asked Prof. S. the foll.
(1) 1879 Feb 15 F67 Star 87 β Orionis of 3" decl wire.
Ans. get record — see diagram, $a = T\delta_2 - T\delta_1$ f = diff of Circle Reads

(2) " F67 α Orionis of correction to Rt wires
Ans — possibly a corr to aberration, better ask Mrs Rogers + the
Waltonville assistants.

(3) F67 Mar 9. 10. 11 dates for which Chronograph Sheets
have not been read, why not read?
Ans — Omit, probably Ch. failed or sheet not clear
Have stars not filled in for them on copy? No.

Usual rule is $\overset{s}{.}000$ of Rt + $\overset{''}{.}00$ decl or $\overset{s}{.}00$ Rt + $0''$ decl
adopted vol XVI = $\overset{s}{.}0$ Rt + $\overset{''}{.}00$ decl

Rmd = Reduction to the Meridian
Tabular values may be used for stars up to 80° of δ
Compute by formulae given in Vol XVI p
used for Zone Obs. Vertical argument = hundredths of sec of time
Horizontal " = degrees
are degrees sufficient?

to apply: Add Rmd to zenith distance of a Southern Star
Subtract " from " " " Northern "
in either case ½ of it is to be added to the latitude

Prof R's formulae includes ½ = $Rmd = 112.5\,(T_m - T\delta)^2 \sin 1'' \sin\delta\cos\delta \quad \left(\frac{15^2}{2}\right) = 112.5$

Opposite sign if applied to latitude from sign as used for Zenith distances.

Note on Runs:

see also p71k — Find no note in regard to what 5' space was measured, in records at beginning of Absolute Work. According to Vol XVI p XXVII "the 5' space preceding 145° for microscope E i.e from 55° to 0' when the telescope points to the north horizon,* has been ~~adopted~~ measured since Jan 1872"; assumed that no change had been made, and that the readings have been made in the usual manner for the Absolute Work as for the years preceding & following this work, and have started the reductions for the determination of the constant of Runs in the same way as the reductions printed in Vol XVI in Jan 1879 & Oct 1883.

Rrs = Reduction for Runs

Computation of Constant

1879 Feb 12.9 M.T., E, p2
Heading 5′ 0′5
Microscope Means of ~~4~~ readings — $21^h 23^m$ = 236 (Chronom)

E	17.70	18.16	300″.46
F	18.88	18.32	299.44
G	18.98	16.90	297.92
H	19.06	18.70	299.64
			1.46

Less than 300″ gives Corr ~~Error~~ of Runs + (Error −)
Greater than 300 gives Corr ~~Error~~ of Runs − (Error +)

Mean E.F.G.H. = 299.36 +.36
Mean ÷ 5 = Corr ~~Error~~ of Runs +.64, +.13 ~~+.07~~ # Value for curve to apply to Zenith dist
Corr for Runs 1′ = −.13 to apply ~~to zenith distance~~ declinations ~~ΣF~~ ~~or~~ to declinations ?

Notes on Runs

Reading 5 headed in record book (of microscopes E.F.G.H)
Feb 11 1883 — 0′ 0′
0′ 5′

Sept 3 1883 headed in record book as folls:
5′ 0′
0 0

i.e. Sept 3 '83 reversed order but they have been reduced in same way + with the same sign ~~[illegible]~~ (See K 24 p106) as Feb 11 1883
Examined Record + Reduction books for printed values of Runs given in Vol XVI and got approximately the same results as printed for a date before + one after the absolute work. viz: for Jan 21 1879 + Oct 14 1883 recomputed the values from which curves were drawn and got Jan 21 1879 error = +.24 corr −.24, read Jan 26 1879 from curve and got corr = −.25, for Oct 14 1883 error = +.18 did not look up curve for this date.
Vol XVI gives corr [illegible] 1879 [illegible] = .22 [illegible] Oct 15 1883 = −.18 [illegible] See p54 this book

see p 42 Have found that Prof R. reduces to
mean wire not middle wire

In Vol X Separate RA wires printed
Mean of " " "
re tand ~~K~~ "
T_m = after K applied (used in comp of ΔT+m)

T_m in Vol XII = Mean of RA wires corrected for diurnal aberration (K) printed

T' in Vol XVI = " " " not corrected for K printed
corr for K has been applied before computation
of ΔT+m (— to what date? —)

Vol X p XVII + XXIV TT' = Mean wire +K used in reductions of ΔT+m
" Vol X T' = Vol XII T_m

119 Sec p4
6
14 " "27
5
13 3 Vol

Have labelled with 135 books all record books received from Waterville in 1878 whether relating to absolute work or not and also put letter and number on inside pages, in order to be able readily to refer to them. Many of them contain no references to 1879–1883 Obs.

Mz: The Series I = Zone Obs
" " P = Miscellaneous (Asteroid Comps &c)
Old " A
" " J } &c p24 = 11 books

June 19

Have stored in Safe Entry all record books except 78, that is have put away all but those containing observations between Feb 15 1879 and Jan 10 1882 Except Series I + J Mz see below

14 A nos 20–33
5 B nos 3–7
9 D nos 20–28
5 E nos 1–5
22 F nos 67–88
8 G nos 1–8 Polaris (kept out whole series)
1 K no. 24
6 M nos 22, 23, 25, 28, 33, 42
L " 1–12 Dis. Errors (put away whole series)
8 J " 20–27
78

June 21 Miss H. Stevens finished List of Stars observed in 1879–1880–1881, comparison of

* number of Stars List from M25 with F67–88

~~163~~ 169 Stars (Fund.) was copied lists in order of RA, also made a separate list of occasionally observed Stars

11 (Nonfund.) which are not fundamental.

\+ Mercury

Fund. design of Stars ~~139~~ 145 see 539 Lists of Pub XIV — Berlin Jahrbuch 1879–80–81 numbers from the 539 Stars List have been entered and are to be copied in Journal instead of the names of the Stars

Berlin Jahrbuch numbers from a continuation of the 539 List have been taken from 1895

20 .. 622 List — List of 622 Stars for 20 Stars leaving 4 Fund

4 lettered — Stars designated by letters. a. b. c. d

~~163~~ 169

Non Funds have not been designated and are to be copied in a separate Journal.

Non Funds to be designated by letters in order of Observation beginning with e and to be copied in Journal with Fund. Stars.

Nov 1898

* Total no = 169 see MSS list.

Notes on Journal (Copying &c)

1898
June 24 — Miss Bond began copy of Absolute Observations
1879–1881 in Journal from F67

" 27 — Miss B. took F67 to Owls Head Maine to continue copying of Journal.
Inquiries checked (cross ruled) double sheets sent later.

July 16 — Received F67 pp 1–16 of Journal also pp 1–3 of Notes in same from Miss Bond

" 17 to 20 or 21st by Express — Sent to Miss B. Owls Head.
F68–77 ten books about ~~240~~ sheets paper

Sept. — Sent to Miss Bond Owls Head
F78–88 eleven books and more ruled paper.

Nov 12 — All books F67–88 sent to Owls Head have been returned to the Observatory

Approx. count of number of Observations from Journal (copy of)

767 =	16 pp. of mss	In 767 on p 1 of mss there are		13 Obs.
68	15 "	"	2 "	13
69	20 "		3	15
70	22 "		4	15
71	22 "		5	17
72	20 "		6	16
73	24 "		7	15
74	10 "		8	14
75	18 "		9	13
76	19 "		10	18
77	19 "		11	14
	205 pp.		12	15
÷ 11 =	18.6 pp		13	15
			14	10
			15	10
		"	16 "	6

18½ = av. pp mss to 1 book

(250) 13½ = .. Obs to a page of mss
av. no. Obs. in a book
22 = no. of books

767 Tot = 219 Obs ÷ 16 = 13.7
774 " = 324 ÷ 24 = 13.5

5,500 = approx no Obs. of stars from Feb 15 1879 to Jan 10 1882 excluding Polaris

(Rept. 1879 – 1880 p 9) — Tot 4388 1879-80

Polaris Obs = 397 1879-80
" .. 232 1881 (1880 – 1881 p 8) — 3202 1881
629 — 7590
2640 Rpt 1882-1883 p 7
10,230

Estimate
5500 1879-80-81
629 " " Polaris
2640 1882-83 Rpt p 7
8,769 approx total

Number of Observations
Absolute Work.

4,388	1879–1880	see Report	1879–1880 p9
3,202	1881	" "	1880–1881 p8
7,590	Reductions begun		
2,640	1883	" "	1882–1883 p7

Reductions not begun for this last series, Chronograph sheets not read for the greater part of them.

Oct 29 1898 For Univ Bond

done — Data for Runs* see Order of Comp K24
Means of 5 Readings Σ F. G. H. Record Books Σ1–6

Nov 17th Prof. S approves Ledger of all — Ledger of all Stars in Journal for rate prev 67–88

Journal — Check Circle Readings in Journal from original Record Books Series A + look up doubtful minutes in the Journal notes
Reduction of broken transits
Examination of Notes on Journal

Meteorological data — 4 columns: Sid hour. Barom. Att Ther. Ext Ther. — Vol XII has 8 Cols to a printed page

Make a list of notes from all the Record Books A, B, D, Σ + K24

Nov 1898 Reduction to apparent place
Prof S. For this need the foll:
Dates of Observation
Names of Stars
R.A. + Decl (1880 Prof S said) ~~Why not for each year~~? Supposed to last for ten years.
Indicate Whether in Jahrbuch or not
" " has (10 day?) daily Ephemeris or not

* For Prof Searles order of Comp of Runs see "Microm" Book II &c of his work.

For Red to app. place

List I p64 1 Fill in 767–88 the (Ephemeris) RA's from Jahrbuchs for these compute moon terms — Nov 12 (RA's + decs) has been done

" III " 2 Make a list of Stars for which no RA's are given for these compute red to app. place in full

" II 3

Find out what the difference is in the Ephemeris places in the 2 Jahrbuchs for 1880

Nov 12 Prof. S. It is a difference between the mean places used in the Jahrbuch & that in the 539 List

Nov 12 Note: the above difference may be the unknown correction applied to α Orionis &c see p50 this book

Nov 11 Miss Bond began means for Runs of the microscopes E. F. G. H in Record Books $E_1 - E_6$ 1879–1881 for all not done & put her values in ink (others in pencil)

" 14 Miss B finished means $E_1 - E_6$ & began on copying them into new book for Constant of Runs 1879–1881

1895

Nov 12 F78-88 with copy of Journal of Absolute Work so far as it is completed (F85 partially done) from these books has been returned to the Observatory from Owls Head Me. by Miss Bond see p.59 this book

" 16 Sent from the Observatory to Miss Bond 64 Walker St. F85-F88 and unfinished pages of Journal also blank sheets of paper & her notes containing List of Stars &c

" 18 Checked Means of Runs in E6 (A.W)

" 19 " " " E1-E5 (A.W)

" 22 Sent to Miss B F67-88 and Journal (to 64 Walker St.)

Nov 16 Examined a case from F85 on copy of Journal

1898

Nov 21 Work for Miss Bond — 1) Runs — see below; 2) Journal — " "; 3) Ledger — " p 62 + Star list below; 4) Red to App. Place. — " + below

Runs:

Nov 21 √ Check with her the copying of data into New Run Book — Nov 28 checked √

√ Work on Runs finding corr for i

Journal:

√ Finish Copy

767-88 √ May 1903 — Compare Circle Readings with those in copy from Series Record Books A

Examine notes with her.

Check Jahrbuch nos from 1890, in which both lists Haupt & Zusatz are in order of RA

Star List in book (For Check on dates see M 25)

List I = Total

- Name of Star (there are 169)
- Jahrbuch no.
- RA + Decl 1880
- Dates of Obs from 767-88

Column to indicate where star occurs + if it has Ephem or not

" II = Red to App Place — List for which Red. to app. place is to be computed in full

No RA + Decl entered in 767-88 — Stars name; Date — 20 Fund Ephem. not given; 4 Non " lettered a b c cc; + θ = all the non Funds occasionally observed and Mercury

" III = C terms to be computed — List for which Ephemeris is given + for which the C terms only of the Red to app place will have to be computed.

RA's + Decl's entered in 767-88 — Stars name; Date

Red. App. Place — Am. Ephem + Berlin Jahr. both give Peters coefficients + Bessels notation, C terms are included in Am. Ephem since (A B etc) data is given for each day

Notes found in Record Books E_1 to E_6 when checking Data for Runs.

E_1 p 13 — Note on Diurnal Aberration.
"From this date Feb. 22^d 1879. correction for Diurnal Aberration not to be applied".

E_4 pp 109 to 115 — Results of observations for Horizontal Flexure from September 1878 to November 1st 1880 with the Collimators.

E_5 pp 44 – 47 — Corrections in RA and Dec. ~~for~~ to the positions given in Pub. XIV. Ast. Gesell.
For η Draconis see Vol 12 p XVII. H.C.O. Ann.

		^{h}	^{m}
α	Tauri	4	29.
β	Orionis	5	9
α	"	5	49
α	Hydrae	9	22
γ	Urs. Maj	11	47
τ	Virginis	13	55
α	Serpentis	15	38
ε	Urs. Min	16	58
β	Draconis	17	28
γ	"	17	54
35	"	17	55
η	Serpentis	18	15
ε	Cygni	20	41
π	Cephei	23	4

Thought this list might throw some light on the unknown correction applied to β Orionis + other stars in 767-88 + mentioned on pp 50 53 + 63 of this book

Noted here only those stars which were in the Absolute Series, the whole list is much longer + gives corrections for years previous to 1879

Apparent Place Reduction Notes

Prof S says no just the reverse | (Would not the f and g formulae be better adapted for this Series (Absolute) where there are a large number of dates and a few stars than the a A b B &c?

Dec 2 | Prof S found by translating from Jahrb. 1880 that the ☾ terms are not included in the either the f g or the a A (data for app. place) formulae.

Dec 19 72 not 79 | There are 72 stars in Berlin Jahrb. 1880 for which apparent places are given, see how many there are in 1879 + 1881 and indicate which of them occur in Absolute Series

Dec 28 | Miss Bond has indicated in the Star List Book the stars for which apparent places given in the Berlin Jahr. for 1880 and whether the star is from the Haupt or Zusatz Sterne List, and also whether in American Ephemeris for 1880.

767–88 | Have Miss B. check the Jahrb. numbers in 767–88 from Jahrb. 1890 or from the first Jahr. in which numbers are given up to 622 + for which the Haupt. + Zusatz Sterne are put together in one list in order of R.A.

If any changes are made in the Jahrb. nos in 767–88 make changes also in Journal.

Check taking out of R.A + Decls in 767–88 for enough stars to see if they were taken from Jahrbuchs when stars were found there or from the 539 Lists 1879–80–81

T67-88 — Arrange reduction to apparent place for all stars
List II p65 this book — & dates for which Ephemerides are not printed in T67-88

List III p65 — Arrange for computation ☾ terms of Red to App. place for stars for which Ephemerides are given

Compare dates of Observation with List in M25 for Check on Star List

✓ Check Circle readings from Record Books A, in T67-88

= 423 pages ✓ See p70 this book — Page the Journal in red ink consecutively (it had been paged by books)

Where shall I get the 1880 places of stars not in the 539 List? Will M25 places brought forward do?

Reject + instead adopt for finding ΔT ✓ —
{ Have data Aberr + Rt + Decl, T - Rt see Vol X p XVIII arranged for comp of ΔT + m for stars suitable for this. Are they all between +20° + -20°? see List of 52 stars.

{ Have ledger copied on sheets ~~in MSS~~ (not in books)? for all stars ~~& from~~ from ~~which to~~ it obtain the ΔT.

~~Start~~ Compute Red to App. Pl. for a (α Andromedae) star with data from the Jahrb. & also from the Am. Ephem and compare results using in both cases the a A formulae, also take out app. places from both ephemerides correct for ☾ terms & compare.

Put Computation of Red. to App. Pl. in books not on sheets?

Apparent Place Reduction Notes

In computing a b c d a' b' c' d' for red to app. pl. ~~use~~

Use hours min sec of RA reduced to deg. min sec-[illegible] + deg. min sec .. decl } for stars over 70° of decl

Use hours min sec of RA reduced to deg min + deg. min of dec } .. .. below 70° ..

Jan 11 1899 No. ☾ terms not included. The note refers to small terms of nutation only

In the Am. Ephem for 1879 the (moon) terms are included pp 249–257 (see note p 15 appendix) in A and B.

For α δ λ Urs Min + 51 Cephei the apparent places also include the moon terms.

App. places for other stars do not.

To compute ☾ terms see Table IV appendix

To apply ☾ terms to app. places see Table VI

summary Am. Ephem. — If the app. places of any star from the Am. Ephem are used (except α δ λ Ur Min + 51 H Cephei) must correct them for ☾ terms. If the app places are computed using the A + B as given on pp 249–257, then ☾ corrections are included. — not so

Tables IV V appendix are to compute ☾ terms of A and B,
.. VI VII .. .. .. apply " " " .. to app. places

How arrange comps of aA bB ?
1st see how many dates it will be necessary to provide for in a year.

Jan 3 1899 approved by Prof S

{Propose to compute a b c d a' b' c' d' for all stars,
(+ so not use the Am. Ephem. mean or apparent places)
~~and~~ to take the A. B. C D E from the Am. Ephem 1880,
also the constants for computation of a b c d, a' b' c' d'
because Struves values of m + n are used see p 77 this book.

Star List Notes

There are in the Absolute Series: 169 Stars of which

	145 are	Fundamental Stars having Ephemerides in 539 Lists
	20 ..	.. .. .. no .. .. ..
a to d	4 ..	Non Fundamental (not found in 539 Lists)
e to p r omitting m	~~11~~ 13 ..	.. .. occasionally observed.
Total no Stars	18~~0~~ 2	
S.		The Sun
M.		Mercury

Dec 28 (Prof P) Designate the Non Funds, now carried in journal (occasionally observed), by letters from e in order of observation in F65-88.
If Mercury is lettered M, omit m in lettering the stars.
Two stars in 5^h are lettered a + b
" " .. 10^h .. .. c + d
Is not the designation of the Non Funds too complicated?
Would it not be better to re letter them in order of R.A.?

No. It is better to retain order of Obs. on account of the 4 Non Funds lettered a, b, c, d.

The total number of pages of Journal is 423 without the notes.

To find constant of Runs see K 29 p 6 (Mr Uptons comp)

5' spaces on E. F. G. H at 8 different degrees 25° apart

Means E = 300.56

F = 300.18

G = 298.95

H = 299.72

299.85

Runs space .70 — How did he get this? Why not 300 / 299.85 / −.15

5).15

Corr for 1' +.03 (.37) — corr or error?

nov Prof S — This is probably the correction to a division of the circle to obtain a mean or average division.

Prof R's order of computation of Runs see K 24 p61

	E 5'	E 0'		F			G			H			Mean Runs
data from E, Feb 12.9 MT	17.70	18.16	300.46	18.88	18.32	299.44	18.58	16.90	297.92	19.06	18.70	299.64	299.36 mean/5; 300 − mean = +.64÷5 +.13

I have adopted the foll. form for the 1879–1881 obs.

			5'	0'		
Runs 1879	Feb 12.9	E	17.70	18.16	300.46	
		F	18.88	18.32	299.44	
		G	18.58	16.90	297.92	
					[illegible].64	
					[illegible]1.46	
					[illegible]9.36	
					+ .64	
Corr. for 1'		"	+5		+.13	To be applied to Zenith distances or Circ. Reads
Cor for 1'		= Data for curve =			−.13	" " " declinations

Since the Circle Readings fall short of 300" (a whole division of the circle) the Error of Runs = −.13 for Z. dist. " " = +.13 .. decl.

(Pasted slip:)

(over)

~~0.46~~ 0.64 — for p71

300.00

300.00 — 300.~~46~~ 64

299.~~54~~ 36

Correction and Error have opposite signs also Correction to be applied to Zenith-distances has opposite sign from that to be applied to declinations.

Star List Notes

There are in the Absolute Series: 169 Stars of which

	145 are	Fundamental Stars having Ephemerides in 539 Lists	
	20 "	" " " no " " "	
at & d	4 "	Non Fundamental (not found in 539 Lists)	
etc. for counting in	~~11~~ 13 "	" " occasionally observed.	
Total no Stars	18~~0~~ 2		
S.	The Sun		
M.	Mercury		

Dec 28 (Prof P) — Designate the Non Funds, now carried in journal, occasionally observed, by letters from e in order of observation in F 65-88.
If Mercury is lettered M, omit m in lettering the stars.
Two stars in 5^h are lettered a + b
" " " 10^h " " c + d
Is not the designation of the Non Funds too complicated?
Would it not be better to re letter them in order of R.A.?

No. It is better to retain order of Obs. on account of the 4 Non Funds lettered a, b, c, d.

The total number of pages of Journal is 423 without the notes.

Changed after I gave Prof S the values

To find constant of Runs see K 29 p 6 (Mr Upton's comp.)
" 5' shares on E. F. G. H at 8 different degrees 25° apart

Means E = 300.56
F = 300.18
G = 298.95
H = 299.72
299.85

Runs share .70 / 5) .15

How did he get this? Why not 300 − 299.85 = −.15

Corr for 1' → +.03 37

Corr or error?

Nov Prof S This is probably the correction to a division of the circle to obtain a mean or average division.

Prof R's order of computation of Runs see K 24 p 61

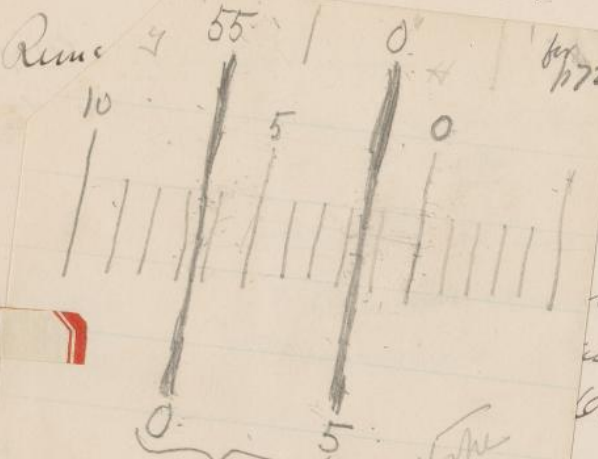
data from E,	5' E 0'		F		G		H		Mean Runs	Mean / 5
Feb 12.9 MT	17.70	18.16	18.88	18.32	18.98	16.90	19.06	18.70	299.36	300 − mean = +.64 = +.13
	300.46		299.44		299.92		299.64			

I have adopted this foll. form for the 1879–1881 obs.

			5'	0'		
Runs 1879	Feb 12.9	E	17.70	18.16	300.46	Since the Circle Readings
		F	18.88	18.32	299.44	fall short of 300 (a whole
		G	18.98	16.90	299.92	division of the circle)
		H	19.06	18.70	299.64	The Error of Runs = −.13 for Zenith
					1.46	" " = +.13 " Decl.
	Mean				299.36	
	300 − Mean				+.64	
Corr for 1'		"		+5	+.13	To be applied to Zenith distances or Circ. Reads
Corr for 1'	= Data for curve	=			−.13	" " " declinations

Correction and Error have opposite signs also correction to be applied to Zenith-distances has opposite sign from that to be applied to declinations.

Rum 55 0 for p72



60 - 1' 30" = short stroke

55 6 30 long stroke

Short stroke read first

Prof S diag

...t as to whether 5' 0' means
60' 0' 0"
... to always read first, the
... is to be subtracted. (i.e from 55' towards 0')?
...n 21 1879 see D_{16} + K24 pp 90 + 94
Oct 14 1883 .. E_8 + K24 p106

10'

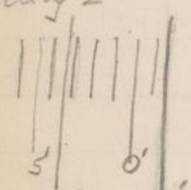
5 0 = scale unit 0 of Circle
5 of Scale = 55' (circle) 5' scale
0 .. .. = 60' (circle) 0' scale

... always read first (or if the microscopes are read anonymously either short or long always first

60 1 30 short stroke
55 6 30 long stroke

the record of the scale will read (see diag 1) 5 0 reduction = 60' 0 - 55' 5
or it may read see diag 2 0 5 .. = ~~55 5 - 60 0~~ 60 0 - 55 5
The reduction in both cases is the same if the reading to be subtracted is read first and if the scale readings are always made forward on the circle from 55' to 0'

diag 2



55' 0'

Prof S says this last is not a likely case

Examine all the above because readings are always made from zero of scale.

From examination of records assume that Prof R always reads from 55° to 0' of Circle recording the scale reading first which follows the 55' stroke i.e 1st reading subtracted from 2d reading gives Corr to Zenith dist.
Prof R's readings (degree + stroke) are sometimes nothing, usually (when given at all) 5 E 0 (17.1 14.3) rarely 0 E 5 (17.1 14.3) and in 1885 5' 0" 17.1 + 0' 0" 17.1
I take 5 E 0 to mean ~~that~~ the 5' space immediately preceding 145° when the instrument is horizontal.

See Vol XVI p XXVII

Runs notes continued

There is no note as to whether 5′ 0′ means 55′ 5′ short 0″ or 60′ 0′ 0″

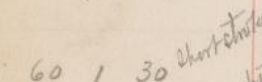
Prof R seems to always read first, the value which is to be subtracted. (ie from 55′ towards 0′)?

For Runs for Jan 21 1879 see D16 + K24 pp90+94
" " " Oct 14 1883 " 28 + K24 p106

for Sis diag 1

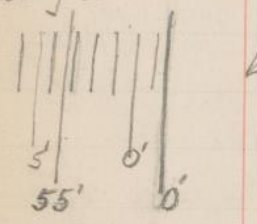
I assume that 5 0 = scale ust 0 of circle
5 of scale = 55′ circle = 5′ scale
0 " " = 60′ circle = 0′ scale

If short stroke is always read first (or if the microscopes are read uniformly either short or long always first) the zero of the scale will read 5 0 reduction = 60′ 0 − 55′ 5′



or it may read see diag 2 0 5 " = 55′ 5 − 60′ 0 = 60 0 − 55 5

diag 2



The reduction in both cases is the same if the reading to be subtracted is read first and if the scale readings are always made forward on the circle from 55′ 50′

Examine all the above because readings are always made from Zero of scale.

Profs says this last is not a likely case

From examination of records assume that Prof R always reads from 55′ to 0′ of circle recording the scale reading first which follows the 55′ stroke i.e. C reading subtracted from Z reading gives Corr to Zenith dist.

Prof R's readings (degree + stroke) are sometimes nothing, usually (when given at all) $\frac{5\,E\,0'}{17.1\quad 14.3}$ rarely $\frac{0'\,E\,5'}{17.1\quad 14.3}$ and in 1885 5′ 0″ 17.1 + 0′ 0′ 17.1″

See Vol XVI pp XXVII

I take 5′ E 0′ to mean the 5′ space immediately preceding 145° when the instrument is horizontal.

Runs notes

that no change has been made in the division adopted for measurement of Runs and that the readings were made usually from the 55′ to the 0′ = 5′ ± 0′, sometimes from the 0′ to 55′ = 0′ ± 5′, always in the same order, that is the reading to be subtracted always read first.

Nov 12 or 14th

Prof S's opinion is; either (1) or (2) must be true: Viz:
Prof R's readings 5′ 0′ and 0′ 5′ at the beginning of the readings of Runs (1) means 5′ to 0′ division of circle or 0′ to 5′ division or else (2) it is a mistake for 55′ to 0′ if the note in Vol XVI p. XVI holds.

I think that the 5′ 0′ & 0′ 5′ refer to Scale only and not to division of circle and that the division mentioned in Vol XVI p. XVI is retained in the Absolute Series.

Nov 12 or 14th
Prof S says → Recentering for constants of Runs will settle it.

Questions

If microscopes are read uniformly e.g. long always first can 60′ 0′ be read before 55′ 5′? Yes (Prof. S)
that is 55′ 5′ is not always the long distance?

on reading the microscopes

Must the long or short distance from the zero of the scale be read uniformly? or must readings be made forward on the circle?

on reduction

Must the short always be subtracted from the long or the long from the short to get down to zenith distance?
Will not one give the error the other the correction?
Does Prof S have short read first?
" " " always subtract the 55′ 5′ from the 0′ 0′?

Runs — Prof S rules order of computation see Book 11 "Microm"

Date	Record Book	No obs	Stand. div	orig results		
1897 Sept 27	14 p30	5	0′	H 0 38.68	mean of 4 readings	F 0° 0′ 26.22
				55 5 39.44		55 5 24.44

corr to Stand. div → + 0.76 / − .56 → − 1.78 / + .16
+ Results corrected for error of division
H = +0.20   F = −1.62

			H	F	H	F
Sept 27	14 p30	5	+0.76	−1.78	+0.20	−1.62
			originals		corrected for div.	

Prof S
See Annals XXIX pp 207-8

The above case ~~done~~ arranged in Prof R's way: Microm H only

H 38.68 39.44 300.76

To be applied to Circle Reading or Zenith-Distance { Corr for Runs for 5′ −0.76 / Error .. .. +0.76

Since the microscope gives a larger value than 300″ the Circle Readings are to be decreased

Sept 27 1897 Error +0.76 Corr −0.76 if applied to Circle Readings
" −0.76 " +0.76 .. .. .. Declinations -

Prof S applies Runs to Circle Readings
Prof R .. .. .. Declinations.

Tried to find correction to division given on p 95 K24 but do not know where to get data called "Readings for Runs Shace"

Dec 4 1898 Took all the Record Books on ~~Division~~ Division Error (Rdv) S1-12 with MSS of same which came from Waterville in 1898 to Prof S.

Profs P r S decide

Jan 7 1899 → Nothing is to be done with Div. Error as Prof R considered this part of the work incomplete. Returned S1-12 to South Entry P.M.S.S

" 9 - to box in "Brick"

Runs notes

1898 Dec 5 — Examined the correction applied to Runs Constant "Correction for 1" for Feb 11 1883 and it is not the reduction of 2 microscopes to 4 or vice versa; it is probably the correction for the reduction of the adopted division on which the Runs were measured to an average division.

(mentioned this to Prof S)

Dec 19th — Looked up Runs Curves, found them all & examined especially 1883 to 1886, -.05 has been applied to Corr for 1" for Zen. dist before curves were drawn in all the years from 1878 to 1886 inclusive K24 proof — see more notes p. 58 in Runs Book 1879-1881

	{ Correction given p XXVII Vol XVI on account of deviation of adopted space from 300" = {Corr 1" for an average division}	Same Correction from K24 (has been applied before before curves were drawn)	} "To be applied to Runs expressed in terms of the zenith-distance".
1872	-.05	-.05	Included in values given pp LXXXVI to CX
1873	-.04	-.04	
1874	-.05	-.05	
1875	-.05	-.05	
1876	-.02	-.02	
1877	-.03	-.03	
1878 *	-.03 →	-.05 *	
	not given after Jan 5 1879 in Vol XVI		
absolute Series } 1879		-.05 to Jan 26	
1883		-.05	
1884		-.05	
1885		-.05	
1886		-.05	

1899 Jan * Error in Vol XVI p XXVII, -.03" given, find that -.05 is the value used, in 1878 peu to CX. In all the other years the value used and that given p XXVII agree

Rums — To be done by Miss B.

Questions:
Why not apply Rums "Corr for i" to Circle Readings in Journal (after the copying of Circle Readings has been checked by comparison with Record Books A) as well as to the declinations in $\mathfrak{D}$67-88 which is the usual method? for check, it will give the same values with opposite signs.
If this is done look out for signs because the Rums Corr for i to be read from curves will be with the signs for declinations.

1899 Jan 6

Work to be done on Rums

Apply the correction described on previous page (-.05) to zenith-dist correction for 1880 1881.
Plot the curves 1880 1881.
Read off the values from the curve for 1879 for the plotted points first and afterwards for the required dates.
see Vol X p XXIII for Rums applied.
Take Polaris Record Books $\mathfrak{D}$ and Circle Readings of same " " to Prof S to prepare for Miss B. with all Mss. relating to Polaris.

not yet. Jan 11 1899 — Send to Miss Bond Record Books A to check Circle Readings in $\mathfrak{D}$67-88 + on Journal.

Jan 13[5] Prof S suggested Classes I + II. On Jan 7[5] Prof S read this Rpt. over — Take note first of Star List Book and also my Report on State of Absolute Work May 7 1898 to Prof S for examination.

Jan 3 1899 — Examined Star on Mar 8 1880 having no name nor place in $\mathfrak{D}$ to see if it was not α Orionis $5^h 48^m$. In A 25 p22 no name or place given either, κ Orionis $5^h 42^m$ precedes + α Cam Maj follows CR $5'\ 0''$ 49.08 49.25

Apparent Place Notes — Constants —

Struves Precession constants for 1875 from Pub XIV Art. 5

1875 $m = 3^s.072245$

$m' = +.0000189933$

$m' \times 5$ = for 5 years $+.000095$

m for 1875 3.072245

m for 1880 = $3^s.072340$

1875 n $20''.05423$

$n' = -.0000863$

$n' \times 5$ = for 5 years $-.00043$

n for 1875 = 20.05423

n for 1880 = $20''.05380$

Jan 2 1898 (from Prof S)

1875 $m = 3^s.07224$ printed for

$\frac{100}{15} m' = {}^s.00190$ Zone Reduc tions.

American Ephemeris 1880 p258

1880 $3^s.07234$

n' $20''.0542$

$100\, n' = -.0086$

1880 $20^s.0538$

Adopt → The American Ephemeris 1880 uses Struves Constants m & n

" Berlin Jahrbuch 1880 " Bessels " " "

Could not get the constants used in Berlin Jahrb. 1880 from Struves values 1875. Prof S found me Bessels as follows:

Bessels Besselś Precession Constants m & n from Bonn Obs Vol VII p148

m 1880 $m = 46''.06219$ ✓

$m' = +''.00030864$ ✓

$\times 20$ $= .006173$

46.06219

M 1880 $46''.068366$

Berlin Jahrb Values 1880

$46''.0684$

$\times 15$

1880 $n = 20''.05375$ ✓

$n' = -.0009702$ ✓

$\times 20$ $-.001940$

20.05375

$\therefore$ n 1880 $20''.05181$

$20''.0518$

Jan 3 1899

Wi: For Dr Auwers' trial places of the Fundamental Stars see recent Ast. Nach about No 3510 (ing at bricleis?); for the newest place of the 303 Southern Fund Stars (Ast Nach 2890-91) see Ast Nach 3511

\# See Star List Book

\# I have adopted the numbers for the 20 Fund Stars (which are not in the 539 List) from the Jahrb. 1895 or Jahrb 1884 and not from the numbers of the 303 Southern Fund List; (only 18 of the 20 are in the 303 List & Pisces Aust 22h 50m not among the 303) they are not alike ε for instance δ Sagittarii 18 47

See Pub XVII for continuation of 539 Stars to 622

ζ Eridi 3h 37 Jahr 1895 = No 550, in List of 303 Star = 47

Jan 18th Why do these nos differ? ~~+ others e.g. ε Can Maj 6h 53 after~~ = 566 in Jahrb 23 in list

The nos of Pub XVII (540-622) used in Jahrbuchs & not those of the 303 List

* Question: See if the list of 622 in Jahrb 1895 is a continuation of the 539 List? yes 539 to 1882, 605 in 1883 (inclusive), 622 1884 & foll years

Jan 9th ans * What is the first Jahrb after 1880 that continues the ~~539~~ 622? 1884

Jan 9th Compared A. B. C. D. E. Berlin Jahr. 1880 formulae & constants with " Am. Ephem .. ..

= Pub XIV + XVII of the Ast. Gesell

Jan 18 = Look for the original of the 622 Stars in Ast Nach or Publications of the Ast. Gesell ~~after~~ later than Pub XIV which contains only 539

Pub XVII = 83 Southern Stars ~~gives also for them abcd~~

Ast. Nach 2890-91 gives the a b c d, a' b' c' d' for 1890 for the 303 Southern Stars.

Mar 9 1899
Miss B. entered this note in Star List Book with variations from dictation.

Prof S read over the original of this note on Jan 13 1899 & I have copied and rearranged it with his suggestion of Classes I & II.

Page ref to Star List

Note for Star List Book

List of Obs in 1879 to 1881 (incl.) This (Star List) book contains a list of the Stars observed in the years 1879-80-81 with their dates of Observation.

How obtained The list was obtained by comparing an old list of 250 stars (see M25 List of ^Fund.^ Stars ^for 1879^) with the Observations made in 1879-80-81 given in Series F Nos 67-88 (Chronograph Readings of Stars and Sun for those years) and in Series G 1-8 ~~which~~ ~~contains~~ (~~Chronograph~~ Readings of Polaris only).

Comparison of list in M25 with Observations in F books 67-88 + G 1-8 From this comparison it appeared that 168 of the 250 stars mentioned in M25 (in which Polaris was included) had been observed in the years 1879-80-81 and that one star 67 Ceti (No 353 of Dr Auwers List of 539 Fundamental Stars) not given in the list in M25 had also been observed.

Class I = List for Absolute Positions. see pp 2-74 This list of 169 stars including Polaris and 67 Ceti ~~are~~ ^is^ here called ^Star List Book^ Class I and ~~are~~ ^is^ arranged in order of R.A.

Class II = others incidentally observed Stars see pp 76-78 From the above comparison (of the list in M25 with the Observations in F 67-88 ^+ G 1-8^) it also appeared that ~~11~~ ^13^ other stars not given in M25 and not found in Dr Auwers Lists (that is not included in Class I) had been incidentally observed; these ~~11~~ ^13^ stars are here called Class II and they are also arranged in order of R.A.

Designation of Stars in Class I by numbers 539 Pub XIV, 83 " XVII, by letters 165 stars of Class I are designated (in the margin) by the catalogue number in Dr Auwers List of 622 Fundamental Stars * originally 539 Stars (see Pub XIV ^+ Pub XVII^ of the Astron. Gesell). The 4 remaining stars of Class I ^which are^ not found in Dr Auwers List but ^are^ included in M25 are designated by the letters a b c d.

Note for Star List Book continued

Designation of Stars in Class II see pp 76–78 of the copy … the Sun

All the Stars of Class II are designated by letters in order of Observation from e to ~~p~~ omitting m. Mercury is designated by M and the Sun by S; the dates of Observation are given for each.

Journal Note on designations

Stars of Classes I & II Mercury and the Sun are also designated in the manner just described in the copy of the Journal made from the books 807–88 by numbers & letters only. Here (In Star List) names are also given.

The facts of designation of Stars of Class I & where the App Places may be found.

Prof S

The mean places and the apparent places (for every 10 days) for 145 of the Stars of Class I are given in the 539 Star Lists for 1879–80–81; the Hauptsterne are numbered from 1 to 336 and the Zusatzsterne from 337 to 539; for the # 20 stars numbered from 540 to 622 no mean or apparent places are given because in these years (1879–80–81) ~~the~~ Dr Auwers' Lists contained only 539 stars. but may be found by carrying back the ~~later~~ places (1884) or or may be found from the Pub XVII places carried forward. The Catalogue numbers for these 20 Stars have been taken from ~~the Jahrbuch for 1845~~ same as ~~(compare 1884)~~ Pub XVII = 83 Southern Stars.

No mean or apparent places are given for any of the lettered stars of either Class I or II

\# See note p78

Prof S Jan 18th

Dr Auwers newest places for all the stars (622) (see note on p78 this book) may be carried back to 1879–80–81.

Report on Absolute Work

Feb 8th 1899 General plan:

To collect and put in shape for printer all the material necessary for the reduction of all the observations made in 1879-80-81 (Feb. 79 – Jan 82) which material is to be found in the 72 record & reduction books mentioned on p 40 of this book.
If it should be found advisable to collect all the unprinted work of Prof Rogers the 32 books mentioned on p 41 will also have to be consulted.
The original series for absolute positions falls between the dates Jan 26 1879 and Oct 9 1883 both of which dates occur in Vol XVI of the Annals.
The present plan has been to limit the examination and arrangement of the material to the observations made in 1879-80-81 as it is supposed that Prof R. intended to do this, from the fact that he was working only upon these years and had not had the chronograph sheets read for the observations made in 1883 (except for Polaris to July 14th 1883) see note p 44 this book.
The series of observations from Jan 26 1879 to Oct 9th 1883 is not continuous but was broken by a over a years vacation in 1882; and

Series retained — the first part of the absolute series extends from Jan 26 1879 to Jan 10th 1882

" rejected — and the second from Feb 8th 1883 to Oct 9 1883.

For the series of observations from Feb. 1879 to Jan 1882 the Journal has been copied 423 (double sheets) pages from which it appears that 6,150 observations were made of 182 stars, 10 of Mercury and ~~459~~ 460 of the Sun. Total = 6620, including Polaris

Mar 4th
Mar 9th final
Miss B's count

The 182 stars have been divided for convenience into two classes, Class I those which have been systematically observed of which

Genl plan continued. there are 1694, Class II those incidentally observed of which there are 13. (from Prof P's Reports for these years 629 ?)

Polaris is included in Class I and observations have been made.

For the names and designations of the stars of Classes I + II see "Star List Book" in which also the dates of observations are found. see pp 79–80 of this book "Note for Star List Book" as to how the lists of Stars in Classes I + II ~~were~~ obtained.

The material to be collected:

see F 67–88 ~~and~~ Journal — Means of RA wires
" " Decl " (Circle Readings)

Σ, 1–8 — Level Readings

" — Azimuth " Long Collimator

" — Runs

D 20–28 — Refraction State (Barom. Therm. &c)

Σ, 1–8 — Horizontal Flexure

Propose to do:

Hansen

Mar 29 or 1st the usual formulae $O - T - RA + (\Delta T + m) + n \tan\delta + c \sec\delta$ to see if $c = 0$

&c &c sec v

What has been done:

Miss B — Journal of 423 pp copied and 96 pp of notes from F67–88 = total of 519 pages

" — Star List and dates of observation arranged from F67–88

" — Ledger started of the 182 stars in Star List, dates only from Journal the rest to be taken from F67–88

" + A.W — Runs data put together and constant computed for 1' for 83 dates on which readings were made, and

O.C. done Feb 28 — Curves have been drawn. It remains to compare the curve values (C) with the observed values (O) and to read off values for the 900 dates for which observations the constant for 1' is required.

Notes on Journal have been classified as follows:

See if any of these are settled in the N books — 1. Those for which chronograph sheets are to be examined
2. " " " circle readings "
3. " " " Rt + Decl wires are not reduced
4 B. Miscellaneous notes

Reduction to Apparent Place:

Miss B — Computation of the independent star numbers for 1880 (a b c d a' b' c' d') has been decided upon and started. (to be done also for 1879 independently as a check)

Miss B — To be done:

Check the designation by numbers of other stars in F67–88 by comparison with Pub. XIV & Pub. XVII and by letters by comparison with Star List Book

" + A.W? — Check the Circle Readings from Series A in F67–88 before Runs constants are applied.

" B — Put in fraction of day on Ledger in Mean Time Mar 16 Miss B doing it

A.W — Red to app. Pl. a + b B to be arranged for Miss B

" (done) — (Runs to be read off from curve for the 83 dates) + for the 900 or so dates required. + to be applied by Miss B.

Mar 4th — No. of incomplete Rts 213, " " Decl 211, " " Cir Reads 208 } of the total 6620 observations.

Mar 29 (about Mar 9th) Miss Bond finished the count of the number of observations in the years 1879-1882 of the (81 excluding Polaris) 82 stars and tabulated the results for each year * for each star, this table of totals is found in the Star List Book in which all the dates of observation from 7h 7-88 have been entered. A check count was made from the dates on the Ledger Sheets which dates had been copied from the dates on the Journal. Both counts give 6,620 for the total number of Observations of the stars (excluding Polaris) of the Sun and of Mercury. Of the 6620 Observations there are

213 Incomplete R.A.'s
211 .. Decl ..
208 .. Circle Readings

and other miscellaneous notes and remarks to the Journal.

No count has been made of the dates of Observations of Polaris (except from the Directors Reports up 82 inclusive), and they have not yet been entered in the Star List Book, all other dates of Obs. have been entered there.

The Ledger has not yet been copied except the dates for which Miss Bond is putting in the Fraction of day in Mean Time = R.A. − T.

Mar 27 Prof S approves Polaris & Sun are not yet entered in Journal, have decided to have Ledger of Sun made out when that of the stars is done, as they are in same books 7h 7-88

Miss B done Apr 9-12" 1900 + notes worked up. Compare dates in Star List with M25 + just entered L.C.'s when so observed. Copy Ledger (dates only are done) + enter L.C. before comparing with M25 & Andromeda cannot be observed twice on May 27

1899

May 31 Circle Readings in F books 67–72 + 76 have been compared with the original readings in the A Books by Miss Bond and changes made (errors of copying) on the Journal but not in the F. Books; notes have been made to indicate where these changes occur.

Fraction of day in mean time has been entered on Ledger sheets for 1879 + parts of the years 1880 – is to be completed for 1879–80–81 this [illegible] (... found them correct) [illegible] approximately.

Reference to bracketed Stars

Miss [illegible] Least Square Solutions for 1803. also preparation of work on

Independent Star Nos. Reduction to apparent place a b c d a'b'c'd'. Computation of 13 Stars for 1880 for which these values are given in Pub XIV for 1865 + 1885 and reduced to 1880 for comparison with her values. (preliminary table in sheets as before) see pp 188–189 of new book. A book has been arranged for this and the places of the 182 Stars entered for 1880. For the 145 Fund Stars the 539 list places have been entered; for the 20 Fund stars numbered 540–622 bracketed Stars list book the places from Pub XVII have been brought forward to 1880; for the other 17 Stars approximate places only are given.

Sheets have been made out for a check reduction of the independent Star nos. using the 1879 places obtained as described for 1880. All data checked by Miss B.

α Librae = no 590 δ Librae = 589 no Obs of the latter the no has been corrected on Journal + in F. Books

1899

May 31 Circle Readings in J books 67–72 + 76 have been compared with the original readings in the A Books by Miss Bond and changes made (errors of copying) on the Journal but not in the F. Books; notes have been made to indicate where these changes occur.

Fraction of day in mean time has been entered on Ledger sheets for 1879 + parts of the years 1880 ~~-~~ to be completed for 1879–80–81 this summer. (May 26 Chkd two cases + found them correct) (June 1 " several cases approximately.)

Miss B. has worked on Comets + Least Square Solutions for Errs also ~~Sep~~ preparation of work on Reduction to apparent place a b c d a′ b′ c′ d′.

Independent Star Nos. Computation of 13 Stars for 1880 for which these values are given in Pub XIV for 1865 ~~+~~ 1885 and reduced twice to 1880 for comparison with her values. (preliminary table in the sheets to be seen see pp 188–189 of new tables)

A book has been arranged for this and the places of the 182 Stars entered for 1880. For the 145 Fund Stars nos 1–539 the 539 List places have been entered; for the 20 Fund Stars numbered 540–622 bracketed Stars List book the places from Pub XVII have been brought forward to 1880; for the other 17 Stars approximate places only are given.

Sheets have been made out for a check reduction of the independent Star nos. using the 1879 places obtained as described for 1880. All data checked by Miss B.

α Librae = no 590 δ Librae = 589 no Ds of the latter the no has been corrected on Journal + in F. Books

1899
May 31 Miss Bonds work for Summer of 1899 Owls Head

Ledger. (452 pp) Fraction of day in Mean time on Ledger Sheets
In Book (1) Computation of Independent Star Numbers for 182 Stars for 1880
On Sheets (85) Check " " " " " " " 1879

The following tables & books will be necessary:
(1899 May 4 May 7 recorded in Loan Book in Library)
Am. Ephem 1879 -80 - 1881 dupl. copies
(May 30 1899 took to Miss B.)
Newcomb's Tables " "
Lecoy " " "
(Apr 9 1900 returned to the Observatory) Schron "

1899
May 29. All the Books 67-88 and Mss of Journal have been returned to the Observatory from 64 Walker St.
also Bagay Tables. June 3 I returned 539 List 1880 A23 pp 113-139 partial, 173 & notes which Miss B has been using since May 29.
June 1 A.W. Took up a Dec 1880 for Safford's Star (e) 20 16 Apr 1. 6. 7. 8. & send it to Miss B to compute abcd &c
This is the only star for which she has no data.

" " Took Star List Book 1879-1881 also classified notes on Journal from Miss Bond's 64 Walker St.

June 3 All books & papers have now been returned by Miss B.

From Jan 25 1899 to date (Apr 1900) have worked for the most part on Eros positions (definitive) from photographic measures made by Miss Leland. Have worked out for Miss Bonds work but have ~~done~~ nothing myself on Prof. Rogers work for over a year. Eros, & Cent. were taking precedence.

Miss Bonds work for Summer of 1900.
for Rockland + Owls Head. Apr 13th 1900.
Computation of Reduction to Apparent Place

For dates see Star List, and for date + fraction see Ledger Sheets
the fraction of day on Ledger Sheets is ^Apr 1900^ not quite complete and
is to be finished.
Compute ^an^ Ephemeris for 5 or 10 day intervals taking
log A. B. C + D, + E from Am. Ephem. for 1879-80-81 pp 248-9
for all stars of Class I ^see Star List Book^ which are not in the
Am. Ephem. (about 75) and for all stars of Class II
13; Apparent places are given for Nautical Alm.
Stars ^of Class I^ without the ☾ terms and these may be
applied afterwards; for these stars the Red. to App. Pl.
will be in nearest hundredths.[x] (If Prof. P. decides .00 sufficient) — [x] yes Apr. 14 1900
The moon terms for all stars of both Classes ^are^ to be
taken out from Tables VI + VII of the Am. Ephem. (or N.A.) ^rather than compute them by Table IV tried + got same result.^
for the years wanted (for example how to get arguments &c see 1st Book of Reductions p 1 α Androm.) and are to
be applied to the Red. to App. Pl.
Books necessary:
3 Nautical Almanacs 1879-80-81 (duplicate copies)
Newcombs Tables
Lacy
(452 pp.) Ledger Sheets
(1 book) Star List Book — note Apr 14 1900 to be sent to Miss B
(1 book) Constants for Reduction to App. Place 1880
(85 sheets) Check sheets of same " " 1879
3 New Record Books, (blank) 1st Book reductions
for α Androm. started. 1 only taken the other two viz
1st Book α Androm &c + Book for moon terms to be sent to her, after
final form of reduction is started.

A comparison of the dates in Star List with M25 this book sep 84
Apr 9 1900 has been made & M25 has been returned to the Cls.
Miss Bonds note: L.C obs entered in Star List Bk from examination of 7 Bks & checked by M25.
It was decided Jan 1899 to compute Red. to App.
for all stars (182) and the constants a b c d a' b' c' d'
have been computed for all the 182 stars app.* see below
They have been checked by an independent comp.
by Miss B. for 1879 and the differences have been
x by A.W. taken and are to be x examined and all discordant
cases looked up. 1880 values to be used
Apr 11-12 Prof. S. thinks (since Moon terms can be taken out
separately by Tables VI + VII Naut. Alm.) that it will be sufficient to get the
Red. to App. Pl. from the N.A. for such stars as
are found there, which will be in hundredths and apply to it the correction
x Apr 14 1900 Prof P says hundredths are sufficient. for the C terms. + (This to be decided by Prof P.) (I prefer
the original scheme of computing for all stars to thousandths.)
The Jahrbuch stars cannot be done that way because
in those years 1879-81 Bessels constants were used.
The list for Red. to App. Place will then be cut
down about 1/2 (88 stars not in N.A) of the Reduction for all stars in
the N.A. are omitted, but the Moon terms can
be taken out for all stars and dates?
Note: The computation of a b c d a' b' c' d' for the 4 stars
α δ λ Ursa Min & 51 H Cephei was omitted as the App. Places
can be taken from the Almanac for these stars.
Sd no. 1804 Indep. Stars ms. computed. α δ λ 51 H Cephei 22 H Camel omitted
Sheets not made out for δ & λ. 606 + 607 ε¹ + ε² Libra both computed.
Miss B's work for summer of set & the comps of a b c d x c
unnecessary except for 37 (20 / 04 / 13 / sep 1870) stars + ε⁴ possibly for stars not in N.A.
80 ...

+ Prof Newcomb said, large personal eq in δ on acct of chronographic method.
said also to use all stars for Eq. point besides Polaris,

Notes on Red. to App. Place

5 or 10 day intervals are sufficient for all south of 70° or 80°
tried α Androm δ = +28° (which has 53 dates comp. for 32 sufficient.) Miss B. trying 9 H Draco +76° !
If the dates wanted are for longer intervals than 5 or 10 days insert extra dates, in order to get daily differences.
Data in N.A given for Wash. Mean midnight = 1/60 d − .02 d
= +.52 Camb M. Time (Apply +.02 d to Wash. to get Camb. or −.02 to Camb. T to get W)
After getting daily difference multiply it by the diff. between the day + fract. wanted + the day + fract. printed in data is given and apply to sum of aA + bB + cC + dD + E +, a'A' b'B' c'C' d'D'.
For L.C. (lower cul) get fract. for U.C + add or subtract ½ day.
omit-# Take out Moon terms for all dates of all stars in a new book.
For other details see Miss Bonds notebook.

+
Apr 27 1900 # Prof Newcombs advice is not to do anything with Moon terms. see his "Hints on reducing Rogers observations" for his advice in general.
also to take Red to App. Pl. from Ephemeris (N.A) + not compute it
" 26 asked if O terms (&c) apply to all places or depend on Mean places
I think he said on mean pl.
mentioned typo. error in N.A. 1879 pp 249−251

May 2, 1900 Miss Bond need only compute these
(1) the Red to App. Pl. for the 24 stars having no ephem. and the 13 non. Funds
and possibly (probably?) the foll:
(2) All the others not in N.A., on acct of the Constants (Bessels) used in those years.

May 2 Corrected Miss B's examples of taking out App. Pl. from N.A and returned them with notes + directions
Stars in N.A. to be marked on Ledger Sheets. (p275)

May 3 1900

Miss Bonds Work (Summary)

done Aug 1900 2 Fract. of day

done " 1 2 Corr. of Signs sec δ 2nd & 4th Quads a b c d, &c (done May 1st) to be ret. later

omit see exceptions p 89 3 Red to App. Pl.

omit all 4 Moon Terms

5 App. Pl. from N.A.

Miss B. ✓ Comparison of changes of dates in Star List to be made with Ledger Sheets when I send her the Star List Book

✓ See if final count is affected by the changes

Aug 1900 (by 72 dates)

A. W. Aug 1900 a few cases to be exd. Examine the a b c d a' b' c' d' differences pointing off (all given units 5th decimal) the nos. before comparing the 4th decimal places by characteristics

Chkd May 2 Miss B's example 2 stars

Examine again α Androm. App pl. p 275 N.A. Should get same reduction by computation as by interpolation in N.A.

			$\alpha'-\alpha$	s	α Androm 1879
(1) see 1st Book App Pl.	Get by compn	Red. Mean to App. =		+.252 *	Apr 13.94 G.M.T.
(2) " below + p91	"	interpolat. p275 "	"	+.260 (56)	from Apr. 9.0 N.A.
(3) " p91	" "	" "	"	+.256	" " 19.0 N.A.

(2) α Androm α' = App Pl. Apr 9.0 0h 2m 8.26 N.A. p275

" 13.94 G.M.T. + .089 = daily diff. .018 × 4.92 d (13.94 d − .02 − 9.0 d)

8.349 +.0876 " " .0177 "

α = Mean Pl 0 2 8.089 N.A p259

App − Mean = α' − α = Red. Mean to App. +.260 (258 using one more dec. place) } without Moon Terms also (1) & (3) above.

α − α' = " App to Mean −.260 (258) }

Prof. S. suggested computing an N.A. date in trying to account for above * discordance between the computed & interpolated vals. see p91

α Androm 1879

data for mean midnight = $\overset{d}{.5}$

Apr 9.0					Apr 19.0	
log A	9.7420		log a 0.4884	log A	9.7601	
B	0.7068n		b 8.5574	B	0.6883n	
C	1.2462n		c 8.8797	C	1.2118n	
D	0.8438n		d 6.8593	D	1.0062n	
aA	0.2304	+ $\overset{s}{1}$.700			0.2485	+ $\overset{s}{1}$.771
bB	9.2642n	− .184			9.2457n	− .176
cC	0.1259n	−1.336			0.0915n	−1.235
dD	7.7031n	− .005			7.8655	− .007
						+ .003
						+ .355

Red. Mean to App

α = Mean pl 1879.

α′ = App. Apr 9.5 = ... 2 8.444

not use N.A. daily diff +.015 .018 use × $\overset{d}{.5}$ = − .008 or .009 .020 or .018 × .5 .010 or .009

App R. Apr 9.0 = 0 2 8.259 8.258 " 19.0 8.434 or 8.435

0 2 8.26 given p 275 N.A. 8.44 N.A.

8.258 8.435

13.94 CMT. −.02 13.92 WMT.

+4.92 × daily diff .018 .0177 = +.090 87 −5.08 × .018 .0177 = −.090 5

α′ Apr 13.94 C.M.T. App R. 8.34$\overset{5}{9}$ Apr 13.94 C.M.T. App. R. 8.34$\overset{5}{3}$

α 8.089

α′−α Red. Mean to App. R. = +.260 56 +.25$\overset{6}{4}$

— without moon terms —

---

19 Apr. Note made looking up dates for Univ B. Comparison of Star List & M25. A 23 Oct 14 1879 ζ Aquilae 18h 59m 30s − 5° 4′ should be λ, the δ is that of λ and an approx reduction of C. Reads shows it also. it has been corrected.

Sept 27 1879 λ Aquilae (Sears)

δ −5° 48
φ 42 22 48
φ − δ = Z = +48 10 48

Z = CR = 32′
φ = 22
(CR−φ) = 10
Z−φ = −δ

Sept 17 ζ Aquilae

δ +13° 41′ Z=CR= 47 or 48
φ +42 22 48 φ 42° 22′
Z=φ−δ= +28 41 48 φ−CR= 34′
φ−Z = +δ

α Androm 1879

data for mean midnight = $\overset{d}{.5}$

	Apr 9.0				Apr 19.0	
log A	9.7420	Log a 0.4884		log A	9.7601	
B	0.7068n	b 8.5574		B	0.6883n	
C	1.2462n	c 8.8797		C	1.2118n	
D	0.8438n	d 6.8593		D	1.0062n	
aA	0.2304	+ 1.700			0.2485	+ 1.771
bB	9.2642n	− .184			9.2457n	− .176
cC	0.1259n	− 1.336			0.0915n	− 1.235
dD	7.7031n	− .005			7.8655n	− .007
	Σ	+ .003				+ .003

Red. Mean to App = + .178 daily diff = .177/10 + .355

α = Mean pl 1879.0 0 2 8.089

α′ = App. Apr 9.5 = 0 2 8.267 App Pl 19.5 0 2 8.444

not use N.A. daily diff ~~+.015~~ .018 × $\overset{d}{.5}$ = ~~−.008~~ or .009 ~~.020~~ or .018 × .5 ~~.010~~ or .009

App Pl. Apr 9.0 = 0 2 8.~~259~~ 8.258 " 19.0 8.~~434~~ or 8.435

. . . . 0 2 8.26 given p 275 N.A. 8.44 N.A.

13.94 C.M.T.
−.02
13.92 W.M.T.

8.258 8.435

+ 4.92 × .018 (.0177) daily diff = + .090 (87) − 5.08 × .018 (.0177) = − .090

α′ Apr 13.94 C.M.T. App. pl. 8.34~~7~~5 Apr 13.94 C.M.T. App. Pl. 8.34~~3~~5

α 8.089

α′ − α Red. Mean to App. Pl. = + .2~~60~~56 + .25~~4~~6

— without Mom terms —

19 Apr. Note made looking up dates for Miss B., Comparison of Star List & M125.
A 23 Oct 14 1879 ζ Aquilae $18^h 59^m 30^s$ − 5° 4′ should be λ,
the δ is that of λ and an approx reduction of C. Reads
shows it also. it has been corrected.

Sept 27 1879 λ Aquilae (Sun?) Sept 17 ζ Aquilae

δ −5° 48 z = CR = 32′ δ +13° 41 z = CR = 47 or 48″
φ 42 22 48 φ = 22 φ +42 22 48 φ 42° 22
φ − δ = z = +48 10 48 (CR − φ) = 10 z = φ − δ = +28 41 48 φ − CR = 34′
z − φ = −δ φ − z = +δ

Owls' Head Me. Aug 22 1900 Miss Bonds work.

1 Take out the App. Pl. in α and δ, for the 107 stars found in Naut. Alm. taking α−α′ + δ−δ′ to hund. in Rt and to tenths in δ. α = mean Pl. α′ = app. Pl.

2 Computing the Red. to App. Place without Moon terms for the 60 stars not in N.A. using 10 day intervals for α & δ. For example of Reduction see α Androm. Use constants 1850 from abc Book.

num *'s 67 / 13 / 80

3. After obtaining the computed red. to app. Pl for 10 day int tabulate

4. results and interpolate for single days & getting daily differences for day + fract. wanted.

Aug 26 For further details see Miss Bonds Note Book

done Aug 24 CAW Look up 17 cases in abc Book errors in constants. ✓

Sept 5 1900 Left with Miss Bond at Owls' Head Me. see p87 for what she had.

(1) Book Constants for Reduction to App. Pl (abc Book)

" " Star List

" " App. Pl. Reductions aA + bB + cC + c started (α Androm example)

to be sent 70 double sheets for 3. above, no hurry.

Old note For Miss Bond

Copying of Polaris

or ΔT + m = T − α in a new book

Sept 10 1900 no need of starting on these yet. App. Place work not much more than begun

5th Oct 1900 Miss Bonds. Work A.W. assisting in checking & arranging &c

Notes for Report of work from Oct 1 1899 to Oct 1 1900.

For the 182 Stars — * The Constants for reduction to Apparent Place have been checked by comparing the logs and also the corresponding numbers for 1879 with the same for 1880 (* suggested by Prof S.) and the values for 1880 adopted for use. abcd a'b'c'd.

= 1st No. in list. * a large job 1446 vals 8 × 182 diffs taken for yrs '79 & '80 & both logs & nos only 17 cases for and to keep work see p. 92

The computation of the Red. to App. Place has been made for 67 dates of α Androm (in 1879-80-81 for 21 dates in dupl.) and it has also been taken out from the Naut. Alm., the computed values have been tabulated + interpolated for single days.

(over wrong & has been rejected)

Comp. of Red. to App. Pl. made for 15 dates of β Cass. and the results tabulated + interpolated for single days. also comp. made for 7 dates of 9 H Draco.

Oct 5 P.M. Wrote a postal to Miss B. for facts from her note Book. see her letter in reply.

In Ems Miss Bond has made all the Check solutions (Cluster Method) (20 of them) 21 plates & for several plates more than one Least Square Solution was made = 25 or 30 solutions

Nov 3 1900 Wrote to Miss Bond to Owls Head of the foll. points:

to be copied in letter Book

L.C. Ns.

Am. Ephem. for 1882

Notes copied into abc Book

Cases of disagreement of constants corrected by Miss B. (Send list)

N.A. cases not examined ("save notes")

Tabulated Vals. to be done on double sheets

Sent Miss B. 9 H. Draco. Comp. of Red. to App. Pl.

Returned to her β Cass Tabulated Vals. Red. to App. Pl. with notes + corrections

Feb 16 1900. Received from Miss Bond Book I of Red. to App. Pl. 48 stars from $0^h 3^m$ to $12^h 23^m$. "It was begun Oct 27 1900 & finished Feb 14 1901." from letter of Feb 14th 1901 = (693 dates approx)

In letter of Mar 6 1901 from Owl's Head Me. R'c'd 2 pp of Ledger 360 48 H Cephei + 76 9 Camelop.

Mar 11 R'c'd Star List + Constants a b c Books by express.

May 17 1901 Note: Miss Bond came down from Owls Head Me. on May 1st + worked on Comparing F Books + Journal 773 774 775 with A Books, (Circle Readings) a gap in the checking which she had left and is now completed to May 27 777 11h 2m. I have looked up all Circle Reading notes made by Miss B. on making this comparison from 767 to 777 May 27 (20 pp single sheets about 270 cases) and also I have looked up all Circle Reading notes made by her when copying the Journal 767 to 777 May 27 on double sheets as far as 77 is compared with the A Books. May 27 11h 2m

Abs. Work Notes:

1. Read all dates from Rims Curve
2. Look up inequality of pivots (see Abs. Mss) and any notes on same in E Books when collecting Hfl (for Mr. Dunne)
3. Correct my copy of Vol XV see Errata in Vol XXXVI

1879–81 Hfl see Vol XVI XXIX

August 1901 Took to Owls Head for Miss Bond

1. Star List
2. Constants a b c fixed to app pl.
3. α Androm +c = Bk I. Comp. of red. to app pl for stars not in N.A.

Nov. 1901 Wrote to Miss B. of 10 day intervals for Bk II, of L.C obs from Ned.

to be descr. 1) 2 pp Ledger app pl. from N.A. to be chkd

done Jan 7 1902 2) B Cass L.C obs to be sent see her letter of Nov 7

Jan 7 1902 Sent notes on L.C. O's to Miss Bond, with her letter of Nov 7 containing 2 examples β Cass & 9 Camel. part of which 9 Camel I had answered last month i.e. her to take out app. place for L.C.'s

July 25 1902 Corrected & returned to Miss Bond yesterday p4 of Ledger & corresponding App Pl Table for β Cass $0^h 2^m$ +58° 29. interpolation aug. Examined and returned today pp 6 and 194 of Ledger which I have had since Oct 1901

" 29 1902 Gave Schön Ypl log table to Mr. Gerrish yesterday to send to Miss Bond. Found a [illegible] returned it to [illegible]

B Cass

Feb 19 1903 Miss Bond [illegible] to app. pl interpolation of table for applying after Comp. [illegible] Reported to (last Rpt Prog?) Nov. about ½ applied 3000 app. Miss B. has worked on Independent Obs for South Pole 12 Least Sq Sol's, also Checking of Gillis Stars within 2° of S. Pole for Table XIV of Vol XLVIIII. 43 Stars + 19 "

Miss Bond in Cambridge 1902 Nov—

Jan 7 1902 Sent notes on L.C. Obs to Miss Bond, with her letter of Nov 7 containing 2 examples β Cass & 9 Camel. part of which 9 Camel I had answered last month i.e. her to take out app. place for L.C.s

July 25 1902 Corrected & returned to Miss Bond yesterday p4 of Ledger & corresponding App Pl Table for β Cass 0h 2m +58° 29. interpolation ang. Examined and returned today pp 6 and 194 of Ledger which I have had since Oct 1901

" 29 1902 Gave Schön 7 pl log table to Mr. Gerrish yesterday to send to Miss Bond. Found a note in it that she had returned it to Obs. Apr. 9 1900.

Feb 19 1903 Miss Bond has been working on red. to app pl interpolation of tables for applying after Comp. Dir. (Least Rht Ascns) Reported to Nov. about ½ applied 3000 app.

Miss Bond in Cambridge 1902 Nov — Miss B. has worked on Independent Obs for South Pole 12 Least Sq Sols, also Obs. of Gillis Stars within 2° of S. Pole for Table XIV of Vol XLVIIII. 43 stars + 19 "

Errata Zone 50°–55°

Feb 1903 Two errors found by Herr Ristenpart (Berlin)
He writes that Millosevich finds by observation
that in Vol XV 2043, 2044 Dm 51 1010, "the pre-
ceding star is the northern".

Herr Ristenpart 1st Decl. 2043 and 2044 Zones 276 277 should be transposed
2 .. 2043 Zone 154 is that of 2044 = 50."3 not 46."4

From examination of Record books 68, 6B, H13 pp 66-7 H20 pp 90-91
both of Herr Ristenparts corrections are confirmed (Feb 19 1903)

Star = $4^h\ 52^m\ 3^s 8$ $+51°\ 52$

2043 } 1st Zones 276 277 Feb 10–11 1874 H 20 reductions correct.
2044 } " " " " I.2 p.5

	1874	$^m\ ^s$	^{s} 1872.0	"	"	^{s}	^{s} 1875.0 52	"	41° "
as foll:	Feb 10	52 20.23	55.11	52 1.74	51 42.29	54.93	59.81	7.5	48.1
	.. 11	5 50.08	55.04	52 0.55	51 43.01	54.78	59.74	6.3	48.8

The most northern as obs. by Prof Rogers is the also
preceding star, and was erroneously transposed
in copy for printer

2043 2nd Zone 154 Feb 1 1872 Prof Rogers note in 68 is:
"last star pr d" but it has been reduced H13 p66-7
(Vol XV XXV. XXXV)
as first star and so printed. A rereduction
as "last star" in δ gives 50."4 not 46."4 = 2044

Prof. S's reduction. Prof Searle hunted up chronograph sheet & found
35.8 } mean 35.9 used as RA wire, by reducing TV
36.0 }
would get Tm – Ts = +2.^{s}65 = as "last star"

35.3 –4
35.8 +1
35.9 +3
35.7

Rm = +2.75 gives δ = 48."8

Errata: The two preceding errors affect XV XXV + XXV

Vol XV p42

2043 δ for 51′ 47.8 read 52′ 6.9

2044 δ " 52 6.9 " 51 49.1 using Z154 δ=50.4 (not Prof S's reduct method)

↓

Vol XXV p281

2043 δ for 46.4 read —

" " 48.1 " 7.5 } = 5 δ's

" " 48.8 " 6.3 }

2044 δ Insert ~~7.3~~ " 50.4

for 7.3 " 48.8 ↑ } = 5 δ

" 65 " 48.8/49.1

Vol XXXV

p119 Zone 154 9th line for 46.4 read — insert 50.4 below dash.

p190 Z 276 for 51° 51′ 48.1 read 51° 52″ 7.5

" " 51 52 7.5 " 51 51 48.1 } = 45 δ's

p191 Z 277 " 51 51 48.8 " 51 52 6.3 }

" " 51 52 6.3 " 51 51 48.8

Feb 21 1903

References for reduction of Zone 50°–55° and Example for Herr Ristenpart who did not find explanations clear.

RA — Example Zone 154 Feb 1 1872 Vol XV 2043

Zm 51° 1010 $4^h 52^m 38^s$ +51° 52′

T = Mean of RA wires	=	$4^h\ 52^m\ 32^s.60$
ΔT + m = see Vol XVI p LXXXVI	=	+ 7.48
n tan δ = " " " +.54 × 128	=	+ .69
k = do X p XVI = diurnal aberration	=	− .02
Sum of reductions printed in Vol XXXV p 119		+ 8.15
		4 52 40.75
Red. to beginning 1872.0		− .07
RA 1872.0		4 52 40.68
Red to 1875.0		+ 14.11
RA 1875.0		4 52 54.79

Note 68 "last star d" as last star diff 2 stars = 49.5

Tm = 32.6, 49.5, 37.5, Tδ = 35.3; Tm 37.55, Tδ = 35.7; Proof δ's

* Rin

Tm−Tδ	− 2.7	+2.25	+ 1.85 / + 2.65
log "	0.43136 n	0.35218	0.26717 / 0.42325
.. cos δ 51° 51′	9.79079	9.79079	9.79079
.. 15 tan i	0.11804	0.11804	0.11804
...	0.34019	0.26101	0.17600 / 0.33208
Rin =	−2.19	+1.82	+ 1.50 / + 2.15

Ristenpart got +1.78 in his letter.

+ Rnd

δ = +51° 51

log sin δ′	9.89564
.. cos δ	9.79079
.. sin 1″	4.68557
$(T_m - T_\delta)^2$ ″ = −2.7	0.86272
.. Const 112.5	2.05115
.. Σ	7.28557

Rnd = .0019.

apply — see Chauvenet II p 291 subtractive from obs δ

× Rfl z = φ − δ = −9° 28′ 51″.65

sin z = .165 Hfl sin z = .05

Hfl = 0.3 + 4

+ .45

Example Zone 154 Feb 1 1872

H13 Nr 66-67

		2043	2044
		′ ″	as "last star" δ
Decl	Mean Circle Readings	32 1.10	Recomputations with Prof Searles Chronograph readings T δ
φ	= Latitude	22 48.35	
Req δ′	= ~~Equ~~ ~~point~~ Vol … p … mean …	50 47.25	
Req	= Equatorpoint Vol XVII p LXXXVI mean	+0 42.98	
		51 51 30.23	
* Ri	= Inclination Vol X p XIX for by 15 stars printed in Vol XXXV p 119	− 2.19	+1.82 +~~2.15~~ 1.50
		51 28.04	32.05 ~~32.38~~ 1.73
† Rmd	= Meridian Vol X p XIX	−.01 (0)	
Rrs	= Runs Vol XVI p LXXXVI − 11 × 2.0 (Cir Reads over 5′)	− 22	
# Rrf	= ~~Refraction~~ Vol X p XX + XVI p CXXII	+10.66 (8)	
× Rfl	= Flexure Vol XVII p CXIV	+ 45	
	Sum of reductions Vol XXXV p 119	+ 10.88 (91)	
	Red. to 1872.0 printed Vol XXXV p 119	− 9.90	
	δ 1872.0	51 51 29.02 (5)	33.03 ~~31.48~~ 2.71
	Red to 1875.0	+ 17.34	
		51 51 46.36 (9)	50.37 ~~48.82~~ 50.05

(See also example of Fund. Star δ Vol X p XXIII)

Her Ristenpart got 50.3

#

		XVI p CXXII 2h	4h
Rrf	Bar = 30.33	= B +1063	
	Att. 68.2	= T = −139	T = 4 52 30
	Ext 15.7	= γ = +2943	Ext 11.4 +3340
	B+T+γ	= +3867	+4264 diff 2h = 397 1h 198.1 20
			4440 (4.88)
μ + log	tan Z 52°	= 0.98946	51.9 9.98432
diff μ = .05138	.1 = .00514	1.02813	11.02872

4.88 × 20 = 176 under 5th dec pl.

μ + log ~~tan Z~~ + (B+T+γ) = +10.67 without + 10.68 (+10.66 H13 N67 see above)

λ γ log γ = … 10.66 see above .00

Rrf − (λγ − γ)

λ Chauv II Table I — no val of λ till Z = 45°

γ − γ = 0

Miscellaneous Notes

March 1903

For Prof Searle on Flexure Merid. Cir see Vol 29 p188

Prof S. Use sin tan not sin cos to get Prof Var. with fl.

.. suggested to see if after obs for H fl

Prof R re obs. coll. and found he had not.

Mar 26 Mr. Chandler thinks personal eq. accounts for the diff (about 15′) between i from Equatorial Stars and i from Polaris See Vol XVII p130

Approx Count of no. obs of i = 2176 values. 1879–1881 Coll. Results

May 1903 Miss Bond finished comparing F. Books and Journal with A. Books from F77 to F88 end.

" 12 .. *Gave Miss B. exact directions again for interpolation of Ephem. Stampers 13 J Cas 32 J androm 20 d Cas Aug 79 + Sept 81 35 H Cas

" 14 1903 Read off Runs from Curves 1879–1881 on Sheets

Note! Bk I Aph. Pl. reductions contains 48 stars not in N.A

.. II begins 12h 35m .. .. 30 .. ..

.. III .. .. .. 2 .. ..

Total Stars not in N.A = 80 (exp. 529 + 533 = Aph. pl. Computed)

Stars in Bk I

III II 172, 173, 174, 176, 183, 193, 201, 228, (259 269 275 287) 289 291 298 299 322 472 485 489 491 493 497 504 510 520 521 525 ~~529~~ 533 598 e = 32

* 1. Take 1st + 2d diffs of the 10 day intervals before interp. to middle and send me suspected cases.

2 Interpolate to middle 1/2 1st – 1/8 2d diffs using last + not 1 tenth

3 Take 1st + 2 diff 5 day intervals.

4 Interpolate for each day = 1/5 1st + 1/25 = .001 approx.

May 12-15 Began chkking copying Tab. Vals. App Pl computed in Bk II with Miss B. finished by her alone Bk II & III =32#s

1903
May 18-19 Checked in "Star List" dates added in red by Miss B. from M25 by comparing with A+F#s

May 19-26 Chkking copying Tab Vals. App. Pl computed today Vals from Bk I 48 Stars.

Dr. S.C.C. Ast. Jour. 529 Jan 31 1903 New Constant Aberration (20.52") affects logs b & d or h & i App. Pl. if Struves used (20.445)

1903
Sept 28 Error found in Vol XV No. 4692 precession δ for 2 years = +27".82 + 7".82 was used. Same error also in Vol XXXV. all 4 do 20" too large. also in Vol XXV See Ast Nach 3900

Oct 9 1903 Report of Miss Bonds Work Oct 1 1902–1903

1 The reductions to apparent place for the individual observations are about two thirds completed and the tabular values for the remaining observations are partially interpolated. (There are
how many done? 48 stars in Bk I, 30 in Bk II, 2 in Bk III)

2 The checking of the copying of the circle readings in the Journal has been finished (11 bks 777–88 = about ½)

3 The values of the inclination about 2176 2000 in number have been grouped according to declination

4 Written letters for Prof. P. ken Pattern correspondence *

\+ 5 South Polar least square solution

* 6 Finished checking Gillis Stars reduction by Fabritius method from 1850 to 1900 for Table XIV of S. Polar Mss. over 124 100 stars

\+ Possibly this was reported last time

* Forgot to put in Rpt. handed in to Prof Searle. } A.W. Oct 14 1903

1903 Oct 22 Errata from Radcliffe (Eng) letter
The declinations, given in the following Annals H.C.O. should be each decreased by 20".

Vol XXXV Page 166 Zone 241 line 22 last col.
" " 242 " 20 " "
(1) 168 " 245 " 1 " "
" " 246 " " " "

Vol XXV Pages 119 + 320 No 4692 each Do.
" XV Pt II and Ast Gesell Cat No 4692 } p95 No 4692

this error found and corrected Sept 28 1903 see p101 this.

(2) Vol XXXV p166 zone 242 line 11 occurs a discrepancy which necessitates an examination of the originals for its elucidation. Value in col. 6 should equal to diff in cols 3+4 mult by about 0.8 the factor found from the other observations of this night.

For new reduction of this date June 17th 1873 and also of June 11th see p104 this

Oct 22 1903 New reduction of June 11 + 17 1873 for λ 18 p 44

n.B order

	June 11 1873 (241)		June 17 1873 (242)	
Cir Read	35 0 8.7		35 0 14.1	
..	22.9		28.1	
Mean ..	35 15.80		35 21.10	
$\delta = \varphi - z$	47 32.55		47 27.25	
Req	− 1 6.01		− 1 5.69	
	46 26.54		46 21.56	
Tm − Tδ = +15.3 s	+ 12.63		+ 18.91	+ 22.9 s
lg .. = 1.18469	50 46 39.17		50 46 40.47	1.35984
.. cos δ = 9.80105	− .06	Rund	− .14	9.80105
.. Const = 0.11571	+ .03	Ris	+ .03	0.11571
1.10145	+ 8.29 (+8.50)	Ref	+ 8.23 (+8.36)	1.27660
+ 12.63	+ .24	Refl	+ .24	+ 18.91
Rund Const +.10	− 4.75	Appl.	− 5.90	Rund Const +.09
δ 1873	50 46 42.92		50 46 42.93	

Found error also in red Appl pl in Rt. dates interchanged.

June 11 − 2.20 s not − 2.10 s June 17 = − 2.10 not 2.20 s

	June 11	June 17
Corrected α =	14h 25 4.84 not 4.94	14 25 4.83 not 4.73
prec +2.103 × 2	+ 4.21	+ 4.21
α 1875	14 25 9.05 not 9.15	14 25 9.04 not 8.94
	50 46 42.92	50 46 42.93
prec −16.16 × 2	− 32.32	− 32.32
	50 46 10.60	50 46 10.61

Vol XV p 92 No 4542 No change in mean vals α or δ.

" XXV p 115 " " " as means given there.

Volume ~~XXXV~~ p.166 ~~zone 241~~ zone 241 line 11 June 11 1873.
5th col is 15".80 not 21".10 zones 241 + 242 interchanged
6th " " +12".63 " +18".91 " "
8 " " +8".50 " +8".42
9 " " ∓ 2ˢ.20 " ∓2ˢ.10 " "
11 " " 9ˢ.05 " 9ˢ.15
12 " " 10".6 " 11".5

XXXV p 166 zone 242 line 11 June 17 1873
5th col is 21".10 not 15".80 " "
6 " " +18".91 " +12".63 " "
8 " " + 8".36 " + 8".43
9 " " − 2ˢ.10 " −2ˢ.20 " "
11 " " 9ˢ.04 " 8ˢ.94
12 " " 10".6 " 9".7

XXV p 317 no 4542 ~~line~~ vol 14 9ˢ.05 not 9ˢ.15 line 38
39
38
39

Errata:
Vol XXXV p166 Zones 241 and 242 are 11th line
interchanged in 5th 6th and 9th columns.

Zone 241 Zone 242

8th col for +8".42 read +8".50 8th col for +8".43 read +8".36
11th " " 9ˢ.15 " 9ˢ.05 11 " " 8ˢ.94 " 9ˢ.04
12 " " 11".5 " 10".6 12 " " 9".7 " 10.6

No changes in Vol XV or Vol XXV p 115 but in p317 the above changes in 11th and 12th columns occur.
To Prof Searle Oct 23 1903 to send to Radcliffe England.

Volume XXXV p. 166 Zone 241 line 11 June 11 1873.

5th col is 15".80 not 21".10 Zones 241 + 242 to be changed

6th " " +12".63 " +18".91 " "

8 " " +8".50 " +8".42

9 " " ∓2ˢ.20 " ∓2ˢ.10 " "

11 " " 9ˢ.05 " 9ˢ.15

12 " " 10".6 " 11".5

XXXV p 166 Zone 242 line 11 June 17 1873

5th col is 21".10 not 15".80 " "

6 " " +8".91 " +12".63 " "

8 " " + 8".36 " + 8".43

9 " " − 2ˢ.10 " − 2ˢ.20 " "

11 " " 9ˢ.04 " 8ˢ.94

12 " " 10".6 " 9".7

XXV p 317 no 4542 ~~Line~~ 14 9ˢ.05 not 9ˢ.15 line 38

" 9ˢ.04 " 8ˢ.94 " 39

Col 15 10".6 " 11".5 " 38

10".6 " 9".7 " 39

From Jan 15 1881 Polaris dates U.C & L.C have not been collected from 9 Books 5=8

May 11 1903

Took out sheets of Journal From Feb 24 1879 to Jan 2 1881 for 95 dates. U.C. & L.C More dates U.C. & L.C. are in Bks 5 & 8 not yet taken out.

May 11 1903

List of Books & Papers in Miss Bond's care. March 1903.

Books

3 Nautical Almanacs 1879. 1880. 1881. 1
Schroens Tables returned (returned Oct 27 1903 to Crs.)

x Annals Vol X. old cdy 2
1 Newcombs Tables. returned " x
1 Le Coys " " "
1 Claudels " " " x

Computation Books

x 1 abc Book Constants. x Ret. May 1903
x 1 Star List " "
x **x 3 Computations by 10 Day Intervals Red App Pl Bks I II III ret. May 1903
1 Note Book

Papers

x 1 Ledger ret to Crs. May 4 1903
1 Constants for Red. App. Place from Am. Ephem. 1879.
1880. Results. Cor Nos. Diffs &c ret. to Crs May 14 1903 see Envelope
x 1 Constants for Red. to App. Pl. & Sheets 1-86
1 " " " Non. Fundamentals " 1-81 } 180 ...
2 1st & 2nd Computations of α Androm. Red to App. Pl. including
1 Constants for Red. App. Place. 13 Stars from Publ. XIV.
x " " " 1880. 22 H. Camel. Examples
2 ~~List of Non Fundamental~~ see Star List Bk ~~Stars~~ & of Bracketted Stars. & red to
Count of ~~Stars~~ Number of Observations of Stars. ...

List of 10 Day Intervals for reduction of 48 Stars not in N.A.

not in how to do it.

2 Notes on L C Obs. & on Red. of Stars in N.A.

X Interpolation of 48 Stars not in N.A

X Absolute Example. Red. of obs. on Feb. 15. 1879.

May 1903
X = returned to Cls. or AW X