1892phae.proj.1814

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v.810

Reduction of Bonn 1855
Groombridge 1810 and
Lalande 1800 to 1875.0

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Reduction of the Bonn observations from 1855 to 1875

Bonn 1855 $-20\frac{dx}{d\tau} + 2\frac{d^2x}{d\tau^2} - \frac{.08}{1.4}\frac{d^3x}{d\beta^3}$

Gr 1810 $-65\frac{dx}{d\tau} + 21\frac{1}{8}\frac{d^2x}{d\tau^2} - .275\frac{d^3x}{d\beta^3}$?

Lal 1800 $-75\frac{dx}{d\tau} + 28\frac{1}{18} - .422\frac{d^3x}{d\beta^3}$

$-1\frac{dx}{d\tau} + \frac{1^2}{200}\frac{d^2x}{d\tau^2} - \frac{1^3}{4000}\frac{d^3x}{d\beta^3}$

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$m = 3.0720$ $n^s = 1.33705$ $\log n^s\ 0.12615$ $n'' = 20.0557$ $\log n''\ 1.30224$

$\alpha = \alpha_0 + m + n^s \sin\alpha \tan\delta$

$\delta = \delta_0 + n'' \cos\alpha$

	h m s											
α_m	0 12 195	0 12 239	0 12 390	0 34 328	0 42 438	0 42 504	0 44 93	0 48 289	0 55 393	0 56 557	0 57 343	0 59 56
α_m	3° 41 52	3 5 58	3 9 45	8 38 42	10 40 57	10 42 36	11 2 15	12 7 13	13 54 49	14 13 55	14 23 35	14 46 24
δ_m	° ′ ″ 49 45 21	49 45 24	50 0 1	49 46 17	49 53 52	49 50 25	49 55 10	49 44 18	49 48 42	49 47 9	49 48 30	49 53 18
$\log \sin\alpha$	8.73034	8.732095	8.74168	9.17699	9.26703	9.26813	9.28105	9.32214	9.38104	9.39066	9.39545	9.40653
$\log \tan\delta$	0.07269	0.07244	0.07619	0.07266	0.07461	0.07372	0.07494	0.07216	0.07328	0.07289	0.07323	0.07446
$\log \sin\alpha \tan\delta$	8.80303	8.80539	8.81787	9.24865	9.34164	9.34185	9.35599	9.39430	9.45432	9.46355	9.46868	9.48099
$\log n'' \sin\alpha \tan\delta$	8.92918	8.93154	8.94402	9.37470	9.46779	9.46800	9.48214	9.52045	9.58047	9.58970	9.59483	9.60714
$n'' \sin\alpha \tan\delta$	.0849	.0854	.0879	.2369	.2935	.2937	.3034	.3314	.3806	.3896	.3934	.4047
$\frac{dx}{dT}$	3.1569	3.1574	3.1599	3.3089	3.3655	3.3657	3.3754	3.4034	3.4526	3.4616	3.4654	3.4767
$\frac{d\alpha}{dT}$	1 03.14	1 3.15	1 3.19	3.20 1 6.18	1 7.31	7.33 1 7.31	1 7.51	7.53 1 8.07	1 9.05	1 9.23	1 9.31	1 9.53 9.54
α_0	0 11 4800	0 11 5234	0 12 7.40	0 33 59.74	0 42 10.22	0 42 16.84	0 43 35.63	0 47 55.00	0 55 4.87	0 56 21.19	0 56 59.70	0 58 30.97
α 1875.0	0 12 51.14	0 12 58.49	0 13 10.59	0 34 35.92	0 43 17.53	0 43 24.15	0 44 43.14	0 49 3.07	0 56 13.92	0 57 30.42	0 58 9.01	0 59 40.50
			10.60		17.53		43.16					37 40.51
$\log \cos\alpha$	9.999937	9.999936	9.999933	9.99503	9.999240	9.999236	9.999189	9.999020	9.98706	9.98646	9.98615	9.985540
$\log n'' \cos\alpha$	1.30161	1.30160	1.30157	1.29727	1.29464	1.29460	1.29413	1.29244	1.28930	1.28870	1.28839	1.28764
$n \cos\alpha$	20.027	20.026	20.025	19.828	19.708	19.706	19.685	19.608	19.467	19.400	19.406	19.393
$20 n \cos\alpha$	6 405	6 40.5	6 405	40.5 6 366	6 342	41.2 6 341	6 337	39.7 6 322	6 293	6 28.0	6 28.1	6 279 27.9
δ_0	49 42 12	49 42 32	49 56 409	49 42 588	49 50 352	4947 79	49 51 527	49 41 21	49 45 273	49 43 546	49 45 18.9	49 50 42
δ 1875.0	49 48 417	49 48 437	50 3 214	49 49 354	49 57 94	49 53 420	49 58 264	49 47 343	49 51 566	49 50 226	49 51 440	49 56 321
			3 + 2.14		57 N 9.4	✓	58 N 2.64					56 320
	h m s											
α_m	2 30 270	2 33 334	2 35 383	2 43 555	2 60 2236	3 3 350	3 8 69	3 9 19	3 9 322	3 18 520	3 21 225	3 22 28
α_m	37 36, 45	38 23 21	38 54 345	40 38 525	45 5 354	45 53 45	47 1 435	47 15 29	47 23 3	49 43 0	50 20 38	50 30 42
δ_m	49 56 0	49 49 21	49 57 17	49 35 46	49 51 34	49 56 46	49 51 42	49 43 29	49 35 56	49 47 39	50 0 56	49 56 53
$\log \sin\alpha$	9.78555	9.79309	9.79807	9.81678	9.85019	9.85617	9.86433	9.86594	9.86682	9.88244	9.88435	9.88392
$\log \tan\delta$	0.07516	0.07345	0.07548	0.06997	0.07302	0.07535	0.07305	0.07145	0.0701	0.07301	0.07642	0.07538
$\log \sin\alpha \tan\delta$	9.86071	9.86654	9.87355	9.88675	9.92321	9.93152	9.93738	9.93739	9.93692	9.95545	9.96077	9.95930
$\log n'' \sin\alpha \tan\delta$	9.98686	9.99269	9.99970	10.01290	10.04936	10.05767	10.06353	10.06404	10.06307	10.08160	10.08692	10.08545
$n \sin\alpha \tan\delta$	.97020	.98331	.99931	1.0301	1.1203	1.14220	1.1575	1.1589	1.1563	1.2067	1.2216	1.2174
$\frac{dx}{dT}$	4.0422	4.0553 1	4.0713 1	4.1021 1	4.1923 1	4.2140 1	4.2295 1	4.2309 1	4.2283 1	4.2787 1	4.2936 1	4.2894
$\frac{d\alpha}{dT}$	1 2.85	20.85 1 2.11	2.13	21.13 1 2.04	2.85	1 2.42	28.28 1 2.59	1 2.46	1 2.57	1 2.57	1 2.87	26.99 1 2.59 2.599
α_0	2 29 4660	2 32 5285	2 34 5767	2 43 1449	2 59 4046	3 2 5296	3 7 2458	3 8 1963	3 8 4998	3 18 930	3 20 3954	3 21 1980
α 1875.0	2 31 [illegible]	2 34 1396	2 36 1910	2 44 3633	3 1 451	3 4 1724	3 8 4217	3 9 4825	3 10 1453	3 19 2487	3 22 391	3 22 4267
	748		1.10		17.24						33.3	40.74
$\log \cos\alpha$	9.989851	9.989421	9.989105	9.987790	9.984877	9.984258	9.983355	9.983167	9.983063	9.981061	9.980594	9.980340
$\log n'' \cos\alpha$	1.20105	1.19645	1.19329	1.17014	1.15101	1.14432	1.13579	1.13391	1.13287	1.11285	1.10818	1.10564
$n \cos\alpha$	15.887	15.720	15.606	14.793	14.158	13.942	13.671	13.612	13.579	12.967	12.829	12.754
$20 n \cos\alpha$	5 177	177 3 144	5 12.12	12-11 5 7.86	4 43.16	4 38.84	37.44	33.42	4 32.24	4 31.58	4 19.34	4 16.58 15.98 4 15.61 15.07
δ_0	49 53 214	49 46 442	49 54 411	49 33 143	49 49 129	49 54 267	49 49 252	49 41 128	49 33 402	49 45 299	49 58 —	49 54 458
δ 1875.0	49 38 391	49 51 586	49 59 532	49 38 241	49 53 3606	49 59 855	49 53 686	49 45 430	49 38 141	49 49 492	50 2 166	49 57 08
	N 58.1		N 53.2			N 56.53					2 46	16.5 59 0.87
α_m	h m s 4 36 21.9	4 36 21.9	4 38 37.5	4 40 49.7	4 48 28.8	4 49 58.0	4 54 46.7	4 56 18.4	5 0 0.9	5 15 21.3	5 39 26.6	5 41 17.1
α_m	69 5 28.5	69 5 28.5	69 39 22.5	70 12 20.5	72 7 2.7	72 29 30	73 41 37	74 4 36	75 0 13.6	78 50 20	84 51 24	85 19 46
δ_m	49 54 2	49 54 2	49 50 41	49 37 2	49 38 11	49 32 34	49 49 38	49 57 53	49 48 67	49 31 23	49 48 31	49 38 35
$\log \sin\alpha$	9.970741	9.970741	9.972 02	9.97355	9.97849	9.97939	9.98216	9.98200	9.98495	9.99170	9.99824	9.99855
$\log \tan\delta$	0.07465	0.07465	0.07379	0.07030	0.07059	0.06915	0.07352	0.07564	0.07335	0.06885	0.07324	0.07069
$\log \sin\alpha \tan\delta$	10.04206	10.04206	10.04458	10.04385	10.04908	10.04824	10.05568	10.05764	10.05830	10.06055	10.06148	10.06924
$\log n'' \sin\alpha \tan\delta$	10.17121	10.17121	10.17196	10.17000	10.17523	10.17469	10.18183	10.18379	10.18445	10.18670	10.19763	10.19539
$n \sin\alpha \tan\delta$	1.4832	1.4882	1.4858	1.4792	1.4970	1.4962	1.5200	1.5268	1.5281	1.5371	1.5763	1.5681
$\frac{dx}{dT}$	4.5552	4.5552	4.5578	4.5512	4.5690	4.5672	4.5920	4.5988	4.6001	4.6091	4.6483	4.6401
$\frac{d\alpha}{dT}$	1 3.10	31.10 1 31.10	1 31.16	1 31.02	1 31.36	1 31.35	1 31.84	1 31.98	1 32.00	1 32.18	1 32.97	1 32.89
α_0	4 35 3639	4 35 36.39	4 37 67.9	4 40 4.22	4 47 44.18	4 49 12.36	4 54 0.87	4 55 32.4	4 59 14.96	5 14 35.21	5 38 39.16	5 40 32.74
α 1875.0	4 37 747	4 37 747	4 37 23.06	4 41 35.27	4 49 15.96	4 50 43.71	4 58 32.71	4 57 438	5 0 46.96	5 15 7.39	5 40 12.13	5 42 53.7
	✓ 7.49						✓					
$\log \cos\alpha$	9.552 52	9.552 52	9.54114	9.52971	9.48723	9.47834	9.44835	9.43886	9.41289	9.28783	8.95253	8.91079
$\log n'' \cos\alpha$	10.83476	10.83476	10.83338	10.83195	10.78947	10.78058	10.75089	10.74110	10.71513	10.59007	10.25477	10.21303
$n \cos\alpha$	7.1875	7.1875	6.9724	6.7913	6.1585	6.0837	5.6311	5.5094	5.1896	3.8911	1.7979	1.6332
$20 n \cos\alpha$	2 22.8	2 23.15	2 19.45	2 15.83	2 3.17	2 0.67	1 52.62	1 50.9	1 43.79	1 17.87	0 35.96	0 32.66
δ_0	49 52 473	49 52 473	49 49 31.1	49 36 89	49 37 19.2	49 31 339	49 48 41.8	49 56 38	49 48 8.3	49 30 44.1	49 47 13.4	49 38 16.4
δ 1875.0	49 55 125	49 55 125	49 51 50.6	49 38 9.8	49 39 22.4	49 33 346	49 50 344	49 38 482	49 49 491	49 32 1.9	49 47 42.4	49 38 51.1
	49 45 56	49 57 39	49 46 38	49 34 5	49 50 49	49 32 49	49 49 26	49 57 17	49 34 56	49 41 24	49 34 34	49 56 30
α_m	8 35 41.2	8 39 43.7	8 48 29.0	8 51 8.6	8 55 10.0	9 24 6.5	9 43 29.7	9 54 324	9 56 8.8	9 56 21.1	9 58 11.4	10 11 46.4
α_m	128 55 18	129 65 66	132 7 15	132 47 9	133 47 30	141 1 38	145 52 26	148 38 6	149 2 12	149 5 17	149 32 51	152 56 36
δ_m	49 53 26	50 1 57	49 51 7	49 38 37	49 55 27	49 38 0	49 52 58	49 57 0	49 40 40	49 47 8	49 40 20	50 2 27
$\log \sin\alpha$	9.89098	9.88468	9.87024	9.86563	9.85845	9.79861	9.74897	9.71641	9.71137	9.71042	9.70486	9.65788
$\log \tan\delta$	0.07258	0.07458	0.07276	0.06554	0.07383	0.06922	0.07347	0.07395	0.06976	0.07141	0.06966	0.07528
$\log \sin\alpha \tan\delta$	9.96356	9.96026	9.94299	9.93117	9.93228	9.86783	9.82244	9.79036	9.78113	9.78183	9.77452	9.73316
$\log n'' \sin\alpha \tan\delta$	10.08971	10.08641	10.06914	10.05732	10.05843	9.99398	9.94859	9.91651	9.90748	9.90828	9.90066	9.85931
$n \sin\alpha \tan\delta$	1.2296	1.2201	1.1726	1.1417	1.1440	.98624	.88837	.82511	.80813	.80962	.79554	.72329
$\frac{dx}{dT}$	4.3015	4.2921	4.2446	4.2131	4.2160	4.0582	3.9603	3.8971	3.8801	3.8816	3.8675	3.7952
$\frac{d\alpha}{dT}$	1 2.62	1 25.85	25.85 1 24.89	1 24.26	1 24.32	24.34 1 21.16	1 17.21	17.21 1 17.44	1 17.60	1 17.63	1 27.36	1 18.90 1.891
α_0	8 34 8116	8 39 0.758	8 47 46.458	8 60 26.31	8 64 27.81	9 23 25.89	9 42 50.09	9 53 53.41	9 55 29.99	9 55 42.22	9 57 32.72	10 11 8.37
α 1875.0	8 36 24.19	8 40 26.57	8 49 1.34	8 51 30.07	8 55 52.13	9 24 47.85	9 44 930	9 55 1.35	9 56 41.0	9 56 58.86	9 59 00.7	10 12 42.27
		26.60			52.45 14		9.30	1.35				34.28
$\log \cos\alpha$	9.79813	9.80174	9.82652	9.83203	9.84015	9.89066	9.91792	9.93139	9.93323	9.93346	9.93563	9.94966
$\log n'' \cos\alpha$	11.10039	11.10764	11.12876	11.13427	11.14237	11.19290	11.22016	11.23365	11.23547	11.23570	11.23779	11.25190
$n \cos\alpha$	12.600	12.873	13.451	13.623	13.879	15.692	16.604	17.125	17.198	17.210	17.289	17.861
$20 n \cos\alpha$	4 12.0	4 17.4	17.47 4 29.0	4 32.5	4 37.6	5 11.8	5 32.0	32.0 5 42.5	42.5 5 44.0	5 44.3	5 45.8	5 57.2 57.2
δ_0	49 48 2.0	49 59 48.4	49 48 52.2	49 86 20.9	49 53 8.0	49 35 24.7	49 52 11.9	49 54 8.6	49 37 47.4	49 44 16.0	49 37 26.8	49 57 28.6
δ 1875.0	49 43 60.0	49 55 30.5	49 44 23.2	49 31 48.4	49 44 30.4	49 30 13.0	49 46 39.9	49 49 26.1	49 32 3.6	49 38 31.7	49 31 41.0	49 53 31.4
		5 N 30.5			45.8 2.6	30.0	1.6 8.5	45 2.6				1.6

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1 1 299	1 4 319	1 19 91	1 35 129	1 38 37	1 47 209	1 50 569	1 55 331	1 69 89	2 2 383	2 2 476	2 6 216	2 28 282
15 22 29	16 7 59	19 47 17	23 48 135	24 30 56	26 50 14	27 44 14	28 53 17	29 47 14	30 39 34	30 41 54	31 25 24	37 7 3
49 44 9	49 48 13	49 37 21	50 0 26	49 43 24	49 49 10	49 56 37	49 51 14	49 51 45	49 57 56	50 0 35	49 41 40	49 38 51
9.42346	9.44384	9.52961	9.60595	9.61798	9.65461	9.66784	9.68303	9.69616	9.70751	9.70701	9.71713	9.78064
0.07212	0.07316	0.07038	0.07629	0.07193	0.07340	0.07531	0.07393	0.07307	0.07565	0.07633	0.07148	0.07076
9.49558	9.51700	9.59999	9.68224	9.68991	9.72801	9.74315	9.75696	9.76923	9.78316	9.78334	9.78861	9.85140
9.62173	9.64315	9.72614	9.80839	9.81606	9.85416	9.86930	9.88311	9.89538	9.92931	9.90949	9.91476	9.97755
.4185	.4397	.5322	.6432	.6547	.7147	.7401	.7640	.7859	.8497	.8118.	.8218	.9496
3.4905	3.5117	3.6042	3.7152	3.7267	3.7867	3.8121	3.8360	3.8579	3.9217	3.8838	3.8938	4.0216
1 981	1 1023	1 1208	1 1430	1 1553	1 1573	1 1624	1 1672	1 1716	1 1843	1 1768	1 1788	1 2043
1 0 5504	1 3 5691	1 18 3306	1 34 3583	1 37 2649	1 46 4309	1 50 1887	1 54 5481	1 58 3042	2 1 5948	2 2 879	2 5 4270	2 27 4799
1 2 485	1 5 714	1 19 4514	1 35 6013	1 38 4202	1 47 5882	1 51 3511	1 56 1153	1 59 4758	2 3 1791	2 3 2647	2 7 058	2 29 842
9.98417	9.98255	9.97356	9.96138	9.95996	9.95050	9.94798	9.94228	9.93845	9.93460	9.93443	9.93112	9.90167
1.28641	1.28479	1.27580	1.26362	1.26220	1.25274	1.25022	1.24452	1.24069	1.23684	1.23667	1.23336	1.20391
19.338	19.266	18.871	18.349	18.290	17.895	17.792	17.560	17.406	17.252	17.245	17.114	15.992
6 268	6 253	6 174	6 70	6 580	5 579	5 558	5 512	5 481	5 450	5 449	5 423	3 398
49 40 554	49 43 03	49 34 120	49 57 226	49 40 218	49 46 112	49 53 390	49 48 189	49 48 506	49 55 38	49 57 429	49 38 495	49 36 115
49 47 222	49 49 256	49 40 294	50 3 296	49 47 198	49 52 91	49 59 348	49 54 161	49 54 387	50 0 488	50 3 278	49 44 318	49 39 513
3 31 398	3 33 59	3 38 396	3 39 175	3 43 436	3 49 464	3 51 586	3 56 323	4 17 426	4 20 70	4 20 215	4 28 67	4 34 484
52 54 57	53 16 29	54 39 54	54 49 23	55 55 54	57 26 36	57 59 9	59 8 5	64 25 39	65 1 45	65 5 23	67 1 41	68 42 6
49 35 12	49 45 58	49 37 39	49 58 11	49 41 56	49 49 17	49 32 37	49 58 52	49 33 35	49 55 23	49 55 32	49 48 46	49 49 57
9.90186	9.90391	9.91157	9.91242	9.91822	9.92575	9.92835	9.93367	9.95522	9.95737	9.95759	9.96411	9.96927
0.06983	0.07258	0.07045	0.07572	0.07155	0.07343	0.06917	0.07589	0.06941	0.07402	0.07404	0.07330	0.07360
9.97169	9.97649	9.98202	9.98814	9.98977	9.99918	9.99752	10.00956	10.01463	10.03139	10.03163	10.03741	10.04287
10.09784	10.10264	10.10817	10.11429	10.11592	10.12333	10.12367	10.13571	10.14078	10.15754	10.16778	10.16336	10.16902
1.2527	1.2666	1.2828	1.3010	1.3059	1.3345	1.3274	1.3668	1.3828	1.4373	1.4381	1.4573	1.4758
3 30 5658	3 32 2256	3 37 3607	3 38 3378	3 42 399	3 49 235	3 51 1266	3 55 4797	4 16 5778	4 19 2187	4 19 3637	4 27 2147	4 34 29
3 33 1207	3 33 4933	3 38 2317	3 40 124	3 44 285	3 50 3048	3 52 1469	3 57 1675	4 18 2658	4 20 526	4 21 657	4 28 506	4 38 336
49 33 113	49 43 580	49 35 428	49 56 157	49 40 33	49 47 292	49 30 502	49 57 89	49 32 86	49 53 586	49 54 77	49 47 278	49 48 440
49 37 132	49 47 377	49 39 348	50 0 48	49 43 460	49 51 56	49 34 228	50 0 324	49 35 17	49 56 479	49 56 617	49 50 44	49 51 97
5 56 12.2	5 58 3.6	5 58 6.2	6 1 51.9	6 3 31.5	6 4 35 51.9	6 5 50 12.2	6 8 54 2.7	1 48.7	7 13 56	7 12 46.8	8 23 31.2	8 35 22.5
89 3 3	89 30 54	89 31 33	90 27 58	91 54 20	100 57 57	102 33 3	103 57 3	105 27 8	107 44 18	123 11 38	125 52 48	128 50 38
49 30 35	49 57 16	49 39 59	49 58 76	49 56 31	49 39 14	49 35 29	49 53 48	49 45 1	49 32 18	49 54 20	49 47 2	49 48 45
9.99994	9.99998	9.99998	9.99998	9.99585	9.99199	9.98949	9.98699	9.98401	9.97884	9.92263	9.90861	9.89145
0.06865	0.07548	0.07105	0.07572	0.07505	0.07053	0.06953	0.07418	0.07197	0.06856	0.07384	0.07185	0.06864
10.06859	10.07546	10.07103	10.07573	10.07090	10.06253	10.05902	10.06117	10.05598	10.04746	9.99647	9.98046	9.96009
10.19474	10.19161	10.19718	10.20185	10.19705	10.18867	10.18517	10.18732	10.18213	10.17555	10.12262	10.10661	10.08624
1.5658	1.6546	1.6746	1.6916	1.5742	1.5441	1.5317	1.5393	1.5210	1.4912	1.3262	1.2782	1.2197
49 30 32.0	49 57 13.2	49 39 57.2	49 58 14.2	47 56 3.0	49 38 35.6	49 34 45.8	49 52 57	49 41 27.9	49 31 16.9	49 52 40.5	49 45 4.1	49 32 39
49 30 38.7	49 57 16.6	49 40 0.45	49 58 17.549	55 57.2	49 37 19.3	49 33 18.6	49 51 22.3	49 42 41.0	49 29 14.7	49 49 09	49 41 9.0	49 28 27.4
49 46 38	49 30 20	49 51 45	49 52 51.5	49 27 58	49 55 26	49 49 21	49 29 45	47 38 54		6.9		
10 12 144	10 19 42.7	10 24 31.9	10 25 30.7	10 52 5.4	11 53 27.8	13 2 6.1	14 2 23.4	14 3 43.2				
153 3 36	154 55 41	156 12 57	156 22 41	163 1 21	178 21 57	195 31 32	210 35 57	210 55 48				
49 52 35	49 36 23	49 57 3	49 56 38	49 36 21	50 2 7	49 56 18	49 45 30	49 44 38				
9.65615	9.62711	9.60561	9.60381	9.46537	8.45511	9.42759	9.70608	9.71095				
0.07275	0.06856	0.07407	0.07426	0.06849	0.07501	0.07358	0.07097	0.07077				
9.72890	9.69569	9.67968	9.67807	9.53386	8.53012	9.50117	9.77702	9.78172				
9.85505	9.82184	9.80583	9.80422	9.66001	8.65627	9.62732	9.90317	9.90787				
.71623	.66350	.63949	.63712	.45710	.45318	−.42396	−.80015	−.80886				
3.7882	3.7355	3.7114	3.7091	3.5291	3.5251	2.6381	2.2719	2.2632				
1 1676	1 1471	1 1423	1 1418	1 1058	1 1058	0 52.76	52.96	0 49.26				
10 11 36.46	10 19 5.37	10 24 14.75	10 24 53.87	10 51 30.0	11 52 56.52	13 1 39.57	14 2 0.70	14 3 20.57				
10 12 52.22	10 20 20.08	10 25 28.98	10 26 7.73	10 52 44.58	11 54 7.02	13 2 32.33	14 2 56.13	14 4 15.83				
9.95011	9.95696	9.96145	9.96199	9.98064	9.99982	9.98385	9.93488	9.93338				
11.25525	11.25920	11.26369	11.26423	11.28288	11.30206	11.28609	11.23712	11.23562				
17.880	18.164	18.352	18.375	19.181	20.048	19.324	17.263	17.204				
5 51.6	6 3.3	6 7.0	6 7.5	6 23.6	6 41.0	6 26.5	5 45.3	5 44.7				
49 49 36.8	49 33 24.2	49 54 —	49 33 34.2	49 33 9.3	49 58 46.4	49 53 9.5	49 42 37.8	49 41 45.8				
49 43 44.9	49 27 17.9	49 47 53.4	49 39 26.7	49 26 45.7	49 52 5.4	49 46 38.0	49 36 52.5	49 36 1.1				

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α_m	14 17 9.7	14 27 45.1	14 34 38.5	15 36 36.9	16 10 18.5	16 12 23.1	16 24 42.3	16 35 33.9	16 46 13.8	16 48 58.5	16 54 6.5	17 6 56.3
$°\alpha_m$	214 17 26	216 56 17	218 39 38	234 7 44	242 34 38	243 5 47	246 10 35	248 53 29	251 33 27	252 14 38	253 31 38	256 44 5
(red)	49 56 51	49 46 50	49 35 23	49 35 56	49 33 31	49 44 56	49 57 44	49 56 59	49 32 6	49 36 55	49 52 12	49 56 30
δ_m	50 1 22	49 52 16	49 40 36	49 39 51	49 36 36	49 47 58	50 0 26	49 59 23	49 34 15	49 38 57	49 54 5	49 58 2
log sin α	9.75080n	9.77883n	9.79567n	9.90866n	9.94820n	9.95025n	9.96132n	9.96983n	9.97710n	9.97880n	9.98179n	9.98825n
log tan δ	0.07512	0.07281	0.06987	0.07001	0.06940	0.07232	0.07560	0.07541	0.06904	0.07027	0.07418	0.07528
log sin α tan δ	9.82592	9.85164	9.86554	9.97867	10.01760	10.02257	10.03692	10.04524	10.04614	10.04907	10.05597	10.06353
log n sin α tan δ	9.95207	9.97779	9.99169	10.10482	10.14375	10.14872	10.16307	10.17139	10.17229	10.17522	10.18212	10.18968
n sin α tan δ	.89551	.95015	.98105	1.2730	1.3923	1.4084	1.4557	1.4838	1.4869	1.4970	1.5210	1.5477
$\frac{d\alpha_m}{dT}$	2.1765	2.1219	2.0910	1.7990	1.6797	1.6636	1.6163	1.5882	1.5851	1.5750	1.5510	1.5153
$\frac{d\alpha}{dT}$	0 43.53 (red 43.53)	0 42.44	0 41.82	0 35.78	0 33.59	0 33.27	0 32.33 (red 32.32)	0 31.76 (red 31.76)	0 31.70	0 31.50	0 31.02 (red 31.04)	0 30.31 (red 30.49)
α_0	14 16 47.90	14 27 23.85	14 34 17.70	15 36 2.88	16 10 1.74	16 12 7.46	16 24 26.14	16 35 18.02	16 45 57.97	16 48 42.7	16 53 50.95	17 6 41.10
α 1875.0	14 17 31.43	14 28 6.29	14 34 59.52	15 36 38.86	16 10 35.33	16 12 40.73	16 24 58.47	16 35 49.78	16 46 29.67	16 49 14.20	16 54 21.97	17 7 11.41
(red)	31.43						58.46	49.78			21.99	11.59
log cos α	9.91708n	9.90270n	9.89257n	9.76787n	9.66340n	9.65560n	9.60629n	9.55646n	9.50017n	9.48425n	9.45264n	9.36070n
log n cos α	11.21932	11.20494	11.19481	11.07011	10.96564	10.95784	10.90853	10.85870	10.80241	10.78649	10.75488	10.66294
n cos α	16.570	16.030	15.661	11.752	9.2394	9.0749	8.1009	7.2228	6.3447	6.1164	5.6870	4.6020
20n cos α	5 31.4 (red 31.4)	5 20.6	5 13.2	3 55.0	3 4.8	3 1.5	2 42.0 (red 42.0)	2 24.5 (red 24.5)	2 6.9	2 2.3	1 53.7 (red 53.7)	1 32.0 (red 32.0)
δ_0	49 58 36.8	49 49 30.4	49 37 59.7	49 37 53.4	49 35 3.3	49 46 27.2	49 59 5.0	49 58 10.9	49 33 11.9	49 37 55.9	49 53 8.4	49 57 15.7
δ_0 1875.0	49 53 5.4	49 44 9.8	49 32 46.5	49 33 58.4	49 31 58.7	49 43 25.7	49 56 23.0	49 55 46.4	49 31 5.0	49 35 53.6	49 51 14.7	49 55 43.7
(red)	53 5.4						56 23.0	55 46.4			51 14.7	55 43.7

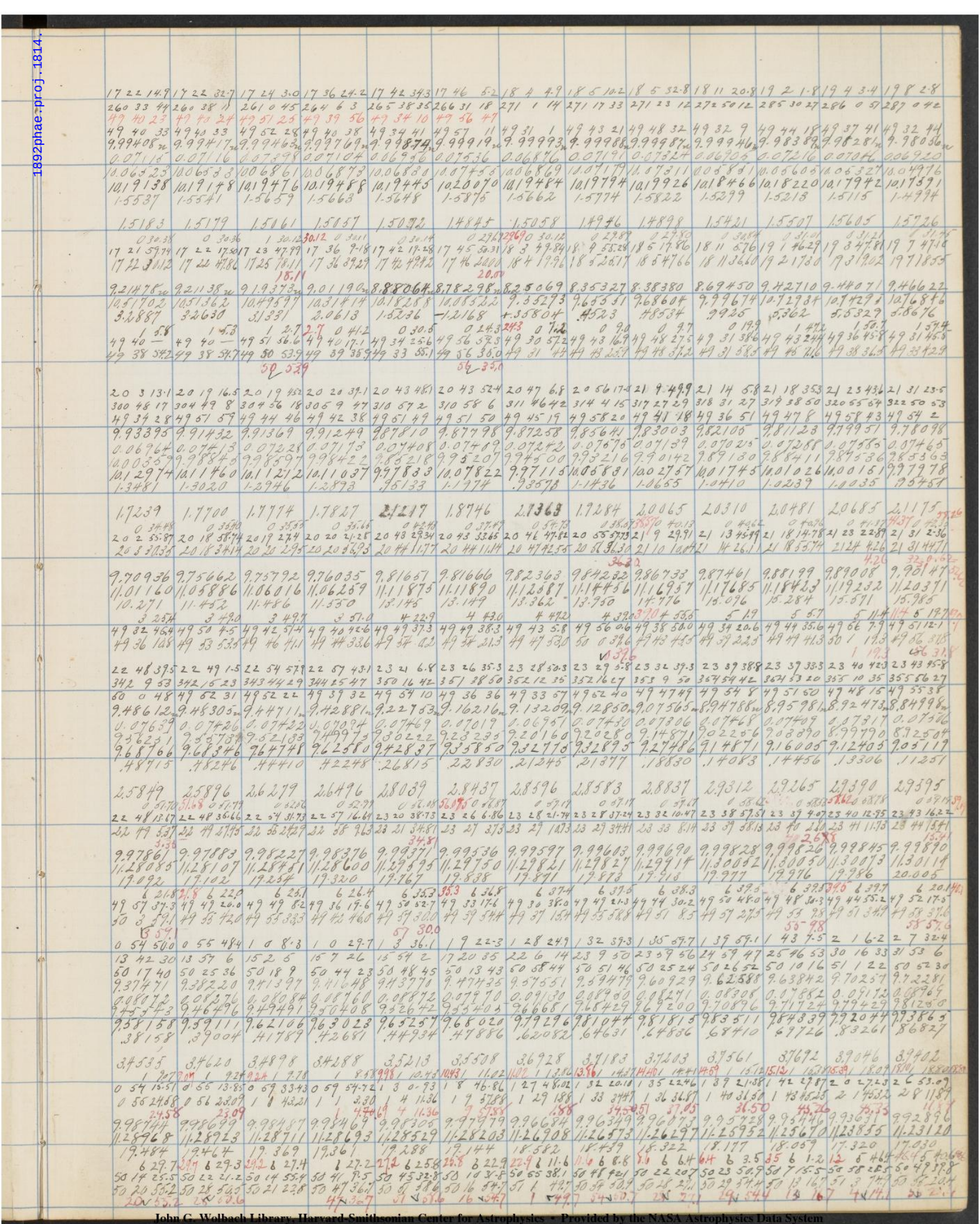
α_m	19 8 36.4	19 8 36.1	19 10 39.4	19 22 39.2	19 30 1.9	19 32 38.5	19 33 13.8	19 46 40.2	19 51 57.5	19 53 34	20 0 3.5	20 2 18.5
$°\alpha_m$	287 8 57	287 9 2	287 39 51	290 39 48	292 30 29	293 9 38	293 18 27	296 40 3	297 57 53	298 23 30	300 0 53	300 34 38
δ_m	49 36 8	49 36 18	49 32 2	49 33 19	49 45 5	49 31 24	49 55 18	49 53 59	49 53 29	49 52 18	49 32 48	49 52 34
log sin α	9.98025n	9.98024n	9.97902n	9.97112n	9.96559n	9.96350n	9.96302n	9.95115n	9.94607n	9.94434n	9.93746n	9.93497n
log tang δ	0.07007	0.07011	0.06902	0.06934	0.07236	0.06885	0.07498	0.07464	0.07464	0.07421	0.06921	0.07428
log sin α tan δ	10.05032	10.05035	10.04804	10.04046	10.03795	10.03235	10.03800	10.02579	10.02071	10.01855	10.00667	10.00925
log n sin α tan δ	10.17647	10.17650	10.17419	10.16661	10.16410	10.15850	10.1[4]415	10.15194	10.14686	10.14470	10.13282	10.13540
n sin α tan δ	1.5013	1.5014	1.4935	1.4676	1.4592	1.4405	1.4[5]72	1.4189	1.4024	1.3594	1.3578	1.3659
$\frac{d\alpha_m}{dT}$	1.5707	1.5706	1.5785	1.6044	1.6128	1.6315	1.5083 ~~1.7048~~	1.6531	1.6696	1.7126	1.7142	1.7061
$\frac{d\alpha}{dT}$	0 31.41	0 31.41	0 31.57	0 32.08	0 32.26	0 32.63	0 30.17 (red 32.26)	0 33.06 (red 33.07)	0 33.39 (red 33.40)	0 34.25	0 34.28	0 34.12 (red 34.12)
α_0	19 8 19.72	19 8 20.43	19 10 23.59	19 22 23.19	19 29 45.72	19 32 22.17	19 32 57.62	19 46 23.66	19 51 34.8	19 53 17.25	19 59 46.3	20 2 1.45
α 1875.0	19 8 51.13	19 8 51.84	19 10 55.16	19 22 55.27	19 30 17.98	19 32 54.80	19 33 27.79	19 46 56.72	19 52 8.20	19 53 51.50	20 0 20.58	20 2 35.57
(red)							29.88	56.73	8.21			35.57
log cos α	9.46907	9.46965	9.48206	9.54762	9.58298	9.59473	9.59732	9.65206	9.67110	9.67714	9.69916	9.70646
log n cos α	10.77181	10.77189	10.78430	10.84986	10.88522	10.89697	10.89956	10.95430	10.97334	10.97938	11.00140	11.00870
n cos α	5.9131	5.9142	6.0856	7.0773	7.6776	7.8881	7.9353	9.0012	9.4046	9.5364	10.032	10.202
20n cos α	1 58.3	1 58.3	2 1.7	2 21.5	2 33.6	2 37.6	2 38.7 (red 38.7)	3 0.0 (red 0.0)	3 8.1 (red 8.1)	3 10.7	3 20.1	3 24.0 (red 24.0)
δ_0	49 35 9.7	49 35 18.7	49 31 0.8	49 32 8.9	49 43 48.3	49 30 5.5	49 53 58.1	49 52 28.6	49 51 55.4	49 49 42.8	49 31 1.4	49 50 51.9
δ 1875.0	49 37 8.0	49 37 17.0	49 33 2.5	49 34 36.4	49 46 21.9	49 32 43.1	49 56 36.8	49 55 28.6	49 55 3.5	49 52 53.5	49 34 21.8	49 54 15.9
(red)							56 36.8	55 28.6	55 3.5			54 15.9

α_m	21 37 53.7	21 48 16.2	22 2 16.3	22 11 51.7	22 20 19.3	22 22 41.1	22 25 21.6	22 25 31.4	22 25 44.1	22 34 31.0	22 46 59.5	22 47 7.5
$°\alpha_m$	324 28 26	327 4 3	330 34 5	332 57 55	335 4 50	335 40 17	336 20 24	336 22 51	336 26 2	338 37 45	341 44 53	341 46 53
δ_m	49 32 2	49 49 48	49 44 29	49 37 57	49 56 53	49 54 31	49 49 45	49 48 56	49 35 22	49 35 13	49 55 35.0	49 35 15
log sin α	9.76423n	9.73531n	9.69142n	9.65756n	9.62465n	9.61486n	9.60347n	9.60277n	9.60186n	9.56158n	9.49581n	9.49504n
log tang δ	0.06902	0.07357	0.07220	0.07053	0.07564	0.07478	0.07355	0.07334	0.06987	0.06983	0.07505	0.06984
log sin α tan δ	9.83325	9.80908	9.76362	9.72809	9.71027	9.68964	9.67702	9.67611	9.67172	9.63141	9.56086	9.56488
log n sin α tan δ	9.95940	9.93523	9.88977	9.85424	9.83642	9.81579	9.80317	9.80226	9.79787	9.75756	9.68701	9.69103
n sin α tan δ	.91076	.86145	.77584	.71490	.68616	.65482	.63551	.63425	.62788	.57222	.48642	.49095
$\frac{d\alpha_m}{dT}$	2.1613 ~~[2.]1644~~	2.2106	2.2962	2.3571	2.3859	2.4177	2.4365	2.4378	2.4442	2.4998	2.5856	2.5811
$\frac{d\alpha}{dT}$	0 48.23	0 44.21	0 45.92	0 46.14	0 47.18 (red 48.04)	0 48.36 (red 48.36)	0 48.73	0 48.76	0 48.88	0 49.99	0 51.71 (red 51.79)	0 51.62
α_0	21 37 32.09	21 47 54.14	22 1 53.30	22 11 28.12	22 19 55.24	22 22 16.93	22 24 57.26	22 25 7.01	22 25 19.63	22 34 6.06	22 46 33.79	22 46 41.66
α 1875.0	21 38 15.32	21 48 38.35	22 2 39.22	22 12 14.26	22 20 42.42	22 23 5.28	22 25 46.99	22 25 55.77	22 26 8.51	22 34 56.05	22 47 25.50	22 47 33.28
(red)					43.28	29 23 5.29					47 25.28	27
log cos α	9.91054	9.92392	9.93998	9.94974	9.95755	9.95961	9.96186	9.96200	9.96217	9.96906	9.97758	9.97766
log n cos α	11.21278	11.22616	11.24222	11.25198	11.25979	11.26185	11.26410	11.26424	11.26441	11.27130	11.27982	11.27990
n cos α	16.322	16.833	17.467	17.864	18.188	18.275	18.370	18.376	18.383	18.677	19.047	19.050
20n cos α	5 26.4	5 36.7	5 49.3	5 57.3	6 3.8 (red 3.8)	6 5.5 (red 5.5)	6 7.4	6 7.5	6 7.7	6 13.5	6 20.9 (red 20.9)	6 21.0
δ_0	49 36 18.3	49 47 0.1	49 41 34.8	49 34 58.4	49 53 57.7	49 51 28.0	49 46 41.8	49 45 52.4	49 32 18.7	49 32 6.1	49 52 24.4	49 32 4.5
δ_0 1875.0	49 35 44.7	49 52 36.8	49 47 24.1	49 40 55.7	49 59 55.5	49 57 33.5	49 52 49.2	49 51 59.9	49 38 26.4	49 38 19.6	49 58 45.3	49 38 25.5
(red)					58 53.5	57 33.5					58 45.3	

α_m	23 48 31.7	0 6 49.8	0 17 39.1	0 18 59.2	0 19 2.6	0 21 53.8	0 36 50.2	0 40 24.9	0 43 4.3	0 44 32.9	0 46 42.9	0 49 31.9
$°\alpha_m$	357 7 56	1 42 27	4 24 47	4 44 48	4 45 39	5 28 27	9 12 33	10 6 14	10 46 5	11 8 14	11 40 44	12 22 59
δ_m	49 52 56	50 47 36	50 59 47	50 19 2	50 32 0	50 33 6	50 12 2	50 3 32	50 42 2	50 39 24	51 0 40	50 39 20
log sin α	8.69724n	8.47417	8.88618	8.91776	8.91906	8.97953	9.20422	9.24411	9.27145	9.28591	9.30626	9.33131
log tang δ	0.07437	0.08743	0.09157	0.08107	0.08441	0.08469	0.07927	0.07709	0.08699	0.08631	0.09180	0.08629
log sin α tan δ	8.77161	8.56160	8.97765	8.99883	9.00347	9.06422	9.28349	9.32120	9.35844	9.37222	9.39806	9.41760
log n sin α tan δ	8.89976	8.68775	9.10380	9.12498	9.12962	9.19037	9.40964	9.44730	9.48459	9.49837	9.52421	9.54375
n sin α tan δ	-.07939	.04872	.12700	.13334	.13478	.15502	.25683	.28010	.30521	.31505	.33436	.34975
$\frac{d\alpha_m}{dT}$	2.9927	3.1207	3.1990	3.2053	3.2067	3.2270	3.3288	3.3521	3.3772	3.3870	3.4063	3.4217
$\frac{d\alpha}{dT}$	0 59.85	1 2.41	1 2.98	1 4.10 (red 4.11)	1 4.12 (red 4.14)	1 4.54	1 6.58 (red 6.58)	1 7.04 (red 7.04)	1 7.54	1 7.74	1 8.13 (red 8.15)	1 8.43
α_0	23 48 1.81	0 6 18.69	0 17 9.15	0 18 27.14	0 18 30.60	0 21 21.56	0 36 16.99	0 39 51.50	0 42 30.63	0 43 39.04	0 46 18.86	0 48 57.74
α 1875.0	23 49 1.66	0 7 21.10	0 18 11.15	0 19 31.24	0 19 34.72	0 22 26.10	0 37 23.37	0 40 58.54	0 43 38.17	0 44 46.78	0 47 26.97	0 50 6.17
(red)			11.15	31.25	34.74	26.10	23.57	58.54			27.01	
log cos α	9.99945	9.99980	9.99871	9.99850	9.99849	9.99801	9.99436	9.99321	9.99228	9.99174	9.99091	9.98977
log n cos α	11.30169	11.30204	11.30095	11.30074	11.30073	11.30025	11.29660	11.29545	11.29452	11.29398	11.29315	11.29201
n cos α	20.030	20.047	19.996	19.987	19.986	19.964	19.797	19.745	19.702	19.678	19.641	19.589
20n cos α	6 20.6	6 20.9	6 39.9	6 39.7	6 39.7	6 39.3	6 35.9	6 34.9 (red 34.9)	6 34.0	6 33.6	6 32.8 (red 32.7)	6 31.8
δ_0	49 49 36.2	50 44 16.9	50 56 27.8	50 15 42.3	50 28 40.1	50 29 46.0	50 8 44	50 0 14.6	50 38 44.9	50 36 7.0	50 57 23.7	50 36 4.7
δ_0 1875.0	49 55 55.8	50 50 36.8	51 3 7.2	50 22 22.0	50 35 19.8	50 36 25.3	50 15 19.9	50 6 49.5	50 45 18.9	50 42 40.6	51 3 56.5	50 42 36.5
(red)			3 7.2	22 22.0	35 19.8	36 25.3	15 19.9	6 49.5			3 56.4	

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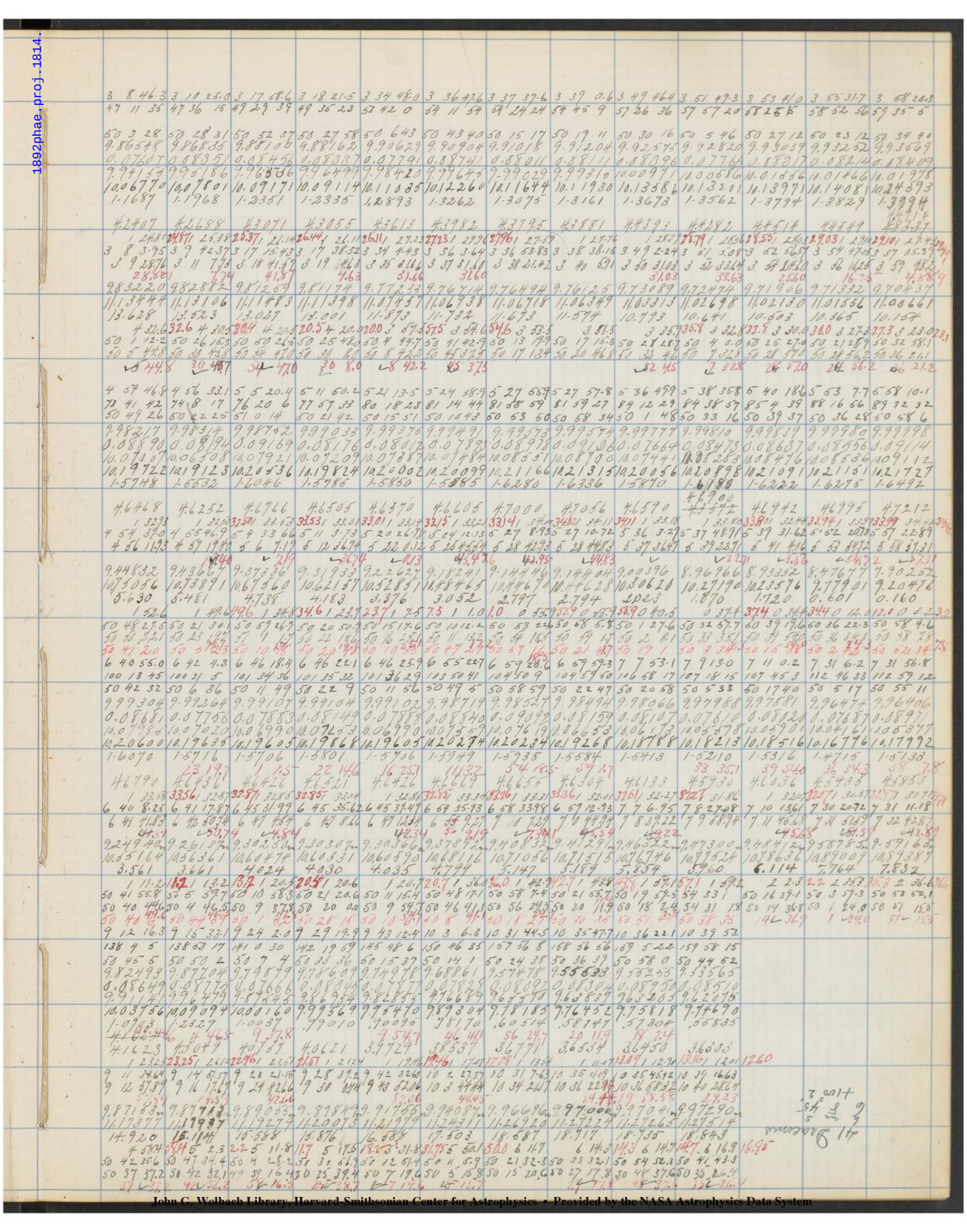
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α m	2 12 27.0	2 12 41.3	2 26 2.1	2 32 37.8	2 38 44.2	2 38 56.7	2 39 2.2	2 43 47.9	2 48 40	2 50 43.4	2 55 2.0	3 0 50.5
α m	33 7 15	33 10 20	36 30 32	38 9 57	39 41 3	39 44 11	39 45 33	40 57 29	42 10 0	42 33 21	43 45 30	45 12 38
δ m	50 40 8	50 50 16	50 35 41	50 31 9	50 29 1	50 57 24	50 58 33	50 28 51	50 25 11	50 50 4	50 50 5	50 27 50
log sin α	9.73751	9.73811	9.77447	9.79094	9.80519	9.80567	9.80588	9.81667	9.82690	9.83014	9.83986	9.85107
log tang δ	0.08655	0.08911	0.08580	0.08419	0.08364	0.09095	0.09127	0.08926	0.08265	0.08906	0.08957	0.08256
log sin α tang δ	9.82201	9.82722	9.86027	9.87513	9.88883	9.89662	9.89718	9.90583	9.90953	9.91920	9.92893	9.93363
Adj sin α tang δ	9.79816	9.79337	9.82642	9.84128	9.84498	9.85277	9.85328	9.86198	9.86570	9.87535	9.88508	9.88978
α sin α tang δ	.88749	.87820	.96822	1.00397	1.01351	1.01538	1.01551	1.01764	1.01857	1.02101	1.03521	1.04755
m												4.2196
d α	3.9594	3.9702	4.0402	4.0759	4.1071	4.1258	4.1271	4.1484	4.1577	4.1821	4.2072	4.2335
d T d α	1 19.17	1 19.27	1 19.40	1 20.00	1 20.32	1 22.14	1 22.41	1 22.52	1 22.53	1 22.54	1 22.69	1 22.76	1 23.15	1 23.64	1 24.14	1 24.41	1 24.38	24.39
L o d T	2 11 47.4	2 12 1.6	2 25 21.75	2 31 57.14	2 38 3.15	2 38 15.47	2 38 21.0	2 43 8.66	2 47 58.47	2 49 31.65	2 57 20.01	3 0 8.36	
α 1875.0	2 13 8.63	2 13 21.87	2 26 42.56	2 32 20.66	2 39 26.29	2 39 37.99	2 39 43.54	2 44 31.62	2 49 21.62	2 51 52.9	2 55 44.15	3 1 32.75
	8.71	21.04	42.56		25.27	38.00	43.54	31.34	21.62		44.15	32.75
log cos α	9.92299	9.92274	9.90512	9.89557	9.88625	9.88592	9.88577	9.87805	9.86993	9.86724	9.85869	9.84788
log ν̄ cos α	11.22523	11.22498	11.20736	11.19778	11.18849	11.18816	11.18301	11.18029	11.17217	11.16948	11.16093	11.15012
n cos α	16.797	16.787	16.120	15.768	15.435	15.423	15.241	15.176	14.865	14.773	14.486	14.130
20 n cos α	5 35.9	5 35.7	5 22.4	5 15.4	5 8.7	5 8.5	5 4.8	5 3.3	5 2.9	5 2.9	4 57.3	4 55.3	4 49.7	4 49.7	4 42.6	42.6
δ o	50 37 24.7	50 47 28.0	50 33 0.1	50 28 31.1	50 26 26.8	50 55 50.1	50 55 59.1	50 26 19.8	50 22 42.5	50 47 36.0	50 47 37.6	50 22 28.6	
δ o 1875.0	50 42 56.3	50 53 8.7	50 38 22.5	50 33 46.5	50 31 32.2	51 0 58.6	51 0 7.9	50 31 22.7	50 27 37.8	50 51 31.0	50 51 29.3	50 27 11.2	
	42	56.3	53.8.7	22.5		31	38.2	0	58.5	1	7.9	36	22.7	27	37.8		29.3	37	11.2
α m	4 4 27.4	4 5 7.0	4 10 44.2	4 11 41.9	4 26 30.2	4 29 19.5	4 31 53.8	4 32 57.5	4 37 15.4	4 37 16.9	4 46 39.7	4 52 22.7	
ᾱ m	61 6 57	61 16 45	62 41 3	62 55 29	66 22 33	67 19 53	67 58 27	68 14 23	69 18 51	69 18 59	71 39 56	73 5 41	
δ m	50 20 48	50 30 37	50 2 50	50 37 41	50 19 24	50 57 46	50 48 50	50 31 53	50 19 7	50 41 56	50 57 18	50 24 14	
log sin α	9.94229	9.94298	9.94865	9.94958	9.96198	9.96508	9.96708	9.96789	9.97105	9.97106	9.97734	9.98081	
log tang δ	0.08152	0.08301	0.07691	0.08587	0.08116	0.09005	0.08874	0.08738	0.08113	0.08696	0.09193	0.08241	
log sin α tang δ	0.02381	0.02603	0.02556	0.03545	0.04314	0.05513	0.05582	0.05227	0.05218	0.05702	0.06827	0.06822	
log sec α tang δ	0.14996	0.15218	0.15171	0.16160	0.16929	0.18128	0.18197	0.17842	0.17833	0.18317	0.19442	0.18937	
n sin α tang δ	1.41248	1.41497	1.41481	1.41508	1.41767	1.45180	1.45207	1.45081	1.45078	1.45247	1.45647	1.45466	
							1.51.07						
m							1.45207						
d α	4.4844	4.4917	4.4901	4.5228	4.5487	4.5900	3.8870	4.5801	4.5798	4.5967	4.6367	4.6186	
d T d α	1 29.69	1 29.91	1 29.83	1 29.80	1 30.56	1 30.97	1 31.80	1 31.84	1 31.77	1 31.80	1 31.60	1 31.60	1 31.59	1 31.92	1 32.06	1 32.73	1 32.74	32.37
L o d T	4 3 42.58	4 4 22.10	4 9 49.41	4 10 56.74	4 24 45.76	4 28 33.57	4 31 7.86	4 32 11.76	4 36 29.63	4 37 29.89	4 45 53.37	4 51 36.56	
L 1875.0	4 5 12.27	4 5 51.93	4 11 29.21	4 10 27.30	4 26 16.73	4 30 5.39	4 32 39.65	4 33 43.36	4 38 1.28	4 39 1.81	4 47 26.12	4 52 38.93	
	12.27	32.00	27.21	27.20	16.74	5.43	33.79	43.36	1.24	1.92	26.13	
log cos α	9.68400	9.68273	9.66171	9.65716	9.60285	9.58591	9.57405	9.56905	9.54807	9.54802	9.49770	9.46358	
log ν̄ cos α	10.98624	10.98497	10.96395	10.96040	10.90509	10.88815	10.87629	10.87129	10.85031	10.85026	10.79994	10.76582	
n cos α	9.6882	9.659	9.203	9.128	8.037	7.729	7.521	7.435	7.084	7.083	6.308	5.832	
20 n cos α	3 13.8	3 13.2	2.7.3	2.6.1	2.6.2	2.4.0.7	2.3.4.6	2.3.0.4	2.2.8.7	2.2.1.7	2.2.1.7	2.0.0.2	1.6.2.6.2	1.5.0.6
δ o	50 19 11.5	50 29 0.9	50 1 17.8	50 36 10	50 18 3.5	50 56 28.4	50 47 34.8	50 30 38.4	50 17 56.9	50 40 45.9	50 56 14.9	50 23 15.3	
δ 1875.0	50 26 25.3	50 36 32.1	50 8 24.3	50 43 22.9	50 25 42.2	51 3 59.2	50 55 8.2	50 37 44.1	50 24 56.6	50 47 46.6	50 58 24.1	50 29 11.9	
	50 37 25.3	50 47 32.1	50 19 24.3	50 54 22.9	50 36 42.2	51 14 59.2	51 6 8.2	50 48 44.1	50 35 56.6	50 58 46.6	51 9 24.1	50 40 11.9	
L m	6 2 8.2	6 14 49.2	6 19 32.9	6 27 22.86	6 28 32.2	6 31 32.9	6 31 36.8	6 32 0.6	6 33 18.9	6 36 24.3	6 39 13.6	6 40 52	
L m	90 32 3	93 42 18	94 53 14	96 50 42	97 8 3	97 53 14	97 54 12	98 0 9	98 19 44	99 6 5	99 48 57	100 13 0	
δ m	50 37 53	50 52 27	50 59 49	50 54 15	50 34 7	50 46 9	50 46 5	50 45 49	50 17 28	50 55 43	50 59 26	50 46 56	
log sin α	9.99998	9.99999	9.99841	9.99689	9.99662	9.99587	9.99585	9.99575	9.99539	9.99449	9.99309	9.99305	
log tang δ	0.08592	0.08956	0.09143	0.08993	0.08474	0.08781	0.08780	0.08772	0.08041	0.09024	0.09144	0.08791	
log sin α tang δ	0.08590	0.08863	0.08984	0.08862	0.08136	0.08868	0.08863	0.08347	0.07580	0.08473	0.08503	0.08096	
log sec α tang δ	11.21205	11.21480	10.21599	10.21297	10.20751	10.20983	10.20980	10.20962	10.20196	10.21088	10.21118	10.20711	
n sin α tang δ	1.6295	1.6398	1.6443	1.6330	1.6126	1.6212	1.6211	1.6204	1.5920	1.6261	1.6262	1.6110	
ν m	22 26.2	32 13.6	4 21.9	59 12.6	20 44.2	59 3.1	50 5.2	38 7.1	20 18.6	43 5.7	6.1	58 24.1	
d α	4.7015	4.7118	4.7163	4.7050	4.6846	4.6932	4.6931	4.6924	4.6840	4.6971	4.6982	4.6830	
d T d α	1 34.03	34.03	34.24	34.44	34.33	34.38	34.10	34.01	33.67	33.69	33.86	33.86	33.86	33.85	33.86	33.28	33.28	33.94	33.94	33.97	33.97	33.66	33.68
L o	6 1 21.17	6 14 20.7	6 18 45.69	6 26 35.74	6 27 45.36	6 30 46.01	6 30 49.88	6 31 13.65	6 32 32.23	6 35 37.33	6 38 28.60	6 39 18.32	
α 1875.0	6 2 55.20	6 15 [illegible]	6 20 21.12	6 28 9.84	6 29 19.00	6 32 19.87	6 32 23.74	6 32 47.50	6 34 6.81	6 37 11.27	6 40 2.86	6 40 51.98	
	55.20	36.31	21.02	9.84	19.06	19.87	23.74	47.50	6.81	11.27	2.86	
log cos α	7.96954	8.81036	8.93041	9.07624	9.09403	9.13774	9.13830	9.14369	9.16093	9.19915	9.23164	9.24888	
log ν̄ cos α	9.27178	10.11260	10.23265	10.37848	10.37633	10.43966	10.44084	10.44598	10.46317	10.50139	10.53385	10.55112	
n cos α	0.186	1.296	1.708	2.390	2.490	2.752	2.757	2.792	2.905	3.172	3.418	3.567	
20 n cos α	0 3.7	3.7	0 26.9	25.9	0 34.2	34.2	0 47.8	47.8	0 49.8	49.9	0 55.0	55.1	0 55.8	55.8	0 58.1	58.1	1 3.4	3.4	1 8.4	8.4	1 10.4	4.1
δ o	50 37 57.3	50 52 14.0	50 69 32.0	50 53 61.0	50 33 42.3	50 45 41.7	50 45 37.7	50 45 21.2	50 16 58.5	50 66 11.1	50 59 51.3	50 46 21.4	
δ 1875	50 37 [illegible]	50 51 [illegible]	50 68 57.8	50 53 3.250	32 52.4	50 44 46.7	50 44 42.6	50 44 25.4	50 16 8.4	50 54 7.7	50 68 48.1	50 45 11.0	
	50 37 [illegible]	50 51 [illegible]	50 68 57.8	50 53 3.250	32 52.4	50 44 46.7	50 44 42.6	50 44 25.4	50 16 8.4	50 54 7.7	50 68 48.1	50 45 11.0	
L m	7 44 40.7	7 45 3.7	7 49 14.3	8 7 49.5	8 17 28.4	8 17 54.9	8 30 31.2	8 31 6.4	8 39 51.6	8 42 47.2	8 45 5.0	8 53 36.3	
ᾱ m	116 10 11	116 15 56	117 18 35	121 57 23	124 22 6	124 28 44	127 87 48	127 46 36	129 52 54	130 41 48	131 16 15	133 24 5	
δ m	50 10 50	50 9 39	50 46 20	50 34 36	50 24 26	50 18 6	50 22 29	50 22 30	50 46 48	50 20 31	50 29 6	50 38 15	
log sin α	9.95303	9.95267	9.94867	9.92862	9.91667	9.91610	9.89870	9.89784	9.88500	9.87976	9.87598	9.86127	
log tang δ	0.07731	0.07790	0.08609	0.08483	0.08152	0.07986	0.08091	0.08091	0.08611	0.08033	0.08253	0.08483	
log sin α tang δ	0.03034	0.03057	0.03471	0.01283	9.99842	9.99396	9.97961	9.97875	9.97111	9.96009	9.95851	9.94610	
log sec α tang δ	10.15639	10.15672	10.16086	10.13898	10.12457	10.12211	10.10576	10.10490	10.09726	10.08624	10.08466	10.07225	
n sin α tang δ	1.4339	1.4346	1.4483	1.3778	1.3322	1.3247	1.2757	1.2732	1.2610	1.2197	1.2152	1.1810	
m	37 48.1	51 48.1	58 57.8	33.82	32 52.4	44 46.6	44 42.6	44 25.4	16 8.4	54 7.5	58 48.1	45 11.0	
d α	4.9055	4.9066	4.9203	4.8773	4.8642	4.8567	4.8547	4.8532	4.8230	4.8297	4.8282	4.8280	
d T d α	1 30.18	30.18	30.13	30.11	30.11	29.98	29.84	29.83	29.75	1 29.88	1 29.83	1 29.74	29.41	29.96	29.96	
L o d T	7 43 53.61	7 44 18.56	7 48 29.04	8 7 4.98	8 16 44.29	8 17 10.89	8 29 53.68	8 30 2.90	8 38 48.28	8 42 4.20	8 44 22.07	8 52 53.70	
L 1875.0	7 45 25.72	7 45 48.69	7 49 59.15	8 8 33.98	8 18 13.3	8 18 38.82	8 31 20.63	8 31 29.80	8 40 8.74	8 43 29.13	8 45 47.81	8 54 18.76	
	25.72	48.69	59.15	33.98	13.3	38.82	20.63	29.80	8.74	29.13	47.81	18.76	
log cos α	9.64446	9.64624	9.66162	9.72368	9.75167	9.75289	9.78572	9.78416	9.80699	9.81428	9.81929	9.83702	
log ν̄ cos α	10.94670	10.94844	10.96382	11.02592	11.05391	11.05513	11.08796	11.08940	11.10923	11.11652	11.12153	11.13926	
n cos α	8.845	8.880	9.200	10.665	11.322	11.354	12.245	12.286	12.860	13.077	13.229	13.780	
20 n cos α	2 56.9	56.92	57.6	57.3	4.0	4.0.5	52.3	52.3	3 46.4	46.4	47.1	47.1	4 4.9	4 5.7	5.3	4 17.2	4 21.5	4 24.6	24.6	4 39.6	35.6
δ o	50 9 1.2	50 8 9.8	50 43 46.2	50 83 0.1	50 23 33.1	50 16 12.6	50 20 26.2	50 20 26.7	50 44 39.7	50 18 20.4	50 26 54.0	50 35 5.4	
δ o 1875.0	50 6 25.1	50 5 12.2	50 40 44.2	50 29 17.3	50 19 46.7	50 12 24.9	50 16 41.3	50 16 41.0	50 40 52.5	50 13 58.9	50 22 29.4	50 31 17.8	
	6	25.1	5	12.2	40	44.2	29	17.3	19	46.7	12	24.9	16	41.3	16	41.0	40	52.5	13	58.9	22	29.4	31	17.8

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α app	10 47 6.4	11 12 2.7	11 21 45.8	11 29 36.9	11 38 36	11 44 33.4	11 45 9.2	11 46 55	11 52 8.8	11 53 29.9	11 56 15.2	12 5 44.8
δ app	161 46 36	168 0 41	170 26 27	172 24 14	174 39 0	176 8 21	176 17 8	176 43 45	178 2 12	178 22 29	179 3 48	179 31 12
	50 21 20	50 39 10	50 2 37	50 37 26	50 36 46	50 53 36	50 40 54	49 57 50	50 28 2	50 20 6	50 8 44	50 53 12
S mn	50 27 41	50 45 43	50 9 13	50 44 3	50 43 25	50 47 34	50 47 34	50 4 31	50 34 43	50 26 47	50 15 25	50 59 53
log sin α	9.49515	9.31747	9.22028	9.12119	8.96969	8.82822	8.81146	8.75620	8.53478	8.45274	8.21344	8.78814
log tang δ	0.08166	0.08625	0.07680	0.08058	0.08063	0.08997	0.08670	0.07553	0.08838	0.08134	0.07842	0.08887
log sec α tang δ	9.57681	9.40372	9.29713	9.20697	9.09522	8.91819	8.89816	8.82123	8.61816	8.53418	8.29186	8.87701
log sin α tang δ	9.70296	9.52987	9.42328	9.33314	9.21137	9.04434	9.02431	8.97738	8.74431	8.66033	8.41801	9.00316
n sin α tang δ	.50462	.33875	.26330	.21535	.16267	.11076	.10676	.07492	.05550	.04574	.02618	−.10073
m			.33370									2.97108
dα	3.5766	3.4107	##00?	3.2873	3.2346	3.1827	3.1777	3.1669	3.1275	3.1177	3.0981	3.1727
dT dα	1 11.53	1 11.40	1 8.21	1 6.74	1 5.73	1 4.67	1 3.65	1 3.55	1 3.34	1 3.26	1 2.33	1 2.35	1 1.96	0 57.8	0.62
L o dT	10 47 30.63	11 11 28.54	11 21 12.38	11 29 3.96	11 38 37.1	11 44 1.51	11 44 37.31	11 46 23.33	11 51 37.46	11 52 58.7	11 55 44.9	12 5 14.44
L 1875.0	10 48 42.16	11 12 36.75	11 22 19.42	11 30 9.71	11 39 7.40	11 45 8.16	11 45 44.86	11 47 26.67	11 52 42.01	11 54 2.22	11 56 46.15	12 6 13.87
	47.03		19.12	9.71	8.17		40.86	26.37	41.01	1.05	46.13	15.06
log cos α	9.977655	9.990042	9.993922	9.996172	9.998102	9.999012	9.999082	9.999252	9.999742	9.999822	9.999932	9.999172
log ν cos α	11.27987	11.29266	11.29616	11.29841	11.30034	11.30126	11.30132	11.30133	11.30198	11.30206	11.30217	11.30141
n cos α	19.050	19.618	19.777	19.880	19.968	20.010	20.013	20.023	20.044	20.048	20.053	20.018
20 n cos α	6 21.0	21.5 6 32.4	6 35.5	35.5 6 37.6	37.6 6 39.4	39.4 6 40.2	40.3 6 40.5	40.3 6 40.5	40.4 6 40.9	40.9 6 41.0	40.9 6 41.1	41.0 6 40.4	41.0
δ o	50 24 30.5	50 42 26.4	50 5 55.2	50 40 44.6	50 40 5.4	50 56 56.3	50 44 14.1	50 1 10.6	50 31 22.9	50 23 26	50 12 4.8	50 56 32.3	
δ o 1875.0	50 18 9.3	50 35 54.0	49 69 19.7	50 34 7.0	50 33 26.0	50 50 16.1	50 37 33.8	49 54 30.1	50 24 42.0	50 16 46.1	50 5 23.7	50 49 51.9	
	18	18	19	19	20	21	21	21	22	23	23	23	
	50 0 57	50 17 23	50 20 3	50 47 49	50 34 47	50 2 17	50 26 32	50 51 28	50 7 32	50 10 53	50 15 46	50 27 26	
L mn	13 40 44.5	14 11 15.4	14 28 13.6	14 29 32.3	14 32 41.6	14 38 51.1	14 39 53.4	14 41 42.4	14 43 13.9	14 51 54.0	14 55 6.2	14 55 18.3	
L mn	206 11 8	212 48 51	217 3 24	217 23 5	218 10 24	219 42 47	219 58 21	220 25 36	220 48 29	222 6 30	223 46 18	223 49 55	
S mn	50 6 57	50 53 0	50 24 23	50 53 8	50 39 3	50 7 26	50 36 39	50 56 33	50 12 36	50 15 48	50 20 36	50 34 9	
log sin α	9.628955	9.783298	9.878003	9.878330	9.877101	9.880546	9.880781	9.881689	9.881526	9.883358	9.883997	9.884044	
log tang δ	0.07641	0.08537	0.05183	0.08048	0.08412	0.07602	0.08200	0.08942	0.07712	0.07899	0.08023	0.08372	
log sec α tang δ	9.70556	9.82230	9.86136	9.87178	9.87513	9.88148	9.88898	9.89631	9.89238	9.91259	9.92020	9.92416	
log sin α tang δ	9.83151	9.94845	9.98751	9.99793	10.00128	10.00763	10.01596	10.02746	10.01853	10.03871	10.04633	10.05031	
n sin α tang δ	.67844	.88908	.97166	.99525	1.00301	1.01775	1.03745	1.06525	1.04836	1.09325	1.11266	1.12285	
m													
dα	2.3736	2.1840	2.1004	2.0768	2.0690	2.0563	2.0346	2.0068	2.0284	1.9788	1.9594	1.9492	
dT dα	0 47.87	47.50	43.68	43.60	42.01	42.01	41.54	41.34	41.04	40.14	39.68	39.19	39.00
L o dT	13 40 20.57	14 10 53.50	14 27 32.54	14 29 11.51	14 32 20.92	14 38 30.50	14 39 33.07	14 41 22.31	14 42 53.61	14 51 39.2	14 54 45.43	14 55 58.80	
L 1875.0	13 41 8.38	14 11 37.18	14 28 34.55	14 29 53.05	14 33 2.30	14 39 11.63	14 39 44.20	14 41 33.78	14 42 24.15	14 51 39.19	14 55 2.83	14 55 37.78	
	8.38	37.18	34.55	53.05	2.30	11.63	44.20	33.78	24.15	39.19	2.83	37.80	
log cos α	9.995661	9.992460	9.990202	9.990063	9.989530	9.988606	9.988482	9.988151	9.987904	9.986430	9.985879	9.985876	
log ν cos α	11.258855	11.226774	11.204266	11.202377	11.199774	11.188330	11.187706	11.183755	11.181128	11.166857	11.160837	11.160405	
n cos α	18.149	16.866	16.006	15.936	15.767	15.428	15.384	15.267	16.160	14.678	14.482	14.468	
20 n cos α	6 3.0	3.0 5 37.1	37.1 5 20.1	20.1 5 18.7	18.7 5 16.3	15.3 5 8.6	8.54 5 7.7	5 6.3	5.3 5 3.6	3.6 4 53.5	53.5 4 49.6	49.6 4 49.4	49.35
δ o	50 3 56.2	50 50 11.1	50 22 43.2	50 50 28.2	50 37 24.9	50 6 51.8	50 29 5.3	50 64 0.5	50 10 3.7	50 13 26.4	50 18 10.9	50 31 44.7	
δ 1875.0	49 57 52.2	50 44 31.0	50 17 23.1	50 45 [illegible]	50 32 9.6	50 0 43.2	50 23 57.6	49 48 55.2	50 5 21.9	50 8 34.4	50 13 21.3	50 26 56.3	55.3
	50 35 [illegible]	49 69 [illegible]	50 57 16	50 [illegible] 15	50 15 [illegible]	50 [illegible]	50 58 42	50 33 41	50 51 22	50 58 43	50 50 42	50 56 16	
L mn	16 22 7.6	16 22 11.9	16 25 13.7	16 28 35.6	16 31 57.2	16 36 20.1	16 36 33.7	16 37 29.6	16 40 34.7	16 42 52.4	16 50 47.4	16 54 26.9	
L mn	245 32 24	245 32 59	246 18 26	247 8 54	247 59 18	248 50 2	249 8 25	249 22 24	250 8 41	250 43 6	252 41 67	253 36 44	
S mn	50 38 39	50 2 36	50 59 57	50 5 50	50 18 18	50 15 32	51 1 5	50 36 2	50 53 38	51 0 55	50 44 44	50 8 9	
log sin α	9.98916	9.99119	9.96165	9.96430	9.96748	9.96966	9.97055	9.97122	9.97338	9.97497	9.97988	9.98196	
log tang δ	0.08541	0.07514	0.09092	0.07602	0.08023	0.07901	0.09139	0.08744	0.08944	0.09139	0.08617	0.07779	
log sec α tang δ	10.04467	10.03433	10.05257	10.04052	10.04376	10.04921	10.06184	10.05606	10.06278	10.06621	10.06605	10.05977	
log sin α tang δ	10.17022	10.16048	10.17872	10.16667	10.17351	10.17536	10.18809	10.18221	10.18893	10.19236	10.19220	10.18592	
n sin α tang δ	1.47987	1.44707	1.50912	1.46781	1.47912	1.48975	1.54205	1.52183	1.54501	1.55727	1.55567	1.53435	
m													
dα	1.5922	1.6250	1.5629	1.6052	1.5807	1.5748	1.5300	1.5307	1.5270	1.5148	1.5153	1.5377	
dT dα	0 31.84	31.81	32.43	31.25	32.10	32.03	31.66	31.49	31.49	30.61	31.02	30.54	30.29	30.23	30.15
L o	16 21 53.71	16 22 1.64	16 24 58.10	16 28 19.62	16 31 41.34	16 35 4.31	16 36 18.38	16 37 14.08	16 40 19.50	16 42 37.27	16 50 32.2	16 54 11.5	
L 1875.0	16 22 28.53	16 22 31.44	16 25 29.36	16 28 51.72	16 32 12.96	16 35 36.81	16 36 48.78	16 37 46.09	16 40 52.04	16 43 7.57	16 51 2.60	16 54 42.25	
	28.53	31.44	29.36	51.72	12.96	36.81	48.78	46.09	52.04	7.57	2.60	42.25	
log cos α	9.617066	9.616892	9.604044	9.592210	9.580779	9.569789	9.568134	9.564786	9.553102	9.541879	9.497336	9.445045	
log ν cos α	10.911930	10.911913	10.911628	10.891140	10.887603	10.885983	10.885378	10.884012	10.883326	10.882103	10.877560	10.872267	
n cos α	8.304	8.301	8.059	7.788	7.616	7.241	7.141	7.081	6.811	6.622	5.964	5.658	
20 n cos α	2 46.1	46.0	45.0	41.2	35.8	30.3	28.2	22.8	21.6	21.3	16.2	12.4	12.4	1 59.3	57.3	1 52.2	53.18
δ o	50 37 16.2	50 1 13.0	50 58 36.8	50 4 32.4	50 17 2.6	50 14 19.2	50 59 58.8	50 34 57.4	50 62 29.9	50 59 49.1	50 43 43.9	50 7 12.7	
δ o 1875.0	50 34 30.1	49 58 27.2	50 55 56.6	50 1 56.6	50 14 32.9	50 11 54.4	50 57 30.7	50 32 30.4	50 59 50.1	50 57 36.1	50 41 44.6	50 5 19.5	
	34	27.2	55	1	14	11	57	32	59	57	41	5	14.5
L mn	18 3 34.3	18 6 23.5	18 14 2.2	18 13 12.7	18 16 37.2	18 21 33.8	18 39 56.6	18 59 25.1	19 4 6.4	19 12 34.5	19 14 44.9	19 15 7.5	
L mn	270 63 35	271 35 53	273 30 33	273 18 11	274 9 18	276 20 67	279 59 9	284 51 17	386 1 36	288 8 38	288 41 14	288 46 63	
S mn	50 26 59	50 22 32	50 34 2	50 49 9	50 57 45	50 24 39	50 28 0	50 28 3	50 27 19	50 38 7	50 56 8	50 37 38	
log sin α	9.99994	9.99983	9.99918	9.99927	9.99885	9.99810	9.99837	9.99852	9.99878	9.99885	9.99647	9.99623	
log tang δ	0.08211	0.08197	0.08493	0.08830	0.08004	0.08351	0.08838	0.08839	0.08820	0.08598	0.08906	0.08588	
log sec α tang δ	10.08205	10.08180	10.08411	10.08688	10.08889	10.08679	10.08676	10.08698	10.08698	10.08383	10.08708	10.08206	
log sin α tang δ	10.20820	10.20795	10.21026	10.21425	10.21504	10.20676	10.20290	10.19477	10.19213	10.18998	10.19323	10.18821	
n sin α tang δ	1.61515	1.61442	1.62228	1.63777	1.64076	1.60978	1.59556	1.56593	1.55645	1.54877	1.5604	1.54246	
m													
dα	1.4569	1.4578	1.4492	1.4383	1.4313	1.4623	1.4765	1.5061	1.5156	1.5233	1.5116	1.5296	
dT dα	0 29.14	29.07	29.16	28.98	28.69	28.55	29.27	30.12	30.12	30.31	30.47	30.43	30.59
dT dα	0 28.9	0 28.9	0 28.7	0 28.7	0 28.6	0 29.2	0 29.2	0 30.1	0 30.1	0 30.4	0 30.2	0 30.6	
L o dT	18 3 19.72	18 6 8.95	18 12 57.7	18 12 58.32	18 16 22.54	18 21 19.12	18 39 41.9	18 59 10.0	19 3 51.36	19 12 19.2	19 14 26.7	19 14 62.20	
L 1875.0	18 3 48.86	18 6 38.1	18 13 26.68	18 13 27.13	18 16 51.37	18 21 48.37	18 40 11.33	18 59 40.17	19 4 21.67	19 12 49.68	19 14 57.02	19 15 22.79	
	3 48.79	6 38.1	13 26.68	13 27.01	16 51.49	21 48.37	40 11.33	59 40.17	4 21.67	12 49.68	14 57.02	15 22.79	
log cos α	8.192737	8.446341	8.786807	8.760533	8.860061	8.969033	9.239061	9.408867	9.441047	9.493327	9.505697	9.507797	
log ν cos α	9.949977	9.774765	10.089904	10.062799	10.162307	10.271777	10.541307	10.711107	10.743287	10.793567	10.807937	10.810037	
n cos α	+.312	.561	1.226	1.156	1.463	1.869	3.3986	5.141	5.537	6.245	6.425	6.457	
20 n cos α	0 6.2	6.25 0 11.2	11.2 0 24.5	23.1 0 23.1	23.1 0 29.1	29.10 37.4	32.7 1 8.0	35.5 1 42.8	42.8 1 50.7	50.7 2 4.9	4.9 2 8.5	8.5 2 9.1	9.1
δ o	50 26 66.2	50 22 26.1	50 33 49.6	50 48 57.4	50 57 30.8	50 23 19.8	50 27 25.5	50 27 11.3	50 26 23.6	50 37 4.9	50 54 58.4	50 36 27.2	
δ o 1876.0	50 27 27	50 22 37.3	50 34 14.0	50 49 22.5	50 57 56.9	50 23 57.2	50 28 33.5	50 28 54.1	50 28 14.3	50 39 9.8	50 56 46.9	50 38 16.3	
	27	22.3	14.0	22.5	56.9	57.2	33.5	54.1	14.3	9.8	46.9	16.3	

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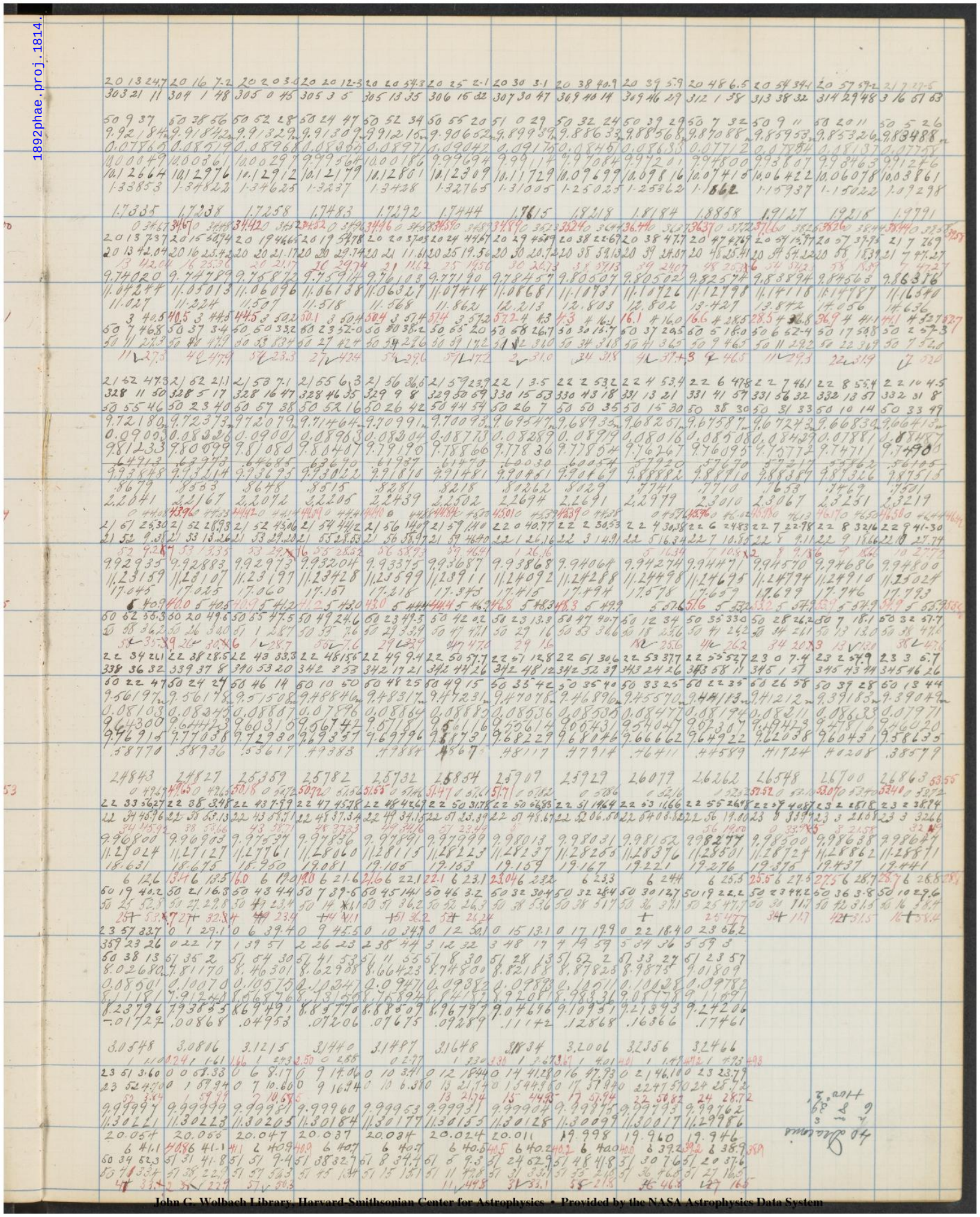
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α m	19 50 12.4	19 52 48.2	19 56 17.2	19 57 3.1	19 59 20.3	20 0 5.4	20 1 57.8	20 6 42.9	20 8 58.5	20 8 64.3	20 9 14.3	20 10 23.1
° α m	297 33 6	298 12 3	299 4 18	299 16 47	299 50 5	300 13 36	300 29 27	301 25 44	301 29 38	302 13 35	302 18 35	302 35 47
δ m	50 32 8	50 26 9	50 15 41.6	50 36 59	50 47 28	50 52 41	50 38 37	50 38 13	50 17 49	50 6 43	50 45 8	50 36 48
log sin α	9.947 72	9.945 12	9.944 51	9.944 70	9.943 825	9.943 653	9.943 536	9.943 109	9.943 079	9.942 734	9.942 694	9.942 556
log tang δ	0.088 44	0.088 290	0.088 021	0.088 289	0.088 809	0.089 774	0.089 511	0.091 177	0.088 076	0.087 791	0.088 779	0.088 564
log sin α tang δ	10.036 116	10.028 802	10.032 572	10.032 639	10.032 634	10.033 427	10.033 047	10.034 286	10.031 155	10.030 525	10.031 473	10.031 120
log π sin α tang δ	10.158 31	10.154 17	10.147 87	10.151 254	10.151 279	10.151 242	10.147 841	10.147 841	10.143 776	10.143 140	10.147 088	10.143 735
π sin α tang δ	1.439 86	1.426 16	1.405 62	1.420 83	1.421 65	1.420 42	1.401 6	1.401 74	1.373 1	1.353 34	1.383 2	1.372 0
π												
d α	1.632 2	1.645 9	1.666 4	1.651 2	1.650 4	1.651 6	1.670 4	1.665 6	1.698 9	1.718 7	1.688 8	1.700 0
d T d α	0 32.4	32.65 32.7	32.92 33.3	33.30 33.0	33.03 33.0	33.01 33.0	33.05 33.1	33.35 33.3	33.30 33.2	33.48 33.4	33.38 33.4	33.38 33.4	34.00
L o d T	19 49 56.0	19 52 31.8	19 56 0.55	19 56 46.55	19 59 33.3	20 0 37.89	20 1 41.09	20 6 26.19	20 5 41.49	20 8 37.14	20 8 57.38	20 10 6.04	
α 1875.0	19 50 28.12	19 52 64.12	19 56 33.85	19 57 19.51	19 59 36.83	20 1 10.92	20 2 14.50	20 5 59.50	20 6 13.47	20 9 11.51	20 9 31.16	20 10 40.04	
	30 7.03	33 4.78	36 33.85	37 19.51	39 36.84	41 10.92	42 14.44	45 59.40	46 13.47	49 11.52	49 31.16	50 40.04	
log cos α	9.665 15	9.674 46	9.686 54	9.689 14	9.696 79	9.701 93	9.702 535	9.711 204	9.711 800	9.726 94	9.727 94	9.731 36	
log π cos α	10.096 739	10.096 70	10.088 78	10.091 38	10.099 03	11.000 417	11.010 759	11.011 44	11.020 24	11.029 18	11.030 18	11.033 60	
π cos α	9.276	9.477	9.745	9.803	9.977	10.094	10.176	10.458	10.477	10.695	10.720	10.804	
20 π cos α	3 55.5	3 9.8	9.5 3 14.9	14.9 3 16.1	16.1 3 19.5	19.5 3 21.9	21.9 3 23.5	23.5 3 29.2	29.2 3 29.5	29.5 3 33.9	33.9 3 34.4	34.4 3 36.1	36.1
δ o	50 30 35.2	50 24 34.5	50 15 41.6	50 35 20.6	50 45 48.3	50 51 0.7	50 36 56.2	50 56 28.0	50 16 40.0	50 4 56.2	50 43 21.1	50 34 57.5	
δ o 1875.0	50 33 40.7	50 27 44.0	50 18 56.5	50 38 36.7	50 49 7.8	50 54 22.6	50 40 18.7	50 59 57.2	50 19 33.5	50 8 30.1	50 46 55.5	50 38 35.6	
	33 41.7	27 44.0	18 56.5	38 36.7	49 7.8	54 22.6	40 18.7	59 57.2	19 33.5	8 30.1	46 55.5	38 35.6	
α m	21 9 44.4	21 10 44.5	21 18 43.9	21 32 42.6	21 32 33.7	21 33 57.2	21 35 10.8	21 35 16.6	21 36 1.6	21 39 21.1	21 41 10.3	21 47 13.6	
° m	317 26 6	317 41 8	319 40 59	323 10 38	323 8 26	323 27 48	323 47 42	323 49 9	324 0 24	324 50 17	325 17 35	326 48 24	
δ m	50 46 32	50 43 16	50 5 22	50 45 27	50 26 50	50 30 49	50 52 0	50 56 39	50 42 45	50 35 4	50 3 6	50 47 54	
log sin α	9.830 22	9.828 11	9.810 91	9.777 67	9.778 04	9.774 76	9.771 34	9.771 09	9.769 14	9.760 33	9.756 40	9.738 35	
log tang δ	0.088 10	0.087 31	0.077 56	0.088 78	0.088 208	0.088 10	0.089 26	0.090 76	0.088 17	0.087 20	0.087 98	0.088 50	
log sin α tang δ	9.918 37	9.915 45	9.887 47	9.866 54	9.866 12	9.862 86	9.860 60	9.861 85	9.857 31	9.847 53	9.843 38	9.826 85	
log π sin α tang δ	-8.258 46	-8.255 00	-7.717 74	-7.733 74	-7.720 88	-7.725 94	-7.720 58	-7.716 66	-7.720 70	-7.679 84	-7.679 84	-7.672 10	
log π sin α tang δ	10.044 52	10.041 60	10.013 62	9.991 69	9.978 27	9.978 01	9.978 05	9.978 00	9.978 41	9.977 68	9.963 53	9.953 10	
π sin α tang δ	1.107 0	1.100 5	1.031 8	0.981 0	0.968 8	0.963 8	0.970 63	0.972 7	0.958 2	0.936 8	0.915 2	0.897 6	
d α	1.965 0	1.971 5	2.010 2	2.091 0	2.103 2	2.108 2	2.101 4	2.099 3	2.113 8	2.135 2	2.156 8	2.174 4	
d T d α	0 32.3	29.28 29.4	39.43 40.8	40.77 40.8	41.80 42.0	42.01 42.0	42.12 42.0	42.03 42.0	41.99 42.0	42.28 42.3	42.77 42.7	43.25 43.2	43.47
L o d T	29 9 24.76	21 10 24.74	21 18 23.82	21 32 11.66	21 32 12.71	21 33 38.14	21 34 49.83	21 34 55.63	21 35 40.44	21 58 59.76	21 40 46.1	21 46 51.86	
α 1875.0	29 10 4.06	21 11 4.17	21 19 4.38	21 32 53.48	21 32 54.77	21 34 12.30	21 35 31.86	21 35 37.62	21 36 22.7	21 59 42.46	21 41 31.34	21 47 35.35	
	10 4.0	11 4.17	19 4.38	32 53.46	32 54.77	34 12.30	35 31.86	35 37.62	36 22.67	39 42.46	41 31.34	47 35.35	
log cos α	9.867 17	9.868 91	9.882 22	9.903 35	9.903 11	9.904 97	9.906 82	9.906 95	9.907 99	9.912 50	9.911 91	9.922 63	
log π cos α	11.169 41	11.171 15	11.184 46	11.205 59	11.205 38	11.207 21	11.209 06	11.209 19	11.210 23	11.214 74	11.217 13	11.224 87	
π cos α	14.77	14.830	15.292	16.054	16.046	16.114	16.183	16.188	16.227	16.397	16.487	16.783	
20 π cos α	4 55.4	56.4 4 56.6	56.6 5 5.8	5.8 5 21.1	20.9 5 21.9	20.9 5 22.3	22.2 5 23.7	23.7 5 23.8	23.8 5 24.5	24.5 5 27.9	27.9 5 29.7	29.7 5 35.7	35.5
δ o	50 44 4.5	50 40 48.1	50 2 49.6	50 42 46.8	50 24 49.7	50 28 7.9	50 49 17.9	50 33 57.5	50 40 2.8	50 32 20.4	50 0 21.5	50 45 6.7	
δ 1875.0	50 48 57.9	50 45 44.7	50 7 55.4	50 48 7.7	50 30 10.6	50 33 32.2	50 54 41.6	50 39 21.3	50 45 27.3	50 37 48.3	50 5 51.2	50 50 41.4	
	48 57.9	45 44.7	7 55.4	48 7.7	30 10.6	33 32.2	54 41.6	39 21.3	45 27.3	37 48.3	5 51.2	50 41.4	
α m	22 11 6.2	22 11 52.3	22 12 3.1	22 15 6.9	22 15 19.3	22 15 58.1	22 18 17.2	22 19 58.9	22 22 51.4	22 27 35.9	22 31 20.6	22 34 53	
° m	332 46 33	332 58 5	333 0 47	333 46 44	333 49 50	333 59 32	334 34 18	334 59 44	335 42 51	336 53 59	337 50 9	338 31 20	
δ m	50 20 5	50 14 2	50 17 6	50 19 4	50 18 8	50 21 50	50 24 39	50 3 38	50 11 29	50 29 52	50 13 27	50 34 51	
log sin α	9.966 036	9.965 752	9.965 685	9.964 526	9.964 446	9.964 196	9.963 284	9.962 602	9.961 414	9.959 366	9.957 664	9.956 364	
log tang δ	0.081 34	0.079 18	0.080 57	0.081 08	0.080 84	0.081 79	0.083 51	0.079 61	0.079 30	0.078 86	0.079 63	0.080 14	
log sin α tang δ	9.747 70	9.737 30	9.737 42	9.726 34	9.725 30	9.723 70	9.721 30	9.721 13	9.720 27	9.717 74	9.717 27	9.716 27	9.716 78
log π sin α tang δ	9.867 85	9.863 45	9.863 57	9.852 49	9.851 45	9.849 90	9.847 50	9.847 50	9.841 42	9.837 40	9.837 42	9.837 93	
π sin α tang δ	.737 65	.730 22	.730 42	.712 02	.710 32	.707 79	.697 23	.673 42	.659 82	.636 32	.605 93	.594 20	
π													
d α	2.334 4	2.341 8	2.341 6	2.360 0	2.361 7	2.364 3	2.377 8	2.398 6	2.462 2	2.435 7	2.466 1	2.477 8	
d T d α	0 46.6	46.69 46.8	46.84 46.8	47.20 47.2	47.23 47.2	47.29 47.2	47.24 47.2	47.56 47.7	47.94 48.2	48.25 48.7	48.72 48.7	49.32 49.2	49.53
L o d T	22 10 42.90	22 11 28.83	22 12 39.57	22 14 43.27	22 14 55.70	22 15 34.43	22 17 53.43	22 19 34.74	22 22 27.16	22 27 11.62	22 30 55.95	22 33 46.57	
L 1875.0	22 11 29.59	22 12 15.69	22 13 26.42	22 15 30.12	22 15 42.73	22 16 21.72	22 18 40.99	22 20 22.91	22 23 16.50	22 28 01.33	22 31 45.27	22 34 30.13	
	11 29.59	12 15.69	13 26.33	15 30.12	15 42.94	16 21.72	18 40.99	20 22.88	23 16.50	28 0.34	31 44.27	34 30.10	
log cos α	9.944 801	9.944 975	9.944 993	9.952 883	9.953 03	9.953 63	9.955 74	9.957 26	9.959 75	9.963 70	9.966 66	9.968 74	
log π cos α	11.250 25	11.251 97	11.252 17	11.255 07	11.255 27	11.255 87	11.257 98	11.259 50	11.261 99	11.265 94	11.268 90	11.270 98	
π cos α	17.793	17.864	17.872	17.992	18.000	18.013	18.113	18.176	18.281	18.448	18.574	18.663	
20 π cos α	5 59.2	5 6.7	6 8.3	6 8.4	6 0.0	6 0.5	6 2.3	2.25 6 3.5	3.5 6 6.6	6.6 6 9.0	8.94 6 11.5	11.5 6 13.3	13.3
δ o	50 17 6.5	50 11 3.2	50 14 6.7	50 16 3.7	50 15 8.1	50 18 49.8	50 21 38.1	50 0 36.4	50 8 26.9	50 26 47.4	50 10 21.8	50 31 44.2	
δ o 1875.0	50 23 2.4	50 17 0.5	50 20 4.1	50 22 0.5	50 21 8.1	50 24 50.3	50 27 40.4	50 6 39.9	50 14 32.5	50 32 54.0	50 16 33.3	50 37 57.5	
	23 3.3	17 0.5	20 4.1	22 0.5	21 8.1	24 50.3	27 40.4	6 39.9	14 32.5	32 54.0	16 33.3	37 57.5	
α m	23 12 34	23 21 50.1	23 22 56.5	23 27 33.1	23 27 33.8	23 27 37.0	23 27 53.8	23 29 24.6	23 35 34.5	23 40 25.3	23 43 19.7	23 45 59.8	
° m	348 8 30	350 27 32	350 44 8	351 53 27	351 53 27	351 54 15	351 58 27	352 21 9	353 53 38	355 6 20	355 49 56	356 29 57	
δ m	50 38 36	50 37 16	50 28 34	50 50 19	50 32 5	50 50 19	50 52 4	50 46 12	51 0 28	50 48 29	50 41	50 24 53	
log sin α	9.931 379	9.921 946	9.920 682	9.914 940	9.914 940	9.915 217	9.914 932	9.912 410	9.909 239	8.931 05	8.861 39	8.787 57	
log tang δ	0.082 10	0.085 76	0.085 362	0.089 19	0.088 443	0.089 13	0.089 58	0.088 06	0.091 13	0.088 62	0.091 77	0.092 37	
log sin α tang δ	9.398 90	9.390 22	9.390 32	9.390 53	9.389 38	9.390 43	9.390 51	9.388 47	9.391 47	9.919 70	9.953 62	9.879 94	
log π sin α tang δ	9.325 05	9.431 37	9.411 47	9.361 68	9.355 98	9.361 75	9.360 66	9.338 31	9.310 29	9.145 85	9.064 77	8.994 49	
π sin α tang δ	.335 01	.270 01	.260 70	.231 57	.229 08	.233 05	.229 44	.217 73	.204 31	.139 91	.116 08	.098 74	
π													
d α	2.637 0	2.802 0	2.811 1	2.840 5	2.843 0	2.839 0	2.842 6	2.854 1	2.867 7	2.932 1	2.956 0	2.973 3	
d T d α	0 53.7	54.44 54.6	56.03 56.2	0 56.8	56.81 56.8	56.86 56.8	56.82 56.8	56.84 57.0	57.08 57.3	57.95 58.1	58.64 58.4	59.12 59.2	59.47
L o d T	23 12 6.66	23 21 23.08	23 22 29.36	23 27 4.67	23 27 6.35	23 27 8.63	23 27 25.39	23 28 5.36	23 35 6.57	23 39 56.0	23 42 50.16	23 45 30.06	
L 1875.0	23 13 0.0	23 22 19.2	23 23 29.08	23 28 1.80	23 28 02.21	23 28 05.71	23 28 22.24	23 29 5.44	23 36 02.92	23 40 54.64	23 43 49.28	23 46 29.68	
	13 1.4	22 19.2	28 1.80	28 2.21	28 5.43	28 22.24	29 5.44	36 2.92	40 54.64	43 49.28	46 29.68		
log cos α	9.999 065	9.999 395	9.999 429	9.999 563	9.999 563	9.999 565	9.999 572	9.999 611	9.999 665	9.999 841	9.999 885	9.999 918	
log π cos α	11.272 87	11.296 19	11.296 33	11.297 87	11.297 87	11.297 89	11.297 96	11.298 35	11.298 89	11.300 65	11.301 09	11.301 42	
π cos α	19.628	19.778	19.794	19.866	19.866	19.866	19.859	19.877	19.902	19.982	20.003	20.018	
20 π cos α	6 32.6	32.6 6 35.6	35.6 6 35.9	6 37.1	37.1 6 37.1	37.1 6 37.1	37.1 6 37.2	37.2 6 37.5	37.5 6 38.0	38.8 6 39.6	39.6 6 40.1	40.04 6 40.4	
δ o	50 35 19.5	50 33 67.2	50 25 16.5	50 47 —	50 28 46.0	50 47 —	50 48 46.6	50 42 63.1	50 67 8.3	50 45 9.1	50 0 41.2	50 21 32.8	
δ o 1875.0	50 41 32.1	50 40 32.8	50 31 52.4	50 53 37.1	50 35 23.1	50 53 37.1	50 55 22.7	50 49 39.3	50 73 46.3	50 51 48.7	50 7 21.3	50 28 13.2	
	41 32.1	40 32.8	31 52.4	53 37.1	35 23.1	53 37.1	55 22.7	49 39.3	3 46.3	51 48.7	7 21.3	28 13.2	

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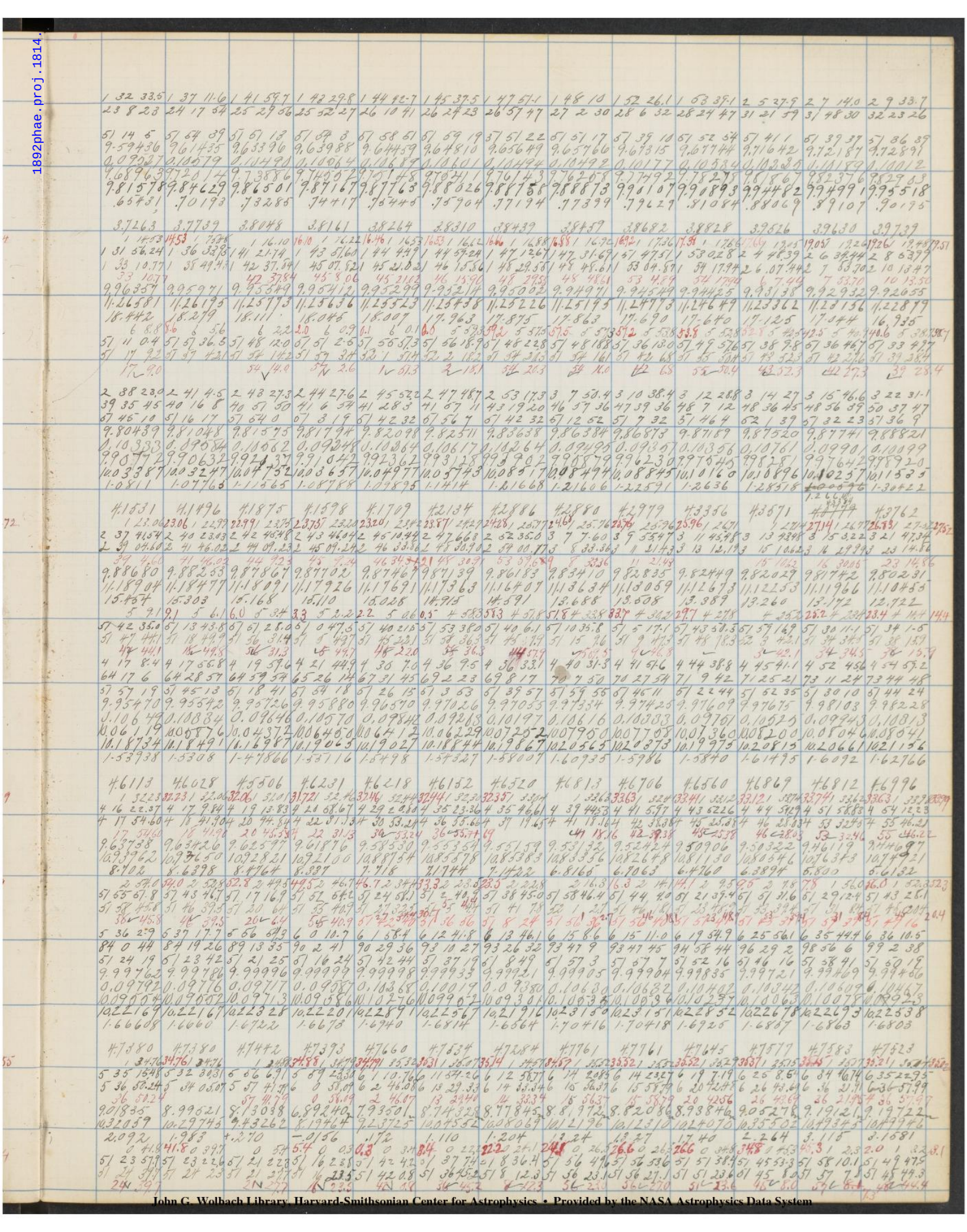


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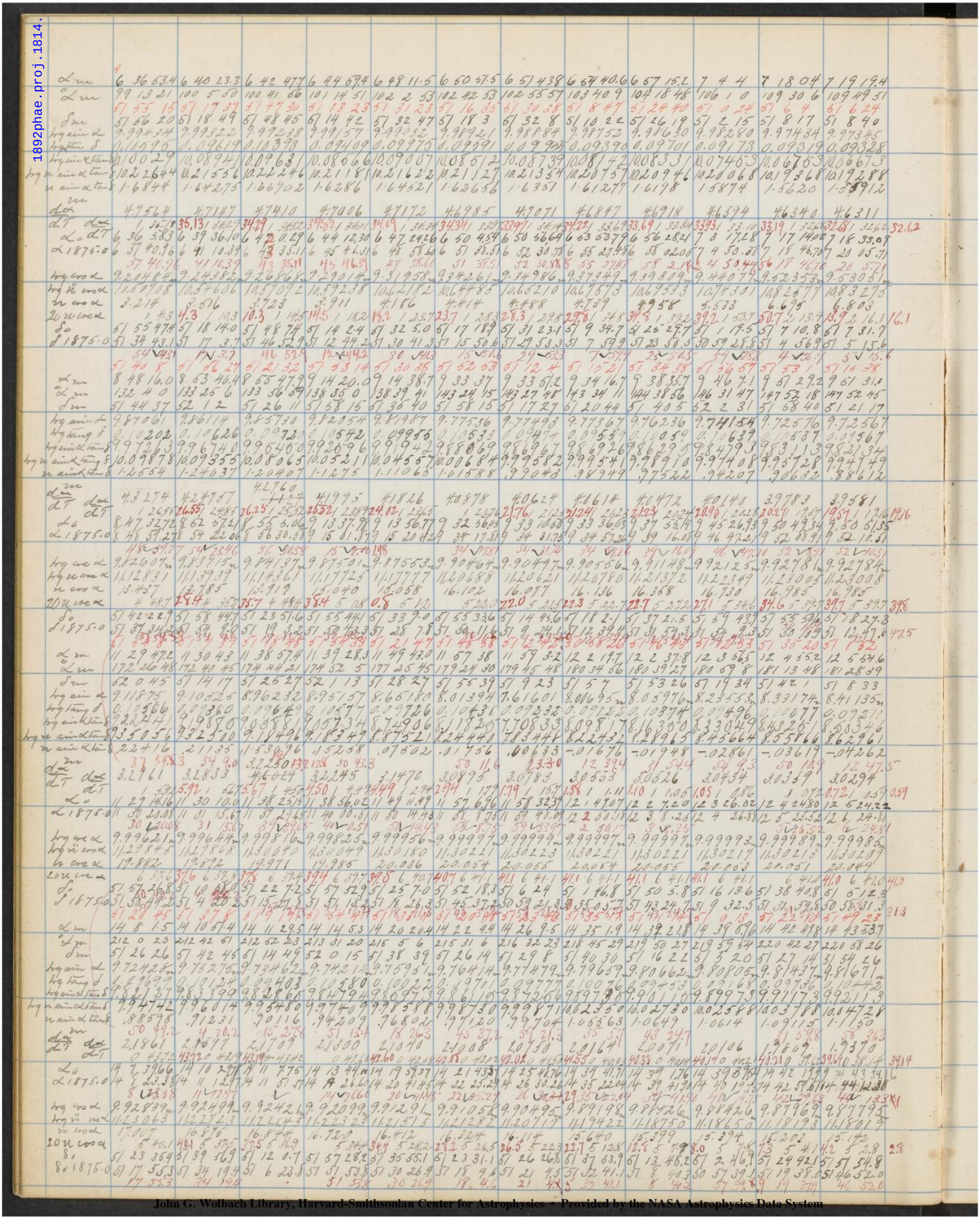
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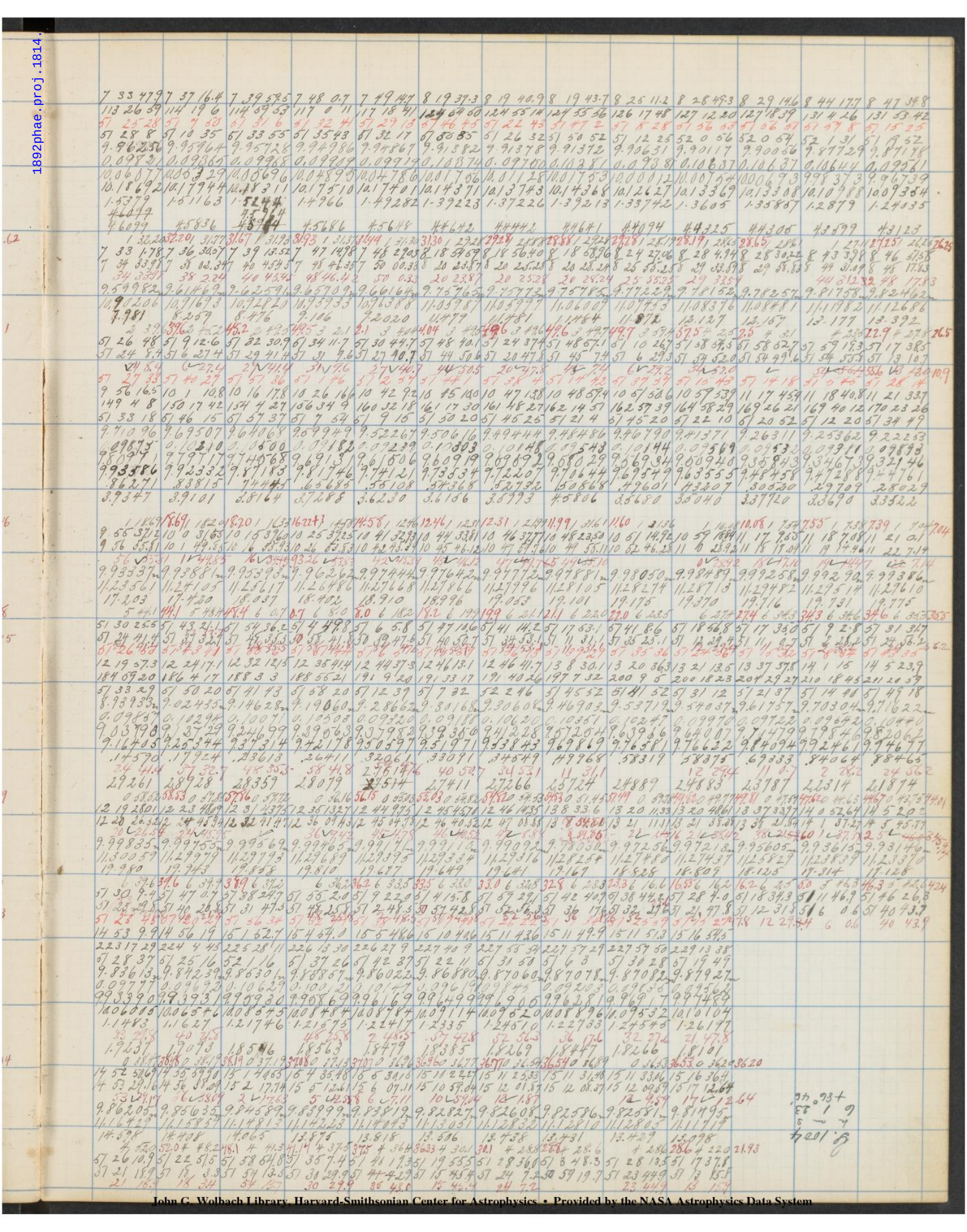
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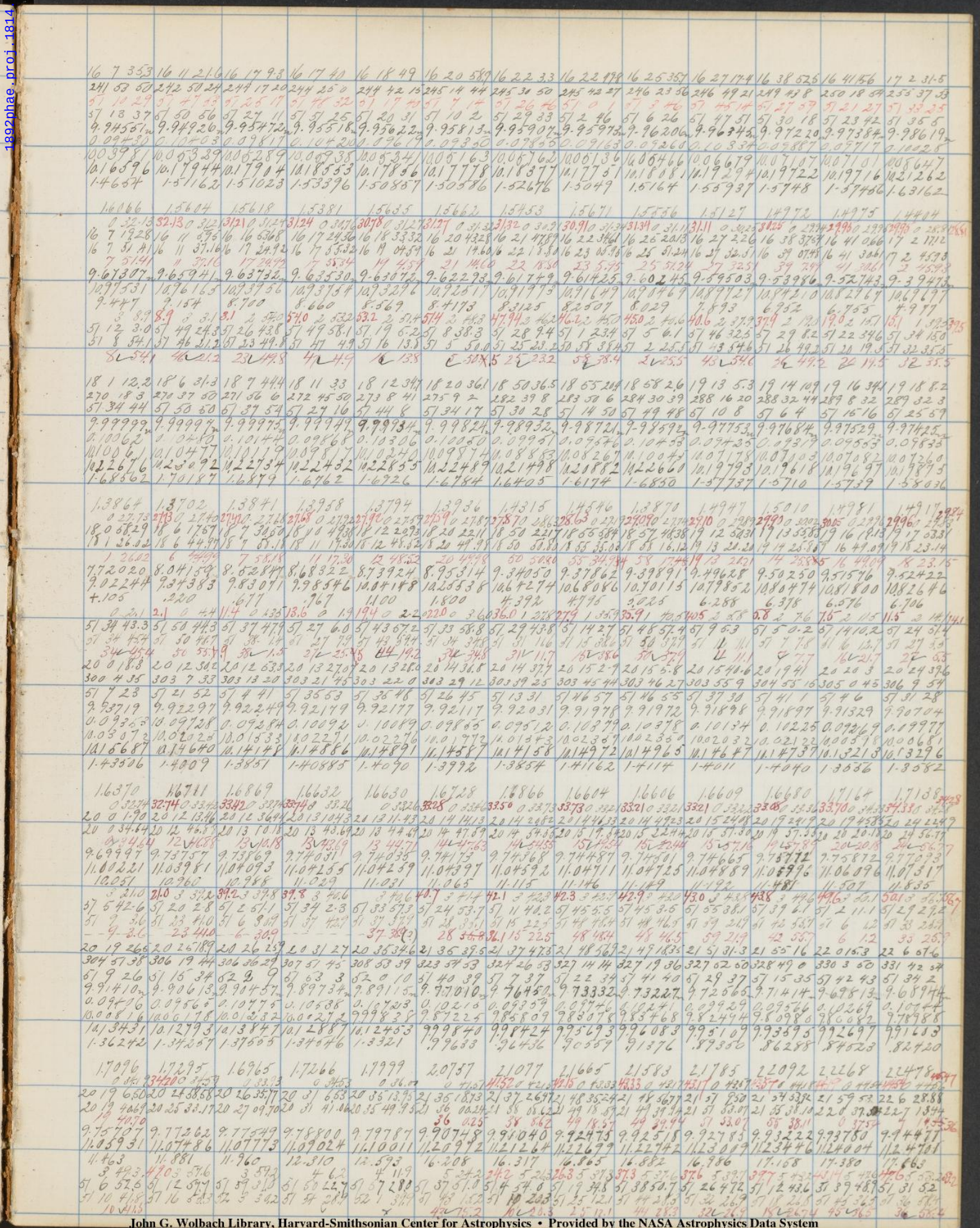
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☉ ☊	15 18 4.5	15 20 50.3	15 22 58.9	15 24 6.1	15 25 11.2	15 39 0.1	15 40 19.3	15 44 27	15 54 29.4	15 55 1	15 56 16.7	16 5 27.4			
☌ ☽	229 31 8	230 12 35	230 44 44	231 1 32	231 17 48	234 45 2	235 4 50	236 6 45	238 37 21	238 45 15	239 3 59	241 21 51			
	51 33 4	51 44 2	51 49 27	51 50 1	51 50 31	51 50 31	51 50 3	51 52 10	51 57 49	51 58 57	51 59 32	51 59 5 12			
☽ ☊	51 57 25	51 46 39	51 31 24	51 6 8	51 25 42	51 4 22	51 23 52	51 25 54	51 53 24	51 16 23	51 36 32	51 8 24			
log sin ☌	9.881164	9.885384	9.888934	9.890664	9.892314	9.912034	9.913794	9.919144	9.931334	9.931944	9.933564	9.943334			
log tan δ	9.105734	9.102254	9.099664	9.098614	9.097194	9.077194	9.075814	9.072364	9.063134	9.062504	9.060774	9.050994			
log sin ☌ tan δ	9.986934	9.987834	9.988604	9.989284	9.989904	0.008374	0.010164	0.014264	0.025894	0.026264	0.027284	0.034334			
log sin ☌ tan δ	10.111269	10.113984	10.113744	10.108934	10.113564	10.129944	10.136734	10.138854	10.145274	10.142254	10.139904	10.136304			
n sin ☌ tan δ	1.296264	1.300124	1.299444	1.285144	1.300514	1.348814	1.370144	1.388554	1.423264	1.422504	1.443754	1.453634			
☽ ☊			1.1726												
☽ ☊	1.77584	1.77194	1.77264	1.77694	1.76694	1.72324	1.70194	1.68324	1.66184	1.64954	1.62694	1.61844			
d☽ / dt	0 35.52	35.52	0 35.44	36.44	0 35.45	35.45	0 35.34	35.72	0 35.34	35.34	0 34.48	34.47	0 34.44	34.04	0 33.66	33.67	0 32.31	32.40	0 32.39	32.99	0 32.84	32.55	0 32.37	32.37
☊	15 17 46.70	15 20 32.5	15 22 41.0	15 23 48.8	15 24 53.2	15 38 42.7	15 40 22.7	15 44 9.8	15 54 13.3	15 54 44.4	15 55 57.6	16 6 12.3			
☌ 1875.0	15 18 22.22	15 21 07.9	15 23 16.6	15 24 23.9	15 25 28.8	15 39 17.3	15 40 36.3	15 44 42.8	15 54 45.6	15 55 17.4	15 56 32.2	16 5 54.6			
	18 22.22	21 07.9	23 16.6	24 23.9	25 28.8	39 17.3	40 36.3	44 42.8	54 45.6	55 17.4	56 32.2	6 5 54.6			
log sin ☌	9.812374	9.806164	9.801244	9.799864	9.796084	9.761274	9.757744	9.746294	9.716564	9.714924	9.710004	9.680554			
log sin ☌	11.114614	11.108404	11.103484	11.100874	11.098324	11.063514	11.059984	11.048534	11.018804	11.017164	11.012244	10.982794			
n sin ☌	13.020	12.835	12.691	12.614	12.541	11.576	11.480	11.183	10.442	10.403	10.286	9.611			
20 y sin ☌	4 204	4 167	4 138	4 123	4 108	3 375	3 345	3 263	3 288	3 281	3 258	3 122			12.2
☽	51 55 14.5	51 43 28.6	51 29 17.2	51 4 2.3	51 23 36.7	51 2 26.4	51 2 1.5	51 24 2.0	51 51 39.6	51 14 38.5	51 34 48.5	51 6 48.1			
☽ 1875.0	51 50 54.1	51 39 3.8	51 25 34.0	51 50 39 50.0	51 19 25.9	50 58 34.9	51 18 7.7	51 51 20 18.3	51 51 48 10.8	51 51 11 10.4	51 31 22.8	51 3 35.9			
	30 54.1	37 38.8	25 34.0	50.0	19 25.9	38 34.9	18 7.7	20 18.3	48 10.8	11 10.5	31 22.5	3 35.9			
	37 38 36	37 38 30	37 33 6	37 32 22	37 29 45	37 36 44	37 14 49	37 32 15	37 37 56	37 4 17	37 32 16	37 31 2	(?)		
☽ ☊	17 2 59.0	17 3 17.9	17 8 6.7	17 8 17.4	17 17 17.8	17 22 19.3	17 33 49.7	17 38 14.8	17 45 3.9	17 48 24.8	17 49 6.2	17 62 34			
☌ ☊	255 44 45	255 49 29	257 1 41	257 4 21	259 19 27	260 34 50	263 27 26	264 33 38	266 15 59	267 6 12	267 15 3	268 0 61			
☌ ☽	51 40 15	51 40 9	51 56 36	51 33 52	51 40 59	51 37 49	51 16 44	51 32 53	51 38 22	51 4 37	51 32 35	51 31 17			
log sin ☌	9.986424	9.986574	9.988774	9.988854	9.990244	9.994104	9.997164	9.998034	9.999074	9.999444	9.999494	9.999734			
log tang δ	0.101624	0.101604	0.105914	0.106004	0.101924	0.091144	0.096504	0.099974	0.101464	0.092734	0.099984	0.099664			
log sin ☌ tan δ	10.088034	10.088174	10.094684	10.094854	10.092334	10.085244	10.093664	10.098004	10.100534	10.091774	10.099474	10.099394			
log sin ☌ tang δ	10.214184	10.214324	10.222134	10.215004	10.220484	10.222394	10.221884	10.224154	10.226674	10.218324	10.225624	10.225544			
n sin ☌ tang δ	1.637564	1.638034	1.666464	1.640664	1.661414	1.664924	1.655864	1.670514	1.685334	1.663224	1.681224	1.680944			
☽ ☊															
d☽ / dt	1.43454	1.43404	1.40574	1.43174	1.41064	1.40714	1.41654	1.39654	1.38674	1.41884	1.39084	1.39114			
d☊ / dt	0 28.69	28.69	0 28.68	0 28.11	28.19	0 28.63	0 28.21	0 28.14	0 28.33	28.34	0 27.93	27.93	0 27.73	27.73	0 27.38	27.38	0 27.26	27.26	0 27.82	27.82
☊	17 2 44.66	17 3 35.7	17 7 52.58	17 8 3.12	17 17 36.6	17 22 6.19	17 33 35.49	17 37 59.3	17 44 50.06	17 48 10.63	17 48 46.27	17 51 49.5			
☌ 1875.0	17 3 13.35	17 3 32.27	17 8 20.64	17 8 31.75	17 17 31.89	17 22 33.33	17 34 03.82	17 38 27.46	17 45 17.77	17 48 39.03	17 49 14.67	17 52 17.32			
	13.35		20.64	31.75	31.89	33.33	03.82	27.46	17.77	39.03	14.67	17.32			
	8 26.77		8 31.75		22 33.33		34 3.85	38 27.46	45 17.77	48 39.03	49 14.67	52 17.32			
log sec ☌	9.391334	9.388964	9.351164	9.349704	9.267764	9.214944	9.056694	8.976774	8.813694	8.703594	8.630914	8.539734			
log tang ☊	10.678574	10.691204	10.653404	10.651944	10.570004	10.517184	10.358934	10.279014	10.111534	10.000834	9.933154	9.841974			
n sec ☌	4938	4911	4602	4486	3.715	3.289	2.285	1.901	1306	10 371	857	−694			
20 n sec ☌	1 38.8	38.8	1 38.2	37.84	30.0	30.06	1 27.7	22.7	1 14.3	14.3	1 5.8	5.65	0 45.7	45.8	0 38.0	38.0	0 26.1	26.1	0 20.7	20.3	0 17.1	17.1	0 14.0	13.9
☽ ☊	51 39 25.7	51 39 19.6	51 55 5.1	51 33 7.3	51 40 22.0	51 37 16.4	51 15 21.7	51 32 33.7	51 38 8.9	51 4 26.8	51 32 25.8	51 31 —			
☌ ☊	51 37 46.9	51 37 41.8	51 54 21.0	51 31 17.6	51 36 7.7	51 36 10.6	51 14 36.0	51 31 33.7	51 37 42.8	4 6.1	32 6.5	51 30 46.0			
☌ ☽	19 24 6.0	19 25 35.2	19 29 43.1	19 30 19.8	19 35 49	19 39 14.5	19 44 16.8	19 44 20.3	19 45 27.0	19 54 55.5	19 56 12.3	19 67 0.5			
	291 1 30	291 23 48	292 25 47	292 34 57	293 57 15	294 48 38	296 4 12	296 5 5	296 21 45	298 43 53	299 3 5	299 15 8			
☽ ☊	51 15 29	51 27 14	51 26 57	51 49 46	51 8 47	51 16 30	51 8 23	51 33 49	51 58 13	51 44 26	51 17 53	51 34 40			
log sin ☌	9.970074	9.969984	9.965834	9.965354	9.960884	9.957944	9.953404	9.953344	9.952304	9.944944	9.941604	9.940754			
log tang ☊	0.095634	0.098674	0.098604	0.104624	0.093904	0.096894	0.093794	0.100284	0.100724	0.103144	0.096264	0.100604			
log sin ☌ tang ☊	10.065704	10.068414	10.064434	10.069784	10.054784	10.054834	10.047194	10.053624	10.053024	10.048084	10.037864	10.041334			
log sin ☌ tang ☊	10.191854	10.194804	10.190584	10.196024	10.180934	10.179984	10.173344	10.179874	10.181714	10.172234	10.164004	10.167504			
n sin ☌ tang ☊	1.555434	1.566004	1.560904	1.570454	1.516854	1.513554	1.490564	1.513124	1.531744	1.486734	1.438854	1.447064			
☽ ☊															
d☽ / dt	1.5166	1.5060	1.5211	1.5016	1.5552	1.5585	1.5815	1.5589	1.5703	1.5853	1.6132	1.6014			
d☊ / dt	0 30.33	30.33	0 30.12	30.19	0 30.03	30.02	0 30.03	31.11	0 31.17	31.17	0 31.63	31.63	0 31.18	31.18	0 30.81	30.81	0 31.27	31.71	0 32.20	32.20	0 32.03	32.03		
☊	19 23 50.9	19 25 20.7	19 29 27.9	19 30 4.8	19 35 33.4	19 38 58.9	19 44 1.6	19 44 4.7	19 45 11.6	19 54 39.6	19 55 56.2	19 66 44.4			
☌ 1875.0	24 20.4	25 50.2	29 57.8	30 34.8	36 4.5	39 30.1	44 32.8	44 35.8	45 42.7	55 11.3	56 28.1	67 16.4			
	24 20.4	25 50.2	29 57.8	30 34.8	36 4.5	39 30.1	44 32.8	44 35.8	45 42.7	55 11.3	56 28.1	67 16.4			
log sec ☌	9.956784	9.956204	9.951554	9.951344	9.948534	9.946224	9.942924	9.943154	9.943744	9.941874	9.939274	9.938994			
log tang ☊	10.185704	10.186434	10.188374	10.188664	10.189104	10.189424	10.189514	10.189444	10.189284	10.187774	10.187774	10.187774			
n sec ☌	7.195	7.362	7.643	7.701	8.142	8.415	8.813	8.818	8.905	9.640	9.739	9.800			
20 n sec ☌	2 39.9	23.9	2 47.2	26.3	2 42.8	33.1	2 54.0	34.0	2 42.8	42.9	2 45.3	48.3	2 56.3	56.3	2 56.4	56.4	2 58.1	58.1	3 12.8	12.8	3 14.8	14.8	3 16.0	16.0
☽ ☊	51 14 16.5	51 26 1.1	51 25 40.7	51 48 25.8	51 7 25.5	51 15 5.4	51 7 6 54.6	51 32 20.6	51 56 43.7	51 42 49.6	51 16 16.3	51 33 1.7			
☌ ☊	51 16 48.4	51 28 24.3	51 28 13.6	51 51 2.8	51 10 8.3	51 17 53.7	51 7 9 50.9	51 35 17.0	51 59 41.8	51 46 24.7	51 19 30.1	51 36 17.7			
	16 10.4	28 27.4	28 13.8	51 2.8	10 8.4	17 53.7	9 50.9	35 17.0	59 41.8	46 24.7	(?) 19 30.1	36 17.7			
☌ ☽	20 26 53.4	20 27 29.6	20 27 55.3	20 30 41.6	20 30 56.7	20 31 29	20 31 6.5	20 38 6.4	20 39 14.8	20 47 29.7	20 12 45	20 17 59.3			
☽ ☊	306 43 21	306 52 24	306 58 50	307 40 24	307 44 11	307 52 15	307 46 23	309 42 51	309 48 42	311 52 26	303 11 15	304 29 50			
☊	57 18 26	57 57 4	57 50 59	57 34 21	57 14 46	57 35 25	57 34 14	57 37 6	57 21 49	57 16 15	57 57 14	57 43 19			
log sin ☌	9.903924	9.903074	9.902454	9.898454	9.898044	9.897294	9.897874	9.892244	9.891654	9.871934	9.922664	9.916604			
log tang δ	0.096394	0.104864	0.104484	0.100274	0.095444	0.105974	0.100494	0.101234	0.097274	0.105954	0.106464	0.102854			
log sin ☌ tang δ	10.000314	10.008074	10.007294	9.998734	9.993494	10.003274	9.998334	9.993474	9.988924	9.977884	10.029124	10.019184			
log sin ☌ tang ☊	10.126464	10.134084	10.133444	10.125124	10.119674	10.129434	10.124514	10.119624	10.114074	10.104034	10.155274	10.145004			
n sin ☌ tang ☊	1.838014	1.861704	1.859774	1.833904	1.817624	1.847284	1.832514	1.817884	1.801264	1.770684	1.842984	1.813644			
☽ ☊															
d☽ / dt	1.7340	1.7107	1.7123	1.7380	1.7548	1.7248	1.7400	1.7549	1.7686	1.8014	1.6422	1.6756			
d☊ / dt	0 34.18	34.18	0 34.21	34.25	0 34.76	34.77	0 35.07	35.10	0 34.85	34.46	0 34.80	34.80	0 35.22	35.22	0 35.47	35.47	0 36.03	36.03	0 36.74	36.74	0 36.03	36.03	0 32.84	32.84
☊	20 26 36.04	20 27 12.47	20 27 38.24	20 30 24.5	20 30 39.13	20 30 45.69	20 30 48.1	20 38 33.68	20 38 56.7	20 47 11.64	20 42 16.62	20 17 39.57			
☌ 1875.0	20 27 10.72	20 27 46.70	20 28 12.49	20 30 59.02	20 31 14.23	20 31 20.79	20 31 22.98	20 39 9.56	20 39 32.36	20 47 47.67	20 42 38.46	20 18 13.48			
		46.70	28 12.49	30 59.02	31 14.23	31 20.79	31 22.98	39 9.56	39 32.36	47 47.67					
log sec ☌	9.776824	9.778184	9.779264	9.786154	9.786774	9.788084	9.787134	9.805464	9.806354	9.824444	9.738284	9.753094			
log tang ☊	11.079064	11.080424	11.081504	11.088394	11.089014	11.090324	11.089374	11.107704	11.108594	11.126684	11.040524	11.055334			
n sec ☌	11.996	12.045	12.064	12.257	12.275	12.312	12.285	12.815	12.841	13.387	10.978	11.258			
20 n sec ☌	3 999	4 09	0.7 4 13	13 4 51	5.2 4 55	5.5 4 62	5.5 4 57	5.7 4 163	5.7 4 168	16.8 4 267	27.7 3 396	3 472			
☽ ☊	51 16 26.8	51 49 3.5	51 48 68.5	51 32 182	51 12 43.9	51 53 22.9	51 32 11.3	51 34 58	51 19 411	51 52 513	51 54 44.7	51 40 46.2			
☌ ☊	51 20 26.2	51 53 4.4	51 42 59.8	51 36 22.3	51 16 44.4	51 57 29.1	51 36 17.0	51 39 14.3	51 23 37.9	51 57 18.9	51 58 23.8	51 44 33.4			
		53 4.3	42 59.8	36 22.4	16 44.6	57 29.1	36 17.0	39 14.3	23 37.9	57 18.9					

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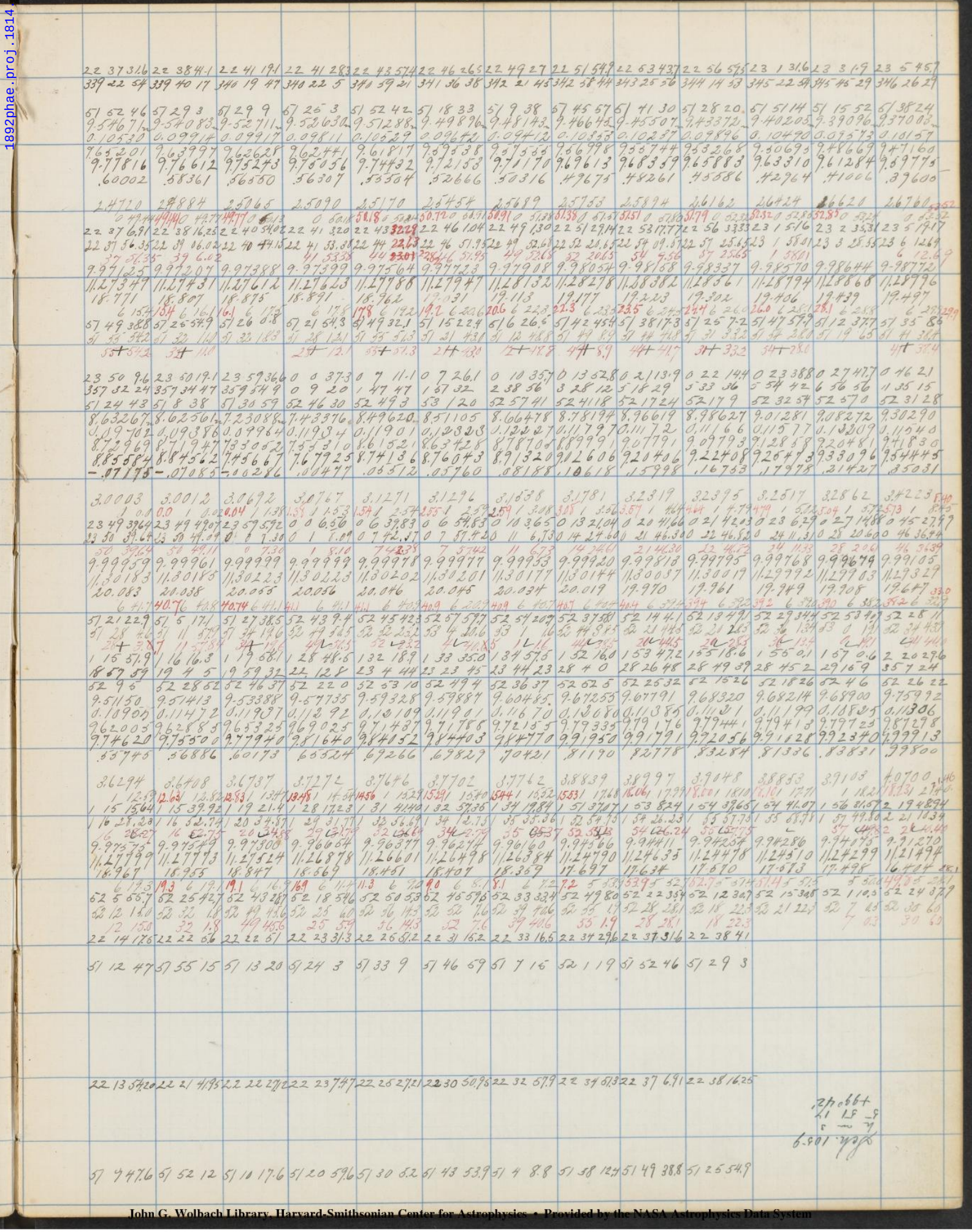
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α_m	22 8 28	22 10 57.3	22 12 22.4	22 13 02.6	22 14 17.5	22 22 5.6	22 22 51	22 23 31.3	22 25 51.2	22 31 15.2	22 33 16.5	22 34 29.6
$°\alpha_m$	332 7 0	332 44 20	333 5 36	333 28 9	333 34 23	335 31 24	335 42 46	335 52 50	336 27 48	337 48 48	338 19 8	338 37 24
δ_m	51 52 43	51 49 27	51 36 48	51 26 39	51 12 47	51 55 15	51 13 20	51 24 3	51 33 9	51 46 59	51 7 16	52 1 19
log sin α	9.66994n	9.66090n	9.65565n	9.64999n	9.64841n	9.61733n	9.61417n	9.61134n	9.60133n	9.57706n	9.56754n	9.56169n
log tang δ	0.10529	0.10444	0.10115	0.09852	0.09493	0.10595	0.09507	0.09785	0.10021	0.10380	0.09350	0.10753
log sin α tan δ	9.77523	9.76534	9.75680	9.74851	9.74334	9.72328	9.70924	9.70919	9.70154	9.68086	9.66104	9.66922
log n sin α tan δ	9.90138	9.89149	9.88295	9.87466	9.86949	9.84943	9.83539	9.83534	9.82769	9.80701	9.98719	9.79537
n sin α tan δ	.79686	.77892	.76375	.74931	.74045	.70702	.68453	.68446	.67250	.64123	.97094	.62427
$\frac{d\alpha_m}{dT}$	2.2752	2.1931	2.3083	2.3227	2.3316	2.3650	2.3875	2.3876	2.3995	2.4308	24[illegible]11	2.4478
$\frac{d\alpha}{dT}$	0 45.50	45.49 0 45.86	45.86 0 46.17	46.17 0 46.45	46.46 0 46.63	46.63 0 47.30	47.30 0 47.75	47.75 0 47.76	47.75 0 47.99	48.00 0 [illegible]	48.62 0 49.12	49.19 0 48.96 48.96
α_0	22 8 5.30	22 10 34.41	22 11 57.29	22 13 29.39	22 13 54.2	22 21 41.95	22 22 27.12	22 23 7.47	22 25 27.21	22 30 50.95	22 32 51.90	22 34 51.3
α 1875.0	22 8 50.80	22 11 20.27	22 12 45.46	22 14 15.84	22 14 40.83	22 22 29.25	22 23 14.87	22 23 55.22	22 26 15.20	22 31 19.57	22 33 40.92	22 35 ~~40.26~~
	8 50.79	11 20.27	12 45.46	14 15.85	14 40.83	22 29.25	23 14.87	23 55.22	26 15.21	31 39.57	33 41.09	34 54.09 (?)
log cos α	9.94640	9.94886	9.95024	9.95167	9.95206	9.95910	9.95975	9.96032	9.96227	9.96659	9.96813	9.96904
log n cos α	11.24864	11.25110	11.25248	11.25391	11.25430	11.26134	11.26199	11.26256	11.26451	11.26883	11.27037	11.27128
n cos α	17.727	17.828	17.885	17.944	17.960	18.253	18.281	18.306	18.387	18.571	18.637	18.676
20 n cos α	5 54.5	54.5 5 56.6	56.6 5 57.7	57.7 5 58.9	58.9 5 59.2	59.2 6 5.1	5.1 6 5.6	5.6 6 6.1	6.1 6 7.7	7.7 6 11.4	11.4 6 12.7	12.7 6 13.5 13.4
δ_0	51 49 35.5	51 46 29.1	51 33 49.0	51 23 39.2	51 9 47.6	51 52 12.0	51 10 17.6	51 20 59.6	51 30 5.2	51 43 53.9	51 4 8.8	51 58 12.4
δ 1875.0	51 55 30.0	51 52 25.7	51 39 46.7	51 29 38.1	51 15 46.8	51 58 17.1	51 16 23.2	51 27 5.7	51 36 12.9	51 50 5.3	51 10 21.5	52 4 25.9
	55 30.0	52 25.7	39 46.7	29 38.1	15 46.8	58 17.1	16 23.2	27 5.7	36 12.9	50 5.3	10 21.5	4 25.8
α_m	23 19 21.6	23 22 35.9	23 23 58.5	23 24 26.2	23 29 20	23 29 23.5	23 29 37.6	23 30 27.1	23 30 31.5	23 31 9.5	23 34 13.6	23 40 19.4
$°\alpha_m$	349 50 24	350 38 59	350 59 38	351 6 33	352 20 0	352 20 58	352 24 24	352 36 47	352 37 53	352 47 23	353 33 24	355 4 51
δ_m	51 56 31	51 30 55	51 54 50	51 10 46	52 2 23	51 52 11	52 0 28	51 32 19	51 32 23	51 52 25	51 48 45	51 12 21
log sin α	9.24649n	9.21077n	9.19462n	9.18907n	9.12518n	9.12435n	9.12103n	9.10913n	9.10806n	9.09868n	9.05007n	8.93323n
log tang δ	0.10628	0.09963	0.10584	0.09441	0.10781	0.10510	0.10738	0.09999	0.09901	0.10521	0.10426	0.09482
log sin α tan δ	9.35277	9.31040	9.30046	9.28348	9.23299	9.22950	9.22841	9.20912	9.20707	9.20389	9.15433	9.02805
log n sin α tang δ	9.47892	9.43655	9.42661	9.40963	9.35914	9.35565	9.35456	9.33527	9.33322	9.33004	9.28048	9.15420
n sin α tan δ	.30125	.27324	.26706	.25682	.22863	.22680	.22624	.21641	.21539	.21382	.19076	.14263
$\frac{d\alpha_m}{dT}$	2.7708	2.7988	2.8050	2.8152	2.8434	2.8452	2.8458	2.8556	2.8567	2.8582	2.8813	2.9294
$\frac{d\alpha}{dT}$	0 55.42	55.42 0 55.98	55.97 0 56.10	56.10 0 56.30	56.30 0 56.87	56.87 0 56.90	56.894 0 56.92	0 57.11	57.11 0 57.13	57.12 0 57.16	57.16 0 57.63	57.63 0 58.60 58.59
α_0	23 18 53.87	23 22 7.91	23 23 30.50	23 23 58.08	23 28 51.59	23 28 53.09	23 29 9.13	23 29 58.58	23 30 2.92	23 30 40.9	23 33 45.05	23 39 50.16
α 1875.0	23 19 49.29	23 23 03.89	23 24 26.60	23 24 54.38	23 29 48.46	23 29 51.99	23 30 06.05	23 30 55.69	23 31 00.05	23 31 38.06	23 34 42.68	23 40 48.76
	19 49.29	23 3.88	24 26.60	24 54.38	29 48.46	29 51.98		30 55.69	31 0.04	31 38.06	34 42.68	40 48.75
log cos α	9.99313	9.99419	9.99461	9.99475	9.99610	9.99611	9.99617	9.99638	9.99639	9.99655	9.99724	9.99839
log n cos α	11.29537	11.29643	11.29685	11.29699	11.29834	11.29835	11.29841	11.29862	11.29863	11.29879	11.29948	11.30063
n cos α	19.741	19.789	19.808	19.815	19.877	19.877	19.880	19.890	19.890	19.897	19.929	19.982
20 n cos α	6 34.8	34.8 6 35.8	35.8 6 36.2	36.2 6 36.3	36.3 6 37.5	37.5 6 37.5	37.5 6 37.6	6 37.8	37.8 6 37.8	37.8 6 37.9	37.9 6 38.6	38.6 6 39.6 39.6
δ_0	51 53 13.2	51 27 37.2	51 51 31.5	51 7 28.2	51 59 4.3	51 48 52.3	51 57 8.9	51 29 0.0	51 29 40	51 49 6.4	51 45 25.6	51 9 1.8
δ 1875.0	51 59 48.0	51 34 13.0	51 58 7.7	51 14 4.5	52 5 41.8	51 55 29.8	52 3 46.5	51 35 37.8	51 35 41.8	51 55 44.3	51 52 42	51 15 41.4
	59 48.0	34 13.0	58 7.7	14 4.5	5 41.8	55 29.8		35 37.8	35 41.8	55 44.3	52 4.2	15 41.4
α_m	0 48 54.1	0 53 26.18	0 55 14	0 56 0	1 0 3.6	1 4 45.1	1 6 53.9	1 8 34.2	1 8 45.3	1 12 51.7	1 15 10.4	1 15 10.15
$°\alpha_m$	12 13 32	13 21 33	13 48 30	14 0 0	15 0 54	16 11 17	16 43 29	17 8 38	17 11 20	18 12 56	18 47 36	18 47 33
δ_m	52 37 7	52 20 8	52 24 52	52 21 44	52 33 51	52 50 47	52 53 44	52 10 57	53 2 41	52 59 24	52 5 10	52 6 1
log sin α	9.32584	9.36371	9.37780	9.38367	9.41342	9.44527	9.45905	9.46945	9.47059	9.49497	9.50806	9.50804
log tang δ	0.11688	0.11244	0.11367	0.11280	0.11502	0.12046	0.12123	0.10904	0.12359	0.12272	0.10863	0.10875
log sin α tan δ	9.44272	9.47615	9.49147	9.49652	9.52844	9.56573	9.58028	9.57849	9.59418	9.61669	9.61659	9.61679
log n sin α tan δ	9.56887	9.60230	9.61762	9.62267	9.65459	9.69188	9.70643	9.70464	9.72033	9.74284	9.74274	9.74294
n sin α tan δ	.37057	.40023	.41460	.41944	.45143	.49191	.50867	.50658	.52521	.55313	.55302	.55328
$\frac{d\alpha_m}{dT}$	3.4425	3.4722	3.4866	3.4914	3.5234	3.5639	3.5806	3.5785	3.5972	3.6051	3.6250	3.6252
$\frac{d\alpha}{dT}$	1 8.85	8.85 1 9.44	9.44 1 9.73	9.72 1 9.83	9.83 1 10.47	10.49 11.28	11.28 1 11.61	11.61 1 11.57	11.59 1 11.94	11.95 1 12.10	1 12.50	12.51 1 12.50
α_0	0 48 19.71	0 52 51.51	0 54 39.20	0 55 25.17	0 59 28.42	1 4 9.54	1 6 18.13	1 7 58.42	1 8 10.40	1 12 15.50	1 14 34.19	1 14 33.96
α 1875.0	0 49 28.56	0 54 00.95	0 55 48.93	0 56 35.00	1 0 38.89	1 5 20.82	1 7 29.74	1 9 09.99	1 9 22.34	1 13 27.60	1 15 46.69	1 15 46.46
	49 28.56	54 0.95	55 48.92	56 35.00	0 38.91	5 20.82	7 29.74	9 40.01	9 22.35		15 46.70	
log cos α	9.99003	9.98808	9.98726	9.98690	9.98491	9.98243	9.98122	9.98026	9.98015	9.97767	9.976[illegible]0	9.97620
log n cos α	11.29227	11.29032	11.28950	11.28914	11.28715	11.28467	11.28346	11.28250	11.28239	11.27991	11.27844	11.27844
n cos α	19.601	19.513	19.476	19.460	19.371	19.261	19.207	19.165	19.160	19.061	18.986	18.986
20 n cos α	6 32.0	32.0 6 30.1	30.2 6 27.5	29.5 6 27.2	29.1 6 27.4	27.4 6 25.2	25.2 6 24.1	24.1 6 23.3	23.3 6 23.2	23.2 6 21.0	6 19.7	19.7 6 19.7
δ_0	52 33 51.4	52 16 52.5	52 21 36.8	52 18 29	52 30 37.2	52 47 34.7	52 50 31.7	52 7 45.2	52 59 29.4	52 56 13.8	52 2 —	52 2 51.8
δ 1875.0	52 40 23.4	52 23 22.6	52 28 6.3	52 24 58.2	52 37 4.6	52 53 [illegible]	52 56 55.8	52 14 18.5	53 5 52.6	53 2 34.8	52 8 19.7	52 9 11.0
	40 23.4	23 22.7	28 6.3	24 58.	37 4.6	53 59.9	56 55.9	14 8.5	5 52.6		8 19.7	
α_m	21 35 39.6	21 37 41.6	21 48 56.9	21 49 18.4	21 51 31.3	21 56 16	22 0 16.3	22 6 51.6	28 8 28.0	22 10 57.3	22 12 22.4	22 13 52.6
$°\alpha_m$												
δ_m	51 40 39	51 7 37	51 22 34	51 41 40	51 29 37	51 15 37	51 42 43	51 34 2	51 52 43	51 49 27	51 36 48	51 26 39
log sin α												
log tang δ												
log sin α tan δ												
log n sin α tan δ												
n sin α tan δ												
$\frac{d\alpha_m}{dT}$ $\frac{d\alpha}{dT}$												
α_0 / α 1876.0	21 35 18.73	21 37 26.47	21 48 35.24	21 48 56.77	21 51 9.50	21 54 53.92	21 59 53	22 6 28.88	22 8 5.30	22 10 34.41	22 11 57.29	22 13 29.39
log cos α												
log n cos α												
n cos α												
20 n cos α												
δ_0 / δ 1875.0	51 37 51.0	51 4 54.0	51 19 34.8	51 38 50.7	51 26 47.2	51 12 43.6	51 39 48.9	51 31 5.2	51 49 35.5	51 46 29.1	51 33 49	51 23 39.2

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α_m	22 41 19.1	22 41 28.3	22 43 57.4	22 46 26.5	22 49 27	22 51 54.9	22 53 43.5	22 56 59.5	23 1 31.6	23 3 1.9	23 5 46.9	23 19 21.5
$°\alpha_m$												
δ_m	51 29 9	51 25 3	51 52 42	51 18 33	51 9 38	51 45 57	51 41 30	51 28 20	51 51 14	51 15 52	51 38 24	51 56 31
log sin δ												
log tang δ												
log sin α tan δ												
log n sin α tan δ												
n sin α tan δ												
$\frac{d\alpha}{dT}$ $\frac{d\alpha}{dT}$												
α_0 / α 1875.0	22 40 54.02	22 41 3.20	22 43 32.53	22 46 1.04	22 49 1.30	22 51 29.14	22 53 17.77	22 56 33.33	23 1 5.16	23 2 35.31	23 5 19.17	23 18 53.87
log cos α												
log n cos α												
n cos α												
20n cos α												
δ_0 / δ 1875.0	51 26 0.8	51 21 54.3	51 49 32.1	51 15 22.4	51 6 26.5	51 42 43.4	51 38 17.3	51 25 7.2	51 47 59.9	51 12 37.7	51 35 8.5	51 53 13.2

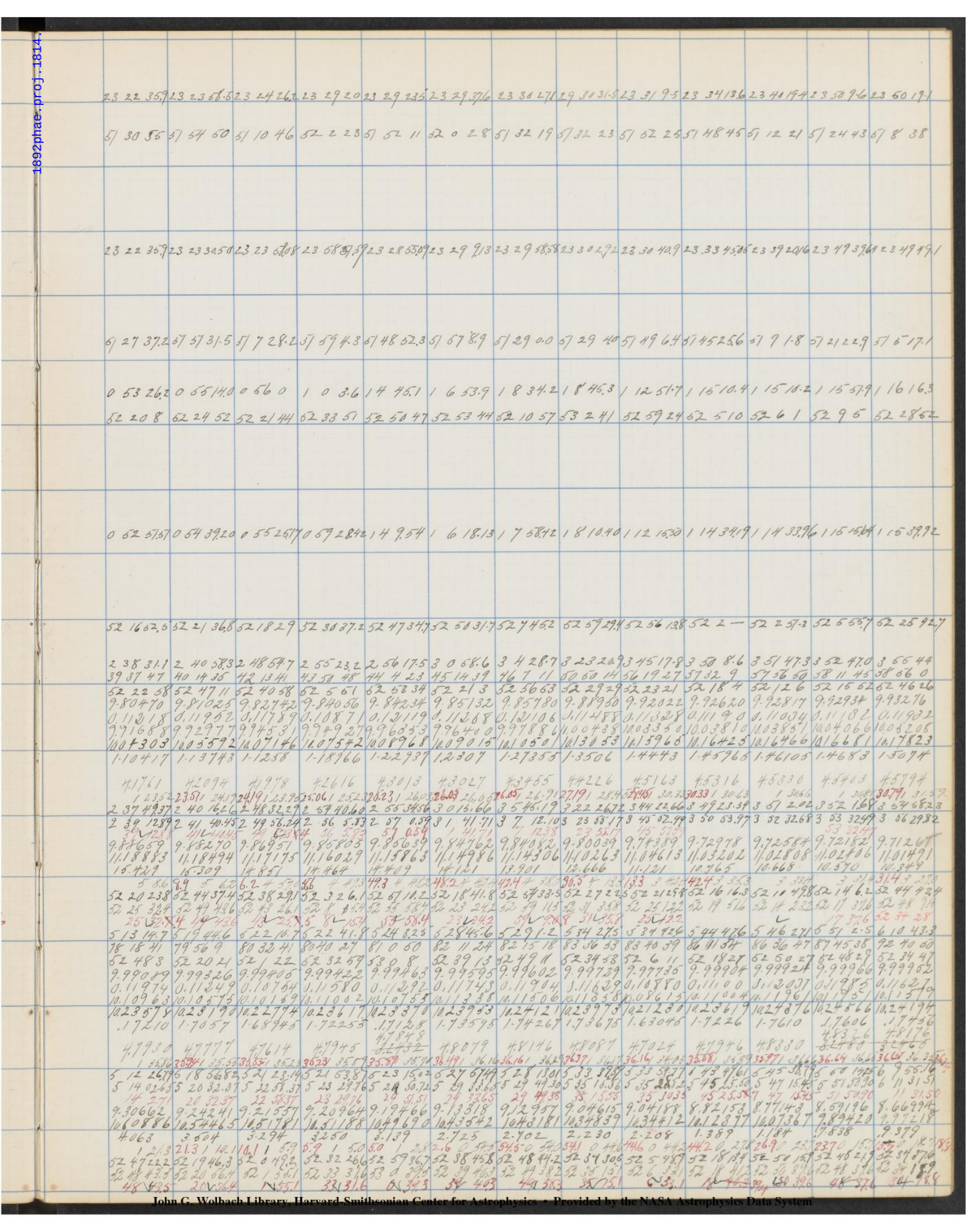
α_m	23 59 36.6	0 0 37.3	0 7 11.1	0 7 26.1	0 10 35.7	0 13 52.8	0 21 13.9	0 22 14.4	0 23 38.8	0 27 47.7	0 46 2.1	0 48 54.1
$°\alpha_m$												
δ_m	51 30 59	52 46 30	52 49 3	53 1 20	52 57 41	52 41 18	52 17 24	52 17 9	52 32 54	52 57 0	52 31 28	52 37 7
log sin α												
log tang δ												
log sin α tan δ												
log n sin α tan δ												
n sin α tan δ												
$\frac{d\alpha}{dT}$ $\frac{d\alpha}{dT}$												
α_0 / α 1875.0	23 59 59.2	0 0 6.56	0 6 39.83	0 6 54.83	0 10 3.65	0 13 21.04	0 20 41.66	0 21 42.03	0 23 6.29	0 27 14.88	0 45 27.99	0 48 19.71
log cos α												
log n cos α												
n cos α												
20n cos α												
δ_0 / δ 1875.0	51 27 38.5	52 43 9.4	52 45 42.3	52 57 59.7	52 54 20.9	52 37 58.1	52 14 4.1	52 13 49.1	52 29 34.4	52 53 41.9	52 28 11.0	52 33 51.4

α_m	~~1 19 58.1~~	~~1 28 48.5~~	~~1 32 19~~	~~1 33 35.0~~	~~1 34 57.5~~	~~1 52 16.0~~	~~1 53 47.2~~	~~1 55 18.6~~	~~1 55 10.1~~	~~1 57 10.6~~	~~2 20 29.6~~	2 36 46.4
$°\alpha_m$												39 11 36
δ_m	52 46 37	52 22 0	52 53 10	52 49 4	52 36 37	~~52 52 6~~	~~52 25 32~~	~~52 16 26~~	~~52 18 26~~	~~52 4 6~~	52 56 22	52 47 19
log sin α												9.80067
log tang δ												0.11955
log sin α tan δ												9.72022
log n sin α tan δ												10.04637
n sin α tan δ												1.1127
$\frac{d\alpha}{dT}$ $\frac{d\alpha}{dT}$												4.1847 / 2 23.69 2370
α_0	~~1 19 21.40~~	~~1 28 17.23~~	~~1 31 41.40~~	~~1 32 57.35~~	~~1 34 19.84~~	~~1 51 37.07~~	~~1 53 8.24~~	~~1 54 39.65~~	~~1 54 41.07~~	~~1 56 31.59~~	~~2 19 48.9~~	2 36 4.58
α 1875.0												2 37 28.27 / 37 28.28 (red)
log cos α												9.88931
log n cos α												11.20155
n cos α												15.906
20n cos α												5 18.1 / 10.8 (red)
δ_0	~~52 43 28.7~~	~~52 18 54.6~~	~~52 50 5.3~~	~~52 45 59.5~~	~~52 33 33.4~~	~~52 49 8.0~~	~~52 22 35.4~~	~~52 12 30.9~~	~~52 15 30.8~~	~~52 1 10.6~~	~~52 24 37.9~~	52 44 43.2
δ 1875.0												52 50 1.3 / 49 ~~54.0~~ 53.6 (red)

α_m	4 2 43.3	4 6 7.4	4 7 22.4	4 18 44.3	4 27 47.5	4 40 31.8	4 44 44.32	4 48 47.8	4 55 49.6	4 56 8.4	4 58 56.1	5 7 59.3
$°\alpha_m$	60 40 50	61 31 51	61 50 36	64 41 5	66 56 53	70 7 57	71 11 5	72 11 57	73 57 24	74 2 6	74 44 2	76 59 50
δ_m	52 35 31	52 37 47	52 2 6	52 11 55	52 44 12	52 9 37	52 49 1	52 16 52	52 28 59	52 2 37	52 32 39	52 40 43
log sin α	9.94046	9.94402	9.94530	9.95615	9.96385	9.97335	9.97614	9.97869	9.98274	9.98291	9.98439	9.98871
log tang δ	0.11646	0.11605	0.10773	0.11029	0.11873	0.10969	0.11900	0.11158	0.11475	0.10787	0.11571	0.11782
log sin α tan δ	10.05692	10.06007	10.05303	10.06644	10.08238	10.08304	10.09514	10.08927	10.09749	10.09078	10.10010	10.10653
log n sin α tan δ	10.18307	10.18622	10.17918	10.19259	10.20873	10.20919	10.22129	10.21542	10.22364	10.21693	10.22625	10.23268
n sin α tan δ	1.5243	1.5354	1.5107	1.5581	1.6171	1.6188	1.66453	1.6422	1.67357	1.6479	1.68366	1.70877
$\frac{d\alpha}{dT}$	4.5963 ~~3.2144~~	4.6074	4.5827	4.6301	4.6891 ~~3.2334~~	4.6908 ~~3.2338~~	4.7365 ~~384~~	4.7142	4.7455	4.7199	4.7556	4.7817
$\frac{d\alpha}{dT}$	1 31.93	31.93 (red) 1 32.15	32.26 (red) 1 32.65	31.66 (red) 1 32.60	32.58 (red) 1 33.76	33.78 (red) 1 33.82	33.82 (red) 1 34.73	1 34.28	34.35 (red) 1 34.91	34.91 (red) 1 34.40	34.40 (red) 1 35.11	35.12 (red) 1 36.61 / 35.62 (red)
α_0	4 1 57.40	4 5 21.34	4 6 36.65	4 17 58.03	4 27 0.63	4 39 44.89	4 43 46.95	4 47 50.71	4 54 52.14	4 56 21.21	4 58 9.52	5 7 11.54
α 1875.0	4 3 29.35	4 6 53.49	4 8 9.30	4 19 30.63	4 28 34.41	4 41 18.71	4 45 21.68	4 49 24.99	4 56 27.05	4 56 55.61	4 59 44.63	5 8 47.15
(red)	3 29.33	6 53.58	8 8.31	19 30.61	28 34.41	41 18.71		49 25.07	56 27.05	56 55.61	59 44.63	8 47.16
log cos α	9.69091	9.67823	9.67383	9.63103	9.59280	9.53128	9.50855	9.48530	9.44148	9.43941	9.42045	9.35217
log n cos α	10.99315	10.98047	10.97607	10.93327	10.89504	10.83352	10.81079	10.78754	10.74372	10.74165	10.72269	10.65441
n cos α	9.843	9.560	9.4640	8.675	7.853	6.815	6.468	6.133	5.542	5.516	5.280	4.512
20n cos α	3 16.9	16.4 (red) 3 11.2	11.2 (red) 3 9.3	9.3 (red) 2 57.5	51.6 (red) 2 37.1	37.1 (red) 2 16.3	16.3 (red) 2 9.4	2 2.6	2.9 (red) 1 50.8	51.1 (red) 1 50.3	50.3 (red) 1 45.6	45.6 (red) 1 30.2 / 30.2 (red)
δ_0	52 33 52.4	52 36 11.6	52 0 31.0	52 10 29.9	52 42 53.6	52 8 28.7	52 47 56.8	52 15 60.9	52 28 3.9	52 1 41.8	52 31 46.0	52 39 57.9
δ_0 1875.0	52 37 9.3	52 39 22.8	52 3 40.5	52 13 21.4	52 45 30.7	52 10 45.0	52 50 6.2	52 17 53.5	52 29 54.7	52 3 32.1	52 33 31.6	52 41 28.1
(red)	37 ✓ 9.2	39 ✓ 22.8	3 ✓ 40.3	13 ✓ 21.5	45 ✓ 30.7	10 ✓ 45.0		17 ✓ 53.50	29 ✓ 54.4	3 ✓ 32.1	33 ✓ 31.6	41 ✓ 28.1

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α_{mn}	6 21 55.9	6 27 46.2	6 29 32	~~2 36 46.4~~	~~2 38 31.1~~	~~2 40 58.3~~	2 48 57.8	2 53 23.2	2 56 17.5	3 0 68.6	3 4 28.7	3 23 20.9	
α_{mn}	95 28 59	96 56 33	97 23 0	99 11 36									
	52 33 37	52 24 13	52 55 17										
δ_{mn}	52 34 36	52 25 1	52 56 8	~~52 47 19~~	~~52 22 38~~	~~52 47 11~~	52 40 58	52 5 51	52 53 34	52 21 3	52 56 53	62 29 29	
log sin δ	9.99800	9.99680	9.99638										
log tang δ	0.11509	0.11301	0.11764										
log sin α tang δ	10.11803	10.11031	10.11802										
log sin α cos α tang δ	0.23920	10.23646	10.24717										
sin α tang δ	1.7347	1.7237	1.7476										
$\frac{d\alpha}{dT}$	48.067	47.987	48.266										
$\frac{d\delta}{dT}$	1 38.63	36.21	35.91	35.91	36.53	36.53							
α_o	6 21 7.82	6 26 58.27	6 28 56.38	~~2 36 45.82~~	~~2 37 49.37~~	~~2 40 16.42~~	2 48 32.29	2 54 40.60	2 55 34.36	3 0 15.66	3 5 45.19	3 22 36.72	
α 1875.0	6 22 39.56	6 28 34.15	6 30 38.21										
	22 44.03	28 34.18	30 36.24										
log cos α	8.98023	9.08233	9.10892										
log sin α cos α	10.28247	10.38457	10.41116										
sin α cos α	-1.9163	2.424	2.577										
20 sin α cos α	-0 38.3	0 48.5	0 51.5	51.9									
δ_o	52 34 16.3	52 24 37.0	52 55 42.4	~~52 44 43.2~~	~~52 20 23.8~~	~~52 44 37.4~~	52 38 29.1	62 3 26.1	52 6 7 10.2	52 18 41.8	52 54 33.5	62 27 22.5	
δ_o 1875.0	52 33 38.0	52 23 48.3	52 54 50.9										
	33 38.0	23 47.5	54 50.6										
α_{mn}	4 56 49.6	4 56 8.4	4 58 56.1	5 7 59.3	5 13 14.7	6 19 44.6	5 22 10.7	5 22 41.8	5 24 23	5 28 45.6	5 29 1.2	5 34 27.5	
α_{mn}													
δ_{mn}	52 28 59	52 2 37	52 32 39	52 40 43	52 48 3	52 20 21	52 1 22	52 32 59	53 0 8	52 39 18	52 49 11	52 34 63	
log sin α													
log tang δ													
log sin α tang δ													
log sin α cos α tang δ													
sin α tang δ													
$\frac{d\alpha}{dT}$													
$\frac{d\delta}{dT}$													
α_o	4 54 52.14	4 55 21.21	4 58 9.52	5 7 11.57	5 12 26.79	5 18 56.82	5 21 23.14	5 21 53.87	6 23 15.62	5 27 67.49	5 28 13.01	5 53 39.39	
α 1875.0													
log cos α													
log sin α cos α													
sin α cos α													
20 sin α cos α													
δ_o	52 28 39.9	52 1 41.8	52 31 46.0	52 39 57.9	52 48 3	52 19 46.3	52 0 49.2	52 32 26.6	52 57 36.7	52 38 45.8	52 48 44.2	52 34 30.5	
δ_o 1875.0	52 14 14.4	52 52 57.2	52 58 38.2	52 16 48.2	52 11 38.2	52 8 42.2	52 38 3	52 37 45.2	52 8 47.2	52 58 36.2	52 24 37.2	52 55 33.2	
α_{mn}	6 50 38.6	7 2 45.4	7 2 59.4	7 3 19.5	7 7 13	7 14 24.9	7 17 15.9	7 20 53.2	7 25 36	7 29 16.1	7 31 41.4	7 33 48.9	
α_{mn}	102 39 39	105 41 21	105 44 51	105 49 53	106 48 15	108 36 14	109 18 39	110 13 18	111 27 0	112 19 2	112 65 21	113 27 14	
δ_{mn}	52 15 42	52 57 46	53 0 26	52 17 37	52 13 34	52 10 50	52 41 16	52 57 4	52 11 13	53 1 9	52 27 36	52 58 13	
log sin α	9.98930	9.98361	9.98338	9.98320	9.98104	9.97669	9.97483	9.97237	9.96897	9.96018	9.96427	9.96254	
log tang δ	0.11090	0.12003	0.12252	0.11130	0.11022	0.10940	0.11712	0.12160	0.10947	0.12291	0.11370	0.12111	
log sin α tang δ	0.10020	0.10364	0.10590	0.09450	0.09126	0.08614	0.09195	0.09387	0.07844	0.08869	0.07797	0.08425	
log sin α cos α tang δ	10.22635	10.22967	10.23205	10.22065	10.21941	10.21229	10.21810	10.22002	10.20459	10.21484	10.20412	10.21030	
sin α tang δ	1.68405	1.69705	1.7063	1.6621	1.64978	1.6304	1.6524	1.6597	1.6075	1.6400	1.6000	1.6230	
$\frac{d\alpha}{dT}$	47.560	47.690	47.783	47.371	47.217	47.024	47.244	47.317	46.795	47.120	46.720	46.950	
$\frac{d\delta}{dT}$	1 35.12	1 35.38	33.46 1 35.87	35.71	34.68	34.68	34.05	34.49	34.43	34.64	34.24	33.44	33.90 33.91
α_o	6 49 5.01	7 1 57.66	7 2 11.63	7 2 32.13	7 6 25.77	7 13 37.80	7 16 28.65	7 20 58.1	7 24 49.26	7 28 26.89	7 30 54.68	7 33 48.9	
α 1875.0	6 51 26.13	7 3 33.04	7 3 47.20	7 4 06.81	7 8 00.20	7 13 11.53	7 16 03.14	7 20 40.44	7 24 22.85	7 30 03.13	7 32 28.12	7 34 35.79	
		3 44.2	3 58.36	4 6.81	8 00.21	13 11.53	16 03.14	20 40.44	24 22.74	29 3.13	31 28.12	33 35.80	
log cos α	9.34079	9.43103	9.43360	9.43586	9.46104	9.50382	9.51954	9.53898	9.56214	9.57947	9.59049	9.59789	
log sin α cos α	10.64303	10.73327	10.73584	10.73809	10.76328	10.80606	10.82178	10.84122	10.86438	10.88171	10.89273	10.90213	
sin α cos α	4.395	5.411	5.443	5.471	5.798	6.398	6.634	6.937	7.317	7.615	7.811	7.982	
20 sin α cos α	1.273	1 48.2	48.5	48.9	1 49.9	1 56.0	2 0.8	2 12.7	2 18.7	2 26.2	2 32.3	2 36.2	2 39.6 39.66
δ_o	52 14 58.0	52 53 57.6	52 58 32.8	52 16 42.7	52 12 36.3	52 9 45.9	52 39 9.3	52 55 54.1	52 10 0.6	52 59 52.4	62 26 17.4	62 56 53.2	
δ 1875.0	52 13 30.1	52 52 34.2	52 57 43.1	52 14 53.3	52 10 40.3	52 7 37.9	52 38 56.6	52 53 33.4	52 7 33.7	52 57 22.1	52 23 41.2	52 54 13.6	13.54
	52 17 41.2	52 52 57.3	52 57 46.2	52 14 56.3	52 10 43.3	52 7 41.9	52 39 0.6	52 53 37.4	52 7 37.7	52 57 26.1	52 23 45.2	52 54 17.6	
α_{mn}	8 39 41.99	9 45.5	9 29 20.5	9 29 57.1	9 41 4.1	9 46 36	9 49 19.8	9 49 43.5	9 49 53.9	10 8 50.3	10 19 15.3	10 22 16.4	
α_{mn}	134 65 29	137 26 23	142 20 8	142 28 32	145 16 2	146 39 0	147 19 57	147 25 53	147 28 29	152 12 35	154 48 50	155 34 6	
δ_{mn}	52 22 24	52 16 47	52 10 53	53 0 8	52 7 44	52 1 45	52 8 49	52 11 41	52 48 27	53 2 27	52 45 1	52 11 37	
log sin α	9.85005	9.83018	9.78606	9.78468	9.75568	9.74016	9.73220	9.73103	9.73051	9.66860	9.62896	9.61658	
log tang δ	0.11180	0.11037	0.10864	0.12183	0.10777	0.10879	0.10708	0.10876	0.11837	0.12197	0.11736	0.10863	
log sin α tang δ	9.96185	9.94045	9.89470	9.90651	9.86429	9.84985	9.83928	9.83979	9.84888	9.79057	9.74632	9.72521	
log sin α cos α tang δ	10.08800	10.06660	10.01085	10.03226	9.98960	9.97500	9.96543	9.96594	9.97503	9.91672	9.87247	9.85136	
sin α tang δ	1.22447	1.16575	1.0253	1.0781	0.97634	0.94407	0.92349	0.92458	0.94413	0.82551	0.74554	0.75017	
$\frac{d\alpha}{dT}$	4.296	4.179	4.093	4.101	4.001	4.078	4.116	4.116	4.116	4.116	4.116	4.116	
$\frac{d\delta}{dT}$	1 24.98	1 24.15	1 21.95	1 22.41	1 23.00	1 20.76	1 20.32	1 19.91	1 19.63	1 20.22	1 17.95	1 16.35	1 16.44 15.64
α_o	8 58 58.66	9 9 3.06	9 28 39.18	9 29 12.57	9 40 23.52	9 45 52.78	9 48 39.81	9 49 34.85	9 49 13.65	10 8 11.25	10 18 37.09	10 21 38.48	
α 1875.0	9 0 24.19	9 10 26.52	9 30 01.13	9 30 35.57	9 41 44.31	9 47 16.10	9 49 59.72	9 50 23.41	9 50 33.81	10 9 29.20	10 19 53.44	10 22 54.92	
	0 24.41	10 27.81	30 1.60	30 35.57	41 44.52	47 16.11	49 54.76	50 23.41	50 33.98	10 9 29.20	19 53.44	22 54.92	54.1 -3
log cos α	9.84891	9.86721	9.89850	9.89932	9.91477	9.92185	9.92521	9.92569	9.92590	9.94677	9.95661	9.96925	
log sin α cos α	11.15115	11.16945	11.20074	11.20156	11.21701	11.22409	11.22745	11.22793	11.22814	11.24901	11.25885	11.26149	
sin α cos α	14.163	14.773	15.876	15.906	16.482	16.753	16.883	16.902	16.910	17.743	18.149	18.261	
20 sin α cos α	4 43.2	4 55.3	5 17.5	5 18.1	5 29.6	5 35.1	5 37.7	5 38.0	5 38.2	5 57.4	6 8.8	6 30.0	6 52.2 5.2
δ_o	52 22 24.6	52 14 18.8	52 8 14.2	52 58 38.7	52 8 57.9	52 8 57.2	52 6 —	52 8 57.6	52 45 37.6	52 59 30.2	52 41 57.2	52 8 34.5	
δ_o 1875.0	52 17 40.8	52 9 43.0	52 2 56.3	52 53 20.6	51 59 30.3	52 3 32.1	52 0 22.3	52 3 13.6	52 39 59.5	52 59 36.1	52 35 56.2	52 2 29.3	
	17 40.8	9 43.2	2 56.6	53 20.6	59 30.3	3 32.1	219 22.3	3 13.6	39 59.5	53 35.2	35 56.2	2 29.5	

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3 45 17.8	3 50 8.6	3 51 47.3	3 52 47	3 55 44	4 2 43.3	4 6 7.4	4 7 22.4	4 18 44.3	4 27 47.5	4 40 31.8	4 44 42.3	4 48 47.9
52 23 21	52 18 4	52 12 6	52 15 52	52 16 26	52 25 31	52 87 47	52 2 6	52 11 55	52 44 12	52 9 37	52 49 1	52 16 32
3 44 32.66	3 49 23.34	3 51 2.02	3 52 1.68	3 57 58.23	4 1 57.40	4 5 21.34	4 6 36.65	4 17 58.03	4 27 0.63	4 39 44.89	4 43 46.95	4 47 30.71
52 21 27.8	52 16 16.3	52 10 49.8	52 14 6.2	52 44 42.4	52 33 52.4	52 36 11.6	52 0 31.0	52 10 29.9	52 42 53.6	52 8 28.7	52 47 56.8	52 45 50.7
5 34 42.6	5 44 47.6	5 46 27.1	5 51 2.6	6 10 43.3	6 21 55.9	~~6 27 46.6~~	~~6 29 32~~	6 35 54.6	6 38 24.5	6 38 39.8	6 41 18	6 48 57.9
52 6 11	52 18 27	52 50 27	52 48 29	52 34 47	52 34 16.3	~~52 25 1~~	~~52 56 8~~	98 58 38	99 36 8	99 39 57	100 19 30	102 14 59
								52 14 45	52 38 46	52 8 21	52 9 46	52 46 24
								9.99464	9.99387	9.99379	9.99290	9.98999
								0.11076	0.11602	0.10907	0.10942	0.11894
								10.10340	10.10989	10.10286	10.10232	10.10893
								10.23155	10.23604	10.22901	10.22847	10.23508
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								4.7763	4.7948	4.7664	4.7643	4.7902
								35.53	35.53	35.95	35.33	35.29
5 33 54.77	5 43 49.61	5 46 38.79	5 50 14.25	6 9 55.16	6 21 78.2	~~6 26 58.7~~	~~6 28 53.8~~	6 35 6.73	6 37 36.46	6 37 62.10	6 40 30.33	6 48 11.98
								6 36 42.26	6 39 12.34	6 39 27.36	42 05.62	6 49 47.78
								36 42.26	39 42.41	39 42.43	42 55.62	49 47.78
								9.19324	9.22221	9.22405	9.25341	9.32667
								10.47548	10.52443	10.52629	10.55563	10.62893
								3.129	3.346	3.359	3.594	4.255
								1.26	2.6 1 69	6.9 1 72	7.3 1 11.9	11.9 1 15.25
82 5 48.9	52 18 13.4	52 58 16.9	52 48 21.9	52 34 37.6	52 34 16.3	~~52 24 37~~	~~52 65 42.7~~	52 14 14.2	52 38 13	52 7 47.6	52 9 10	52 45 41.6
								52 13 11.6	52 37 6.1	52 6 40.4	52 7 58.1	52 44 26.5
62 35 58	52 50 44	52 20 32	52 13 41	52 34 37	52 18 30	51 08 18	52 38 0	52 13 51.62	52 37.2 6.1	52 5 49.3	52 7 58.1	52 44 26.5
7 38 2.1	4 38 37.3	7 56 9.2	7 58 28.1	8 6 5.7	8 13 11.1	8 13 45.5	8 20 29.6	8 30 19.7	8 36 15.7	8 38 8.3	8 48 47.7	8 82 35.7
114 30 32	114 39 20	119 2 18	119 37 2	121 31 26	123 17 47	123 26 23	125 1 50	127 34 56	129 11 26	129 32 5	130 56 56	133 8 56
52 38 45	52 53 32	52 33 47	52 16 59	52 38 7	52 22 10	52 1 57	52 41 50	52 19 56	52 6 16	52 41 21	~~52 2 12~~	52 37 30
9.95899	9.95848	9.94172	9.93919	9.93065	9.92212	9.92140	9.91323	9.89898	9.88932	9.88718	9.87811	9.86307
0.11658	0.12045	0.11515	0.11675	0.11622	0.111 01	0.10674	0.11711	0.11132	0.10771	0.11687		0.11400
10.07557	10.07893	10.05687	10.04994	10.04687	10.03313	10.02814	10.03034	10.01050	9.99803	10.00405		9.97707
10.20172	10.20508	10.18302	10.17609	10.17302	10.13928	10.15429	10.15647	10.13645	10.12418	10.13020		10.10322
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1 32.26	33.26	33.51	31.92	31.44	31.23	30.30	30.37	29.96	29.97	30.12	31.07	28.82	28.82	28.06	28.43	1 26.8
7 37 15.43	7 37 50.46	7 66 23.29	7 67 42.30	8 6 20.06	8 12 26.44	8 13 06.5	8 19 35.0	8 29 35.27	8 36 1.60	8 37 24.05	58 43.38	8 67 32.15
7 38 48.69	39 23.97	56 55.16	57 13.74	8 6 51.29	13 56.148	14 30.51	21 05.62	31 04.09	37 29.66	38 52.98		53 18.99
38 48.69	39 23.97	56 55.16	57 13.74	6 51.29	13 56.148	14 30.51	21 05.62	31 04.09	37 29.66	38 52.98		53 18.99
9.61787	9.62030	9.68609	9.69390	9.71838	9.73954	9.74719	9.75886	9.78525	9.80064	9.80382	9.81649	9.83499
10.72011	10.72254	10.78833	10.79614	11.02062	11.04178	11.04943	11.06110	11.08747	11.10288	11.10606	11.11873	11.13723
8.319	8.366	9.735	9.911	10.486	11.010	11.205	11.511	12.232	12.673	12.766	13.144	13.716
2 46.4	46.4 2 47.3	47.3 3 14.7	14.7 3 15.2	15.2 3 27.7	27.7 3 42.2	42.2 3 44.1	44.1 0 5	5 20.4	4.6 4 13.5	13.5 4 15.3	16.3 4 22.7	4 34.3
52 37 21.4	52 52 8.6	52 32 9.4	52 15 20.2	52 36 22.3	52 20 20.3	52 0 8.4	52 39 55	52 17 53.9	52 4 8.1	52 39 13	52 0 —	52 32 18
52 34 35.0	52 49 20.3	52 28 57.7	57 12 28.2	52 32 57.6	52 19 49.1	51 56 29.3	52 36 18.5	52 13 49	51 59 57.6	52 34 57.7	57 55 37.1	52 27 35.8
52 8 6.3	52 34 0.4	52 48 38.1	52 46 55.2	52 32 57.6	52 12 49.1	52 26 34.4	52 7 36.4	52 4.2 39 47.2	52 34 57.6	34 57.7		27 38.8
10 30 10	10 51 57.7	10 58 23.1	11 16 13.5	11 18 22.2	11 21 19	11 26 42.1	11 36 67.8	11 62 53	12 3 15.6			
157 32 30	162 59 26	164 35 47	169 3 23	169 35 38	170 19 45	171 40 32	174 12 57	178 13 16	180 48 54			
52 14 17	52 41 24	52 11 21	52 63 28	52 69 2	52 21 16	52 32 14	52 21 48	52 44 45	52 10 29			
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0.10980	0.11631	0.10847	0.11940	0.12090	0.11001	0.11387	0.11113	0.11713	0.10717			
9.69137	9.58247	9.53272	9.39784	9.37773	9.33528	9.27457	9.11451	8.60915	8.26019			
1.81752	1.70862	1.65887	1.52399	1.50388	1.46143	1.40072	1.24066	87330	8.38634			
.65694	.51124	.45591	.33419	.31907	.28936	.25161	.11704	-.00536	-.02434			
37 39.0	49 20.8	28 54.7	12 20	32 52	40.1	27	26.7 36.4	3.9 13 49.3	3.0477			
3.7289	2.5892	2.5279	2.4061	2.3910	2.3613	2.3236	2.2460	2.1263	-.0963			
1 1458	14.58 1 11.66	10.791	10.56	10.561	8.12	8.12 1 7.82	7.82 1 7.23	7.24 1 6.47	6.47 1 4.92	4.92 1 3.53	1 0.95	0.95
10 29 32.62	10 57.22	10 57 47.72	11 15 59.36	11 17 46.20	11 20 45.34	11 26 88.6	11 36 19.28	11 52 21.66	12 2 45.48			
10 30 47.20	10 58 33.86	10 58 58.28	11 16 47.48	11 18 86.02	11 21 52.57	11 27 15.33	11 37 24.20	11 53 25.19	12 3 46.43			
30 47.20	58 31.99	58 58.28	16 47.48	18 56.02	21 52.57	27 15.33	37 24.20		3 46.43			
9.96674	9.98057	9.98411	9.99202	9.99279	9.99378	9.99540	9.99778	9.99979	9.99995			
11.26798	11.28287	11.28635	11.29426	11.29503	11.29602	11.29764	11.30002	11.30203	11.30219			
18.635	19.178	19.365	19.691	19.726	19.771	19.845	19.964	20.046	20.054			
6 10.7	6 23.6	26.56 27.1	26.7 6 33.8	33.8 6 34.5	34.5 6 35.7	35.7 6 36.3	36.3 6 36.9	36.9 6 39.1	39.1 6 40.8	6 41.1	41.1	
62 11 11.8	52 38 10.3	52 87 9	52 58 11.8	52 55 44.9	52 17 58	52 28 55.3	52 18 28.2	52 41 24.7	52 7 8.5			
52 5 1.1	52 31 46.7	52 1 40.8	52 43 38.0	52 49 10.4	52 11 22.6	52 22 18.4	52 11 49.1	52 34 43.8	52 0 27.4			
5 1.1	31 43.7	1 41.1	43 36.0	49 10.4	11 22.6	22 18.4	11 49.1					

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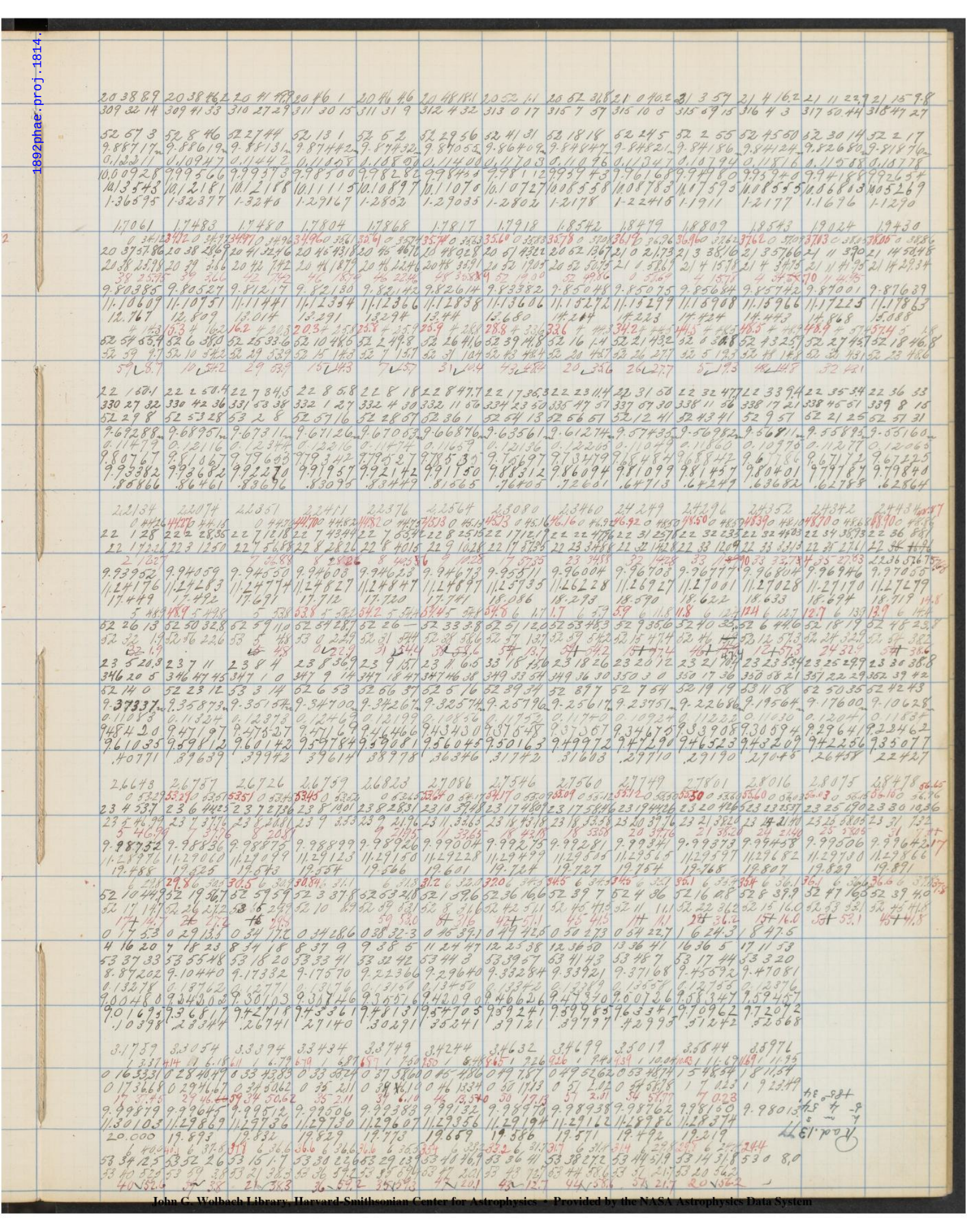
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λ sun	20 20 38.5	20 21 13.3	20 21 36.2	20 21 58.4	20 22 28.8	20 24 14.5	20 26 27.5	20 26 37.2	20 27 6.5	20 30 9.1	20 35 44.7	20 38 5.0	
☉ sun	305 9 38	305 18 20	305 24 3	305 29 56	305 37 12	306 3 38	306 36 53	306 39 18	306 58 45	307 32.17	308 38 41	309 31 16	
sun	52 9 12	52 51 5	52 25 24	52 35 11	52 30 55	52 30 57	52 8 9	52 8 9	52 45 48	52 8 10	52 39 23	52 57 0	
log sin ☉	9.91250	9.91173	9.91122	9.91072	9.91003	9.90762	9.90453	9.90430	9.90246	9.89924	9.89063	9.88727	
log sin δ	0.10908	0.12004	0.11381	0.11627	0.11525	0.11226	0.10931	0.10931	0.11813	0.10931	0.11747	0.12209	
log cos ☉ sin δ	10.02208	10.03227	10.02550 3	10.02709	10.02528	10.02288	10.01384	10.01361	10.02059	10.00825	10.00813	10.00936	
log sin α cos δ	10.14823	10.15842	10.15118	10.15324	10.15143	10.14903	10.13999	10.13976	10.14674	10.13470	10.13425	10.13557	
sin α cos δ	1.40 68	1.4402	1.4164	1.42313	1.4172	1.4074	1.38037	1.3802	1.4020	1.36365	1.36223	1.3662	
								1.6913					
sin α	1.6652	1.6818	1.6556#	1.6489	1.6548	1.6626	1.6917	5870	1.6700	1.7084	1.7098	1.7058	
sin δ	0 33.30	33.31	32.64	33.11	33.98	33.40	33.250	33.83	33.85	34.13	34.17	34.20	34.12
☊	20 20 22.8	20 20 36.9	20 21 19.2	20 21 41.8	20 22 12.9	20 23 58.7	20 26 10.2	20 26 20.7	20 27 38.2	20 29 52.4	20 35 37.6	20 37 47.9	
☊ 1875.0	20 20 56.6	20 21 29.5	20 21 52.7	20 22 15.8	20 22 45.5	20 24 31.2	20 26 44.4	20 26 54.9	20 28 11.6	20 30 26.2	20 36 11.8	20 38 22.1	
	20 36.7	21 29.5	21 52.7	22 15.8	22 45.5	24 31.2	26 44.4	26 54.9	28 11.6	30 26.2	36 11.8	38 22.1	
log cos ☊	9.76032	9.76188	9.76289	9.76388	9.76522	9.76984	9.77556	9.77597	9.77925	9.78482	9.79866	9.80370	
log ☊ cos ι	11.06236	11.06412	11.06513	11.06612	11.06746	11.07208	11.07780	11.07821	11.08149	11.08706	11.10090	11.10594	
☊ cos ι	11.579	11.591	11.618	11.645	11.681	11.805	11.962	11.973	12.064	12.220	12.616	12.763	
20 ☊ cos ι	3 51.0	5.10 3 51.8	3 52.4	3 52.9	3 53.6	3 56.1	3 59.2	3 59.2	4 1.3	1.3 4 4.4	4.4 4 12.3	12.3 4 15.3	15.2
☊	52 9 12	52 49 9.8	52 23 28.2	52 33 14.6	52 11 18.2	52 28 58.5	52 6 9.7	52 6 9.7	52 43 42.9	52 6 8.1	52 37 26.6	52 54 52.4	
☊ 1875	52 13 13.0	52 53 11.6	52 27 20.6	52 37 7.8	52 15 11.8	52 32 54.6	52 10 8.9	52 10 9.2	52 47 44.2	52 10 12.5	52 41 38.8	52 59 7.7	
	13 3.0	53 1.6	27 20.0	37 7.5	15 11.8	32 54.6	10 8.9	10 9.2	47 44.2	10 12.5	44 38.8	52 7.6	
☌ sun	21 25 31.8	21 28 38	21 29 20.9	21 31 57.6	21 33 18	21 40 42.6	21 45 19.9	21 50 8.2	21 50 47.1	21 57 50.4	21 59 32.3	22 0 32.5	
☉ sun	321 22 57	322 0 57	322 20 14	322 59 24	323 19 30	325 10 39	326 19 09	327 32 3	327 41 47	329 27 36	329 53 5	330 8 5	
sun	52 41 15	52 29 14	52 7 6.7	52 44 56.6	52 25 13.8	52 36 3.3	53 2 37	52 29 26	52 50 29	52 27 23.7	52 33 19	52 52 28	
log sin ☌	9.79526	9.78918	9.78605	9.77956	9.77617	9.75666	9.74372	9.72980	9.72787	9.70598	9.70047	9.69716	
log sin δ	0.11796	0.11481	0.10925	0.11892	0.11376	0.11673	0.12057	0.11486	0.12038	0.11330	0.11688	0.11579	
log sin ☌ sin δ	9.91322	9.90399	9.89530	9.89849	9.88993	9.87339	9.86736	9.84466	9.84825	9.81928	9.81630	9.81297	
log sin ☌ cos δ	10.03937	10.03014	10.02145	10.02464	10.01608	9.99954	9.99351	9.97081	9.97440	9.94543	9.94250	9.93912	
sin ☌ cos δ	1.0949	1.0729	1.05065	1.0584	1.0377	.99875	.98617	.93500	.94276	.87600	.87600	.86721	
☌ sun	1.9771	1.9991	2.0214	2.0136	2.0343	2.0731	2.0869	2.0370	2.1293	2.1270	2.1960	2.2018	
☌	0 39.5	39.84	40.00	40.43	40.69	40.69	41.46	41.74	42.37	42.59	43.80	43.92	44.06
☊	21 26 12.8	21 27 43.8	21 29 07.2	21 31 37.6	21 32 57.6	21 40 21.8	21 44 57.6	21 49 46.8	21 50 25.8	21 57 27.6	21 59 10.6	22 0 10.48	
☊ 1875.0	21 25 51.6	21 28 23.8	21 29 47.2	21 32 17.6	21 33 37.6	21 41 1.8	21 45 37.6	21 50 26.8	21 51 5.8	21 58 7.6	21 59 50.6	22 0 50.48	
	25 51.62	28 23.83	29 41.15	32 17.73	33 37.73	41 1.73	45 37.73	50 26.73	51 5.73	58 7.53	59 50.53	60 50.41	
log cos ☌	9.89285	9.89662	9.89851	9.90229	9.90419	9.91430	9.92026	9.92619	9.92697	9.93514	9.93702	9.93812	
log ☊ cos ι	11.19507	11.19886	11.20075	11.20453	11.20643	11.21654	11.22250	11.22843	11.22921	11.23738	11.23926	11.24036	
☊ cos ι	16.670	15.807	15.876	16.015	16.085	16.464	16.692	16.921	16.952	17.274	17.348	17.373	
20 ☊ cos ι	5 13.4	13.4 5 16.1	16.2 5 17.5	17.5 5 20.3	20.3 5 21.7	21.7 5 29.3	29.3 5 33.8	33.8 5 38.4	5 39.0	39.0 5 45.5	45.5 5 47.0	47.0 5 47.7	47.85
☊	52 38 37.9	52 26 36.8	52 5 12.5	52 42 16.5	52 22 32.1	52 33 48	52 39 50.9	52 26 36.9	52 47 39.4	52 20 34.4	52 30 25.2	52 30 48	
☊ 1875.0	52 43 31.3	52 31 34.9	52 10 30.0	52 47 33.8	52 27 53.8	52 39 17.3	53 5 24.7	52 32 14.3	52 53 18.4	52 26 17.9	52 36 12.2	52 35 37.7	
	4 54.3	31 52.0	10 30.0	47 33.8	27 53.8	39 17.3	5 24.7		5 18.4	19.9	26 12.2	25 37.7	52.7
☌ sun	22 37 46	22 45 12.8	22 46 2.5	22 46 49	22 46 11.5	22 46 13.7	52 47 19.7	22 51 22.2	22 53 33	22 55 18.7	22 55 49.7	23 5 3.6	
☉ sun	339 16 9	341 18 27	341 30 38	341 31 14	341 32 53	341 33 26	341 49 56	342 50 33	343 23 15	343 49 41	343 57 26	346 15 54	
sun	52 26 57	52 19 43	52 18 48	62 28 30	52 21 10	52 21 10	52 5 12	52 40 17	52 18 47	52 47 16	52 42 37	62 14 6	
log sin ☌	9.57897	9.50581	9.50123	9.50101	9.50038	9.60017	9.49387	9.46982	9.45621	9.44485	9.44146	9.37553	
log sin δ	0.11423	0.11233	0.11209	0.11462	0.11271	0.11271	0.10857	0.11771	0.11208	0.11967	0.11820	0.11086	
log sin ☌ sin δ	9.66320	9.61814	9.61332	9.61563	9.61309	9.71288	9.60241	9.58753	9.56829	9.56439	9.55978	9.48639	
log sin ☌ cos δ	9.78935	9.74429	9.73947	9.74178	9.73924	9.73903	9.72856	9.71368	9.69444	9.69054	9.68593	9.61254	
sin ☌ cos δ	.61568	.56500	.54888	.55180	.54858	.54832	.53526	.51723	.49482	.47039	.48622	.40777	
☌ sun	2.4564	2.5170	2.5232	2.5202	2.5236	2.5237	2.5368	2.5548	2.6772	2.6817	2.6868	2.6123	
☌	0 42.2	49.13	50.34	50.46	50.41	50.47	50.47	50.74	51.10	51.63	51.61	51.71	53.25
☊	22 36 40	22 44 46	22 45 37	22 45 37	22 45 46	22 45 48	22 46 54	22 50 56	22 53 7.20	22 54 32	22 55 23	23 4 37	
☊ 1875.0	22 37 29.1	22 45 40	22 46 27.3	22 46 20.0	22 46 36.7	22 46 38.9	22 47 46.5	22 51 47.7	22 53 38.7	22 54 44.8	22 56 15.5	23 5 30.2	
	37 29.1	39.03	46 27.3	46 30.0	46 36.7	46 38.9	47 46.5	51 47.7		53 44.8	56 15.5	5 30.2	6
log cos ☌	9.97922	9.97646	9.97698	9.97700	9.97707	9.97710	9.97779	9.98022	9.98148	9.98246	9.98274	9.98740	
log ☊ cos ι	11.27316	11.27870	11.27922	11.27924	11.27931	11.27934	11.28003	11.28246	11.28372	11.28470	11.28498	11.28964	
☊ cos ι	18.757	18.997	19.020	19.021	19.024	19.026	19.056	19.163	19.219	19.262	19.274	19.482	
20 ☊ cos ι	6 15.7	5.1 6 19.9	20.4 6 20.4	20.4 6 20.4	20.4 6 20.5	20.5 6 20.5	20.5 6 21.1	21.1 6 23.3	23.3 6 25.4	6 25.2	25.2 6 25.6	25.6 6 29.6	29.64
☊	52 23 57.6	52 16 33.3	52 15 37.3	52 25 19.4	52 18 —	52 18 —	52 2 1.0	52 37 5.8	52 15 34.3	52 44 3.5	52 39 24.4	52 10 57.9	
☊ 1875.0	52 30 6.7	52 22 33.2	52 21 37.7	52 31 39.8	52 24 24.0	52 24 20.5	52 8 22.1	52 43 29.1	52 21 58.1	52 50 28.7	52 45 49.9	52 17 21.5	
	36 6.7	22 33.2	21 37.7	31 39.8	24 20.5	24 20.5	8 22.1	43 29.1		50 28.7	45 49.9	17 21.5	
☌ sun	23 36 12.7	23 36 22.9	23 41 44.3	23 58 23.3	23 58 33.4	0 2 31.4	0 43 7.9	0 6 41.4	0 7 29	0 7 54.8	0 7 32.4	0 16 25	
☉ sun	354 3 11	354 5 44	355 26 5	359 35 60	359 38 21	0 37 51	1 9 29	1 40 21	1 52 15	1 58 42	2 23 6	4 6 15	
☌ sun	53 0 34	52 22 3	52 46 46	62 5 42	62 6 47	53 36 2	53 35 6	53 42 51	53 4 39	53 19 42	53 54 35	53 41 7	
log sin ☉	9.01539	9.01228	8.90088	7.84693	7.79918	8.04178	8.30557	8.46518	8.51383	8.53809	8.61924	8.85473	
log sin δ	0.12303	0.11294	0.11947	0.10867	0.10869	0.13238	0.13218	0.13219	0.12410	0.12807	0.13730	0.13373	
log sin ☉ sin δ	9.13842	9.12522	9.02039	7.95560	7.90787	8.17416	8.43775	8.59737	8.63793	8.66616	8.75704	8.98846	
log cos ι sin δ	9.26457	9.25137	9.14644	8.08175	8.03402	8.30031	8.56385	8.72492	8.76401	8.79231	8.87269	9.11461	
sin ι cos δ	−.18390	−.17839	−.14010	−.12071	−.01081	.01996	.03663	.05303	.06808	.06198	.07633	.13020	
								3.1 250					
sin δ	2.8881	2.8937	2.9319	2.9513	3.0612	3.0919	3.1086	3.1300	3.1339	3.1483	3.2022		
☌	0 57.76	57.87	58.64	59.03	1.20	1.22	1.23	1.84	1.84	2.77	2.81	2.50	2.93	2.60	2.68	2.68	2.97	2.94	4.05
☊	23 35 43.8	23 35 53.6	23 41 15.3	23 57 47.6	23 58 28.0	0 2 0.57	0 4 6.87	0 6 10.19	0 6 57.2	0 7 43.5	0 9 0.7	0 16 53.07	
☊ 1875.0	23 36 41.6	23 36 51.8	23 42 13.6	23 58 45.9	23 59 26.3	0 3 2.41	0 5 9.04	0 7 12.69	0 8 0.32	0 8 46.19	0 10 3.14	0 16 55.11	
		36 51.8	42 13.6	58 45.9	59 26.3	3 2.41	5 9.04	7 12.69	8 0.32	8 46.19	10 3.14	16 55.11	
log cos ☌	9.99765	9.99768	9.99862	9.99998	9.99999	9.99997	9.99991	9.99981	9.99976	9.99974	9.99962	9.99888	
log ☊ cos ι	11.29989	11.29992	11.30086	11.30222	11.30223	11.30221	11.30215	11.30205	11.30200	11.30198	11.30186	11.30112	
☌ cos ι	19.948	19.949	19.992	19.963	20.056	20.054	20.047	20.047	20.045	20.044	20.038	20.004	
20 ☌ cos ι	6 39.0	6 39.0	39.0 6 39.8	39.8 6 39.3	41.1 6 41.1	41.1 6 41.1	41.1 6 41.1	41.2 6 40.7	40.9 6 40.7	40.9 6 40.7	40.9 6 40.8	40.8 6 42.1	42.1
☊	23 35 43.8	52 18 43.1	52 43 26.2	52 2 21.2	52 2 26.2	53 32 41	53 31 44.2	53 39 30.4	53 1 18.6	53 16 21.8	53 51 17.8	53 37 46.7	
☊ 1875.0	52 42 22.9	52 25 22.1	52 50 6.0	52 9 0.6	52 9 4.6	53 39 22.1	53 38 25.2	53 46 11.3	53 7 59.4	53 23 2.7	53 57 55.6	53 44 26.8	
		22.1	6.0	0.6	4.6	22.1	25.2	11.3	59.4	2.7	55.6	26.8	

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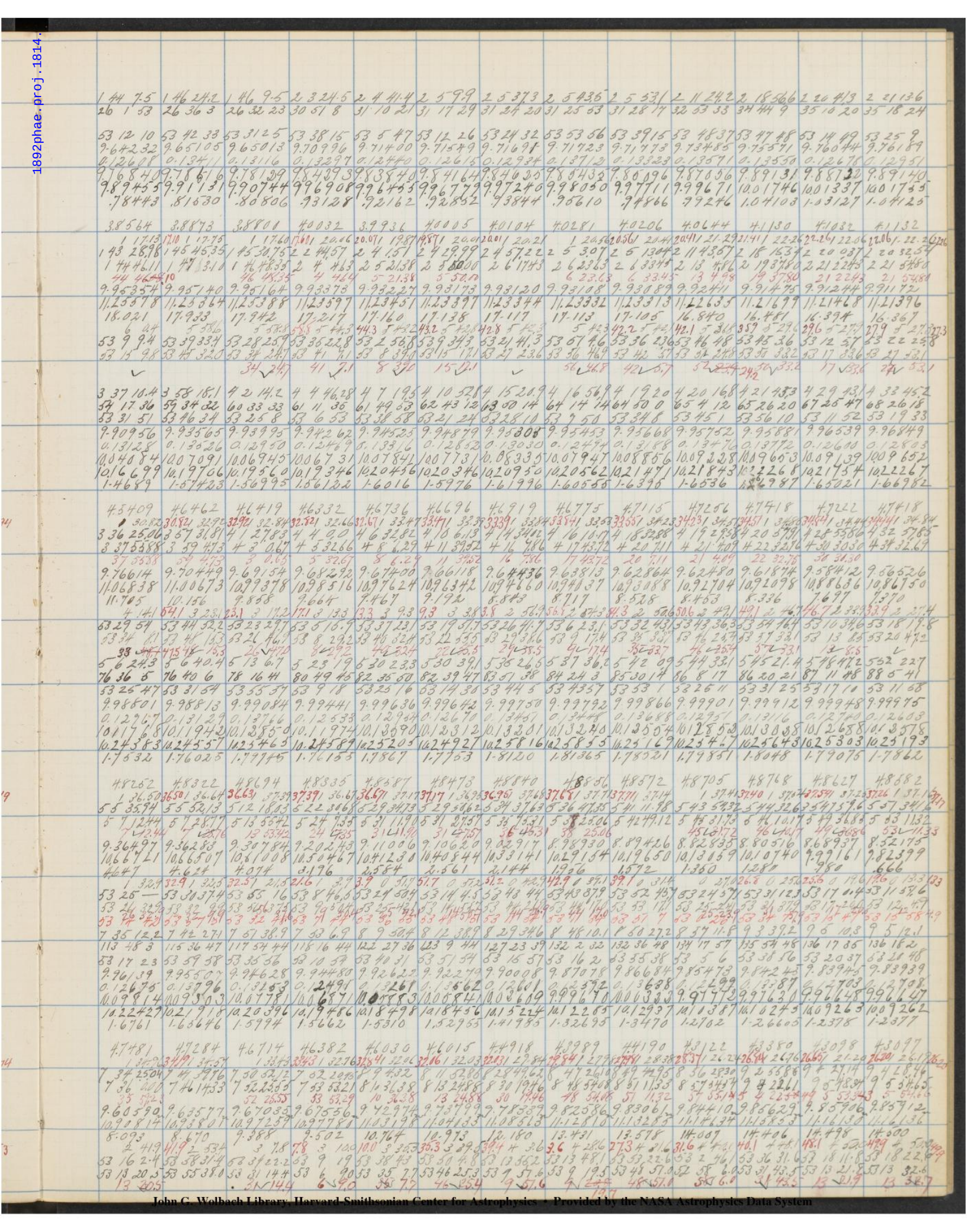
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α m	1 8 47.5	1 9 48.6	1 20 4	1 21 45.4	1 29 38	1 29 39.0	1 30 52.8	1 31 30.4	1 33 33.9	1 33 47.2	1 40 27.1	1 42 9.9
α m	17 11 53	17 27 9	20 1 0	20 26 21	22 15 07	22 24 45	22 43 12	22 52 36	23 23 29	23 26 48	25 6 47	25 32 27
δ m	53 3 20	53 12 18	53 27 15	53 34 0	53 25 22	53 63 66	53 26 56	53 52 20	53 25 44	54 0 37	53 29 36	53 32 34
log cos δ	9.47081	9.47699	9.53739	9.54309	9.57853	9.58123	9.58684	9.58966	9.59880	9.59946	9.62778	9.63464
log sin δ	0.12376	0.12612	0.13006	0.13184	0.12956	0.13712	0.12998	0.13670	0.12966	0.13890	0.13068	0.13146
log cos δ sin δ	9.59457	9.60311	9.66445	9.67493	9.70809	9.71830	9.71682	9.72636	9.72846	9.73866	9.75846	9.76610
log sin δ sin δ	9.72072	9.72926	9.79060	9.80108	9.83424	9.84450	9.84297	9.85251	9.85461	9.86481	9.88461	9.89225
m cos δ	.52568	.53612	.61745	.63253	.68272	.69904	.69658	.71205	.71551	.73251	.76668	.78028
m												
Δα	3.5971	3.6081	3.6894	3.7045	3.7847	3.7710	3.7685	3.7840	3.7875	3.8045	3.8386	3.8522
Δ T	1 11.93	11.45 1 12.16	12.10 1 13.80	13.79 1 14.09	14.09 1 14.09	1 15.42	15.42 1 15.37	15.38 1 15.38	15.68 1 15.75	15.75 1 16.12	16.09 1 16.77	16.77 1 17.04 17.05
Δ δ	1 8 11.57	9 12.55	1 19 2.17	1 21 8.40	1 28 26.34	1 29 1.37	1 30 16.79	1 30 52.60	1 32 36.6	1 33 9.19	1 39 46.81	1 41 31.44
α 1875.0	1 9 23.49	10 24.71	1 20 40.97	1 22 22.49	1 29 40.43	1 30 16.79	1 31 30.36	1 32 8.28	1 34 12.11	1 34 25.29	1 41 3.58	1 42 48.49
	9 23.49	10 24.71	20 40.96	22 22.49		30 16.79	31 30.36	32 8.28	34 12.11	34 25.29	41 3.58	42 48.49
log cos α	9.98013	9.97953	9.97253	9.97175	9.96634	9.96588	9.96492	9.96442	9.96275	9.96257	9.95687	9.95533
log sin α	11.28237	11.28177	11.27517	11.27399	11.26858	11.26812	11.26716	11.26666	11.26497	11.26781	11.25911	11.25787
m cos α	19.159	19.132	18.844	18.793	18.560	18.541	18.500	18.478	18.407	18.527	18.160	18.096
20 m cos α	6 23.2	23.2 6 22.5	22.6 6 16.9	16.9 6 15.9	15.8 6 11.2	6 11.0	10.8 6 10.0	10.0 6 9.5	9.5 6 8.1	8.1 6 11.5	8.0 6 3.2	3.2 6 1.8 19
δ 0	53 0 8.0	53 9 6.9	53 24 6.5	53 30 51.7	53 22 16.5	53 50 51	53 23 51	53 49 14.7	53 22 39.5	53 57 33.2	53 26 34.3	53 29 33.4
δ 1875.0	53 6 31.2	53 15 29.4	53 30 23.4	53 37 7.6	53 28 27.7	53 57 1.8	53 30 1.0	53 55 24.2	53 28 47.6	54 3 43.7	53 33 37.5	53 36 35.2
	6 √31.2	15 √29.5	30 √23.4	37 √7.5		57 √1.8	30 √1.0	55 √24.2	28 √47.6	3 √41.2	32 √37.5	35 √35.3
α m	2 21 31.4	2 21 25.3	2 32 49.9	2 38 9.2	2 43 17.5	2 57 39.4	2 58 5.8	3 1 47.1	3 2 9.7	3 10 28.2	3 16 23.1	3 21 16.7
α m	36 22 57	36 21 20	38 12 29	39 32 18	40 49 23	44 24 51	44 31 27	45 26 47	45 32 26	47 37 3	49 5 47	50 19 11
δ m	53 20 49	53 20 49	53 35 47	53 37 10	53 58 40	53 56 46	53 49 31	53 10 42	54 0 15	53 39 22	53 43 33	53 11 18
log cos α	9.76268	9.76241	9.77935	9.80386	9.81539	9.84499	9.84584	9.85284	9.85354	9.86844	9.87841	9.88627
log sin δ	0.12836	0.12836	0.13231	0.13268	0.13838	0.13787	0.13796	0.12570	0.13880	0.13326	0.12408	0.12585
log cos δ sin α	9.89104	9.89077	9.92366	9.93654	9.96377	9.98286	10.08179	9.97854	9.99234	10.00170	10.00349	10.01212
log cos δ cos α	10.01719	10.01692	10.04981	10.06269	10.07992	10.10901	10.20794	10.10469	10.11847	10.12785	10.12867	10.13827
m cos δ sin α	1.04037	1.03975	1.12155	1.1553	1.20205	1.28533	1.61415	1.2726	1.3137	1.3423	1.34476	1.3749
m	1.6963											
Δα	4.1128	4.1117	4.1935	4.2273	4.2740	4.3573	4.3461	4.3446	4.3857	4.4143	4.4167	4.4469
Δ T	1 22.25	1 22.23	23.31 1 23.87	23.87 1 24.53	24.53 1 25.48	1 27.15	1 26.97	27.08 26.87	26.90 1 27.71	27.71 1 28.27	28.29 1 28.33	28.33 1 28.94 28.94
Δ δ	2 20 50.35	2 30 43.68	2 32 7.98	2 37 27.02	2 42 34.83	2 56 55.92	2 67 22.33	3 1 18.66	3 1 25.87	3 9 44.14	3 15 38.99	3 20 32.30
α 1876.0	2 23 12.60	2 32 5.91	2 33 31.85	2 38 51.57	2 43 58.31	2 57 23.07	2 58 44.29	3 2 38.49	3 2 53.38	3 11 12.43	3 17 7.32	3 22 1.24
		32 5.94	33 31.85	38 51.57			58 44.44	2 35.50	2 53.38	11 12.43	17 7.32	22 1.24
log cos α	9.91132	9.91146	9.89529	9.88716	9.87894	9.85388	9.85306	9.84607	9.84534	9.82870	9.81610	9.80516
log sin δ	11.21356	11.21370	11.19753	11.18940	11.18118	11.15612	11.15530	11.14831	11.14758	11.13094	11.11834	11.10740
log cos α cos δ	16.352	16.367	15.769	15.467	14.977	14.326	14.299	14.071	14.047	13.519	13.132	12.806
20 m cos α	3 27.0	3 27.0	16.7 3 15.2	13.2 3 9.3	9.3 3 3.5	4 16.5	4 16.0	46.0 4 11.4	41.3 4 11.9	41.0 4 3.0	30.4 4 22.6	22.6 4 16.1 16.1
δ 0	53 18 6.3	53 4 13.3	53 33 9.0	53 37 35.8	53 56 8.8	63 54 22.1	53 47 8.1	53 8 2.1	53 57 34.6	53 37 6.7	53 2 22	53 9 10.0
δ 1875.0	53 23 32.5	53 9 40.3	53 38 24.2	53 39 46.1	54 1 12.3	53 49 8.6	53 37 34.1	53 13 27.4	54 2 33.5	53 41 37.1	53 6 44.6	53 13 26.1
		9 √30.0	38 √24.2	39 √45.7			51 √54.1	13 √2.3	2 √35.6	41 √37.1	6 √44.6	13 √36.1
α m	4 34 42.6	4 38 49.1	4 38 38.7	4 47 15.8	4 47 37.9	4 50 12.2	4 54 34.7	4 64 37	4 59 16.2	5 2 31.7	5 4 1.3	5 6 19.2
α m	68 40 39	69 42 17	69 44 41	71 48 48	71 57 29	72 33 3	73 38 41	73 39 15	74 49 3	75 37 56	76 0 20	76 34 48
δ m	53 23 15	53 7 26	53 48 59	53 41 20	53 12 7	53 22 14	53 8 41	88 11 5	53 31 40	53 27 36	53 3 47	53 25 25
log cos α	9.96920	9.97216	9.97227	9.97774	9.97797	9.97934	9.98206	9.98208	9.98457	9.98616	9.98691	9.98797
log sin δ	9.12440	9.12440	9.13581	9.13376	9.12607	9.12874	9.12516	9.12588	9.13123	9.13024	9.12386	9.12958
log cos α cos δ	9.09260	9.09700	9.11808	9.11162	9.10404	9.10828	9.10722	9.10788	9.10158	9.11646	9.11079	9.11765
log sin α cos δ	10.22435	10.24315	10.23423	10.23767	10.23019	10.13443	10.23337	10.23403	10.14195	10.24255	10.23694	10.24370
m cos δ cos α	1.6763	1.76046	1.7149	1.7285	1.6790	1.3628	1.7115	1.7141	1.3866	1.74805	1.7256	1.7627
m	4.7483	4.7424	4.7869									
Δα	896			4.8005	4.7710	4.7848	4.7187	4.7861	4.8186	4.8200	4.7976	4.8247
Δ T	1 34.9	34.97 1 34.85	34.87 1 35.74	35.74 1 36.04	36.01 1 36.72	36.70 1 36.70	36.78 1 34.37	35.72 1 35.72	35.72 1 36.37	36.36 1 36.40	36.40 1 36.98	36.95 1 36.41 36.49
Δ δ	4 33 55.18	4 38 41.67	4 38 10.89	4 46 21.21	4 46 50.31	4 49 24.39	4 53 46.85	4 53 49.18	4 58 28.46	5 1 43.50	5 3 13.36	5 5 30.98
α 1875.0	4 35 30.15	35 30.15	39 36.57	39 46.63	48 3.22	48 25.78	57 0.14	53 22.57	53 24.90	0 4.42	3 29.90	4 4.31 4 7.48
log cos α	9.56014	9.56015	9.53933	9.49431	9.49212	9.47691	9.44962	9.44937	9.41812	9.39470	9.38350	9.36565
log sin α cos δ	10.86288	10.84239	10.84157	10.79655	10.79436	10.77915	10.75186	10.75161	10.72036	10.69694	10.68574	10.66789
m cos α cos δ	7.292	6.956	6.943	6.259	6.228	6.013	5.647	5.644	5.282	4.976	4.850	4.654
20 m cos α	2 25.8	25.8 2 19.1	19.1 2 18.9	18.9 2 9.2	5.2 2 4.6	4.5 2 0.3	0.3 1 52.9	53.0 1 52.7	52.9 1 45.1	45.1 1 37.3	37.3 1 37.0	37.0 1 33.1 33.0
δ 0	53 22 2.6	53 6 16.1	53 47 50	53 40 17.4	53 11 4.3	53 21 14.1	53 7 44.8	53 10 8.8	53 30 57.9	53 27 6.5	53 3 8.7	53 24 38.3
δ 1876.0	53 24 26.0	53 8 39.5	53 50 13.4	53 42 25.6	53 13 12.3	53 23 22.1	53 9 52.8	53 12 16.8	53 32 45.9	53 28 54.5	53 4 56.7	53 26 26.1 14.3
	53 24 26.0	53 8 39.5	53 50 13.4	53 42 25.6	53 13 12.3	53 23 22.1	53 9 52.8	53 12 16.8	53 32 45.9	53 28 54.5	53 4 56.7	53 26 26.1
	53 24 26.0	53 8 39.5	53 50 13.4	53 42 25.6	53 13 12.3	53 23 22.1	53 9 52.8	53 12 16.8	53 32 45.9	53 28 54.5	53 4 56.7	53 26 26.1
	53 24 26.0	53 8 39.5	53 50 13.4	53 42 25.6	53 13 12.3	53 23 22.1	53 9 52.8	53 12 16.8	53 32 45.9	53 28 54.5	53 4 56.7	53 26 26.1
Δ m	6 5 21.6	6 26 18.6	6 5 2 20.9	6 6 6 58.1	6 6 58 9.3	7 10 59.2	7 11 66.1	7 16 20.2	7 21 51.8	7 22 1.7	7 29 16.1	7 31 6.3
α m	91 20 24.4	96 37 39	103 5 14	104 14 32	104 32 20	107 44 48	107 89 2	109 6 3	110 27 57	110 30 26	112 19 2	112 46 35
δ m	53 50 17	53 33 53	53 9 54	53 42 38	53 56 11	53 25 12	53 26 8	53 30 35	53 27 11	53 18 23	53 1 16	53 31 30
log cos δ	9.99988	9.99713	9.98857	9.98644	9.98586	9.97882	9.97824	9.97544	9.97168	9.97156	9.99618	9.96474
log sin δ	0.13611	0.13205	0.12500	0.13413	0.13369	0.13162	0.12922	0.13036	0.12943	0.12711	0.12321	0.13050
log cos δ sin δ	10.13599	10.12918	10.11307	10.12057	10.11955	10.11044	10.10746	10.10858	10.10111	10.09867	10.11939	10.09524
log sin α cos δ	10.26214	10.25533	10.23972	10.14672	10.24370	10.23659	10.23361	10.23193	10.22726	10.22482	10.24354	10.22139
m cos δ sin α	1.8287	1.80025	1.7367	1.40191	1.76077	1.7242	1.71242	1.7059	1.6876	1.6781	1.76012	1.6649
Δα	4.9007	4.8722	4.8087	4.8439	4.8327	4.7962	4.7844	4.7779	4.7596	4.7501	4.7212	4.7367
Δ T	1 38.01	38.01 1 37.44	37.44 1 36.17	36.17 1 36.88	36.88 1 36.68	36.70 1 36.60	36.43 1 36.92	36.92 1 36.68	36.69 1 36.56	36.56 1 36.19	36.19 1 36.07	36.07 1 36.01 1 34.24 34.24 1 34.74 34.74
Δ δ	6 4 32.54	6 25 29.86	6 51 32.78	6 56 9.75	6 57 20.77	7 10 11.17	7 11 8.23	7 16 32.4	7 21 41.67	7 21 14.15	7 28 28.89	7 30 18.91
α 1875.0	6 6 10.55	6 27 7.30	6 53 8.95	6 57 46.45	6 58 57.46	7 11 47.09	7 12 43.92	7 17 7.97	7 22 39.36	7 22 49.15	7 29 3.13	7 31 53.64
	6 10.55	27 7.30	53 8.95	57 46.45	58 57.46	11 47.09	12 43.92	17 7.97	22 39.36	22 49.15	30 3.13	31 53.64
log cos α	8.36894	9.05898	9.35494	9.39097	9.39973	9.48402	9.48960	9.54469	9.54363	9.54447	9.67947	9.58786
log sin δ	9.67118	10.36222	10.15718	10.16321	10.17019	10.17826	10.17184	10.18173	10.18457	10.18471	10.18811	10.18901
m cos α	469	4.302	4.541	4.934	5.034	6.118	6.192	6.557	7.012	7.026	7.615	7.764
20 m cos α	0 9.4	9.4 0 4.6	4.6 0 3.8	3.8 0 3.8	3.8 0 3.8	3.8 0 2.3	2.3 0 2.3	2.3 0 1.1	1.1 0 2.2	2.2 0 2.2	2.2 0 3.2	3.2 0 3.2 3.3 3.3
δ 0	53 36 12.1	53 35 10	53 8 48.8	53 41 48.5	53 57 20.9	63 34 16.5	53 25 6.3	63 29 29.2	63 26 1	53 17 13.2	53 0 —	53 31 12.7
δ 1875.0	53 50 2.7	53 34 24.0	53 7 18.0	53 40 9.8	53 52 40.2	53 32 8.2	53 23 2.3	53 27 18.1	53 23 40.8	53 14 52.7	52 57 27.7	53 27 37.1
	50 N 2.7	34 √24.0	7 √18.0	40 √9.8	52 40.2	32 √8.2	23 √2.3	27 √18.1	23 √40.8	14 √52.7	57 27.7	27 √37.1

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Δ sec	9 18 39.8	9 23 10.3	9 40 37.7	9 42 59.2	9 53 12.2	10 8 50.3	10 11 46.6	10 19 25.6	10 26 41.6	10 57 29.8	10 57 59.5	11 3 36.7	
α sec	139 39 57	140 47 35	145 9 26	145 44 48	148 18 3	152 12 35	152 56 39	154 57 24	156 40 24	163 37 27	164 29 07	165 54 11	
	53 7 22	53 10 32	53 31 5	53 46 32	53 37 57		53 53 27	53 58 43	53 59 29	53 56 0	53 3 16	53 0 28	
δ sec	53 12 28	53 15 43	53 36 34	53 52 3	53 43 31	53 2 57	53 39 53	53 34 56	53 12 7	52 2 25	53 9 43	56 6 57	
log r sin Δ	9.81106	9.80080	9.75688	9.75039	9.72053	9.66860	9.65787	9.62827	9.59766	9.45015	9.42692	9.38661	
log tang δ	0.12482	0.12665	0.13107	0.13516	0.13266		0.13183	0.13049	0.12445	0.12367	0.12374	0.12300	
log sin α cos δ	9.99 5088	9.99 2645	9.98 7905	9.98 8555	9.98 5319		9.97 8970	9.97 6876	9.97 2211	9.95 7382	9.95 0669	9.94 0961	
log tang α	10.06203	10.05260	10.01410	10.01170	9.97934		9.91585	9.88491	9.84826	9.69997	9.67681	9.63576	
log sin α cos δ tang δ	1.15388	1.12877	1.0330	1.0273	.95365		.82386	.76721	.70512	.50116	.47513	.43228	
			4.1050										
Δ sec	42255	42007	43724	40993	40285		38958	38392	37771	35731	35171	35042	
dα/dT	1 24.51	24.51 1 24.0	24.01 1 22.10	22.10 1 21.99	21.99 1 20.51	20.51	1 17.92	17.92 1 16.78	16.78 1 15.34	15.34 1 11.46	11.79 1 10.34	10.94 1 10.08	10.085
Δ	9 17 57.52	9 22 28.9	9 39 56.62	9 42 18.9	9 52 3.84	10 8 11.25	10 11 7.44	10 18 47.16	10 26 37.9	10 53 53.80	10 57 24.1	10 57 53.83	
α 1875.0	9 19 2.03	9 23 52.20	9 41 18.72	9 43 40.18	9 53 52.35		10 12 25.36	10 20 3.94	10 27 19.33	10 55 5.32	10 58 34.64	11 4 11.71	
	19 2.03	23 52.20	41 18.72	43 40.18	53 52.35		12 25.36	20 3.94	27 19.33	55 5.32	58 34.64	5 4 11.715	
log cos α	9.8821 1	9.8892 2	9.9141 9	9.9172 7	9.9298 3	9.9467 7	9.9496 6	9.9667 6	9.9762 9	9.9820 1	9.9839 0	9.9867 2	
log sin cos α	11.18735	11.19146	11.21643	11.21951	11.23207	11.24907	11.25190	11.25908	11.26520	11.28425	11.28617	11.28896	
log r cos α	10.288	10.540	10.860	10.877	11.064	11.743	11.861	11.936	12.017	12.242	12.326	12.752	
20 r cos α	5 55	5 75 5 10.8	10.8 5 22.2	29.2 5 31.5	31.5 5 41.3	41.3 5 57.9	5 57.2	57.2 6 3.1	3.1 6 6.3	6.3 6 24.8	24.8 6 26.5	26.5 6 27.0	29.0
δ	53 9 55	53 13 7.6	53 33 49.8	53 49 17.6	53 40 40.4	53 0 —	53 36 56.9	53 31 57.1	53 9 3.3	53 57 12.7	53 6 29.5	53 3 42.8	
δ 1875.0	53 4 49.2	53 7 56.7	53 28 20.6	53 43 46.1	53 34 49.1	52 54 5.1	53 30 58.7	53 25 57.0	53 2 55.0	53 52 47.9	53 0 3.0	52 57 13.8	
	4 49.2	7 56.7	28 20.6	43 46.1	34 49.1		30 58.7	25 57.0	2 55.0	52 47.9	0 3.0	57 13.8	
	53 28 3	53 31 12	53 50 53	53 10 43	53 12 6	52 39 19	53 41 18	53 37 27	53 37 27	53 42 36	53 26 7	53 27 24	
α sec	12 49 43.1	12 49 48.2	12 57 25.2	12 58 26.6	12 59 56.4	13 4 40.1	13 14 27.8	13 26 2.6	13 27 16.7	13 35 11	13 35 18.9	13 35 28	
δ sec	192 25 47	192 27 3	193 6 18	194 36 39	194 59 6	196 10 2	198 36 57	201 30 39	201 49 11	203 47 45	203 49 44	203 62 0	
Δ sec	53 35 3	53 38 4	53 37 20	53 17 11	53 18 33	53 45 44	53 47 33	53 44 7	53 43 39	53 58 43	53 32 5	53 33 81	
log sin α cos δ	9.33292	9.33365	9.35552	9.40183	9.41257	9.44473	9.50409	9.56428	9.57047	9.60582	9.60638	9.60703	
log tang δ	0.13039	0.13119	0.13101	0.12570	0.12606	0.13223	0.13375	0.13287	0.13276	0.13677	0.12976	0.13010	
log sin α cos δ tang δ	9.46331	9.46484	9.48653	9.52763	9.53863	9.57798	9.63784	9.69711	9.70382	9.74209	9.73614	9.73713	
log sin α cos δ tang δ	9.58946	9.59099	9.61268	9.65368	9.66478	9.70413	9.76399	9.82330	9.82938	9.86874	9.86229	9.86328	
r sin Δ tang δ	.38857	.38994	.40991	.45049	.46215	.50598	.58076	.66574	.67512	.73917	.72827	.72993	
Δ sec	2.6835	2.6821	2.6621	2.6216	2.6099	2.5661	2.4913	2.4063	2.3969	2.3329	2.3438	2.3421	
dα/dT	0 53.67	53.67 0 53.64	53.64 0 53.24	53.24 0 52.43	52.43 0 52.20	52.20 0 51.32	51.32 0 49.83	49.83 0 48.13	48.13 0 47.95	47.95 0 46.66	46.66 0 46.57	46.57 0 46.84	46.84
Δ	12 49 16.26	12 49 21.38	12 57 68.50	12 58 0.37	12 59 30.30	13 4 14.30	13 14 2.89	13 26 58.48	13 26 52.71	13 34 47.74	13 34 55.46	13 35 4.58	
α 1875.0	12 50 9.93	12 50 15.02	12 57 51.74	12 58 52.80	13 0 22.50	13 5 5.68	13 14 53.27	13 26 48.86	13 26 43.09	13 34 37.92	13 34 46.23	13 34 55.42	
	50 9.93	50 15.02	52 51.74	58 52.80	0 22.50	5 5.68	14 53.27	26 48.86	27 43.09	35 37.92	35 46.23	35 55.42	
log cos α	9.98962	9.98966	9.98853	9.98572	9.98477	9.98247	9.97666	9.96864	9.96771	9.96141	9.96130	9.96117	
log sin cos α	11.29193	11.29190	11.29077	11.28796	11.28721	11.28471	11.27890	11.27088	11.26993	11.26365	11.26354	11.26341	
log r cos α	19.585	19.593	19.407	19.374	19.262	19006	18.689	18.619	18.351	18.346	18.341		
20 r cos α	6 31.7	31.7 6 31.7	31.7 6 30.7	30.6 6 28.1	28.1 6 27.5	27.5 6 25.2	25.2 6 20.1	20.1 6 13.2	13.2 6 12.4	12.4 6 7.0	7.0 6 6.9	6.9 6 6.8	6.8
δ	53 31 47.1	53 34 47.8	53 34 5.0	53 13 57.1	53 15 19.8	53 42 31.7	53 44 23.4	53 41 0.0	53 40 32.8	53 53 39.4	53 29 —	53 30 27.2	
δ 1875.0	53 25 15.4	53 28 16.1	53 27 37.3	53 7 11.2	53 8 33.0	53 35 36.6	53 38 3.3	53 34 46.8	53 34 20.4	53 49 24.4	53 22 53.1	53 24 20.4	
	53 25 15.4	53 28 16.1	53 27 37.3	53 7 11.2	53 8 33.0	53 35 36.6	53 38 3.3	53 34 46.8	53 34 20.4	53 49 24.4	53 22 53.1	53 24 20.4	
α sec	15 40 6.2	15 49 22.8	16 69 52.2	16 2 56.8	16 21 57.2	16 28 43.1	16 42 56.2	16 60 27.4	16 67 1	17 1 22.2	17 2 57.9	17 2 59.1	
δ sec	235 1 33	237 20 42	239 68 3	240 44 12	245 27 48	247 10 47	250 44 3	252 36 51	254 15 16	255 20 33	255 42 59	255 44 47	
Δ sec	53 29 59	53 46 38	53 38 40	53 42 48	53 28 45	53 19 15	53 1 45	53 21 41	53 16 23	53 1 56	53 57 22	63 23 40	
log sin α cos δ	9.91356	9.92627	9.93738	9.94070	9.95889	9.96460	9.97497	9.97969	9.98338	9.98563	9.98636	9.98642	
log tang δ	0.12977	0.13423	0.13219	0.13331	0.12930	0.12726	0.13778	0.12806	0.12671	0.12295	0.13760	0.12868	
log sin α cos δ tang δ	10.04337	10.00960	10.06907	10.07401	10.08962	10.09187	10.11367	10.10775	10.11009	10.10858	10.12896	10.11510	
log sin α cos δ tang δ	10.16942	10.18565	10.19572	10.20016	10.21577	10.21802	10.23982	10.23390	10.23624	10.23473	10.25011	10.24125	
r sin Δ tang δ	1.47716	1.5334	1.56737	1.5855	1.6433	1.65205	1.7371	1.7136	1.72282	1.71687	1.77875	1.7428	
Δ sec	1.5949	1.5386	1.5027	1.5865	1.4285	1.4200	1.3349	1.3584	1.3792	1.3552	1.2933	1.3292	
dα/dT	0 31.90	31.90 0 30.77	30.77 0 30.05	31.70 0 31.73	29.73 0 28.57	28.65 0 28.40	28.40 0 26.70	27.950 22.07	27.17 0 26.98	26.98 0 27.10	27.11 0 25.87	25.87 0 26.58	26.58
Δ	15 39 50.24	15 49 7.44	15 69 37.15	16 2 41.9	16 21 36.92	16 28 28.87	16 42 42.21	16 50 13.83	16 56 47.3	17 1 8.60	17 2 38.97	17 2 45.580	
α 1875.0	15 40 22.16	15 49 38.21	16 0 7.20	16 3 13.63	16 22 5.49	16 28 57.27	16 43 8.91	16 50 40.90	16 57 14.28	17 1 35.70	17 3 4.84	17 3 11.38	
	40 22.16	49 38.21	60 7.20	63 13.63	82 5.49	88 57.27	103 8.91	110 40.90	117 14.28	121 35.71	123 4.84	123 11.38	
log cos α	9.76831	9.73205	9.69939	9.68915	9.61833	9.58865	9.51845	9.47538	9.43356	9.40318	9.39220	9.39131	
log sin cos α	11.06055	11.03429	11.00163	10.99139	10.92057	10.89089	10.82069	10.77762	10.73580	10.70542	10.69444	10.69353	
log r cos α	11.496	10.822	10.038	9.803	8.228	7.778	6.617	5.992	5.442	5.074	4.948	4.928	
20 r cos α	3 49.9	49.9 3 36.4	36.4 3 20.9	20.9 3 16.1	16.1 2 46.6	46.6 2 35.6	35.6 2 12.3	12.3 1 57.8	57.8 1 44.8	48.5 1 41.5	41.5 1 39.0	39.0 1 38.8	38.8
δ	53 28 4.0	53 34 50	53 36 59.1	53 41 10.1	53 27 21.9	53 17 57.4	53 0 39.2	53 20 41	53 15 28.9	53 1 53	53 56 32.5	53 22 30.1	
δ 1875.0	53 24 14.1	53 41 13.6	53 33 38.3	53 37 54.0	53 24 35.3	53 15 21.8	52 58 26.9	53 18 41.2	53 13 40.1	52 59 23.8	53 54 53.5	53 21 11.3	
	24 14.1	41 13.6	33 38.2	37 54.0	24 35.3	15 21.8	58 26.9	18 41.2	13 40.1	59 23.8	54 53.5	21 11.3	
α sec	18 8 13.8	18 10 17.3	18 18 22.1	18 20 6.3	18 26 36.1	18 34 30.3	18 44 16.3	18 44 52	19 1 51.8	19 4 10.4	19 6 57.1	19 6 46.3	
δ sec	272 3 27	272 34 20	274 35 32	275 13 20	276 39 2	278 37 35	281 4 5	281 13 0	285 27 07	286 2 36	286 44 17		
Δ sec	53 27 43.3	53 39 40	53 20 27	53 13 41	53 51 31	53 4 9	53 40 45	53 51 24	53 7 25	53 38 6	53 30 38	53 40 45	
log sin α cos δ	9.99971	9.99956	9.99860	9.99819	9.99706	9.99503	9.99184	9.99162	9.98398	9.98274	9.98119		
log tang δ	0.13918	0.13884	0.13591	0.13648	0.13648	0.12877	0.13863	0.13677	0.12483	0.13293	0.13091		
log sin α cos δ tang δ	10.12889	10.13290	10.12687	10.12467	10.13352	10.11902	10.12647	10.12807	10.10488	10.11567	10.11214		
log sin α cos δ tang δ	10.25504	10.25905	10.25302	10.25082	10.25969	10.24577	10.25162	10.25422	10.23096	10.24172	10.23829		
r sin Δ tang δ	1.79905	1.81375	1.7907	1.78165	1.8184	1.7586	1.78495	1.79665	1.7020	1.7447	1.7310		
Δ sec	1.2730	1.2563	1.2813	1.2904	1.2586	1.3134	1.2871	1.2764	1.3700	1.3273	1.3410		
dα/dT	0 25.44	0 25.13	25.13 0 25.62	25.63 0 25.81	25.81 0 25.11	24.07 0 26.27	26.27 0 25.74	25.74 0 25.53	25.53 0 27.14	27.06 0 26.53	26.54 0 26.82	26.82	
Δ	18 8 1.10	18 10 4.44	18 18 22.5	18 20 40.36	18 26 23.5	18 34 17.6	18 44 34.0	18 44 39.2	19 1 38.29	19 3 57.16	19 6 43.66	18 44 34.0	
α 1875.0	18 8 26.56	18 10 29.87	18 18 34.87	18 20 46.17	18 26 45.68	18 34 43.43	18 44 29.14	18 45 47.35	19 2 46.43	19 4 23.71	19 7 10.48		
		10 29.87	18 34.87	20 46.17	26 45.68	34 43.43	44 29.14	45 47.35	2 46.43	4 23.71	7 10.48		
log cos α	8.95512	8.65204	8.90343	8.95913	9.06375	9.17606	9.28524	9.28896	9.42596	9.44148	9.45938		
log sin cos α	9.85736	9.93428	10.20567	10.26137	10.36599	10.47830	10.58548	10.59120	10.72820	10.74372	10.76162		
r cos α	.720	.900	1.6605	1.825	2.322	3.006	3.880	3.901	5.348	5.542	5.776		
20 r cos α	0 14.4	0 18.0	18.0 0 33.2	32.5 0 36.5	36.5 0 46.4	46.45 0.2	0.2 1 17.6	17.6 1 18.0	18.0 1 47.0	47.0 1 50.8	50.85 55.5	55.5	
δ	53 27 35.7	53 39 31	53 20 20.9	53 18 23.2	53 51 7.2	53 3 39.3	53 40 6.5	53 50 44.7	53 6 31.6	53 37 10.7	53 29 39.3	53 40 6.5	
δ 1876.0	53 27 50.1	53 39 46.0	53 20 35.9	53 18 38.2	53 51 22.2	53 3 54.3	53 40 21.5	53 50 59.7	53 6 46.6	53 37 25.7	53 29 54.3	53 40 21.5	
		39 46.0	20 35.9	18 38.2	51 22.2	53.6	4 22.5	4 37.7	52 2.7	8 18.6	36 1.53	31 35.8	

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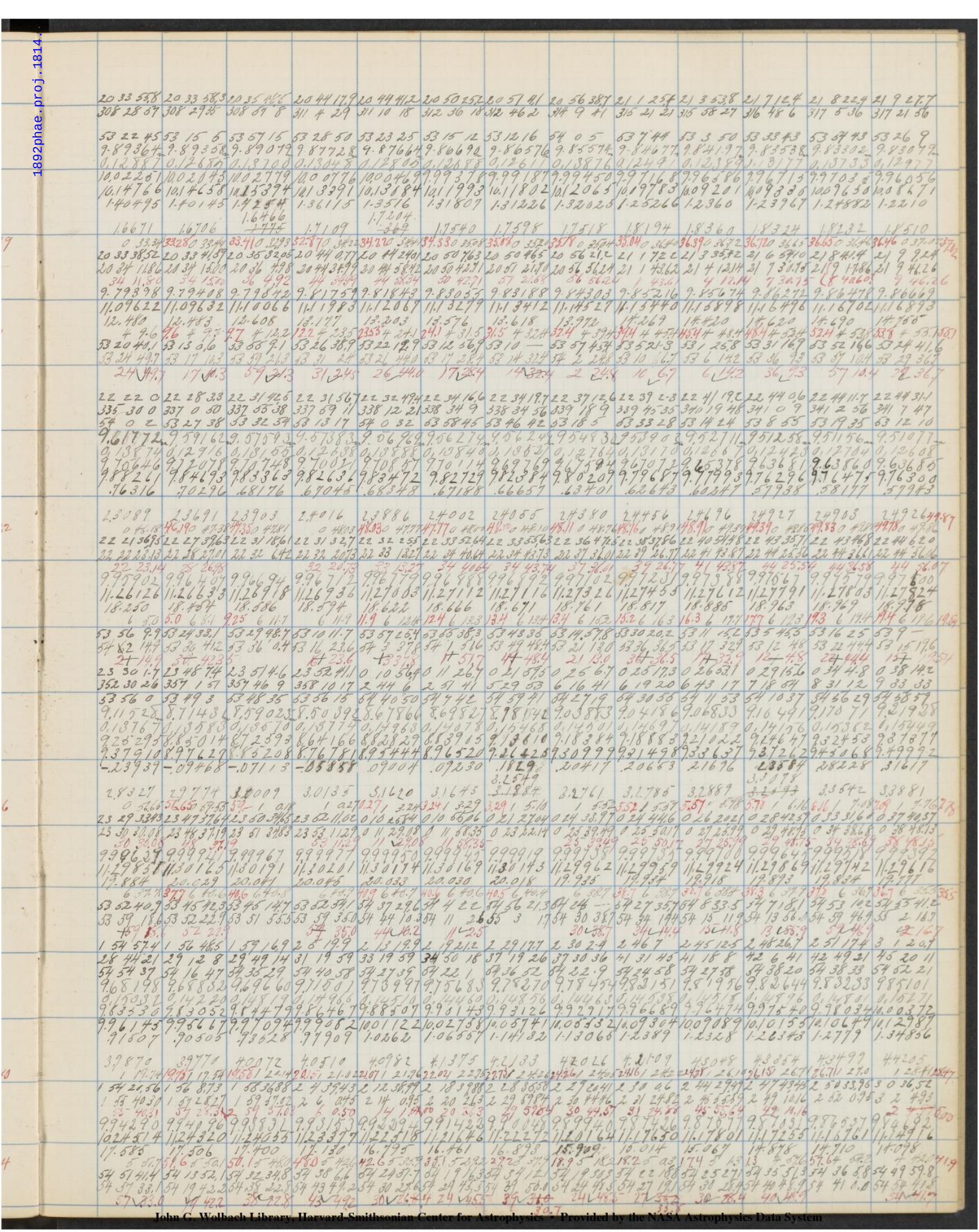
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α m	19 44 28.5	19 45 47.1	19 52 42.7	19 54 42.9	19 54 49.6	20 4 30.6	20 8 5.8	20 10 6.3	20 16 55.5	20 18 44.6	20 20 57.1	20 26 30.2
δ m	296 7 8	296 26 47	298 10 41	298 40 44	298 40 54	301 7 39	302 14 60	302 31 35	304 13 53	304 41 9	305 13 52	306 37 33
δ m	53 35 5	53 25 41	53 37 21	53 33 24	53 33 31	53 35 52	53 29 58	53 15 6	53 10 6	53 12 7	53 6 48	53 38 37
log r sin α	9.95321	9.95199	9.94852	9.94315	9.94314	9.93248	9.92727	9.92590	9.91738	9.91502	9.91216	9.90437
log r cos δ	0.13213	0.12967	0.13703	0.13168	0.13772	0.13284	0.13078	0.12684	0.12564	0.12667	0.12467	0.13206
log sin α cos δ	0.08534	0.08167	0.08224	0.07483	0.07486	0.06482	0.05805	0.05275	0.04292	0.04109	0.03683	0.03643
log r sin α cos δ	0.21149	0.20779	0.20839	0.20098	0.20101	0.19097	0.18420	0.17890	0.16967	0.16724	0.16298	0.16258
r sin α cos δ	1.6274	1.6136	1.6158	1.5885	1.5886	1.5523	1.5283	1.5077	1.4796	1.4776	1.4554	1.4540
d α / dt	1.4446	1.4584	1.4562	1.4835	1.4834	1.5197	1.5437	1.5623	1.5961	1.6023	1.6166	1.6180
d δ / dt	0 18.88	28.59	29.17	29.17	0 29.12	29.05	0 29.67	29.67	29.67	0 30.39	30.40	30.88
	0 31.25	31.25	0 31.92	31.92	0 32.05	32.05	0 32.33	32.33	0 32.36	32.29		
λ o	19 44 14.07	19 45 32.52	19 52 28.2	19 52 28.78	19 54 28.10	19 54 28.78	20 4 13.37	20 8 42.58	20 9 50.71	20 16 39.57	20 18 28.6	20 20 37.93
λ 1875.0	19 44 42.75	19 46 1.69	19 52 57.33	19 54 57.77	19 54 58.45	20 4 43.76	20 9 13.45	20 10 21.96	20 17 11.49	20 19 0.66	20 21 10.26	20 26 46.72
	44 42.96	46 1.69	53 57.26	54 57.77	54 58.45	4 43.77	9 13.46	10 21.96	17 11.49	19 0.65	21 10.26	26 46.38
log r cos α	9.64368	9.64871	9.67413	9.68116	9.68118	9.71344	9.72712	9.73053	9.76015	9.75571	9.76102	9.77567
log r sin α	1.09459 2	1.09309 5	1.09763 7	1.09833 7	1.09834 2	1.01568	1.02936	1.03277	1.05239	1.05741	1.06326	1.07791
m sin α	8.829	8.932	8.770	9.624	9.625	10.368	10.700	10.784	11.282	11.414	11.568	11.965
2 m cos α	2 56.6	2 58.6	2 58.6	2 9.4	3 12.5	3 12.5	3 12.5	3 27.4	3 34.0	3 35.7	3 45.6	3 48.3
	3 57.4	5.4										
δ o	53 33 37.0	53 24 12.1	53 55 45.8	53 31 48.0	53 31 57.5	53 34 8.4	53 28 10.7	53 13 18	53 8 18.3	53 10 12.8	53 4 52.9	53 36 57.3
δ 1875.0	53 36 33.6	53 27 10.7	53 58 55.2	53 35 0.5	53 35 7.0	53 37 18.8	53 31 44.7	53 16 53.7	53 11 54.9	53 14 6.1	53 8 44.3	53 40 36.8
	36 33.6	27 10.7	58 55.2	35 0.5	35 7.0	37 18.8	31 44.7	16 53.7	11 54.9	14 6.1	8 44.3	40 36.8
α m	21 15 31.5	21 29 40.7	21 32 40.8	21 35 30.1	21 41 49.2	21 48 59.1	21 57 42.4	21 55 12.9	22 7 45.2	22 10 17.4	22 19 34.4	22 19 40.5
° α m	318 52 53	322 25 11	323 10 12	323 52 30	325 27 18	327 14 47	328 40 36	328 48 14	331 66 18	332 34 21	334 53 35	334 55 8
δ m	53 45 17	53 18 33	53 9 16	53 24 30	53 29 58	53 10 5	53 5 31	53 27 42	53 25 43	53 37 48	53 42 36	54 2 14
log r sin α	9.81897	9.78623	9.77774	9.77705	9.75866	9.73322	9.71689	9.71438	9.67248	9.66334	9.62168	9.62726
log r cos δ	0.13483	0.12776	0.12532	0.12864	0.13069	0.12053	0.13688	0.12918	0.12967	0.13285	0.13317	0.18935
log r sin α cos δ	9.96380	9.91299	9.90306	9.89900	9.88431	9.86874	9.85317	9.84348	9.80213	9.79619	9.76080	9.76609
log r sin α cos δ	10.07995	10.03914	10.02921	10.02520	10.01046	9.98489	9.97932	9.96963	9.92828	9.92234	9.88695	9.89274
r sin α cos δ	1.20215	1.09495	1.06957	1.06977	1.02447	0.96581	0.95482	0.93246	0.84778	0.83621	0.77082	0.78116
r m							2.1172			2.2358		
d m / dt	1.8699	1.9771	2.0025	2.0123	2.0476	2.1062	2.0950	2.1396	2.2243	2.2763	2.3012	2.2909
d α / dt	0 37.40	37.45	0 37.54	37.55	0 42.05	41.85	0 42.35	42.35	0 42.39	0 42.79	42.75	0 44.49
	44.49	0 44.71	44.72	0 46.32	46.32	46.99	0 47.82	45.82				
λ o	21 15 12.76	21 29 20.91	21 32 20.85	21 35 8.95	21 41 28.73	21 48 38.03	21 57 21.19	21 57 31.51	22 7 22.94	22 9 55.05	22 19 11.56	22 19 17.63
λ 1875.0	21 16 50.16	21 30 0.45	21 33 29.0	21 35 49.20	21 42 9.68	21 49 20.15	21 58 3.83	21 58 14.30	22 8 7.43	22 10 39.76	22 19 57.38	22 20 3.45
	15 50.16	30 0.46	33 0.98	35 49.20	42 9.68	49 20.15	58 3.83	58 14.30	8 7.43	10 39.77	19 57.38	20 3.45
log r cos α	9.87699	9.89899	9.90331	9.90727	9.91555	9.92479	9.93159	9.93216	9.94468	9.94821	9.95689	9.95698
log r sin α	1.17923	1.20123	1.20555	1.20951	1.21799	1.22703	1.23382	1.23440	1.24792	1.25045	1.25913	1.25922
r cos α	15.109	15.894	16.053	16.200	16.519	16.867	17.133	17.155	17.698	17.801	18.161	18.164
2 n cos α	5 2.2	2.2 5 17.9	17.9 5 21.1	21.0 5 24.0	24.0 5 30.4	30.4 5 37.3	5 42.7	42.7 5 42.1	42.1 5 45.1	5 47.0	54.0 5 56.0	56.0 6 3.2
	3.2 6 3.3	3.3										
δ o	53 42 45.4	53 15 54.1	53 6 35.7	53 18 48.4	53 26 53.2	53 7 16.8	53 50 9.5	53 24 50.3	53 22 45.7	53 34 60.1	53 39 34.0	53 59 12.7
δ 1875.0	53 47 47.6	53 21 12.0	53 11 55.7	53 24 52.4	53 32 53.6	53 12 54.1	53 55 52.2	53 30 33.4	53 28 32.7	53 40 46.1	53 45 37.2	54 5 16.6
	47 47.6	21 12.0	11 55.7	24 52.4	32 53.6		55 52.2	30 33.4	28 32.7	40 46.1	44 37.2	4 16.6
α m	22 47 40.0	22 50 23.5	22 53 19.8	22 55 2.4	22 58 6.6	23 8 4	23 8 23.6	23 12 25.7	23 25 16.4	23 25 22.9	23 26 25.9	23 29 51.3
δ m	341 55 0	342 35 53	343 19 67	343 45 36	344 31 24	347 1 0	347 5 67	348 6 26	351 19 6	351 21 61	351 36 29	352 27 60
δ m	53 14 20	53 30 35	53 47 54	53 35 40	53 28 18	53 3 15	53 50 29	53 25 16	53 23 51	53 26 4	53 29 47	53 43 22
log r sin α	9.49192	9.47677	9.45860	9.44763	9.42626	9.35154	9.34984	9.31403	9.17881	9.17753	9.16418	9.11777
log r cos δ	0.12665	0.13094	0.13552	0.13228	0.13034	0.12874	0.13621	0.12954	0.12816	0.12976	0.13073	0.13432
log r sin α cos δ	9.61807	9.60771	9.59412	9.57991	9.55660	9.47528	9.48605	9.44307	9.30697	9.30728	9.29491	9.25249
log r sin α cos δ	9.74472	9.73386	9.72027	9.70606	9.68275	9.60143	9.61220	9.56972	9.43312	9.43343	9.42106	9.37824
r sin α cos δ	.55553	.54183	.52514	.50823	.48168	.39942	.40945	.37130	.27110	.27129	.26367	.23891
d m / dt	2.5165	2.5302	2.5469	2.5638	2.5904	2.6726	2.6626	2.7007	2.8009	2.8008	2.8084	2.8331
d α / dt	0 50.33	50.33	0 50.60	50.63	0 50.94	50.96	0 51.28	51.30	0 51.61	0 53.45	53.45	0 53.23
	53.30	0 54.01	54.01	0 56.02	56.02	56.01	0 56.02	56.03	0 56.17	56.17	0 56.66	56.66
λ	22 47 14.90	22 49 58.1	22 52 57.0	22 54 36.0	22 57 39.7	23 7 37.26	23 7 56.97	23 11 58.75	23 24 48.47	23 24 57.43	23 25 57.85	23 29 23.04
α 1875.0	22 48 3.23	22 50 48.78	22 53 45.24	22 55 28.00	22 58 31.51	23 8 30.71	23 8 50.22	23 12 52.76	23 25 44.49	23 25 53.46	23 26 54.02	23 30 19.70
	48 3.23	5 48.78	53 45.24	55 28.0	58 31.51	8 30.71	8 50.22	12 52.76	25 44.48	25 53.46	26 54.02	30 19.70
log r cos α	9.97800	9.97965	9.98135	9.98281	9.98591	9.99870	9.99889	9.99907	9.99949	9.99957	9.99982	9.99623
log r sin α	1.28024	1.28189	1.28359	1.28456	1.28619	1.29099	1.29113	1.29281	1.29723	1.29728	1.29756	1.29847
r cos α	19.065	19.138	19.213	19.256	19.328	19.543	19.547	19.625	19.826	19.828	19.841	19.882
δ o	6 21.3	6 22.5	6 22.7	6 24.3	6 25.1	6 26.6	6 26.6	6 30.3	6 30.4	6 31.0	6 32.6	6 32.5
	6 36.5	6 36.6	6 36.5	6 36.6	6 36.3	36.6	37.6					
δ 1875.0	53 11 9.6	53 27 23.3	53 44 42.2	53 32 27.4	53 26 5.0	53 0 —	53 47 13.6	53 21 59.6	53 20 33.1	53 22 46.0	53 26 28.9	53 40 29.7
	53 17 30.9	53 33 46.0	53 51 6.44	53 38 52.5	53 31 31.6	53 6 30.84	53 53 44.6	53 28 32.1	53 27 46.6	53 29 41.2	53 33 57.5	53 46 40.5
α m	0 47 37.0	0 48 16.9	1 6 8.1	1 12 37.4	1 12 46.5	1 28 53.5	1 29 0.2	1 40 23.7	1 41 11.8	1 52 58.4	1 53 26.9	1 59 7.4
δ m	11 54 15	12 4 14	16 32 2	18 1 51	18 11 38	22 13 23	22 15 3	25 5 56	25 17 57	28 14 36	28 21 44	28 31 51
δ m	54 43 55	54 37 48	54 53 25	54 21 23	54 38 45	54 29 55	54 29 46	54 28 7	54 11 55	54 8 23	54 58 13	54 34 46
log r sin α	9.31444	9.32088	9.45420	9.49076	9.49447	9.50773	9.57825	9.62755	9.63077	9.67406	9.67613	9.67809
log r cos δ	0.15842	0.14871	0.15200	0.14443	0.14807	0.14670	0.14667	0.14629	0.14190	0.14096	0.14249	0.14700
log r sin α cos δ	9.46789	9.46791	9.60620	9.63513	9.64254	9.65443	9.72492	9.77377	9.77267	9.81302	9.82076	9.82509
log r sin α cos δ	9.59104	9.59134	9.73285	9.76128	9.76869	9.75038	9.85107	9.89992	9.89882	9.94117	9.95717	9.95124
r sin α cos δ	.38998	.39386	.53998	.57714	.58708	.70870	.70970	.79419	.79218	.87332	.90607	.89380
d m / dt	3.4619	3.4658	3.6119	3.6491	3.6596	3.7809	3.7817	3.8661	3.8641	3.9453	3.9786	3.9658
d α / dt	1 9.24	9.08	1 9.32	9.81	1 12.24	12.61	12.98	1 13.18	13.21	1 15.62	15.62	1 15.63
	15.44	1 17.32	17.28	17.29	1 18.91	18.90	1 19.86	19.56	19.32	19.40		
λ o	0 46 25.3	0 47 42.25	1 5 32.01	1 11 30.96	1 12 9.97	1 28 16.78	1 28 22.43	1 39 45.08	1 40 33.23	1 52 18.97	1 52 47.19	1 53 2.775
λ 1875.0	0 47 11.77	0 48 51.57	1 6 44.25	1 12 44.94	1 13 23.15	1 29 31.40	1 29 38.06	1 41 240	1 41 50.67	1 53 37.88	1 54 6.75	1 54 47.07
	47 11.61	48 51.56		12 43.94	13 23.18	29 31.40	29 38.07		41 50.52	53 37.72	54 6.75	54 47.15
log r cos α	9.99855	9.99908	9.99816	9.99781	9.99772	9.99664	9.99689	9.99569	9.99562	9.99449	9.99446	9.99437
log r sin α	1.69279	1.69253	1.68390	1.68037	1.67996	1.66871	1.66863	1.65916	1.65845	1.64718	1.64670	1.64601
r cos α	19.624	19.612	19.227	19.071	19.053	18.566	18.565	18.164	18.132	17.668	17.648	17.620
2 n cos α	6 22.5	6 22.3	6 22.6	6 24.5	6 24.5	6 21.4	6 21.1	6 21.0	6 11.3	6 10.9	6 5.2	6 2.6
	5 59.4	5 57.6	5 53.4	5 53.4	53.0	52.4						
δ o	54 40 39.2	54 34 32.3	54 53 25.0	54 18 12.6	54 35 34.9	54 26 49.3	54 26 42.3	54 25 55.5	54 8 53.7	54 5 26.2	54 55 16.3	54 31 49.6
δ 1875.0	54 47 11.7	54 41 4.3	54 59 27.0	54 24 34.0	54 41 36.0	54 33 0.6	54 32 53.2	54 31 8.7	54 14 56.3	54 11 29.0	55 1 9.3	54 37 42.0
	47 11.7	41 4.3		24 34.0	41 36.0	33 0.6	32 53.2		14 56.3	11 29.0	1 9.3	37 42.0

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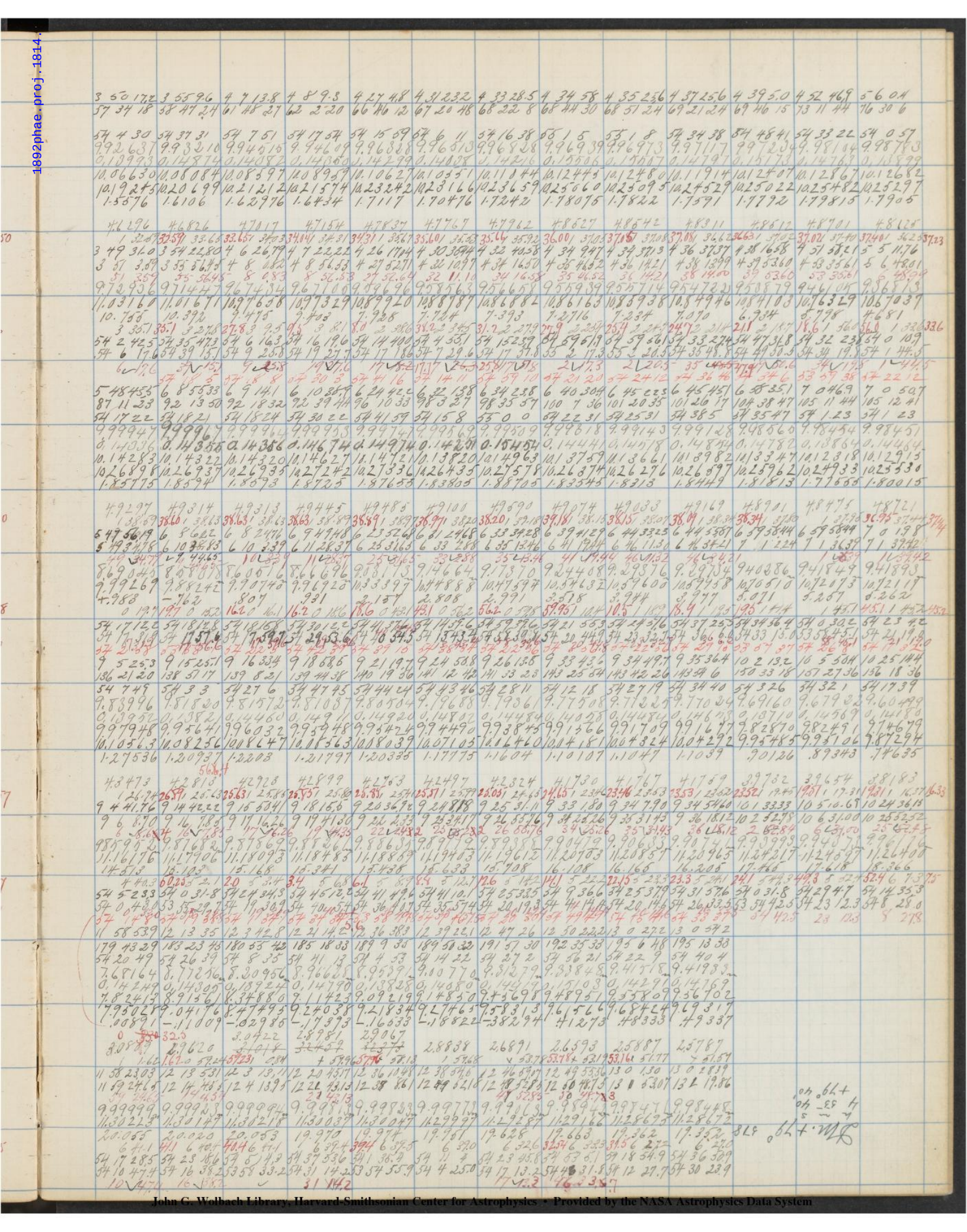
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α app	3 1 51.8	3 2 46.4	3 2 46.6	3 0 54.8	3 8 49.8	3 13 45.6	3 18 55.5	3 30 41	3 31 46.3	3 3 / 50.2	3 35 34.8	3 43 48.2	
° app	45 27 57	45 41 36	45 41 39	46 28 42	47 12 27	48 26 24	49 43 53	52 31 2	52 56 35	52 57 33	53 53 42	55 57 3	
Sun	54 6 33	54 49 40	54 49 38	54 48 11	54 53 59	54 5 7	54 4 8	55 0 25	54 9 1	54 9 25	54 41 49	54 29 58	
log ein α	9.85298	9.85467	9.85468	9.86046	9.86758	9.87405	9.88253	9.89956	9.90102	9.90211	9.90787	9.91832	
log tang δ	0.14048	0.15197	0.15197	0.15197	0.15210	0.14009	0.13783	0.15488	0.14113	0.14124	0.14979	0.14672	
log ein α tang δ	9.99846	10.00666	10.00666	10.01199	10.01763	10.01414	10.02236	10.05444	10.04215	10.04333	10.05726	10.06304	
log sec α tang δ	10.11961	10.13281	10.13281	10.13814	10.14378	10.14029	10.14851	10.18039	10.16830	10.16950	10.18341	10.19119	
ein α tang δ	1.3171	1.35772	1.35773	1.3745	1.39246	1.3813	1.4077	1.51565	1.47233	1.47745	1.5255	1.5531	
Δα	#3891	#4297	#4297	#4465	#4644	#4533	#4797	#5876	#6443	#6494	#5975	#6251	
Δ1 Δα	1 27.78	27.76	26.59	28.59	28.59	1 27.73	28.94	1 29.27	29.36	1 29.07	29.53	29.59	1 31.76
Δ2 Δ1	1	1	1	1	1	1	1	1	1	1	1	1	1
Lo	3 1 7.94	3 2 2.14	3 2 2.39	3 5 13.37	3 8 5.16	3 13 1.46	3 18 10.63	3 29 18.23	3 31 0.86	3 31 4.76	3 34 48.72	3 43 2.0	
α 1875.0	3 2 35.72	3 3 30.73	3 3 30.98	3 6 42.32	3 9 8.44	3 14 30.23	3 19 40.37	3 30 50.07	3 32 31.76	3 32 35.75	3 36 20.87	3 44 34.50	
	3 35.72	3 30.73		6 42.33	9 9.51	14 30.23	19 40.37	30 50.07	32 31.85	32 35.75	36 20.87	44 34.50	
log cos α	9.84692	9.84416	9.84415	9.83898	9.83209	9.82177	9.81048	9.78437	9.78003	9.77987	9.77031	9.74811	
log sec δ tang δ	11.14916	11.14640	11.14639	11.14122	11.13433	11.12402	11.11272	11.08651	11.08227	11.08211	11.07255	11.05036	
sin cos α	14098	14009	14008	13.843	13.625	13.305	12.964	12.204	12.086	12.081	11.818	11.229	
2 sin cos α	4 42.0	41.3 4 42	40.2 4 42	4 39.9	36.1 4 31.5	32.5 4 26.1	26.1 4 19.3	19.3 4 4.1	4.1 4 4.1	1.7 4 1.6	1.6 3 36.4	36.3 3 44.5	44.6
δo	54 4 12.6	54 4 19.2	54 4 18.6	54 4 53.3	54 5 37.4	54 2 53.9	54 1 57.9	54 5 8 23.2	54 7 —	54 7 24.3	54 3 50.3	54 2 8.5	
α 1875.0	54 8 54.6	54 5 19.4	54 5 18.2	54 5 0.2	54 5 6.2	54 5 15.0	54 7 20.0	54 6 17.2	55 2 27.3	54 11 4.1	54 11 25.9	54 3 46.7	54 3 50.4
	8 37.6	8 37.4		5 0 29.0	5 6 15.0	7 20.0	6 17.2	2 27.3	11 1.7	11 25.9	4 46.6	3 50.5	
α app	5 6 47.1	5 10 17.2	5 12 1.2	5 19 33.0	5 20 25.1	5 22 9.4	5 22 20.1	5 23 10.6	5 33 16.7	5 36 33.5	5 37 23.3	5 38 56.6	
° app	76 41 47	77 34 18	78 0 18	79 33 15	80 6 17	80 32 2.1	80 35 2	80 47 39	83 19 11	84 8 23	84 20 60	84 44 9	
Sun	54 14 18	54 6 26	54 5 17	54 36 22	54 33 26	54 8 49	54 35 37	54 52 12	54 59 9	54 35 46	54 42 21	54 0 22	
log ein α	9.98818	9.98970	9.99041	9.99320	9.99849	9.99403	9.99410	9.99436	9.99704	9.99772	9.99788	9.99816	
log tang δ	0.14254	0.14044	0.15823	0.14848	0.14764	0.14005	0.14823	0.15267	0.15454	0.14827	0.14903	0.13883	
log ein α tang δ	10.13072	10.13014	10.13364	10.14163	10.14113	10.13410	10.14233	10.14703	10.15158	10.14399	10.14691	10.13699	
log sec α tang δ	10.25687	10.25629	10.26979	10.26778	10.26728	10.26025	10.26848	10.27318	10.27773	10.27214	10.27306	10.26314	
ein α tang δ	1.80665	1.80425	1.8612	1.8526	1.8505	1.82066	1.8556	1.8758	1.89558	1.8713	1.87625	1.8329	
Δα	#8786	#8762	#9332	#9246	#9225	#8926	#9276	#9478	#9675	#9483	#9472	#9079	
Δ1 Δα	1 37.5	37.57	37.53	38.66	38.49	38.45	37.95	38.55	38.96	38.73	38.67	37.03	38.10
Δ2 Δ1	1	1	1	1	1	1	1	1	1	1	1	1	
Lo	5 5 38.38	5 9 28.48	5 11 11.88	5 18 43.80	5 19 35.70	5 21 20.42	5 21 30.81	5 22 21.11	5 32 27.07	5 35 44.05	5 36 33.76	5 38 7.56	
α 1875.0	5 7 35.95	5 11 6.00	5 12 50.54	5 20 32.29	5 21 14.35	5 22 58.26	5 23 9.36	5 24 0.07	5 34 6.42	5 37 22.92	5 38 12.70	5 39 46.66	
	7 35.95	11 6.01	12 50.54	20 32.29	21 14.35	22 58.26	23 9.36	24 0.07	34 6.42	37 22.92	38 12.79	39 46.66	
log cos α	9.96293	9.96338	9.96378	9.96444	9.96514	9.96683	9.96379	9.96407	9.96568	9.96903	9.96943	9.96259	
log sec δ tang δ	10.66517	10.66611	10.66997	10.67671	10.67738	10.67907	10.68163	10.68631	10.68792	10.69127	10.69867	10.68483	
sin cos α	4.625	4.626	4.628	3.571	3.446	3.304	3.281	3.208	2.333	2.047	1.975	1.840	
2 sin cos α	1 32.3	32.3 1 26.5	26.3 1 23.4	23.4 1 10.4	10.4 1 8.9	8.9 1 6.1	5.9 1 5.6	5.6 1 4.2	4.2 0 46.7	46.7 0 41.9	41.0 0 39.5	39.5 0 36.8	36.8
δo	54 13 31.7	54 5 43.2	54 5 38.2	54 35 46.5	54 32 57.1	54 8 15.9	54 35 4.5	54 51 49.6	54 58 45.6	54 35 25.2	54 42 1.2	54 0 32.0	
α 1875.0	54 20 42.3	54 7 9.7	54 5 56.8	54 36 19.9	54 34 1.2	54 9 19.3	54 36 10.1	54 52 44.2	54 59 23.3	54 36 6.7	54 42 40.7	54 0 40.0	40.0
	54 20 42.3	54 7 9.7	54 5 56.8	54 36 19.9	54 34 1.2	54 9 19.3	54 36 10.1	54 52 44.2	54 59 23.3	54 36 6.7	54 42 40.7	54 0 40.0	
α app	7 12 50.9	7 18 26.4	7 26 17.9	7 55 53.8	7 59 52.1	8 11 57.9	8 21 27.3	8 27 27.6	8 29 20.4	8 40 11.1	8 43 20.6	9 0 2.9	
° app	108 12 44	109 36 36	111 34 29	118 58 27	119 58 2	122 59 29	125 21 50	126 51 54	127 20 6	130 2 47	130 6 9	135 0 44	
Sun	54 22 46	54 23 38	54 43 14	54 20 57	54 12 14	54 54 5	54 7 26	54 19 23	54 35 3	54 24 34	54 18 52	54 11 25	
log ein α	9.97768	9.97405	9.96845	9.94192	9.93767	9.92363	9.91142	9.90311	9.90042	9.89495	9.87885	9.84989	
log tang δ	0.14424	0.14443	0.14961	0.14336	0.14736	0.15220	0.13968	0.14283	0.14699	0.14410	0.14209	0.14012	
log ein α tang δ	10.12192	10.11848	10.11806	10.08537	10.07903	10.07583	10.05110	10.04594	10.04741	10.02908	10.02144	9.98991	
log sec α tang δ	10.24807	10.24463	10.24421	10.21152	10.20518	10.20198	10.17725	10.17209	10.17356	10.15523	10.14759	10.11606	
ein α tang δ	1.77704	1.76645	1.7848	1.6275	1.6039	1.51215	1.5040	1.48625	1.4713	1.42963	1.4047	1.30635	
Δα	#8424	#8284	#8268	#7995	#7759	#7841	#7560	#8582	#8633	#8076	#7767	#7383	
Δ1 Δα	1 36.86	36.85	36.57	36.57	36.54	33.99	33.91	33.52	33.52	33.28	32.97	32.53	27.57
Δ2 Δ1	1	1	1	1	1	1	1	1	1	1	1	1	
Lo	7 12 24.2	7 17 38.6	7 25 29.7	7 55 6.76	7 59 52.5	8 11 15.8	8 20 41.50	8 26 41.98	8 28 34.68	8 39 26.05	8 42 33.51	8 57 19.08	
α 1875.0	7 13 39.27	7 19 14.63	7 27 6.31	7 56 40.75	8 0 38.77	8 12 46.86	8 22 13.02	8 28 13.14	8 30 5.96	8 40 56.08	8 43 3.34	9 0 46.62	
	13 39.27	19 14.63	27 6.31	56 40.75	0 38.77	12 46.86	22 12.79	28 13.15	30 5.96	40 56.08	43 3.34	0 46.62	
log cos α	9.49490	9.49258	9.48659	9.46852	9.46503	9.45300	9.44250	9.43705	9.43528	9.42848	9.42650	9.41907	
log sec δ tang δ	10.77714	10.78088	10.78675	10.80743	10.81077	11.00324	11.06474	11.07934	11.08505	11.11072	11.11777	11.15181	
sin cos α	6.268	6.731	7.374	9.715	10.018	10.895	11.608	12.004	12.163	12.904	13.086	14.185	
2 sin cos α	2 5.4	5.4 2 14.6	14.6 2 27.5	27.5 3 14.3	14.3 3 20.4	20.4 3 37.2	38.5 3 52.2	52.2 4 0.1	0.6 4 3.3	3.3 4 18.1	18.1 4 21.7	22.3 4 42.7	43.7
δo	54 21 43.7	54 22 30.9	54 42 0.7	54 19 19.8	54 11 33.4	54 52 15.9	54 5 30.3	54 17 22.9	54 33 1.5	54 22 24.6	54 16 41.0	54 9 8.4	
α 1875.0	54 19 38.3	54 20 16.3	54 39 33.2	54 16 5.3	54 8 18.0	54 48 32.0	54 1 34.1	54 13 22.8	54 28 58.2	54 18 18.5	54 12 37.3	54 4 59.7	59.7
	54 28 37.9	54 29 15.9	54 48 32.8	54 25 4.9	54 17 17.6	54 57 31.6	54 10 33.7	54 22 22.4	54 38 0.2	54 27 17.5	54 21 36.3	54 14 58.7	
α app	10 27 2.3	10 35 51.9	10 39 45.6	10 40 66.2	10 44 3.9	10 52 26.2	10 67 56.9	11 18 36.3	11 34 17.2	11 41 27	11 42 54	11 47 45	
° app	156 45 35	158 57 69	159 56 24	160 13 48	161 0 59	163 6 33	164 29 14	169 39 5	173 34 18	175 21 45	175 43 30	176 56 15	
Sun	54 34 19	54 31 38	54 48 50	54 42 32	54 57 46	54 3 53	54 41 14	54 23 52	55 0 44	54 4 54	54 40 19	54 18 24	
log ein α	9.59614	9.56699	9.53529	9.52923	9.51228	9.46321	9.42724	9.35439	9.04906	8.90768	8.87241	8.72774	
log tang δ	0.14624	0.14490	0.14980	0.14705	0.14255	0.16248	0.18707	0.14701	0.14333	0.15318	0.16429	0.14770	
log ein α tang δ	9.74238	9.71189	9.68517	9.67628	9.65483	9.62569	9.61431	9.50140	9.19339	9.06107	9.04670	8.87544	
log sec α tang δ	9.86883	9.82764	9.81052	9.80377	9.79091	9.77643	9.76040	9.65387	9.32839	9.18812	9.14626	8.99474	
ein α tang δ	.73932	.67242	.64643	.63646	.61789	.53264	.50165	.33410	.21300	.15421	.14004	.09902	
Δα	3.8113	3.7444	3.7184	3.7084	3.6898	3.6046	3.5736	3.4061	3.2855	3.2262	3.2120	3.1710	
Δ1 Δα	1 16.23	16.22	14.85	14.37	14.18	14.17	13.80	13.80	12.09	12.12	11.47	11.50	8.12	8.12	5.70	5.70	1 4.52	4.41	1 4.24	4.24	1 2.42	2.42
Lo	10 26 29.4	10 35 14.4	10 39 8.29	10 40 18.10	10 43 26.89	10 57 58.13	10 57 21.04	11 18 2.15	11 33 44.32	11 40 54.72	11 42 21.84	11 47 4.26	
α 1875.0	10 27 40.37	10 36 29.33	10 40 22.66	10 41 32.27	10 44 40.69	10 58 12.22	10 58 32.87	11 19 16.27	11 34 50.02	11 41 59.24	11 43 26.08	11 48 16.68	
	27 40.36	36 29.30	40 22.63	41 32.27	44 40.69	58 12.22	58 32.87	19 16.27	34 50.02	41 59.24	43 26.08	48 16.68	16.89
log cos α	9.96324	9.97005	9.97182	9.97361	9.97741	9.98084	9.98385	9.99284	9.99724	9.99847	9.99879	9.99957	
log sec δ tang δ	11.26548	11.27229	11.27582	11.27795	11.28124	11.28308	11.28612	11.29511	11.29750	11.30081	11.30103	11.30161	
sin cos α	18.428	18.719	18.874	18.873	18.965	19.190	19.225	19.729	19.930	19.990	20.000	20.027	
2 sin cos α	6 8.6	8.6 6 14.4	14.4 6 17.5	17.5 6 19.3	19.3 6 22.6	23.5 6 26.5	26.5 6 34.6	34.6 6 38.6	38.6 6 39.8	39.8 6 44.0	44.0 6 44.5	44.5	44.5
δo	54 31 14.5	54 28 30.9	54 45 41.7	54 39 23.1	54 64 38.5	54 0 43.1	54 38 1.2	54 20 34.7	54 57 23.6	54 1 33.9	54 36 37.2	54 15 3.9	
α 1875.0	54 23 5.9	54 22 16.5	54 39 24.2	54 33 5.6	54 48 19.2	54 33 54 19.3	54 31 34.7	54 14 0.1	54 50 46.5	54 54 1.1	54 29 59.2	54 8 23.4	
	23 5.9	22 16.5	39 24.2	33 5.6	48 19.2	33 54 19.3	31 34.7	14 0.1	50 46.5	54 1.1	29 59.2	8 23.4	

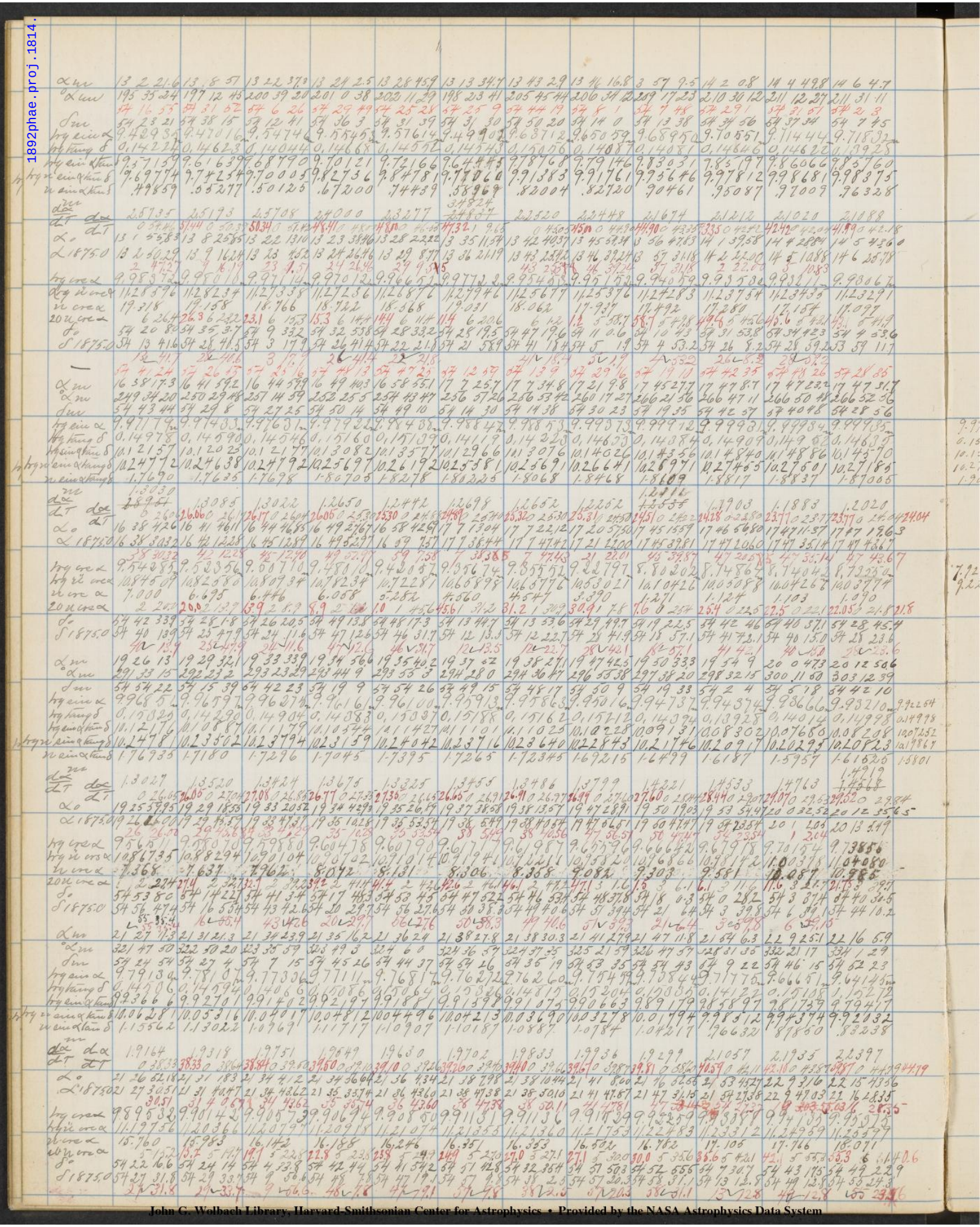
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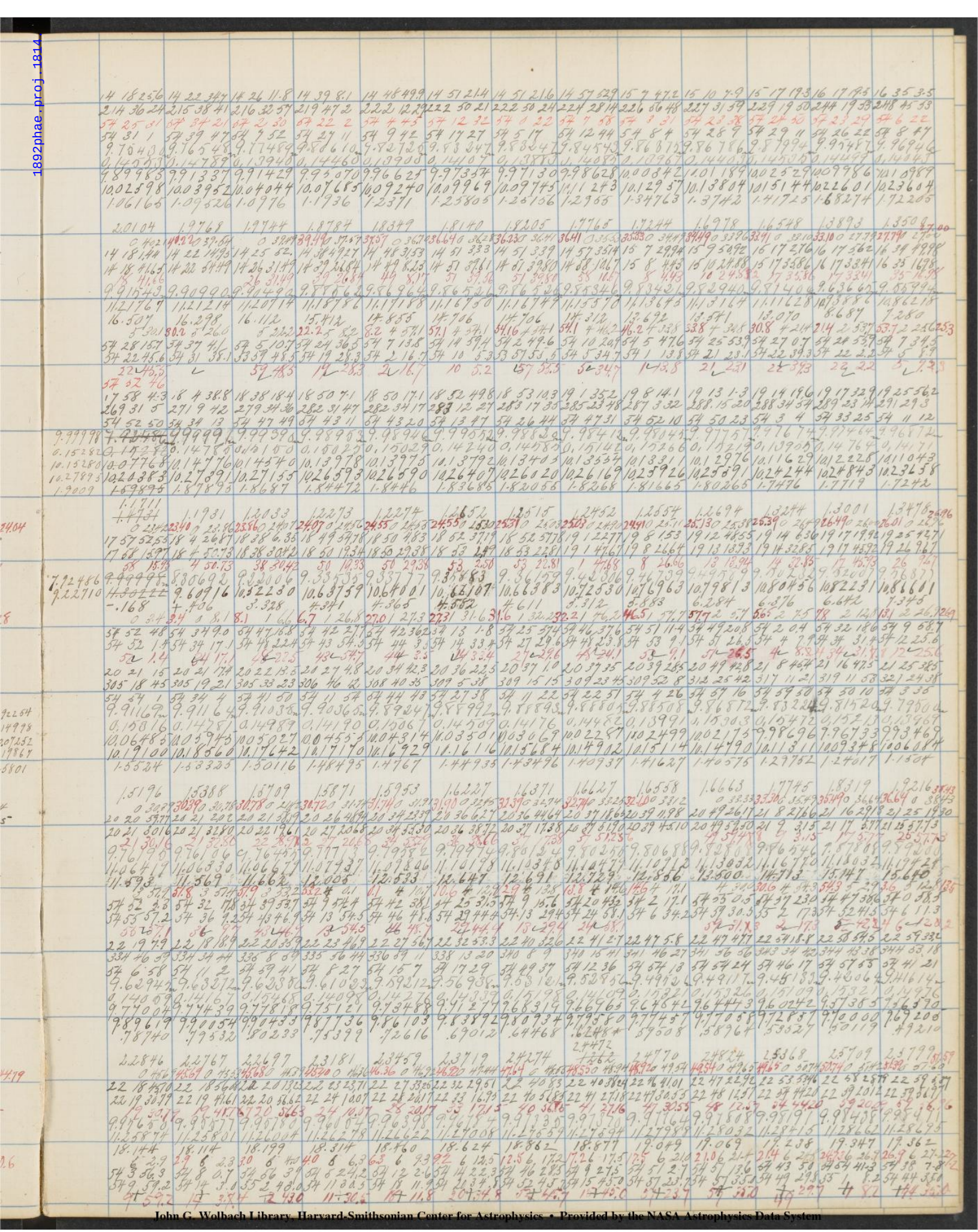
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Δm	23 2 0.3	23 5 48.3	23 10 26.7	23 11 26.5	23 14 53.7	23 17 3.8	23 17 47.6	23 19 27.1	23 21 19.4	23 22 7.0	23 25 20.5	23 31 7.9
α m	346 30 5	346 27 5	347 36 41	347 51 38	348 43 26	349 13 57	349 26 34	349 31 47	350 19 61	350 31 45	351 20 8	352 46 59
δ m	54 17 21	54 59 32	57 27 13	57 24 11	54 55 44	57 21 3	54 55 4	54 21 57	54 51 16	54 33 43	54 58 27	54 12 16
log r sin α	9.398552	9.369714	9.381514	9.382882	9.29127	9.270102	9.263744	9.246514	9.225202	9.216 26	9.178962	9.109082
log r cos δ	0.143356	0.184644	0.144598	0.144237	0.158626	0.144341	0.153440	0.144584	0.174242	0.144772	0.152202	0.141977
log r sin α tan δ	9.571905	9.532433	9.947749	9.946819	9.944484	9.941444	9.941718	9.939109	9.937762	9.936400	9.933116	9.923107
log r sin δ sec δ	9.668057	9.635050	9.960364	9.959434	9.957099	9.954059	9.954333	9.951724	9.950377	9.949015	9.945731	9.937722
r sin δ tan δ	.46564	.44720	.40146	.39296	.37239	.34721	.34941	.32904	.31899	.30914	.28662	.25835
Δr	2.6064	2.6248	2.6706	2.6791	2.6997	2.7248	2.7226	2.7430	2.7531	2.7629	2.7854	2.8337
dα/dt	0 52.18	52.13	52.50	53.41	53.60	53.99	54.00	54.45	54.47	54.93	55.06	55.72
dδ/dt	0 53.05	0 51.30	0 53.41	0 53.50	0 54.36	0 54.50	0 54.45	0 54.47	0 54.06	0 54.26	0 54.71	0 54.78
L o	231 34 27	235 22 09	23 10 00 4	23 10 57.76	23 14 26.75	23 16 36 53	23 17 20.42	23 19 19 62	23 20 57 86	23 21 39 41	23 22 44 67	23 30 39 55
L 1875.0	232 26 40	23 6 14 59	23 10 53 45	23 11 53.37	23 15 20.74	23 17 31.03	23 18 14 87	23 20 14 48	23 21 46 92	23 22 34 87	23 25 49 38	23 31 36.22
log r cos d	9.98594	9.98774	9.98976	9.99017	9.99155	9.99203	9.99259	9.99316	9.99378	9.99403	9.99561	9.99654
log r sin α	11.28818	11.28993	11.29200	11.29241	11.29377	11.29451	11.29483	11.29540	11.29602	11.29621	11.29725	11.29878
r cos α	19.417	19.477	19.589	19.607	19.668	19.705	19.717	19.742	19.771	19.782	19.827	19.897
20 r cos α	6 28.3	28.36 29.9	29.9 6 31.8	31.8 6 32.1	32.1 6 32.4	33.4 6 34.1	34.1 6 34.3	34.3 6 34.8	34.9 6 35.4	35.4 6 35.6	35.6 6 36.5	36.5 6 37.9
L o	57 14 7.0	57 56 16.6	57 23 57.3	57 17 57.4	57 52 27.6	57 17 45.6	57 51 46.5	57 18 39.2	57 47 58.2	57 30 25.8	57 47 8.5	57 8 5.6
L 1875.0	57 20 35.3	55 2 46.5	57 38 29.1	57 24 26.5	57 59 1.0	57 24 19.7	57 58 20.8	57 25 14.0	57 54 33.6	57 37 1.4	57 53 45.0	57 15 33.9
α m	0 27 43.6	0 43 55.4	0 48 38.8	0 53 38.6	0 59 52.2	1 5 20.5	1 18 44	1 23 46.4	1 31 1.6	1 39 7.8	1 58 14.6	2 0 26.2
δ m	6 55 54	10 58 51	12 9 42	13 24 39	14 58 3	16 20 8	19 41 0	20 36 36	22 45 24	24 46 47	29 33 39	30 6 33
L m	58 20 17	56 19 12	55 5 16	56 10 57	55 21 24	55 18 26	55 28 17	55 22 12	55 5 48	55 22 52	55 32.14	55 12 41
log r sin α	9.08165	9.27985	9.32360	9.36586	9.41307	9.44911	9.52709	9.55320	9.58750	9.62209	9.69315	9.70040
log r cos δ	0.160 23	0.15994	0.15619	0.15772	0.16054	0.15973	0.16240	0.16075	0.17683	0.16093	0.16847	0.15818
log r sin α tan δ	9.24188	9.43979	9.47979	9.52306	9.57261	9.60884	9.68979	9.71375	9.75838	9.78332	9.85662	9.85858
log r sin δ sec δ	9.36803	9.56594	9.60594	9.64921	9.69876	9.73499	9.81894	9.83990	9.86998	9.90047	9.98277	9.98473
r sin δ tan δ	.23336	.36808	.40369	.44588	.49976	.53424	.65455	.69168	.74128	.81184	.96111	.96546
Δr	3.3033	3.4400	3.4755	3.5178	3.5717	3.6152	3.7265	3.7636	3.8132	3.8838	4.0331	4.0374
dα/dt	1 6.11	1 8.80	1 9.57	9.51 1 10.2	10.36 1 11.43	1 12.30	1 14.55	1 15.27	1 16.26	16.24 1 17.68	1 20.66	1 20.75
dδ/dt	0 27 10.60	0 43 2.01	0 48 4.69	0 53 3.49	0 59 15.61	1 4 44.36	1 18 6.82	1 23 8.83	1 30 23.57	1 38 29.01	1 57 34.32	1 59 45.84
L 1875.0	6 28 16.71	0 44 29.81	0 49 14.20	0 54 13.85	1 0 27.04	1 5 56.66	1 19 21.35	1 24 24.10	1 31 39.83	1 39 46.68	1 58 51.98	2 1 63.59
log r cos α	9.99681	9.99197	9.99042	9.98899	9.98550	9.98210	9.97385	9.97031	9.96480	9.95804	9.99943	9.98709
log r cos α	11.29905	11.29426	11.29266	11.29113	11.28724	11.27607	11.27255	11.26704	11.26028	11.25167	11.24917	11.23929
r cos α	19.909	19.688	19.618	19.579	19.375	19.246	18.884	18.731	18.495	18.209	17.445	17.350
20 r cos α	6 31.2	6 33.8	6 32.4	32.1 6 31.0	30.2 6 27.5	6 24.9	6 17.7	6 14.6	6 9.9	9.9 6 4.2	5 48.9	5 47.0
L o	55 16 58.3	55 15 56.5	55 2 0.3	55 7 41.9	55 18 10.4	55 15 14.0	55 25 8.5	55 19 4.7	55 2 43.2	55 19 49.7	55 29 19.7	55 9 47.7
L 1875.0	55 23 36.5	55 22 29.3	55 8 32.7	55 14 12.9	55 24 37.9	55 21 35.9	55 31 26.2	55 25 19.3	55 8 53.1	55 25 53.9	55 35 8.6	55 15 34.7
			52.42	14 12.80		(?)			53.1			34.7
L m	3 15 43.1	3 29 25.7	3 29 26.6	3 31 57.9	3 53 47.6	3 3 12 32	3 21 47.4	3 21 21.3	3 25 4.1	3 28 56.1	3 37 29.9	3 43 41.2
L m	48 55 47	52 21 26	52 21 39	52 59 29	58 26 48	48 8 0	50 26 51	50 20 20	51 16 2	52 14 2	54 22 29	55 55 18
δ m	55 15 39	55 18 48	55 26 7	55 13 6	55 22 44	55 24 22	55 17 56	55 10 19	55 13 41	55 27 57	55 29 29	55 12 28
log r sin α	9.87731	9.89863	9.89865	9.90229	9.93051	9.87198	9.88607	9.88639	9.89213	9.89791	9.90900	9.91817
log r cos δ	0.14798	0.10983	0.16181	0.15800	0.16090	0.16134	0.15960	0.15755	0.15845	0.16231	0.16272	0.16812
log r sin α tan δ	0.03629	0.00584	0.00604	0.00609	0.00914	0.00333	0.00457	0.00439	0.00258	0.00622	0.00717	0.00762
log r sin δ sec δ	0.16244	0.18461	0.18661	0.18674	0.21756	0.15947	0.17182	0.17009	0.17673	0.17637	0.19787	0.20244
r sin δ tan δ	1.4536	1.5267	1.5368	1.53725	1.6503	1.4437	1.48533	1.4794	1.5022	1.5010	1.57715	1.59382
Δm												
dα/dt	4.6256	4.5987	4.6088	4.6092	4.7223	4.5157	4.5573	4.5514	4.6742	4.5730	4.6491	4.6668
dδ/dt	1 30.61	1 31.97	1 32.18	1 32.18	1 34.45	1 30.31	1 31.15	1 31.03	1 31.48	1 31.46	1 33.97	1 33.32
L o	3 14 57.93	3 28 39.72	3 28 40.59	3 31 11.89	3 53 0.0	3 11 44	3 20 57.14	3 21 32.12	3 24 15.83	3 28 7.46	3 36 40.98	3 42 52.32
L 1875.0	3 16 28.44	3 30 11.69	3 30 12.77	3 32 44.07	3 54 34.45	3 13 14.31	3 22 30.29	3 23 4.15	3 25 47.31	3 29 38.92	3 38 14.97	3 44 23.64
log r cos d	9.81750	9.78585	9.78581	9.77954	9.71874	9.82408	9.80499	9.80598	9.79634	9.78706	9.76528	9.74844
log r sin α	11.11979	11.08809	11.08805	11.08178	11.02098	11.12662	11.10723	11.10822	11.09857	11.08930	11.06752	11.05068
r cos α	13.176	12.249	12.248	12.072	10.495	13.385	12.801	12.830	12.548	12.283	11.682	11.238
20 r cos α	4 23.5	4 5.0	4 5.0	4 1.4	3 29.9	4 27.7	4 16.0	4 16.6	4 11.0	4 3.7	3 53.6	3 44.8
L o	55 13 27.9	55 16 45.7	55 24 4.2	55 11 5.2	55 19 59	55 22 5.6	55 16 32.7	55 8 55.8	55 12 20.5	55 26 39.8	55 28 1.8.2	55 11 22.7
L 1875.0	55 17 51.4	55 20 50.7	55 28 9.2	55 15 6.6	55 23 28.9	55 27 19.3	55 20 48.7	55 13 12.4	55 16 31.5	55 30 45.3	55 34 11.8	55 15 7.5
	53 9 2	56 24 20	57 17 6	56 2 12	56 10 57	56 14 47	56 8 2	56 1 19	56 4 41	56 11 21	56 10 23	56 1 19 24
L m	7 11 19.6	7 31 27.7	7 57 52	7 58 7.5	8 10 55.4	8 28 15.3	9 0 4.9	9 0 22.7	9 6 9.3	9 13 42.7	9 19 12.6	9 16 15.8
α m	107 49 54	117 51 56	118 43 0	119 31 53	122 43 51	127 3 50	135 1 14	135 5 41	136 32 20	138 25 41	138 33 9	139 3 59
δ m	65 11 5	65 37 27	55 21 4	55 30 31	55 24 28	55 4 0	55 7 2	55 5 30	55 15 22	55 15 23	55 8 44	55 24 37
log r sin α	9.97561	9.94679	9.94300	9.93952	9.92558	9.90298	9.84932	9.84876	9.83750	9.82188	9.82081	9.81636
log r cos δ	0.15720	0.16133	0.15958	0.16211	0.16059	0.17009	0.15509	0.15497	0.15760	0.15677	0.15677	0.15904
log r sin α tan δ	0.13581	0.10780	0.10238	0.10167	0.08629	0.07298	0.00471	0.00373	9.99310	9.97947	9.97658	9.97540
log r sin δ sec δ	10.26196	10.23395	10.22873	10.22782	10.21244	10.19913	10.13086	10.12988	10.12125	10.10539	10.10273	10.10155
r sin δ tan δ	1.82795	1.71375	1.6933	1.68976	1.63096	1.58175	1.3516	1.3486	1.32205	1.27525	1.26687	1.26345
							1.204					
Δm												
dα/dt	4.8999	4.7857	4.7653	4.7617	4.7029	4.6537	4.4256	4.4206	4.3940	4.3472	4.3388	4.3354
dδ/dt	1 37.09	1 36.71	1 36.31	1 36.23	1 34.96	1 33.07	31.91	1 28.47	25.41	28.41	1 26.78	26.71
L o	7 10 30.61	7 50 39.77	7 54 4.31	7 57 19.51	8 10 8.37	8 27 27.25	8 59 20.53	8 59 38.39	9 6 25.28	9 12 59.16	9 13 29.17	9 15 32.40
L 1875.0	7 12 7.61	7 52 16.48	7 55 39.62	7 58 55.04	8 11 42.43	8 29 2.32	9 0 49.02	9 1 6.80	9 6 53.16	9 14 26.10	9 14 56.96	9 17 59.11
						24 1.16	0 49.02	6.88			14 33.95	
log r cos d	9.48503	9.66868	9.68167	9.69275	9.73295	9.77910	9.84964	9.85020	9.86084	9.87397	9.87480	9.87821
log r sin α	10.87227	10.89192	10.89397	10.89499	10.93299	11.38134	11.13588	11.13244	11.16308	11.17627	11.17704	11.18045
r cos α	6.127	9.373	9.636	9.883	10.844	12.060	14.187	14.205	14.887	15.004	16.033	16.151
20 r cos α	2 2.5	3 7.5	3 12.7	3 17.7	3 36.9	4 1.2	4 7.4	4 7.4	4 7.4	5 0.1	5 0.7	5 3.0
L o	55 10 35.5	55 25 53.6	55 19 27.3	55 28 52.2	55 22 39.2	55 1 59.4	55 4 40.5	55 3 8.4	55 12 66.7	55 12 53.1	55 6 14.1	55 22 5.3
L 1875.0	55 8 1.0	55 22 46.1	55 16 14.6	55 25 34.5	55 19 2.3	54 57 55.2	54 59 57.8	54 58 24.3	55 8 6.6	55 7 53.0	55 1 13.4	55 17 2.3
						57 5.1	57 3.4	57 24.5			1 13.4	

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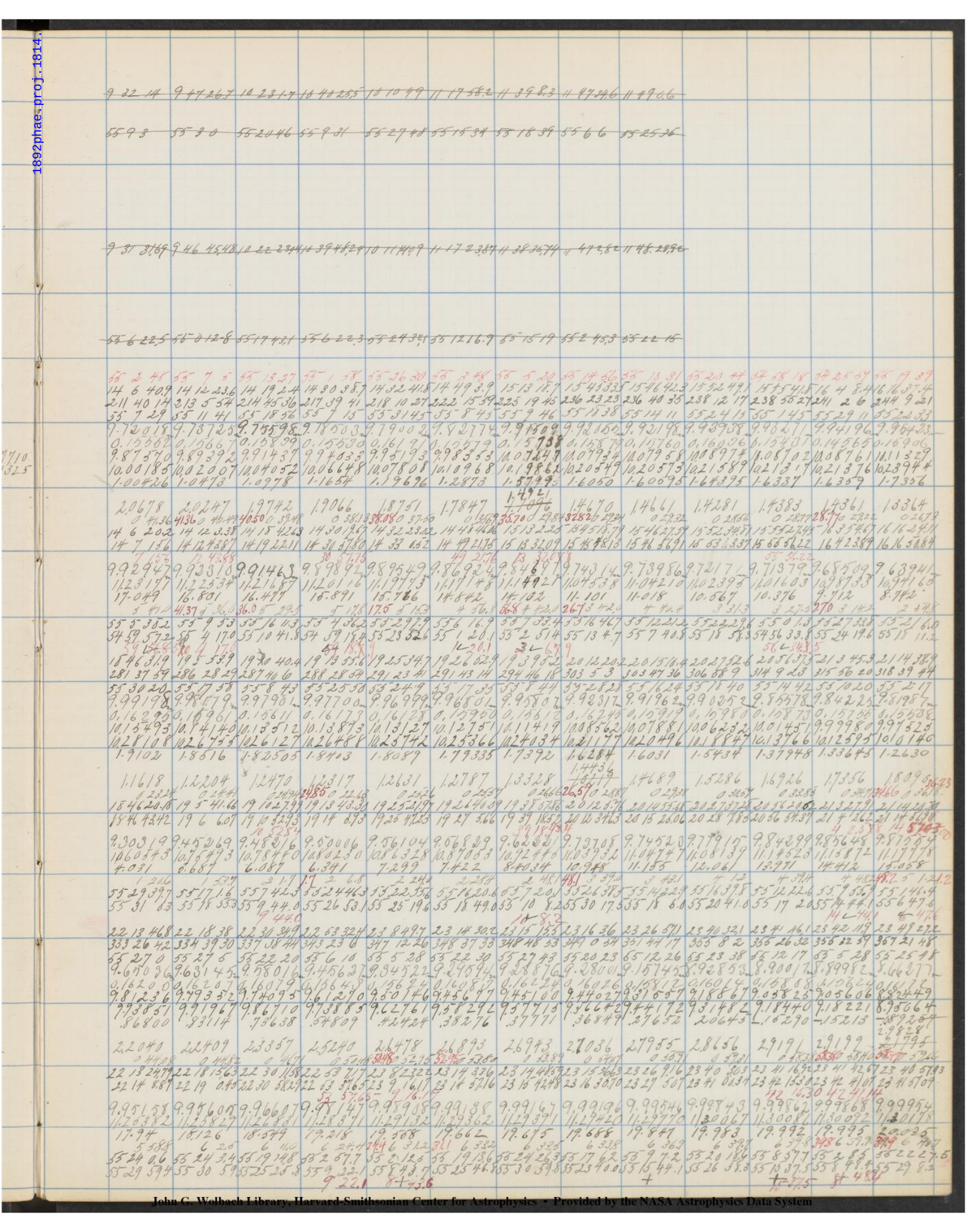
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α_{mn}	7 11 19.6	7 51 7.7	7 54 52	7 58 7.5	8 10 55.4	8 28 16.3	8 60 4.9	9 0 22.7	9 6 9.3	9 13 42.7	9 14 12.6	9 16 15.7	
δ_{mn}	55 14 5	55 27 27	55 21 4	55 30 31	55 24 28	55 4 0	55 7 2	55 5 30	55 13 22	55 15 23	55 6 44	55 24 37	
$\log \sin \alpha \tan \delta$													
$\log \cos \alpha \tan \delta$													
$\log \sin \alpha \tan \delta$													
$\log \cos \alpha \tan \delta$													
$\log \sin \alpha \tan \delta$													
$\log \cos \alpha \tan \delta$													
α_o	7 10 30.67	7 50 39.77	7 54 4.31	7 57 19.81	8 10 8.37	8 27 29.25	8 59 20.55	8 59 38.39	9 5 25.28	9 12 59.16	9 13 26.17	9 16 32.40	
$\alpha_{1875.0}$													
$\log \cos \alpha$													
$\log \sin \alpha$													
$\log \cos \alpha$													
δ_o	56 10 36.6	56 25 53.6	56 19 27.3	55 28 52.2	55 22 37.2	55 1 57.4	55 4 40.5	55 3 8.4	55 12 56.7	55 12 53.1	55 6 14.1	55 22 53	
$\delta_{1875.0}$													
	55 21 03	55 22 24	55 20 13	55 20 18	55 5 26	55 17 06	54 57 42	55 1 13	55 1 0	55 2 47	55 18 37	55 15 17	
α_{mn}	12 32 1.8	12 16 59.4	12 19 51.7	12 29 37.6	12 44 56.7	13 30 29.5	13 32 42.3	13 43 6.8	13 56 36	13 57 52.1	13 58 45.5	14 5 32.7	
α_{mn}	180 0 17	184 14 57	184 57 56	187 24 24	191 14 11	202 37 23	203 10 35	205 46 42	209 9 0	209 28 2	209 31 8	211 23 11	
δ_{mn}	55 28 34	55 29 4	55 26 52	55 26 56	55 11 59	55 24 6	55 3 51	55 7 14	55 6 56	55 29 43	55 24 48	55 2 10	
$\log \sin \alpha$	5.916022	5.869611	8.937302	9.100028	9.289711	9.558408	9.594001	9.638381	9.687617	9.691892	9.692592	9.716677	
$\log \tan \delta$	0.160677	0.160811	0.160222	0.160240	0.176231	0.159600	0.158312	0.155106	0.155061	0.161482	0.179881	0.160433	
$\log \sin \alpha \tan \delta$	6.076692	9.030422	9.097524	9.260262	9.465944	9.743688	9.747316	9.793487	9.842678	9.853374	9.872473	9.927102	9.87710
$\log \cos \alpha \tan \delta$	9.915574	9.122367	9.238667	9.357209	9.546983	9.746983	9.873314	9.919634	9.968822	9.977952	9.977862	10.053255	10.00325
$\sec \alpha \tan \delta$	.000135	.141341	.167377	.243607	.373337	.741037	.746997	.831067	.930787	.953947	.951977	1.007555	
$\frac{d\alpha}{dT}$	3.07.19	2.9286	2.9047	2.8284	2.6987	2.3310	2.3231	2.2410	2.1413	2.1181	2.1201	2.0845	
	1.144	0.8857	0.8709	0.8687	0.8379	0.7246	0.7217	0.6963	0.6653	0.6579	0.6586	0.6476	
$\frac{d\alpha}{dT}$	0	0	0	0	63.97	0	0	46.44	0	0	0	0	
α_o	12 11 31.5	12 16 30.1	12 19 22.58	12 29 9.34	12 44 29.67	13 30 6.22	13 32 19.08	13 42 44.38	13 56 22.43	13 57 30.9	13 57 42.3	14 5 12.03	
$\alpha_{1875.0}$	12 12 32.82	12 17 28.67	12 20 20.67	12 30 5.91	12 45 23.64	13 30 52.84	13 33 5.58	13 43 29.20	13 57 5.26	13 58 13.26	13 58 25.70	14 5 33.32	
					45 23.64		33 5.58		57 5.26				
$\log \cos \alpha$	10.000000	9.999880	9.999836	9.999686	9.999159	9.996529	9.996345	9.995447	9.994118	9.993983	9.993961	9.993129	
$\log \sin \alpha$	11.302241	11.301047	11.300609	11.299860	11.297383	11.267746	11.265569	11.262677	11.243422	11.242077	11.241883	11.233633	
$\log \cos \alpha$	20.056	20.000	19.980	19.888	19.671	18.512	18.437	18.060	17.515	17.461	17.452	17.121	
$\log \cos \alpha$	6 77.1	6 40.0	6 39.6	6 37.8	6 33.4	6 14.2	6 8.7	6 0.2	5 54.3	5 47.2	0 47.1	5 42.4	
					33.4		8.7		57.3				
δ_o	55 25 18.5	55 25 44.5	55 23 32.5	55 23 36.9	55 5 42.4	55 21.7	55 0 46.3	55 4 13.7	55 5 4.4	55 27 48.3	55 21 53.8	55 18 8.7	
$\delta_{1875.0}$	55 10 32.4	55 19 4.5	55 16 52.9	55 16 59.1	55 2 9.0	55 14 36.5	54 57 37.6	54 58 13.5	54 58 13.7	55 21 59.1	55 16 4.8	55 12 26.3	
	55 28 31	55 22 38	55 14 48	55 27 44	55 4 18.4	55 21 1.1	55 3 41.65	55 27 52	55 3 2.4	55 16 29			
α_{mn}	16 16 46.3	16 51 52.7	16 55 32.3	17 1 14	17 15 30.5	17 30 45.4	17 33 51.3	17 34 7.7	17 46 10.8	17 48 58.5	18 36 39.6	18 39 0.9	
α_{mn}	244 11 35	252 58 11	253 33 5	255 18 30	259 37 42	262 4 21	263 27 30	263 31 56	266 32 42	267 14 38	279 9 54	279 45 14	
δ_{mn}	55 31 26	55 24 33	55 16 39	55 29 25	55 5 27	55 22 1	55 4 0	55 25 37	55 15 49	55 16 48	55 28 14	55 26 50	
$\log \sin \alpha$	9.974377	9.980152	9.982459	9.985456	9.992284	9.996445	9.997116	9.999722	9.999920	9.999949	9.999442	9.999367	
$\log \tan \delta$	0.162468	0.160887	0.160879	0.162225	0.155991	0.160447	0.157564	0.162288	0.158982	0.159211	0.162386	0.161002	
$\log \sin \alpha \tan \delta$	10.111683	10.141139	10.141134	10.147781	10.148675	10.156921	10.162800	10.161950	10.158112	10.161870	10.161680	10.160469	
$\log \cos \alpha \tan \delta$	10.242981	10.226754	10.226749	10.227896	10.227490	10.228367	10.228895	10.228563	10.228427	10.227483	10.228295	10.228082	
$\sec \alpha \tan \delta$	1.74798	1.85316	1.85135	1.87915	1.88325	1.9190	1.94517	1.9304	1.9243	1.97175	1.91845	1.9091	
$\frac{d\alpha}{dT}$	1.3222	1.2204	1.2207	1.1929	1.1888	1.1530	1.1271	1.1416	1.1477	1.1003	1.1536	1.1629	
	0.2444	0.2441	0.2441	0.2386	0.2376	0.2306	0.2257	0.2283	0.2294	0.2201	0.2307	0.2326	
$\frac{d\alpha}{dT}$	0	0	0	0	23.78	0	0	23.43	0	0	0	0	
α_o	16 16 33.08	16 51 40.53	16 55 20.13	17 1 2.03	17 18 15.94	17 30 33.86	17 33 39.54	17 33 56.28	17 45 39.29	17 48 47.05	18 36 28.03	18 38 49.26	
$\alpha_{1875.0}$	16 16 59.62	16 52 49.4	16 55 44.54	17 1 28.89	17 18 42.72	17 30 59.92	17 34 2.08	17 34 19.11	17 46 2.23	17 49 9.06	18 36 51.10	18 39 12.52	
					18 42.72		34 2.08						
$\log \cos \alpha$	9.963882	9.946668	9.944337	9.940417	9.925535	9.910466	9.905626	9.905170	9.878006	9.868200	9.820115	9.822895	
$\log \tan \delta$	10.941106	10.876892	10.874661	10.870641	10.855759	10.840698	10.835847	10.835394	10.808238	10.798427	10.750339	10.753119	
$\log \sec \alpha$	8.731	0.874	0.566	5.086	3.610	2.562	2.283	2.259	1.208	.964	3.187	3.397	
	2 34.6	1 57.3	1 51.3	1 41.2	1 12.2	12.2	0 37.0	0 45.7	45.65	0 44.2	−0 19.2	+1 38.1	+1 41.9
δ_o	55 29 58.1	55 28 36.9	55 15 43.3	55 28 34.5	55 4 50.7	55 21 35.3	55 3 37.0	55 25 14.4	55 15 36.4	55 16 35.2	55 27 42.2	55 26 14.6	
$\delta_{1875.0}$	55 27 3.5	55 21 39.4	55 13 52.0	55 26 53.1	55 3 38.5	55 20 44.9	55 2 51.3	55 27 29.2	55 15 12.2	55 16 19.0	55 28 45.9	55 27 23.5	
					33.5		51.3						
α_{mn}	21 20 18.7	21 21 4.6	21 26 26.5	21 32 44.4	21 33 14.8	21 33 16.3	21 51 28.5	21 51 34.4	21 54 6	21 58 40.0	22 10 32.6	22 13 28.3	
α_{mn}	320 4 41	320 16 9	321 36 38	323 11 6	323 17 42	323 18 30	327 32 8	327 33 36	328 31 30	329 40 0	332 38 8	333 24 35	
δ_{mn}	55 28 53	55 15 41	55 18 4	56 21 24	55 9 22	55 10 7	55 5 58	55 6 6	55 8 10	55 8 43	55 8 50	55 23 24	
$\log \sin \alpha$	9.807362	9.805622	9.793092	9.777592	9.777631	9.761628	9.725792	9.725750	9.717772	9.703312	9.644242	9.651892	
$\log \tan \delta$	0.162560	0.158994	0.159642	0.160800	0.156429	0.152729	0.156371	0.156411	0.156911	0.156141	0.158028	0.160088	
$\log \sin \alpha \tan \delta$	9.969922	9.964461	9.952734	9.938393	9.933360	9.914357	9.882216	9.882161	9.874683	9.859453	9.802270	9.811980	
$\log \cos \alpha \tan \delta$	10.096076	10.090761	10.078884	10.063784	10.059932	10.038316	10.008306	10.008864	9.990894	9.985557	9.944722	9.953812	
$\sec \alpha \tan \delta$	1.24766	1.23245	1.19916	1.15882	1.14795	1.09795	1.04308	1.01875	.97925	.96732	.88049	.86721	
$\frac{d\alpha}{dT}$	1.8244	1.8396	1.8729	1.9138	1.9245	1.9241	2.0290	2.0583	2.0928	2.1047	2.1916	2.2048	
	0.3679	0.3673	0.3746	0.3826	0.3847	0.3849	0.3848	0.4057	0.4167	0.4107	0.4340	0.4203	0.4285
$\frac{d\alpha}{dT}$	0	0	0	0	38.49	0	0	0	41.67	41.07	0	42.05	43.79
α_o	21 20 04.92	21 20 46.23	21 26 7.75	21 32 26.27	21 32 55.51	21 32 56	21 51 7.96	21 51 13.86	21 53 45.28	21 58 17.02	22 10 10.61	22 13 6.30	
$\alpha_{1875.0}$	21 20 36.98	21 21 23.02	21 26 45.21	21 33 4.57	21 33 34.03	21 33 34.48	21 51 48.54	21 51 56.53	21 54 27.14	21 59 1.11	22 10 54.19	22 13 50.40	
					34.03			56.53	54 26.64	59 1.11	10 54.19	13 50.40	
$\log \cos \alpha$	9.884749	9.885096	9.889420	9.903406	9.904111	9.914139	9.927799	9.927891	9.930188	9.938606	9.948476	9.951444	
$\log \tan \delta$	11.186398	11.188819	11.191644	11.205564	11.206335	11.206337	11.230063	11.230152	11.233122	11.238306	11.258706	11.258368	
$\sec \alpha \tan \delta$	15.381	15.424	15.720	16.096	16.083	16.083	16.984	16.988	17.105	17.210	17.812	17.934	
	5 7.6	5 8.5	5 14.4	5 21.1	5 21.7	21.6	5 21.7	5 99.7	5 99.8	5 102.1	5 46.2	46.2	5 46.2
δ_o	55 28 19	55 15 6.6	55 15 26.8	55 18 43.5	55 6 41.8	55 7 26.3	55 3 8.5	55 3 16.5	55 5 19.2	55 6 49.7	55 5 5.8	55 20 24.2	
$\delta_{1875.0}$	55 33 26.6	55 20 15.0	55 20 41.2	55 24 4.6	55 12 3.5	55 12 48.0	55 8 48.2	55 8 56.3	55 11 1.3	55 11 35.9	55 11 38.0	55 26 22.7	
					12.34				11 43	11 52.9	11 48.81		

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Δm
αm

δm
$\log \sin \alpha$
$\log \tan \delta$
$\log \sin \alpha \tan \delta$
$\log \sin \alpha \tan \delta$
$m \sin \alpha \tan \delta$
m

α_0
$\alpha\ 1875.0$

$\log \cos \alpha$
$\log \ddot{\sin} \cos \alpha$
$m \cos \alpha$

δ_0
$\delta\ 1876.0$

Δm
$^0\alpha m$
δm
$\log \sin \alpha$
$\log \tan \delta$
$\log \sin \alpha \tan \delta$
$\log \sin \alpha \tan \delta$
$m \sin \alpha \tan \delta$
m

α_0
$\alpha\ 1875$

$\log \cos \alpha$
$\log \ddot{\sin} \cos \alpha$
$m \cos \alpha$

δ_0
$\delta\ 1875.0$

Δm
$^0\alpha m$
δm
$\log \sin \alpha$
$\log \tan \delta$
$\log \sin \alpha \tan \delta$
$\log \sin \alpha \tan \delta$
$m \sin \alpha \tan \delta$
m

α_0
$\alpha\ 1875.0$

$\log \cos \alpha$
$\log \ddot{\sin} \cos \alpha$
$m \cos \alpha$

δ_0
$\delta\ 1875.0$

Δm
$^0\alpha m$
δm
$\log \sin \alpha$
$\log \tan \delta$
$\log \sin \alpha \tan \delta$
$\log \sin \alpha \tan \delta$
$m \sin \alpha \tan \delta$
m

α_0
$\alpha\ 1875.0$

$\log \cos \alpha$
$\log \ddot{\sin} \cos \alpha$

δ_0
$\delta\ 1875.0$

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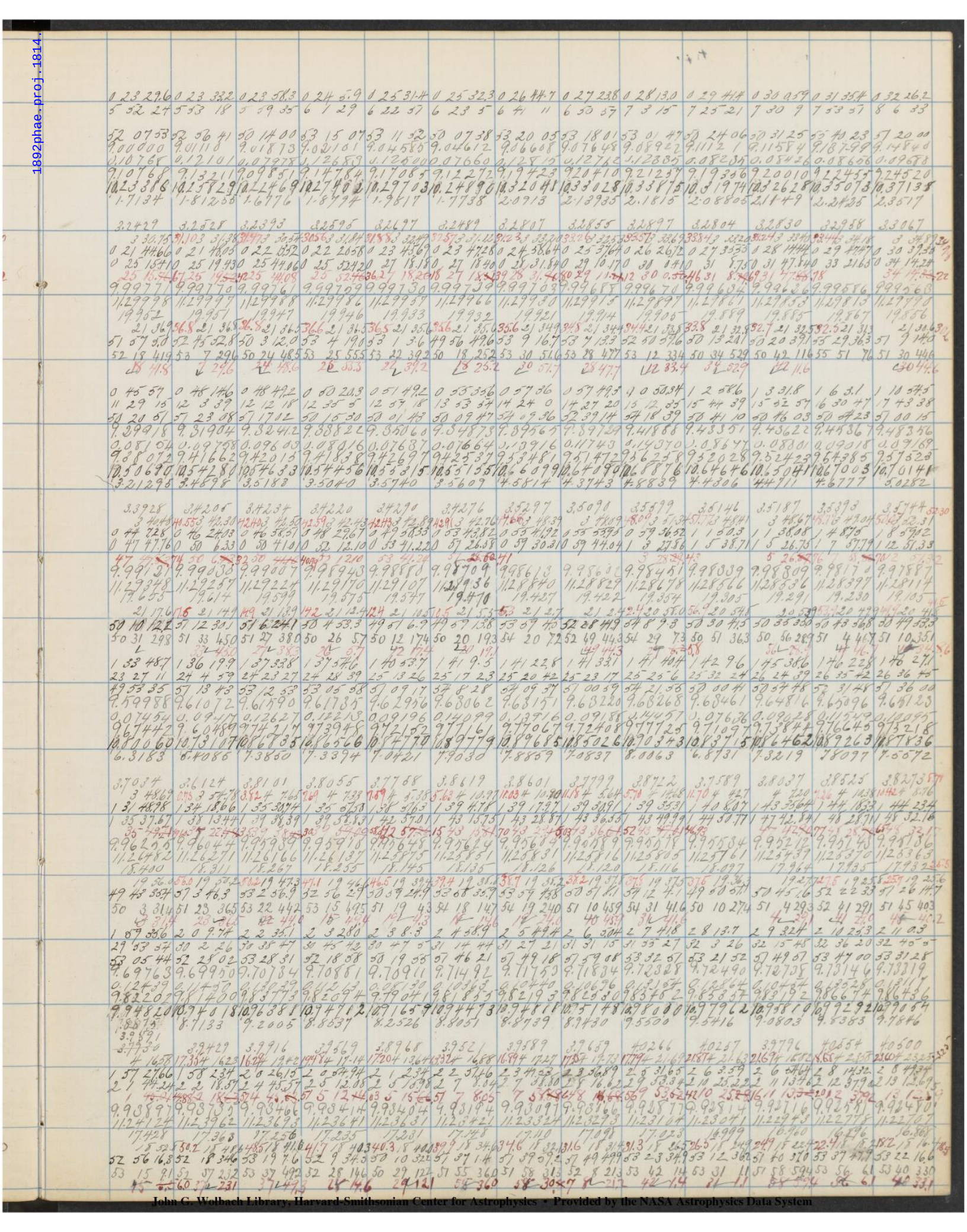
Precession for 1810 m = 3.0716 log s^s 1.12418 log $s^{s''}$ 1.30227

(log s^s 0.12618)

α_{mn}	0 2 04.70	0 2 22.30	0 3 40.10	0 4 37.50	0 6 24.80	0 9 23.40	0 7 19.87	0 15 47.60	0 16 36.50	0 23 55.10	1 23 60.10	0 23 60.70
	0 31 11	0 35 35	0 55 2	1 9 23	1 36 12	2 20 51	3 34 89	3 56 54	4 9 8	5 46 23	5 46 30	5 46 32
δ_{mn}	51 22 40.0	51 26 26.0	50 36 06.0	50 36 29.0	50 44 27.0	50 33 26.0	53 46 17.0	51 08 46.0	52 10 24.0	51 58 10.0	53 39 07.0	53 05 28.0
	7.95764	8.01901	8.20433	8.80495	8.44684	8.60236	8.79584	8.83794	8.85977	9.00254	9.00269	9.00273
	0.09744	0.09847	0.08544	0.08536	0.08761	0.08477	0.13509	0.09108	0.10996	0.10671	0.13317	0.12827
	8.03513	8.11748	8.28977	8.39031	8.53445	8.68713	8.93093	8.92902	8.96967	9.10925	9.13586	9.12600
	9.18131	9.24366	9.41595	9.51649	9.66063	9.81381	9.05520	9.09385	10.12354	10.23543	10.26204	10.25218
	.01518	.81 76025	.02 60 59	.03 28 47	.04 57 76	.06 06 60	.81	.01356	1-2470	1.7196	1.8283	1.78725
	3.1867	3.0891	3.0776	3.1044	3.2173	3.1366	3.0830	3.1851	3.1963			
	3.2284	3.2468	3.2377	3.2496	3.2693	3.2522	3.1836	3.1857	3.2186	3.2435	3.2544	3.2603
	3 20.63	20.63	20.20	20.78	20.88	21.53	21.79	21.83	22.61	22.63	23.84	23.93
	0 0 24.94	0 0 42.41	0 1 59.92	0 2 57.13	0 4 43.96	0 7 41.78	0 16 36.31	0 14 46.8	0 14 53.11	0 21 20.62	0 21 20.84	0 21 21.03
	0 3 45.70	0 4 26.10	0 5 20.70	0 6 18.92	0 8 6.370	0 11 6.620	0 16 3.93	0 17 35.71	0 18 28.850	0 24 57.40	0 24 57.35	0 24 57.28
log cos α	9.99998	9.99997	9.99994	9.99991	9.99988	9.99963	9.99915	9.99896	9.99885	9.99917	9.99914	9.99778
	11.30225	11.30224	11.30221	11.30218	11.30210	11.30170	11.30142	11.30123	11.30112	11.30006	11.30006	11.30005
	20.056	20.056	20.054	20.053	20.049	20.040	20.018	20.009	20.004	19.955	19.955	19.955
	+21.436	+21.436	+21.435	+21.434	+21.432	+21.426	+21.412	+21.406	+21.403	+21.371	+21.371	+21.371
	51 4 49.4	51 15 34.9	50 25 17.5	50 25 37.5	50 33 36.2	50 22 35.3	53 35 26.3	50 57 36.3	51 59 33.6	51 47 21.9	53 28 19.3	52 54 40.0
	51 33 33.0	51 37 18.5	50 47 10.5	50 47 20.7	50 55 19.4	50 44 17.9	53 57 7.5	51 19 36.9	52 21 13.9	52 8 59.0	53 49 56.4	53 16 17.1
	-21.437	-21.436	-21.435	-21.434	-21.432	-21.426	-21.412	-21.406	-21.403	-21.371	-21.371	+21.371
	35 35.1	37 18.5	47 1.0	47 21.0	55 19.4	44 17.9	57 7.4	19 36.9	21 13.9	8 59.0	49 56.4	16 17.1
	0 33 49.1	0 36 20.4	0 36 57.5	0 37 15.9	0 37 34.0	0 39 5.6	0 39 55.6	0 41 57.8	0 42 36.1	0 43 7.7	0 44 43.7	0 45 16.8
	8 27 17 9	5 6	9 12 53	9 18 09	9 22 30	9 46 24	9 58 54	10 29 27	10 39 2	10 46 06	11 10 56	11 10 12
	51 28 22	54 21 31	54 07 09	54 26 37	54 17 02	50 35 00	50 06 28	50 38 53	50 42 48	55 24 25	51 50 00	55 27 52
log sin α	9.16739	9.19838	9.20348	9.23820	9.21190	9.22981	9.23888	9.25926	9.26674	9.27201	9.28764	9.29289
	0.09897	0.14446	0.18900	0.14582	0.14326	0.08500	0.07656	0.08519	0.08619	0.16135	0.10458	0.16228
	9.26636	9.34284	9.34248	9.35402	9.35516	9.31481	9.31644	9.34444	9.35293	9.43336	9.39222	9.45317
	10.39254	10.46902	10.46866	10.48020	10.48134	10.44099	9.44162	10.47062	10.47911	10.53954	10.51844	10.58835
	2.4691	2.9446	2.9421 5	.30214	3.0293	2.1606	.27645	2.9554	3.0138	3.6270	3.2992	3.8138
	3.3185	3.3660	3.3658	3.3737	3.3745	3.3476	3.3480	3.3671	3.3729	3.3343	3.4015	3.4529
	0 32 18.50	0 34 31.67	0 35 27.30	0 35 26.92	0 35 41.00	0 37 17.33	0 38 17.29	0 40 8.78	0 40 47.07	0 41 16.79	0 42 53.78	0 43 20.32
	0 35 37.59	0 38 10.160	0 38 41.60	0 39 6.170	0 39 20.310	0 40 54.90	0 41 44.910	0 43 47.640	0 44 26.230	0 44 53.50	0 46 34.85	0 47 9.70
log cos α	9.99526	9.99445	9.99435	9.99423	9.99416	9.99365	9.99337	9.99267	9.99245	9.99226	9.99167	9.99146
	11.29752	11.29678	11.29662	11.27650	11.29643	11.29592	11.29564	11.29494	11.29472	11.27845	11.29394	11.29373
	17.839	19805	19798	19793	19789	19766	19763	19722	19712	19703	19676	19667
	21.295	21.295	21.287	21.269	21.263	21.263	21.247	21.239	21.219	21.213	21.184	21.183
	51 17 37.1	51 10 46.7	53 56 24.7	54 15 53.3	54 6 18.1	50 24 16.7	49 55 46.1	50 28 13.4	50 32 6.6	55 13 44.1	51 39 20.4	55 17 12.3
	51 39 6.6	51 54 32.1	54 0 51.6	54 37 19.8	54 27 44.4	50 45 41.5	50 17 10.0	50 49 35.3	50 53 27.8	55 35 47.2	52 0 39.3	55 38 30.6
	1 11 10.9	1 11 26.8	1 12 57.1	1 14 38.9	1 15 44.8	1 17 59.1	1 18 59.9	1 19 22.2	1 25 32.4	1 25 49.4	1 29 39.0	1 30 14.2	1 33 40.0
	17 47 44	17 51 42.2	18 14 17.0	18 39 44.1	18 56 12.0	19 29 47.0	19 44 59.0	19 50 35.0	21 23 6.0	21 27 21.0	22 24 45.2	22 33 33.2	23 25 0.0
	50 45 58.8	51 09 36.8	50 37 01.8	50 21 01.8	50 37 39.8	50 59 20.8	50 51 39.8	50 42 00.8	52 32 12.8	51 57 20.8	51 28 53.8	53 04 59.8	52 05 21.8
	9.98518	9.98674	9.99549	9.99504	9.99512	9.99524	9.99528	9.99580	9.99618	9.99563	9.99512	9.99539	9.99392	9.99924
	0.08700	0.09104	0.09080	0.08108	0.08947	0.09145	0.08947	0.08956	0.11569	0.10493	0.09810	0.12214	0.10725
	9.97818	9.97778	9.98634	9.98571	9.96017	9.96486	9.96182	9.96213	9.96744	9.96681	9.96493	9.97606	9.97065
	10.69936	10.70396	10.71252	10.71189	10.71789	10.71404	10.74445	10.77649	10.80362	10.79458	10.78558	10.83224	10.83270
	5.0045	5.0578	5.1585	5.1510	5.3443	5.5086	5.5521	5.5782	6.3624	6.2278	6.3902	6.7968	6.8030
	3.3714	3.3773	3.3874	3.3867	3.3660	3.3624	3.3618	3.3694	3.3078	3.3943	3.3706	3.3511	3.3519
	1 9 15.50	1 9 31.05	1 11 12.2	1 12 42.94	1 13 48.28	1 16 2.00	1 17 26.8	1 17 24.90	1 23 32.59	1 23 50.35	1 27 39.05	1 28 12.98	1 31 38.69
	1 13 7.70	1 13 23.33	1 14 57.32	1 16 36.04	1 17 42.68	1 19 57.43	1 21 22.49	1 21 20.78	1 27 33.54	1 27 50.46	1 31 40.20	1 32 16.80	1 35 42.31
	9.97870	9.97854	9.99776	9.97604	9.97583	9.99743	9.99736	9.99734	9.99690	9.99688	9.99658	9.99654	9.99626
	11.26097	11.26081	11.27988	11.27881	11.27810	11.27662	11.27574	11.27568	11.27129	11.27107	11.26815	11.26769	11.26494
	18.097	19.090	19.049	19.003	18.971	18.907	18.877	18.866	18.676	18.667	18.542	18.522	18.405
	50 35 36.4	50 59 14.9	50 46 40.9	50 10 41.7	50 41 20.5	50 49 40.0	50 41 23.7	50 41 46.1	52 22 3.1	51 11 12.0	51 17 48.7	52 53 54.7	51 55 20.6
	50 35 36.4	51 19 55.7	51 7 19.1	50 31 16.9	51 1 53.6	51 9 32.9	51 1 50.9	51 2 12.4	52 42 17.0	51 31 25.3	51 37 53.9	53 13 58.6	52 15 16.9
	1 46 46.8	1 47 36.6	1 48 12.8	1 50 47.9	1 51 30.7	1 52 56.9	1 53 15.2	1 56 14.4	1 57 9.4	1 58 48.8	1 58 58.1	1 59 31.5	
	26 40 12	26 54 9	27 3 2.7	27 42 29.4	27 57 39.0	27 57 56.2	28 14 14.8	28 48 48.0	29 3 36.0	29 17 21.2	29 41 12.0	29 44 32.4	29 32 45.0
	51 42 53	52 23 21	52 18 23	52 45 25	53 43 25	52 51 54	53 55 58	49 53 08	53 33 10	51 22 28	53 34 08	52 29 29	53 34 54
	9.66210	9.65559	9.65790	9.66142	9.67005	9.67159	9.67499	9.68208	9.68639	9.68950	9.69483	9.69356	9.69737
	0.02278	0.01328	0.01906	0.02162	0.02766	0.02734	0.02742	0.03162	0.03744	0.03188	0.02488	0.02488	0.02208
	9.76483	9.76887	9.76988	9.78641	9.78838	9.79234	9.81263	9.78642	9.78180	9.78674	9.82671	9.81044	9.82948
	10.88101	10.89306	10.89606	10.91265	10.91476	10.91852	10.93881	10.88260	10.94419	10.91312	10.95289	10.93662	10.95563
	7.6036	7.8533	7.8716	8.1781	8.2179	8.2894	8.6859	7.6314	8.1941	8.1870	8.9721	8.6422	9.0289
	3.8317	3.8569	3.8587	3.8894	3.8933	3.9005	3.9401	3.8347	3.9510	3.8913	3.9688	3.9358	3.9744
	1 44 36.99	1 45 32.0	1 46 9.16	1 48 42.23	1 49 43.83	1 49 53.72	1 50 49.61	1 53 11.19	1 54 6.77	1 55 3.66	1 56 36.63	1 56 60.95	1 57 22.57
	1 48 46.01	1 49 42.63	1 50 19.93	1 52 53.02	1 53 56.81	1 54 7.22	1 55 6.11	1 57 29.40	1 58 24.99	1 59 16.61	2 0 53.52	2 1 6.32	2 1 40.94
	9.95114	9.94026	9.94955	9.94710	9.94609	9.94393	9.94497	9.94426	9.94156	9.94059	9.93589	9.93555	9.93865
	11.25341	11.25252	11.25792	11.24937	11.24836	11.24820	11.24724	11.24487	11.24383	11.24286	11.24116	11.24092	11.24032
	17.923	17.886	17.862	17.716	17.670	17.604	17.574	17.502	17.493	17.425	17.415	17.391	
	19 25.0	19 22.6	19 21.0	19 14.3	19 11.6	19 11.1	19 8.5	19 2.3	19 2.2	18 59.6	18 57.0	18 52.6	18 52.0	18 50.4
	51 33 8.3	51 38 48.4	51 32 8.4	51 35 46.3	51 33 46.5	51 42 16.5	51 53 46.2	51 49 43.6	51 23 37.6	51 12 06.7	51 24 38.6	51 20 1.3	51 25 26.4
	51 52 32.3	52 13 0.1	52 8 40.4	52 35 46.3	53 33 46.5	52 42 16.5	53 46 20.6	49 43 36.1	53 23 37.6	51 31 53.7	53 43 31.1	52 36 53.3	53 44 16.8

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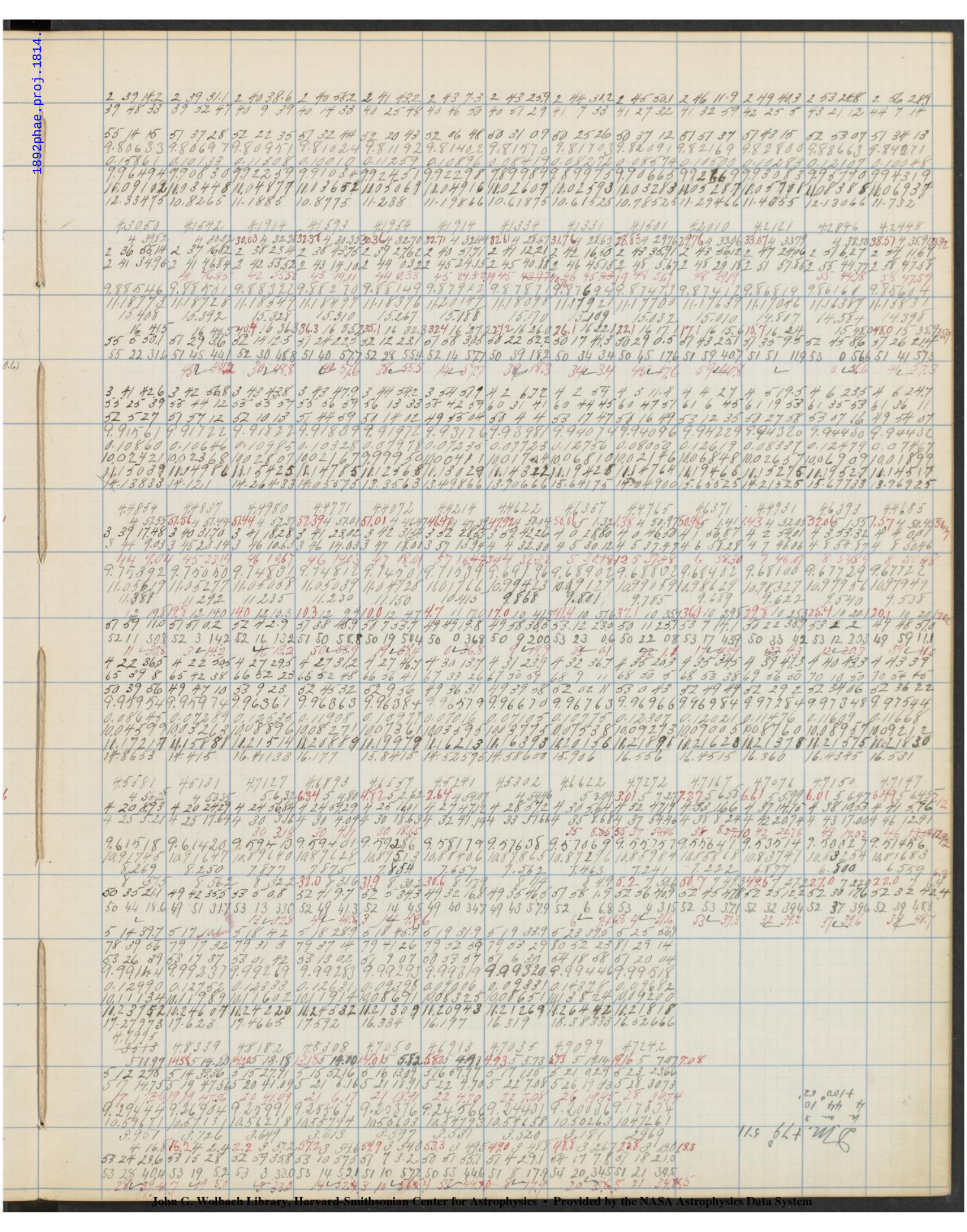
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a m	2 11 24.5	2 12 43.3	2 13 25.1	2 17 17	2 17 19.1	2 20 3.4	2 22 32.5	2 26 05	2 26 55.0	2 29 20.7	2 31 48.3	2 31 05.2	
	32 57 8	33 10 33	33 21 17	34 19 15	34 19 47	35 0 57	35 38 8	36 31 15	36 43 45	37 21 21	37 57 8	37 58 48	
log sin a	57 07 15	57 21 42	57 28 16	57 50 14	49 57 46	57 27 57	57 35 33	57 16 11	57 07 28	57 07 15	57 26 46	57 57 0	
	9.784437	9.785821	9.786022	9.785114	9.785124	9.785874	9.786539	9.784460	9.784672	9.784201	9.784887	9.784914	
	0.140066	0.139724	0.139533	0.140467	0.140407	0.140148	0.139883	0.140581	0.140911	0.140907	0.140586	0.140552	
	9.879039	9.883345	9.879056	9.878578	9.882531	9.878722	9.886222	9.870441	9.883833	9.891108	9.893473	9.899066	
	10.001128	10.296163	10.296736	9.981961	10.299940	10.299240	10.299240	10.296559	11.012081	11.012611	11.060911	11.035847	
	1.0028	9.1545	9.9260	9.5932	8.9432	9.9862	9.8266	9.9218	1.0304	10.405566	11.506661	10.860501	
	#0744	3.9870							#1020	#1121	#2221		
	3.1778	3.9870	#0641	#0309	3.9659	#0702	#0842	#0637	3.1746	3.1786	1866	#1576	
	4 24.54	4 19.15	19.16	4 24.17	24.17	4 22.01	22.04	20.75	17.74	4 24.56	4 23.57	23.54	4 24.14	24.12	4 26.63	4 27.29	27.45	4 34.44	34.40	4 30.24	30.25
	2 9 11.662	2 10 34.63	2 11 13.77	2 15 6.71	2 15 10.88	2 17 57.95	2 20 21.48	2 23 49.20	2 24 42.54	2 27 12.48	2 29 31.85	2 29 31.85	2 30 40.83								
	2 13 36.502	2 14 53.80	2 15 37.94	2 19 28.72	2 19 31.66	2 22 16.51	2 24 45.00	2 28 13.342	2 29 9.172	2 31 39.72	2 34 6.29	2 34 11.09									
		14 53.81	15 37.94	19 28.72	19 28.66		24 45.00	28 13.52		31 39.72	34 6.29	34 11.09									
log cos a	9.924831	9.922269	9.921833	9.916922	9.916877	9.919358	9.909995	9.905506	9.903888	9.900330	9.899681	9.899666									
	11.226398	11.224796	11.224210	11.219179	11.219144	11.215555	11.212222	11.207536	11.206155	11.202097	11.199908	11.198972									
	16.849	16.787	16.753	16.566	16.563	16.427	16.301	16.119	16.075	15.943	15.816	15.810									
	18 15.2	18 14.1	18 8.9	17 8.6	17 6.6	17 4.7	17 3.9	17 2.7	17 2.9	17 1.3	16.3	17 5.0	8.0	17 7.7	7.6						
	57 58 50	57 12 33.0	57 19 8.1	57 41 11.9	49 42 43.5	57 18 57.7	57 27 39.9	57 7 22.9	57 38 37.4	57 38 33.8	57 14 7.9	57 42 2	28(?)								
	55 16 20.2	51 30 44.1	53 37 17.0	51 59 8.6	50 0 40.1																
		30 44.1	37 17.0	59 8.6	0 40.1		48	28	31.8		15	50.1	34	10.2	58	9.9	(or 30.6)				
	2 56 46.8	3 0 23.4	3 4 34.3	3 4 58.3	3 7 26.1	3 18 1.2	3 35 27.8	3 35 59	3 36 57.1	3 37 36.9	3 38 35.0	3 39 31.0									
	44 11 42	45 5 57	46 8 35	46 14 35	46 57 32	49 30 18	53 51 57	53 59 45	54 14 47	54 24 14	54 38 45	54 52 45									
	51 36 06	51 33 40	51 21 57	50 20 53	49 38 24	54 54 04	51 12 44	51 02 02	50 53 03	52 09 52	51 59 37	52 01 14									
log sin a	9.843299	9.850221	9.857991	9.858770	9.863121	9.881071	9.907211	9.907931	9.909301	9.910161	9.911471	9.912721									
	0.100971	0.100341	0.098182	0.098153	0.097065	0.103171	0.094921	0.092151	0.089831	0.109761	0.107091	0.107511									
	9.944261	9.950956	9.939979	9.940268	9.938771	10.084241	10.002131	10.000008	9.999131	10.019922	10.018561	10.026231									
	10.070441	11.076741	11.066971	11.066431	11.035951	10.160421	11.128311	11.126261	11.125311	11.146101	11.144741	11.146981									
	11.761001	11.933001	11.640681	11.640631	11.480331	14.468	13.437331	13.3741	13.3455	13.9995	13.9865	14.009331									
						#3184															
	#2477	#2649	#2356	#2369	#2196	#2008	#4183	#4090	#4061	#4715	#4671	#4725									
	4 36.10	36.11	4 37.42	37.21	4 35.31	35.32	4 35.40	35.35	4 37.21	5 37.0	52.7	4 46.99	47.04	4 46.58	46.59	4 46.40	46.42	4 50.63	50.65	4 50.36	50.37	4 50.71	50.71
	2 42 29.92	2 58 3.51	3 2 17.27	3 2 41.29	3 5 9.61	3 15 33.07	3 33 4.91	3 33 36.31	3 34 36.51	3 35 12.19	3 36 10.52	3 87 6.34									
	2 59 5.59	3 2 42.93	3 6 52.53	3 7 16.69	3 9 43.883	3 20 38.79	3 37 51.903	3 38 22.893	3 39 22.91	3 40 28.74	3 41 0.88	3 41 57.05									
	57 3.60	2 40.58	60 6 32.53	2 16.54	48	30 28.54	41.37	57.91	38 22.94	39 22.94	40 28.7	41 0.88	41 57.05								
log cos a	9.855550	9.848174	9.840647	9.809869	9.834922	9.812608	9.770611	9.769226	9.766633	9.764977	9.762468	9.759899									
	11.137771	11.151011	11.142911	11.142121	11.137171	11.134771	11.070281	11.071831	11.068901	11.067241	11.064671	11.066211									
	14.381	14.158	13.897	13.872	13.716	13.023	11.824	11.790	11.719	11.675	11.606	11.539									
	15 34.53	47 15 20.3	20.2	15 3.3	3.3	15 1.7	1.7	14 51.5	14 6.6	6.6	12 48.7	48.8	12 46.3	46.4	12 41.7	41.75	12 38.9	38.9	12 34.4	34.4	12 30.0	30.0	
	57 28 14.5	57 25 36.2	57 14 20.8	56 13 17.6	49 30 54.1	57 46 33.0	57 6 14.6	56 53 33.5	57 46 36.9	52 3 26.3	57 53 13.8	57 54 37.1									
	51 43 49.3	51 41 16.5	50 29 24.1	50 28 19.3	49 45 46.6	55 1 1.6	51 19 33	51 8 19.8	50 59 13.6	52 16 5.4	52 5 48.2	52 7 24.1									
	43	41 16.4	24.1	19.3		1.6	19	19.8	13.6	5.4	5	24.1									
	4 7 24.6	4 8 16.5	4 8 47.9	4 8 48.1	4 10 9.2	4 10 29.7	4 12 8.7	4 12 36	4 12 33.4	4 14 52.7	4 19 34.3	4 21 13.6									
	61 57 9	62 4 8	62 11 39	62 12 2	62 32 18	62 37 26	63 2 11	63 9 0	63 13 57	63 43 11	64 53 35	65 18 24									
log sin a	49 39 32	50 31 52	50 38 09	50 43 41	50 38 07	57 31 46	57 31 49	50 28 24	50 28 21	61 27 05	53 33 41	60 42 21									
	9.945331	9.946211	9.946731	9.946741	9.948881	9.948411	9.950062	9.950451	9.950761	9.952611	9.956891	9.958351									
	0.070941	0.084371	0.085991	0.087421	0.085981	0.099851	0.099861	0.083481	0.083471	0.099631	0.131761	0.087071									
	10.016271	10.030981	10.032721	10.034161	10.034061	10.048261	10.047981	10.033931	10.034231	10.052441	10.088761	10.084541									
	1.142751	1.156761	1.158901	1.160341	1.160241	1.174441	1.171761	1.160611	1.160411	1.177421	1.214831	1.171601									
	13.882	14.347	14.418	14.498	14.496	14.943	14.999	14.45825	14.468	15.046	16.39975	14.8466									
	#4598	#5063	#5134	#5214	#5212	#5659	#5715	#5174	#5184	#3762	#7115	#5562									
	4 49.99	4 51.91	52.93	4 53.89	53.86	4 53.88	53.86	4 56.78	56.82	4 57.15	57.27	4 58.26	53.44	4 58.70	53.71	4 37.43	6.25	6.27	4 56.15	56.16	
	4 5 0.21	4 5 32.58	4 6 21.76	4 6 21.76	#7 42.94	#8 1.90	4 9 40.69	4 10 9.72	4 10 29.09	#12 24.58	4 17 1.78	#18 46.02									
	4 9 30.104	10 42.99	11 23.12	11 13.64	12 36.82	12 38.84	14 37.84	13 33.54	15 22.79	17 22.04	22 8.03	23 42.17									
		10 43.89		10 33.52	36.46	38.84	37.84	33.54	22.80		8.03	42.15									
log cos a	9.673720	9.671062	9.668705	9.668713	9.663841	9.662599	9.656650	9.654801	9.653591	9.646171	9.627681	9.620971									
	10.977597	10.977289	10.977102	10.977100	10.976611	10.976486	10.978817	10.973707	10.976886	10.974844	10.972795	10.972317									
	9.461	9.395	9.354	9.354	9.249	9.222	9.094	9.058	9.033	8.880	8.510	8.379									
	49	10 10.4	10.7	10 7.6	10 7.8	8.1	10 1.3	1.2	9 59.3	9.4	9 59.9	59.1	9 59.9	48.8	9 46.9	47.8	9 57.2	9	13.2	13.2	9 47.4	47.7	
	49 34 17.9	50 26 41.2	50 32 38.5	50 38 31.3	50 33 0.4	51 26 39.6	51 26 46.7	50 23 24.0	50 23 21.7	51 22 11.9	53 28 58.1	50 37 41.9									
	49 44 32.8	50 36 51.6	50 43 6.3	50 48 39.1	50 43 1.7	51 36 38.9	51 36 37.8	50 32 51.2	50 33 8.5	51 31 48.1	53 28 11.3	50 46 46.6									
		36 57.6		48 39.0	43.1.6	36 39.0	36 37.8	32 51.2	33 8.5		38 11.3	46 46.6									
	4 44 40.4	4 44 59.1	4 47 14.1	4 48 39.1	4 47 9.6	4 57 21.2	4 57 41.3	4 57 42.4	4 57 26.3	4 57 26.8	4 58 16.2	5 2 6.3									
	7 10 6	7 14 47	7 18 32	7 23 27	7 23 24	7 23 35	7 23 40	7 23 40	7 24 21	7 24 42	7 24 49	7 25 31									
	53 29 34	53 40 10	53 52 23	53 49 13	53 49 14	53 57 22	53 57 29	53 49 08	53 53 29	53 52 5	53 53 14	53 53 01									
log sin a	9.976110	9.976308	9.976773	9.976163	9.976182	9.976193	9.976212	9.976212	9.976361	9.976361	9.976457	9.976599									
	0.130671	0.130760	0.130841	0.130741	0.130742	0.130774	0.130813	0.130786	0.130853	0.130853	0.130878	0.130819									
	10.106771	10.147401	10.099141	10.095305	10.095396	10.079950	10.082125	10.053981	10.061436	10.092141	10.111135	10.109181									
	11.232961	11.277381	11.225321	11.181231	11.180141	11.205681	11.217431	11.180161	11.241061	11.218321	11.237531	11.235361									
	17.098	18.776	16.8003	15.17875	15.14066	16.0576	16.12275	15.14125	17.400	16.632	17.2795	17.1935									
	4.7814	4.9491	4.7516	4.5894	4.5856	4.6773	4.6838	4.5857	4.8116	4.7248	4.7995	4.7909									
	5 10.79	10.50	5 2.69	5 8.85	8.84	58.34	58.06	5 4.02	4.04	4.45	4.47	4.55		5 12.75	12.75	5 7.11	7.11	5 1.97	1.97	5 11.41	11.41
	4 42 5.46	4 42 31.23	4 44 40.19	4 51 20.24	4 51 40.1	4 51 49.63	4 52 9.40	4 52 13.54	4 54 60.37	4 54 53.63	4 56 46.14	4 59 31.02									
	4 47 16.23	4 47 52.92	4 49 40.14	4 56 18.63	4 56 39.07	4 56 39.63	4 57 13.54	4 57 11.61	5 0 3.12	5 0 0.80	5 0 5.1	5 2.58									
	16.25		49 40.14	56 18.63		56 39.63	57 13.54	57 11.61	0 3.12	0 0.80		2.58									
log cos a	9.508911	9.507117	9.494411	9.474045	9.494523	9.494507	9.494991	9.448581	9.443077	9.430066	9.418122	9.399821									
	10.811181	10.809744	10.796768	10.756178	10.756458	10.756334	10.756218	10.751081	10.756238	10.752431	10.720391	10.701071									
	6.474	6.448	6.261	5.712	5.683	3.666		5.637	5.407	5.406	5.252	5.024									
	7 0.6	6 59.3	6 46.9	6 11.2	11.3	6 8.5	8.1	6 7.3	6.5	6 6.6	5 51.6	51.6	51.45	5 51.6	51.45	5 41.3	41.4	5 26.3	25.8		
	53 25 36.6	53 36 38.7	53 50 52.6	53 46 0.2	53 41 34.1	53 19 47.4	53 25 44.7	53 39 57.3	53 26 50.3	53 32.2	53 11 31.5	53 58 19.6									
	53 32 57.2	53 43 32.9	53 52 39.5	53 52 11.4	53 47 12.6	53 25 55.9	53 31 57.0	53 46 4.3	53 32 41.9	53 32 7	53 17 32.8	53 3 45.9									
	57.4		52 39.5	52 11.5		25 55.9	31 57.0	46 4.3	32 41.9			3 45.9									

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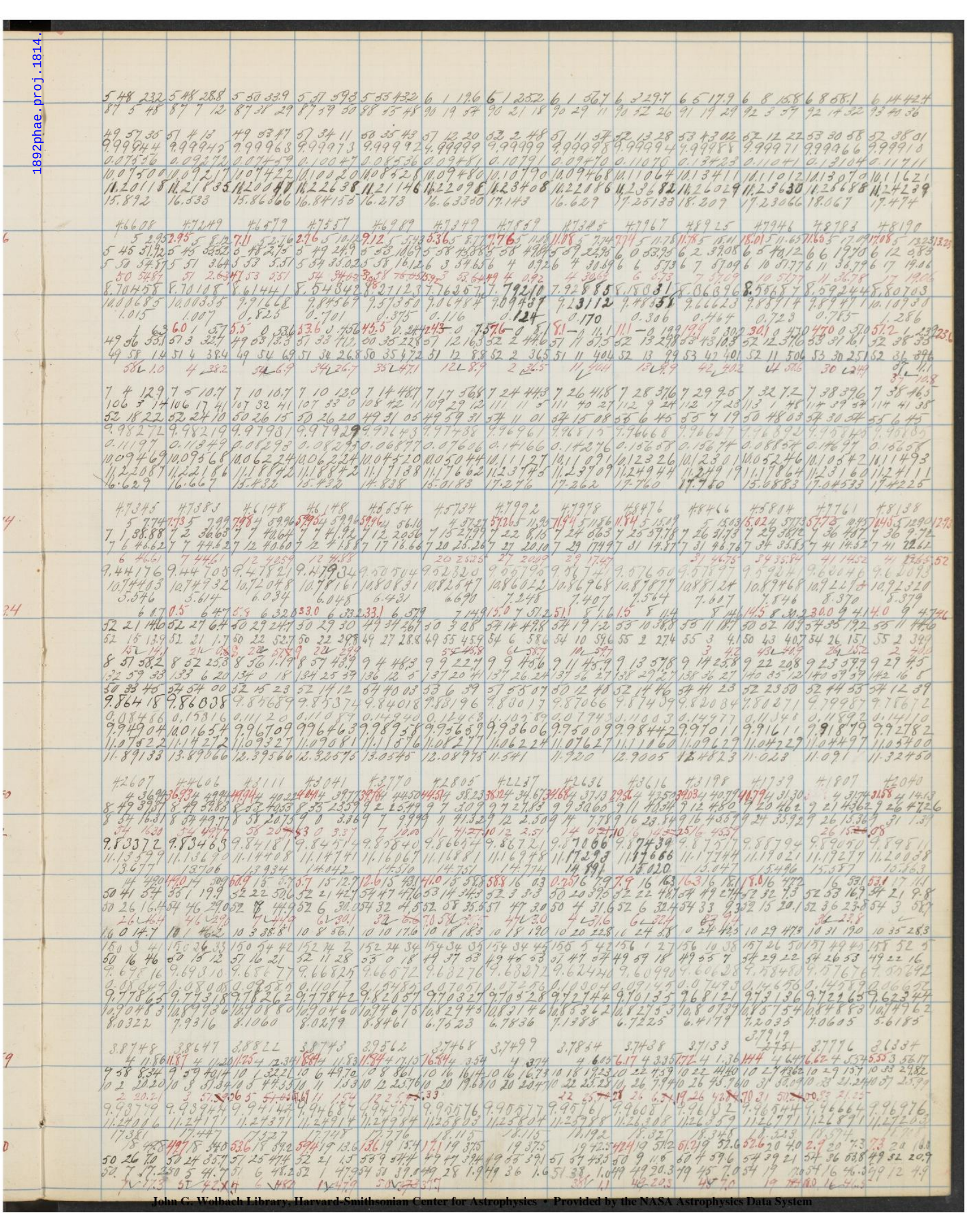
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	5 29 83.1	5 30 57.2	5 34 32.5	5 37 23	5 38 24.9	5 43 43.3	5 46 33.3	5 46 37.4	5 46 48.1	5 47 36.8	5 47 7.53	5 47 44.8
	82 23 47	82 44 18	83 38 8	84 20 45	84 36 14	85 55 50	86 38 20	86 39 21	86 42 2	86 45 56	86 46 53	86 56 12
log sin α	57 44 31	57 46 52	57 27 02	57 18 42	57 27 32	57 46 03	57 15 59	57 18 03	57 31 30	57 22 10	49 57 00	57 3 38
	9.99616	9.99603	9.99731	9.99788	9.99807	9.99890	9.99525	9.99925	9.99927	9.99928	9.99981	9.99937
	0.15061	0.15124	0.09862	0.09646	0.09675	0.10556	0.14299	0.15763	0.14713	0.14464	0.07464	0.09256
	10.14677	10.14794	10.09593	10.09434	11.09482	10.10246	10.13824	10.15888	10.14640	10.14394	10.07395	10.09193
	11.27295	11.27392	11.22211	11.22052	11.22100	11.22864	11.26442	11.28506	11.27258	11.27012	11.20018	11.21816
	18.748	18.790	16.677	16.616	16.63425	16.92296	18.38325	19.278	18.732	18.626	16.854	16.524
	#9464	#9506	#7393	#7332	#7350	#7645	#9099	#9994	#9448	#9342	#6870	#7240
	5 21.52	21.51 5 21.74	21.78 5 [illegible]	8.05 5 7.66	7.65 5 7.7	8.27 5 9.69	9.9 5 19.47	20.23 5 24.96	5 21.41	21.41 5 20.72	20.72 5 [illegible]	2.70 5 7.06
	5 26 37.69	5 28 16.57	5 31 38.71	5 34 44.13	5 35 51.01	5 41 8.66	5 43 53.42	5 43 53.16	5 44 7.59	5 44 23.55	5 44 36.58	5 45 11.50
	5 32 16.21	5 33 38.36	5 37 6.76	5 39 57.09	5 40 57.78	5 46 18.35	5 49 12.56	5 49 20.12	5 49 29.10	5 49 44.27	5 49 41.18	5 50 18.56
log cos α	9.12162	9.10175	9.04474	8.99354	8.97331	8.85104	8.76811	8.76791	8.76017	8.75144	8.74991	8.72786
	10.42387	10.40402	10.34701	10.29581	10.27558	10.15331	10.07038	10.06818	10.06234	10.05371	10.05131	10.03013
	2.653	2.585	2.223	1.976	1.886	1.423	1.175	1.170	1.154	1.131	1.126	1.071
	2 52.3	52.45 2 45.1	44.7 2 24.3	24.5 2 8.7	8.4 2 2.8	2.5 1 32.3	32.51 16.7	16.4 1 16.1	1 15.8	15.0 1 13.5	13.6 1 13.4	13.2 1 9.6 9.6
	54 42 68.1	54 45 22.1	51 25 45.4	51 17 29.6	51 26 24.4	51 45 8.7	54 10 12.9	55 17 17.7	54 30 44.3	54 21 26.1	49 53 16	51 2 55.7
	54 45 50.4	54 48 7.2	51 28 7.7	51 19 38.2	51 28 27.2	51 46 41.2	54 16 29.6	55 18 33.8	54 31 59.3	54 22 39.6	49 54 15.0	51 4 5.3
	45 50.35	48 6.8	28 7.9	19 38.9	28 26.9	46 41.4	16 23		31 59.5	22 39.7	54 29.2	4 5.3
	6 16 13.3	6 16 22.4	6 21 25.6	6 21 21	6 24 34.2	6 41 2.2	6 41 5.6	6 48 17.9	6 50 16.4	6 53 7.7	7 0 21.2	7 1 5.87
	94 3 20	94 5 36	95 21 24	95 20 15	96 8 33	100 15 33	100 16 24	102 4 29	102 34 6	103 16 66	105 5 18	105 16 21
	52 32 01	52 12.52	52 27 41	52 34 21	53 28 45	52 42 01	52 49 57	53 4 02	53 6 49	52 59 14	54 44 48	53 40 59
log sin α	9.99891	9.99889	9.99874	9.99811	9.99749	9.99300	9.99298	9.99028	9.98946	9.98822	9.98476	4.98438
	0.11528	0.11067	0.16223	0.11615	0.16252	0.11816	0.10448	0.15585	0.15660	0.12268	0.15069	0.10224
	10.11419	10.10943	10.16097	10.11426	10.16001	10.11116	10.09746	10.14613	10.14606	10.11090	10.13545	10.08662
	11.24037	11.23561	11.28715	11.24044	11.28619	11.23734	11.22364	11.27231	11.27224	11.23708	11.26163	11.21281
	17.393	17.2035	19.371	17.396	19.328	17.272	16.73675	18.42033	16.4171	17.2616	18.26566	16.323
	#8109	#7919	6.0087	#8112	5.0044	#7988	#7451	#9436	#9433	#7977	#8981	#7039
	5 12.37	12.78 5 10.47	11.47 5 [illegible]	5 12.33	12.72 5 25.29	5 11.92	8.00 5 9.43	38.43 5 21.33	21.33 5 21.31	21.31 5 11.85	11.86 5 18.37	18.37 5 5.75 5.74
	6 13 36.76	6 13 46.23	6 18 41.99	6 18 44.68	6 21 51.68	6 38 28.25	6 38 31.40	6 45 37.18	6 47 25.10	6 50 31.11	6 57 44.86	6 58 32.37
	6 18 49.67	6 18 58.22	6 24 8.66	6 23 57.41	6 27 16.89	6 43 40.17	6 43 40.83	6 50 38.46	6 52 57.01	6 53 43.36	7 3 0.23	7 3 38.14
	18 42.58	18 58.22	23 40	43 [illegible]	43 [illegible]	67 43 [illegible]	46 50 58.46	52 [illegible]	55 42.57	3 4.23	3 [illegible]	
log cos α	8.84956	8.85358	8.87061	8.96858	9.02989	9.25066	9.25025	9.02053	9.03766	9.06025	9.41548	9.42063
	10.15183	10.15585	10.17288	10.27085	10.33166	10.53293	10.38252	10.62280	10.63993	10.66252	10.71775	10.72290
	1.418	1.431	1.488	1.865	2.146	2.715	2.412	4.195	4.364	4.697	5.221	5.283
	1 32.3	32.2 1 32.9	33.0 1 36.9	2 1.5	1.3 2 19.7	2 37.3	57.2 2 36.7	52.64 32	32.7 4 43.4	43.7 4 59.0	59.6 5 39.3	39.4 5 43.2 4.34
	52 32 40.4	52 13 30.7	53 28 33.7	52 35 13.5	56 29 47.3	57 43 50.1	57 57 26.1	55 6 11.5	53 9 42.3	53 1 36.2	54 47 29.7	57 43 43.9
	52 34 12.1	52 15 36	55 30 10.6	52 39 15.0	55 32 7.0	51 46 27.4	51 54 28	55 10 43.9	55 13 47.6	53 6 35.2	54 53 9.2	51 49 27.8
	31 [illegible]	11 [illegible]	26 56.8	33 12.0	27 27.4	41 [illegible]	48 [illegible]	4 32.1	4 20.5	52 56 37.8	41 50.6	38 0.7
	7 44 41.3	7 48 40.8	7 50 26.3	7 57 12.7	7 56 34.9	8 14 0.6	8 19 31.9	8 20 42.1	8 26 34.7	8 27 10.8	8 27 [illegible]	8 30 34.1
	115 25 29	117 12 12	117 36 35	117 48 14	119 8 44	122 57 38	124 52 57	125 10 32	126 38 41	126 48 57	129 23 33	132 38 32
log sin α	57 7.09	57 33.06	57 33.34	57 35.33	57 57.16	58 43.21	58 38.40	58 38.39	58 36.41	58 28.15	58 15.29	58 21.13
	9.95577	9.94909	9.94749	9.94672	9.94120	9.92378	9.91498	9.91242	9.90406	9.90309	9.88804	9.86664
	0.15666	0.15289	0.14768	0.14821	0.10647	0.13432	0.13208	0.13207	0.13785	0.13832	0.12676	0.07726
	10.11245	10.10198	10.09517	10.09493	10.04767	10.06810	10.04706	10.04449	10.04221	10.03337	10.01500	9.94390
	11.26863	11.22816	11.22135	11.22111	11.17385	11.19428	11.17324	11.17667	11.16839	11.15989	11.14118	11.07008
	17.3235	16.911	16.64766	16.638	14.923	15.64166	14.902	14.814	14.73675	14.451	13.84166	11.75125
				4.7354								
	#8039	#7627	#7363		#5639	#6357	#5618	#5530	#5452	#5167	#4957	#4267
	5 12.25	12.24 5 9.57	9.57 5 7.86	7.85 7.80	7.80 4 56.65	56.65 1.32	5.90 4 56.52	56.54 4 55.94	56.64 4 53.44	55.44 4 53.58	53.58 4 49.73	52.76 4 36.03 36.83
	7 39 2.47	7 46 13.74	7 47 52.96	7 48 38.71	7 54 6.24	8 9 20.59	8 17 3.20	8 18 13.65	8 24 6.57	8 24 44.62	8 25 8.73	8 28 15.35
	7 44 17.72	7 51 23.31	7 52 59.92	7 53 46.51	7 59 2.89	8 14 21.91	8 21 39.72	8 23 9.98	8 29 2.01	8 27 42.20	8 29 58.76	8 32 51.38
	44 11.71	51 23.31	52 59.92	53 46.51	59 2.89	14 21.91	21 39.72	23 9.98	29 2.01	27 42.20	29 58.76	32 51.38 4.02
log cos α	9.63278	9.66005	9.66590	9.66880	9.68755	9.73564	9.75772	9.76048	9.77586	9.77760	9.80257	9.80385
	10.93505	10.96232	10.96826	10.97107	10.98982	11.03791	11.05759	11.06278	11.07813	11.07987	11.10484	11.13312
	8.611	9.169	9.295	9.355	9.768	10.912	11.471	11.535	11.971	12.019	12.730	13.587
	9 19.7	19.7 9 56.0	56.0 10 39.42	10 [illegible]	8.1 10 35.0	35.1 11 49.8	49.3 12 25.6	25.6 12 31.8	31.0 12 58.1	58.0 13 1.2	1.2 13 47.3	47.2 14 43.1 4.21
	53 11 41.5	54 57.58	54 38 30.5	54 40 31.0	52 2 27.9	53 49 9.3	53 44 46.1	53 44 48	54 3 4.4	53 34 44.0	53 21 55.1	50 28 29
	55 2 21.8	54 48 2.0	54 28 26.6	54 30 22.6	51 51 52.5	53 37 20.0	53 32 21.3	53 32 17.0	53 50 6.3	53 21 38.8	53 8 7.6	50 13 45.9
	2 21.8	48 2.0	28 26.6	30 22.6	23.25 7 52.4	37 20.0	32 21.3	32 17.0	50 6.4	21 38.8	8 7.6	13 45.9
	9 29.47	9 32 10.9	9 41 20.5	9 45 23.7	9 45 45.3	9 48 27.0	9 52 36.8	9 53 0.8	9 54 7.6	9 55 18.6	9 55 33.3	9 58 57.5
	142 21 48	143 2 44	146 20 8	146 20 56	146 26 30	147 6 45	148 9 12	148 15 12	148 31 30	148 49 39	148 58 20	149 44 23
	54 4 24	53 4 46	54 47 49	50 33 37	54 59 13	50 52 24	50 38 10	50 52 01	47 39 03	52 9 10	51 40 51	51 35 20
log sin α	9.78597	9.77900	9.75493	9.74361	9.74258	9.78479	9.72204	9.72112	9.71777	9.71400	9.71823	9.70286
	0.13979	0.14505	0.16150	0.16848	0.15456	0.14966	0.18592	0.18956	0.19913	0.19957	0.19121	0.19077
	9.92587	9.93405	9.90643	9.82843	9.89714	9.82445	9.80833	9.81068	9.81690	9.82325	9.81444	9.80313
	11.19200	11.06023	11.03261	10.99946	11.02332	10.97063	10.93451	10.93688	10.93308	10.94977	10.94062	10.92931
	11.2735	11.48675	10.780	9.00077	10.55175	8.92555	8.6003	8.6469	9.8420	8.9074	8.7221	84.979
				3.9423								0.9213
	#1989	#2202	#1496	0795	#1267	3.9641	3.9316	3.9862	#0558	3.9623	3.9438	0675
	4 32.93	32.76 4 34.3	34.50 4 27.2	29.78 4 18.20	18.20 4 28.23	28.24 4 17.67	17.67 4 15.55	15.55 4 16.85	16.86 4 23.63	23.63 4 17.53	17.53 4 16.35	16.38 4 4.88 14.89
	9 27 30.26	9 29 5.08	9 39 5.2	9 43 14.3	9 43 30.57	9 46 17.72	9 50 28.56	9 50 32.39	9 58 53.62	9 58 9.34	9 55 24.55	9 56 4.96
	9 32 3.19	9 34 27.39	9 43 34.89	9 47 32.33	9 47 58.89	50 35.39	54 7.41	9 53 8.24	9 56 17.25	9 57 26.59	9 57 40.90	10 1 4.48
	22 [illegible]	[illegible]	[illegible]	[illegible]	47 58.81	50 35.39	54 44.11	53 8.25	56 17.23	57 26.59	57 40.91	10 1 4.48
log cos α	9.89915	9.90260	9.91613	9.92084	9.92079	9.92414	9.92914	9.92961	9.93088	9.93224	9.93239	9.93628
	11.20142	11.20487	11.21740	11.22261	11.22306	11.22641	11.23141	11.23188	11.23315	11.23454	11.23482	11.23855
	15.901	16.028	16.497	16.696	16.713	16.843	17.036	17.056	17.106	17.161	17.172	17.320
	17 13.6	133 17 21.8	21.8 17 [illegible]	52.3 8.2	8.2 18 6.3	6.3 3 14.8	14.8 5 27.4	27.4 18 28.6	28.6 18 31.9	31.9 18 35.5	35.5 18 36.2	36.2 5 46.8 46.0
	64 12 56.5	55 13 2.30	54 46 40.8	50 42 35.9	55 8 13.0	50 1 28.1	50 47 19.7	57 1 10.8	57 48 16.4	52 18 40.1	51 50 5.7	51 44 40.4
	53 56 42.7	57 56 1.25	38 48.5	50 24 34.7	54 50 6.7	50 43 13.3	50 28 52.3	50 42 47.2	57 29 44.3	57 [illegible]	51 29.5	25 54.6
	55 [illegible]	56 1.2	38 46.6	24 20.2	52 6.7	42 12.3	28 52.3	42 47.2	29 44.3	56 46.6	52 [illegible]	25 54.6

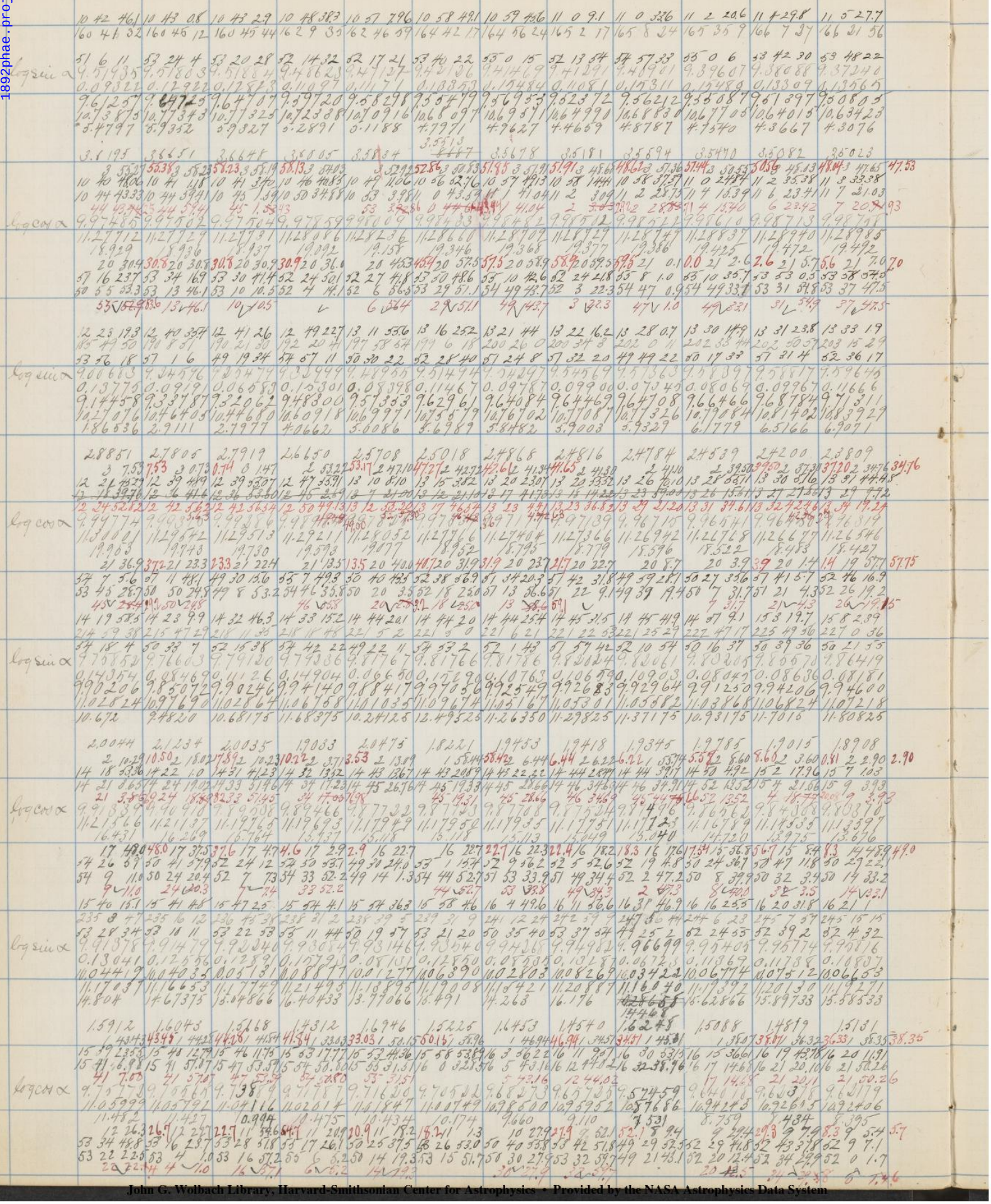
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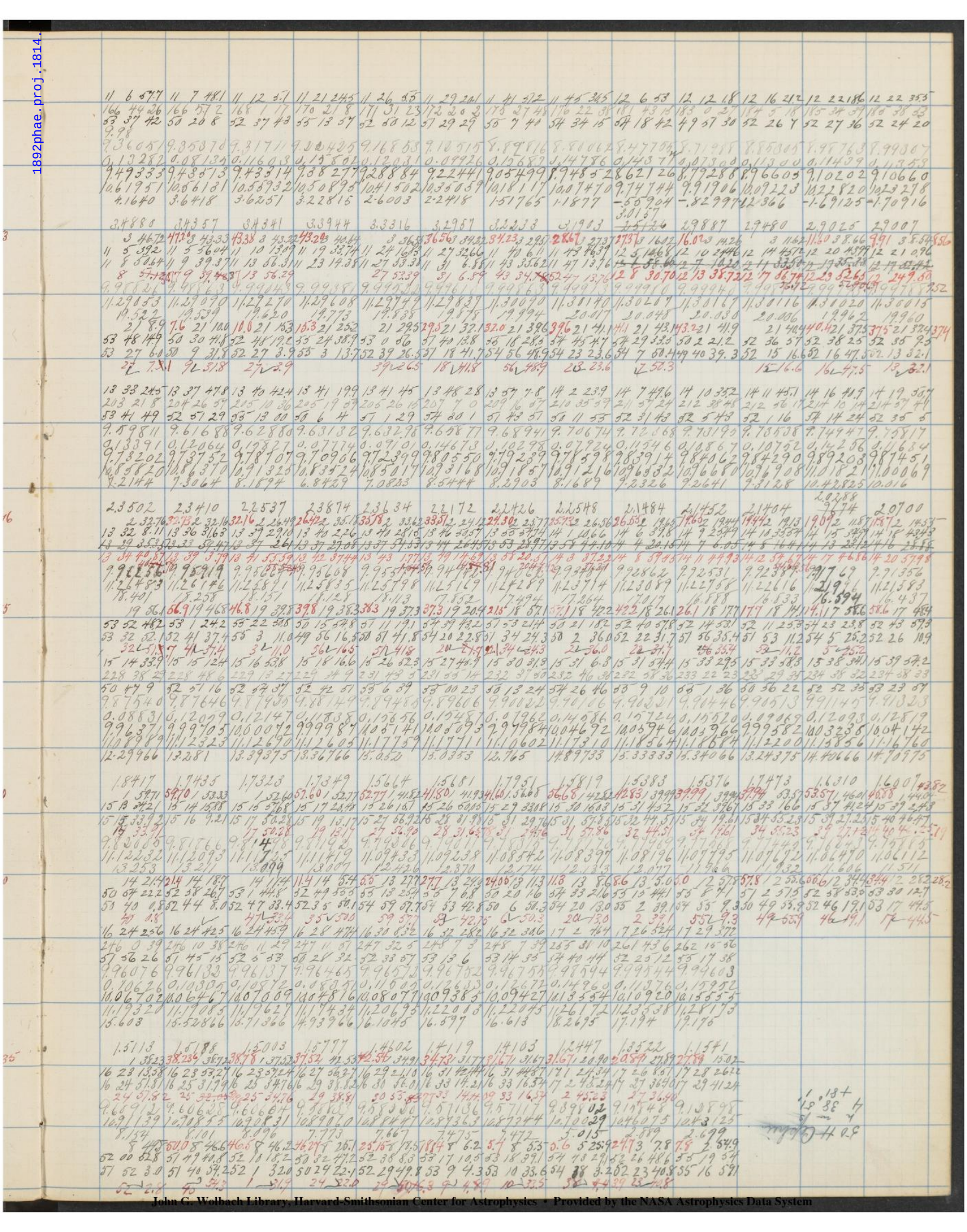
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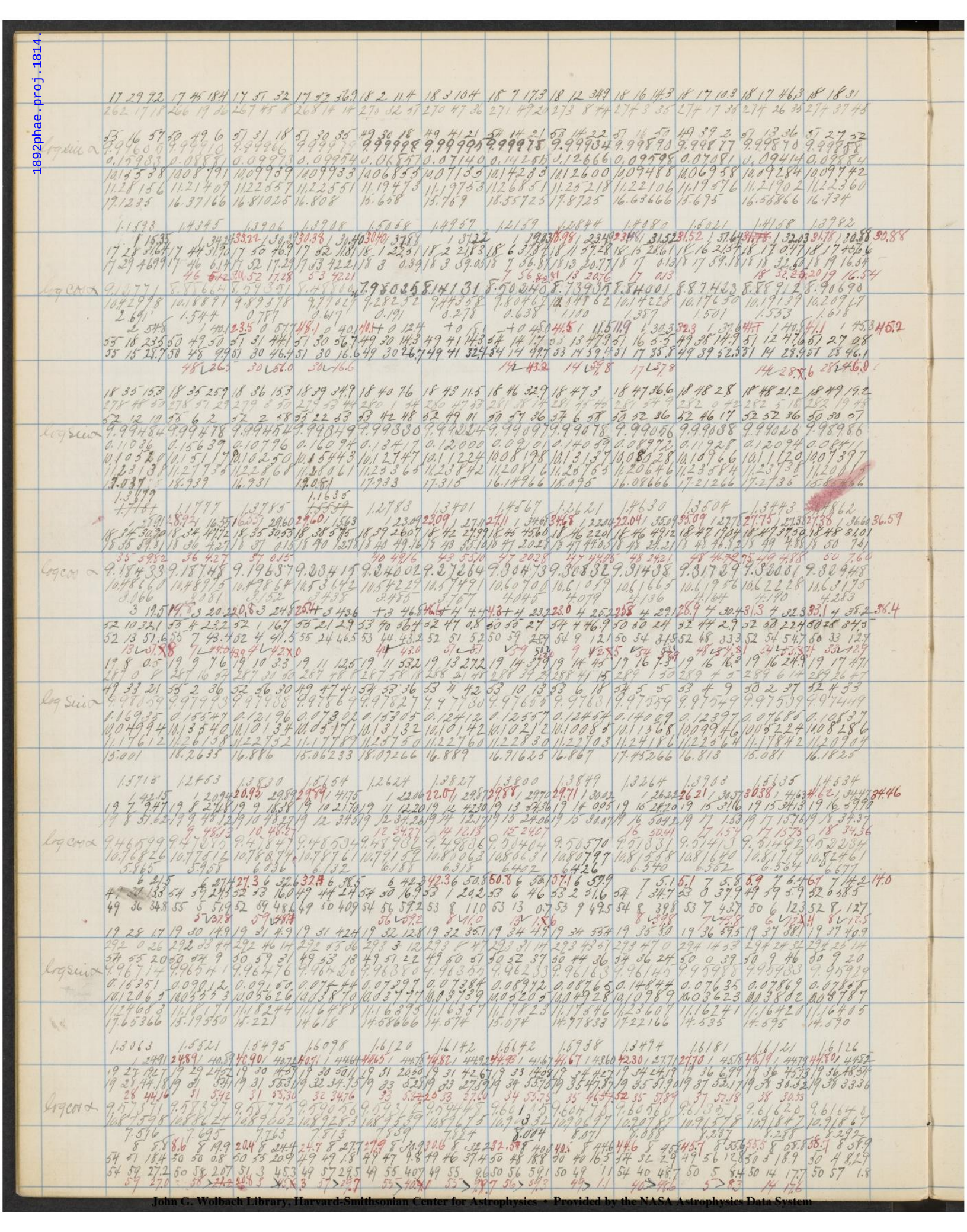
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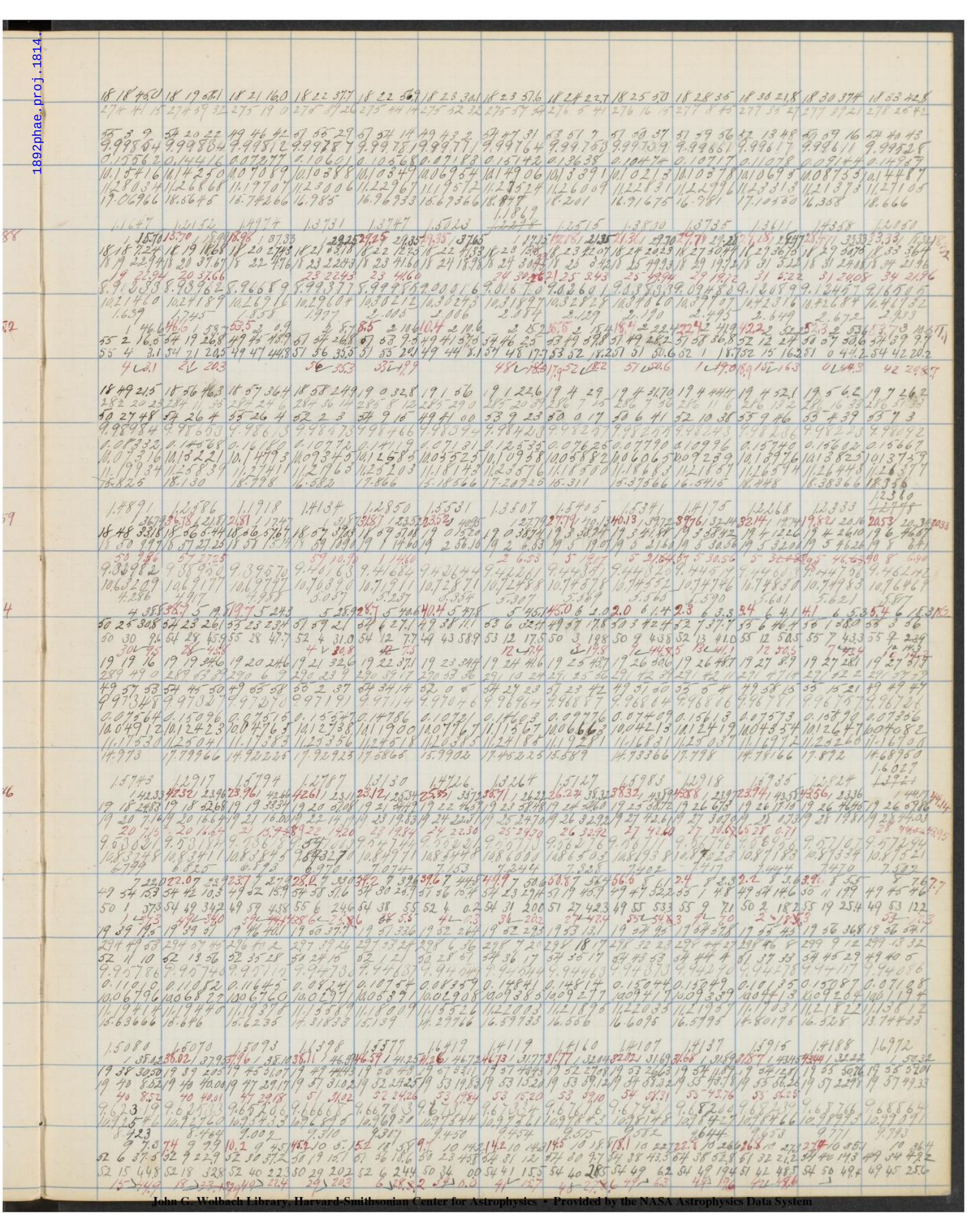
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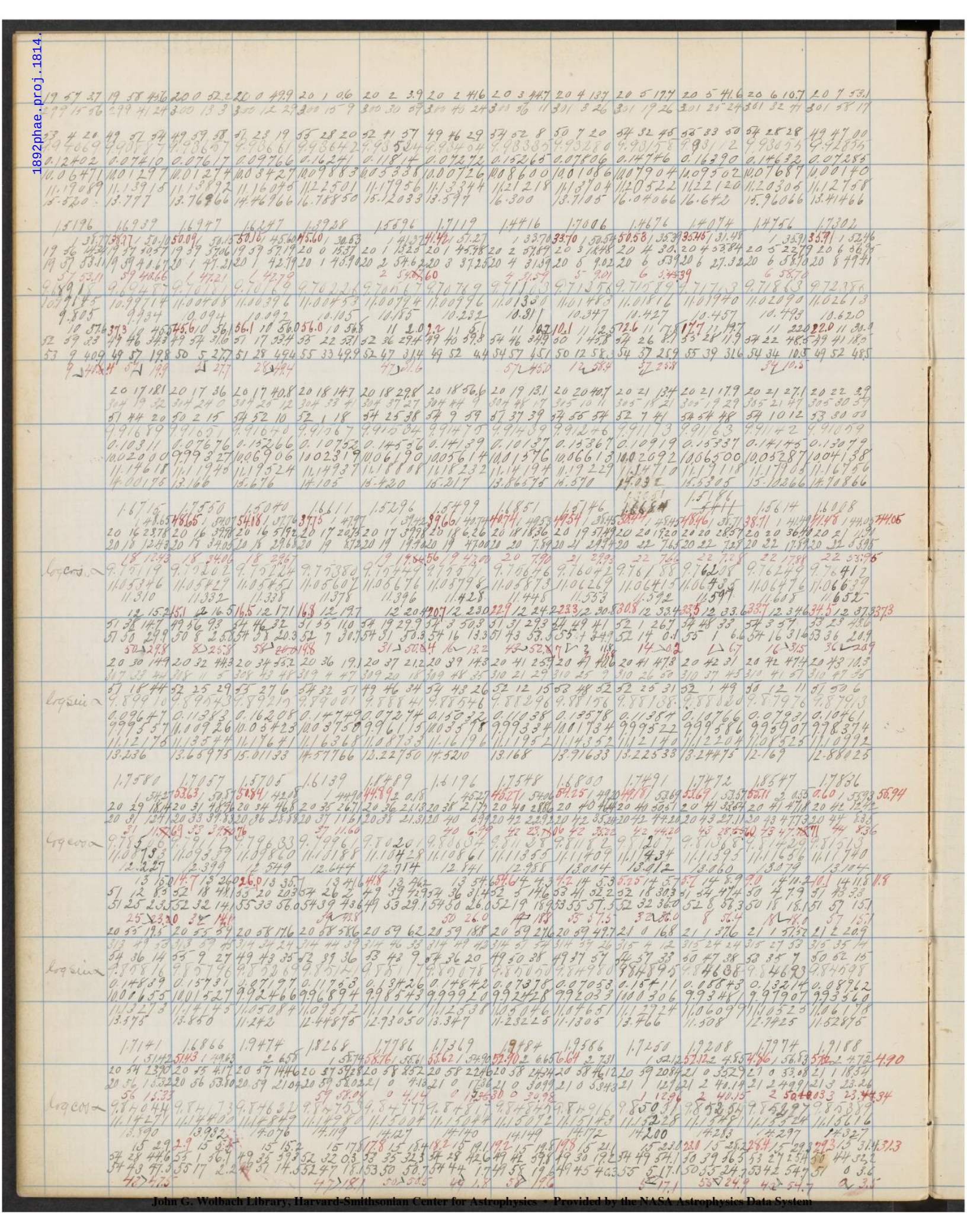
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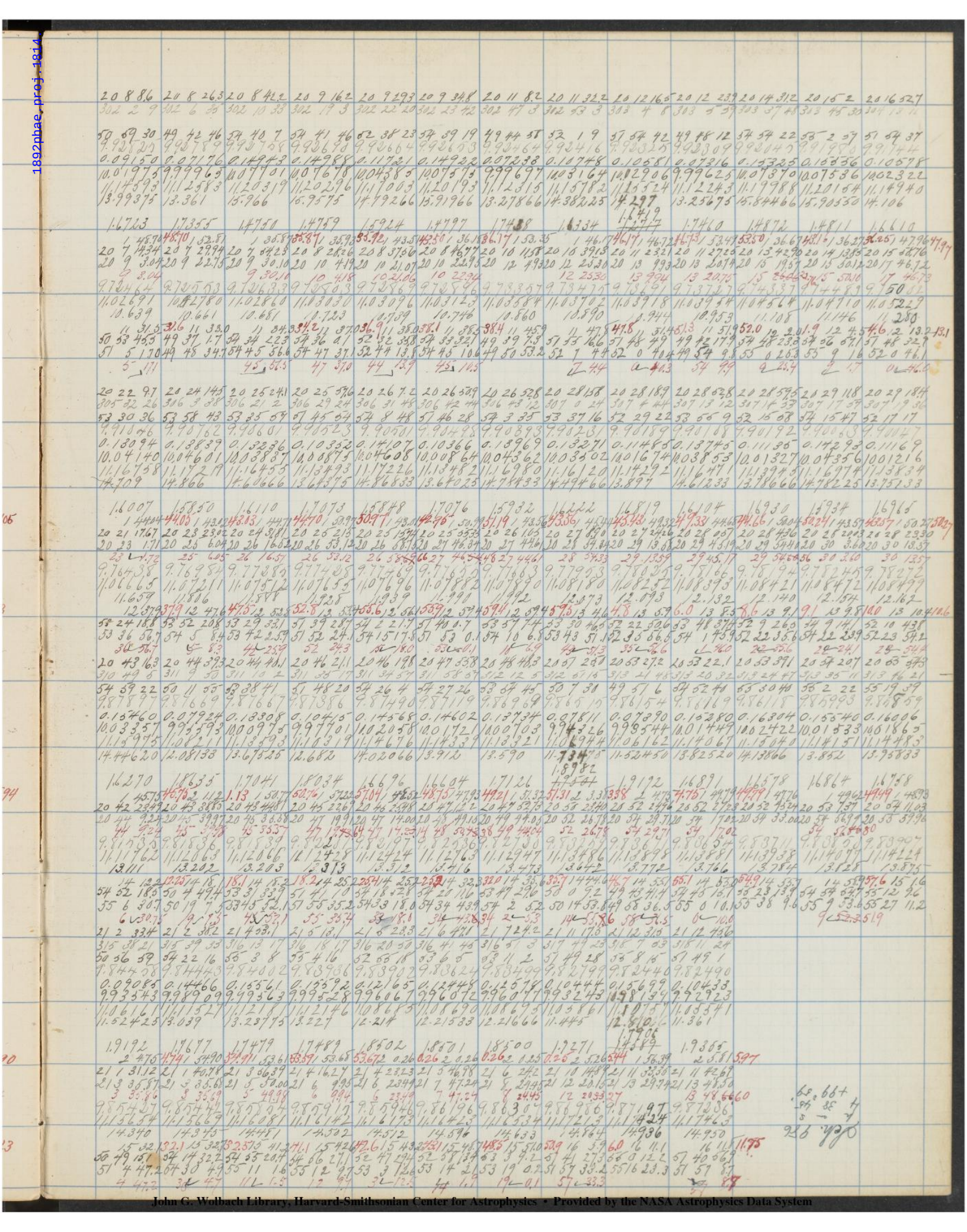
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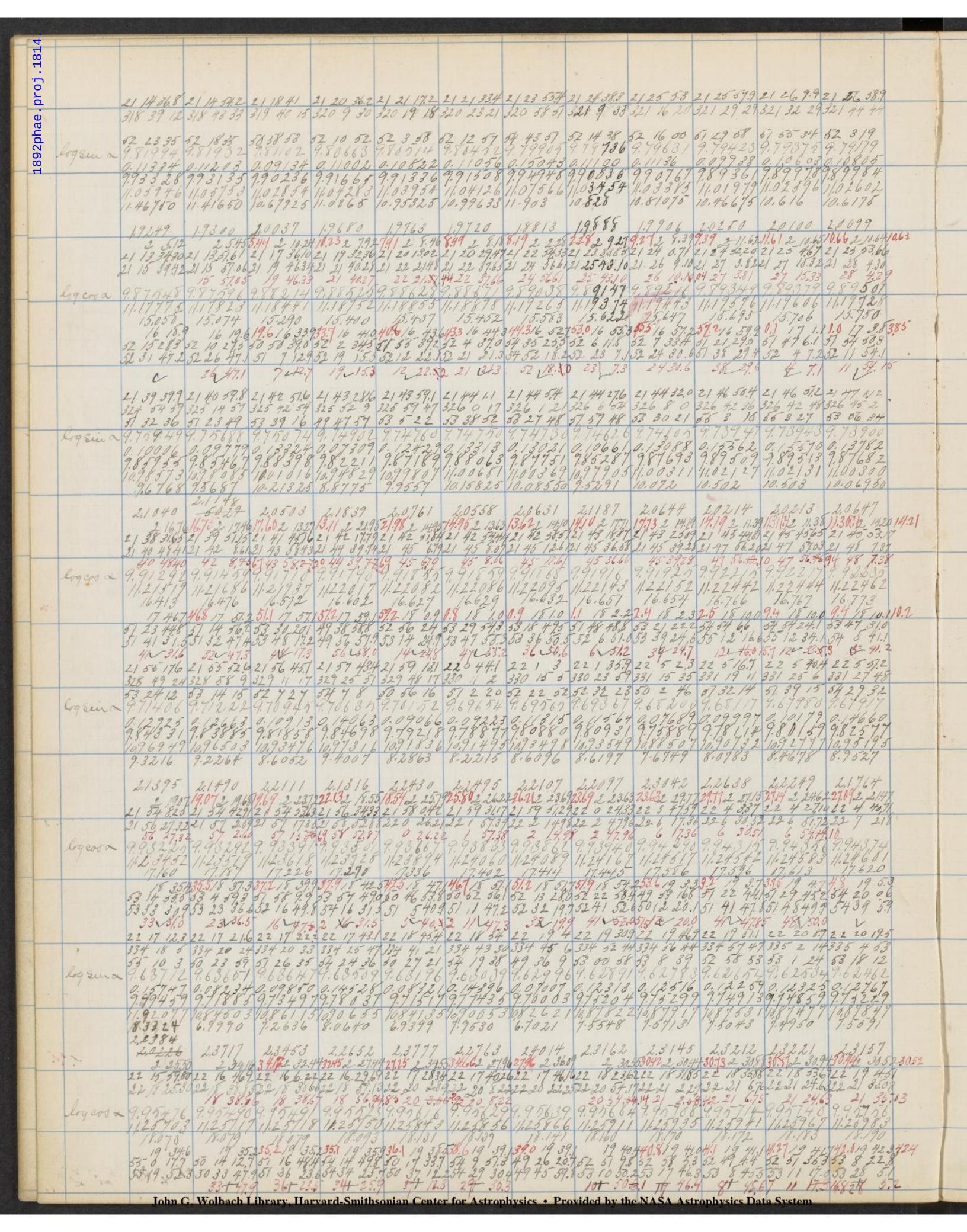
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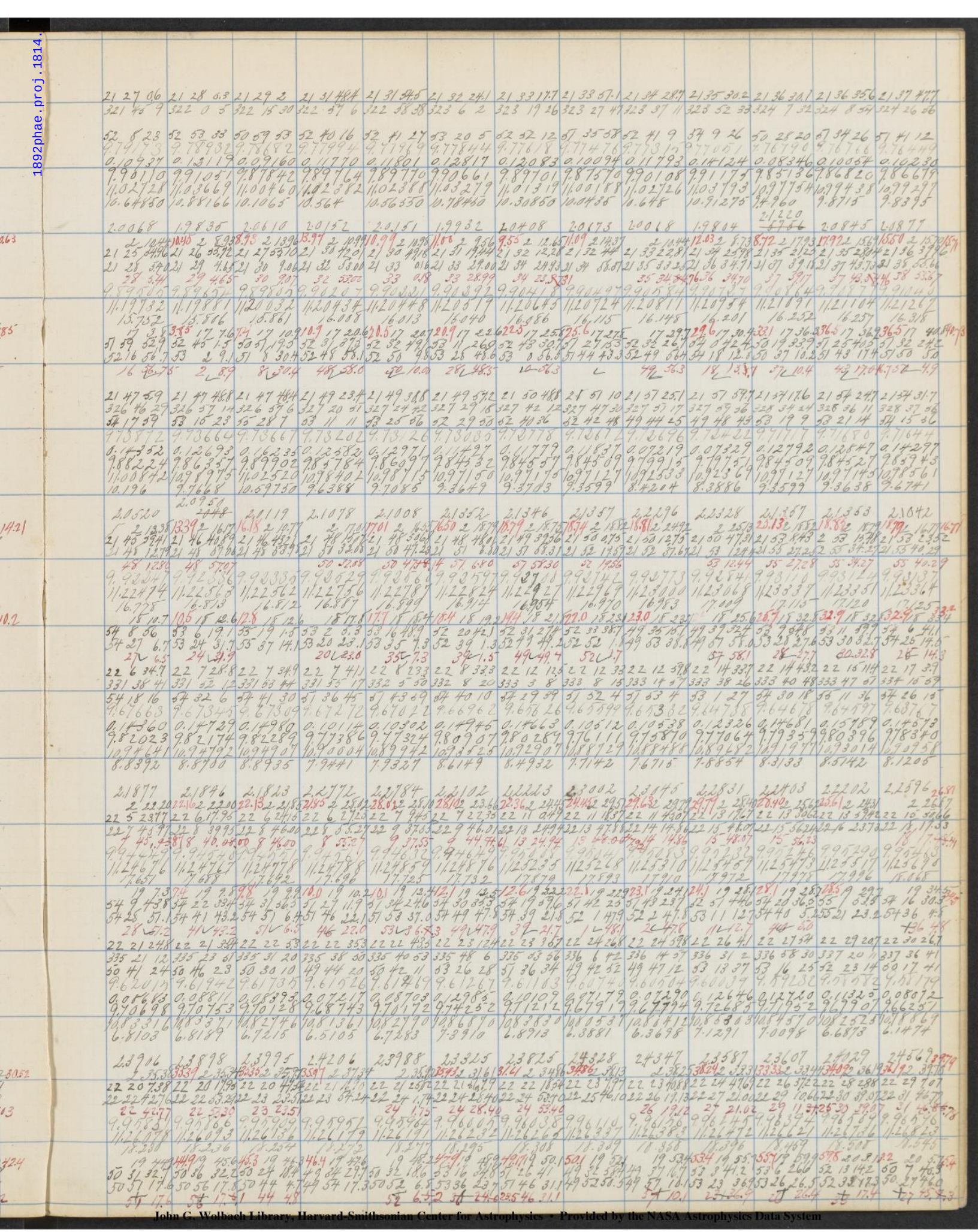
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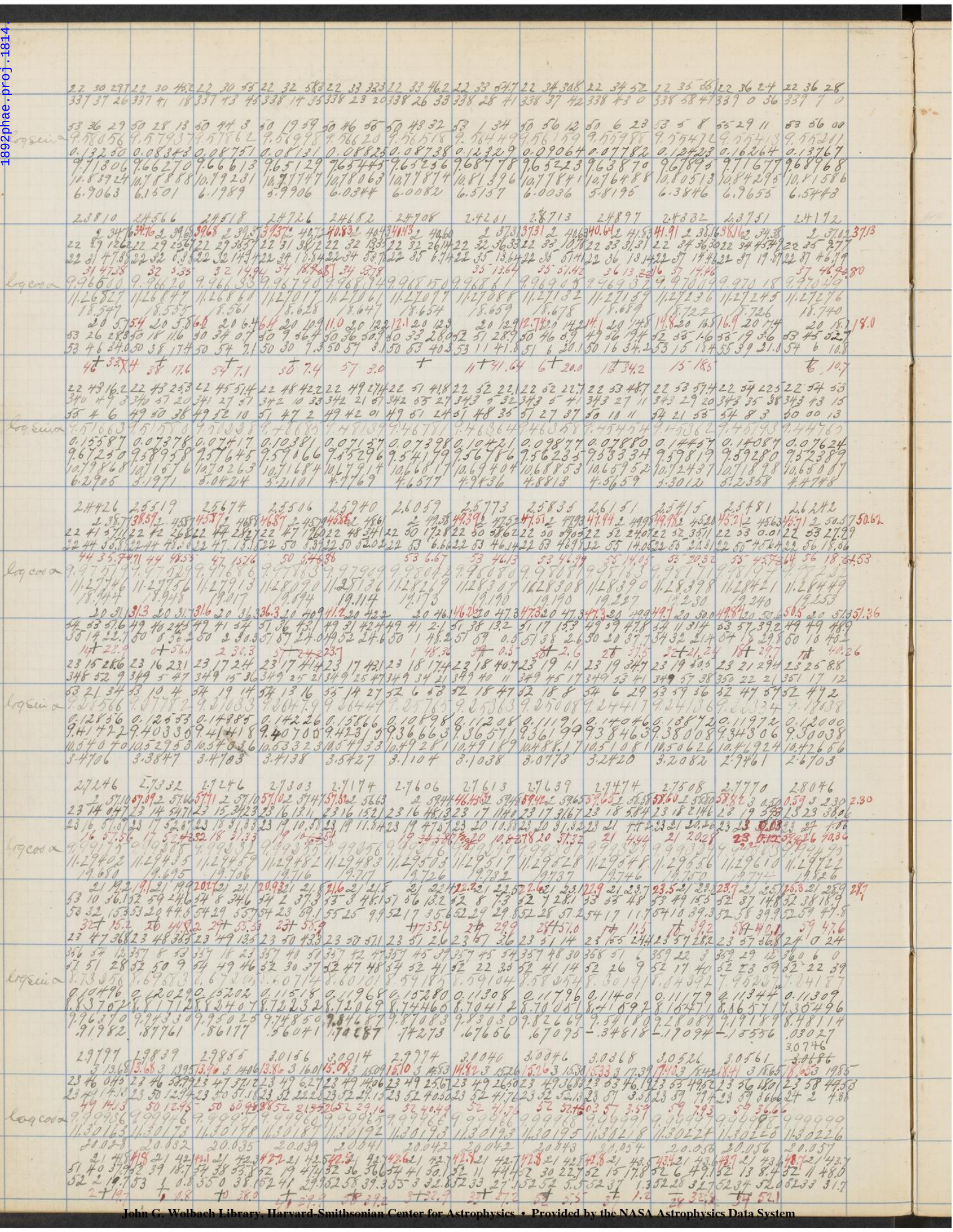
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Washington, D. C. May 25 1892

My dear Will:

Your letter with Beeks addendum was forwarded to me here. But the Echo was not so I have not seen the Article.

Will do so when I get home.

I wish if you still have it, You would return to me the Copy of the letter I wrote Arthur as I want to show to Livermore and one or two others just what I said to him.

Hope we can connect

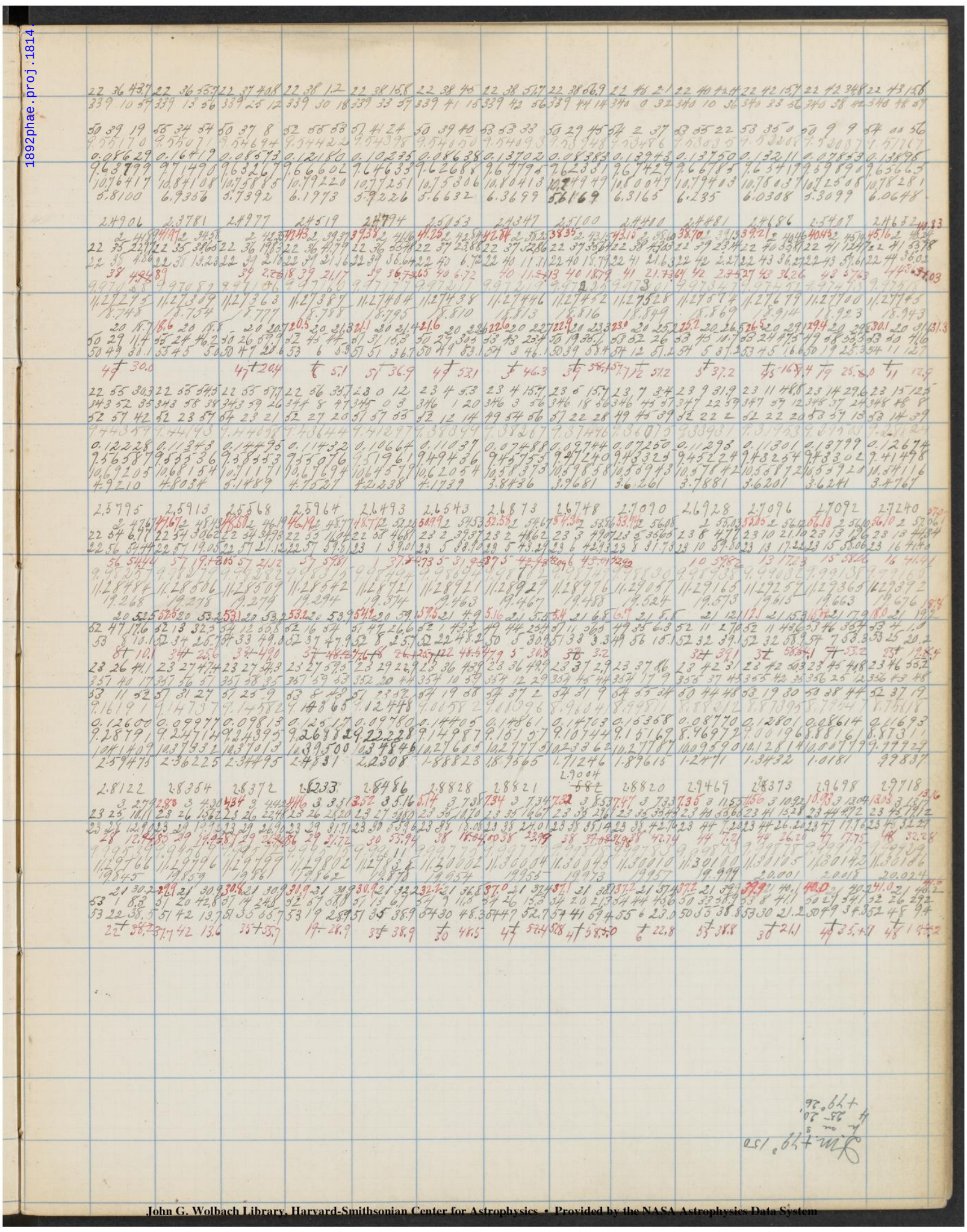
Love to you all

Hurriedly

E. Holden

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Lalande 1800 m = 3.0715 n^s 1.334162 log n^s 0.12618 n'' 20.0584 log n'' 1.30227

Multiplier = 75 – 100×3/4

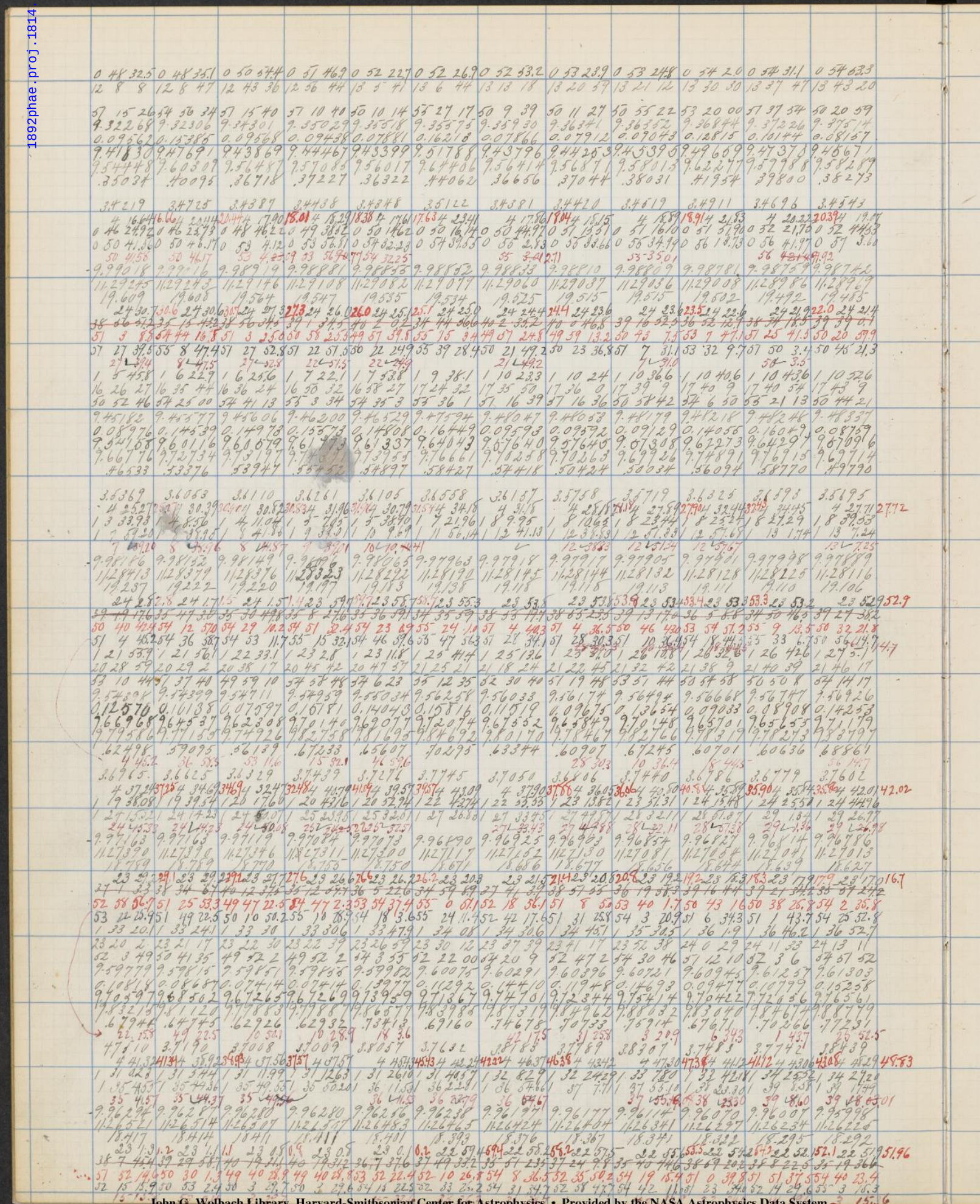
αm	0 2 6.7	0 2 18.0	0 2 20.8	0 3 8.8	0 4 29.4	0 5 8.2	0 5 41.4	0 5 47	0 6 23.6	0 6 31.2	0 6 38.2	0 7 56.5
°αm	0 31 41	0 34 30	0 35 12	0 47 12	1 7 21	1 17 3	1 25 21	1 26 15	1 35 33	1 37 48	1 39 33	1 57 38
δm	51 24 49	54 26 15	50 16 28	55 3 22	54 57 17	57 45 22	54 22 48	57 57 26	53 10 29	57 44 15	52 39 58	53 2 32
log sin α	7.96455	8.00153	8.01028	8.13765	8.29203	8.35046	8.39488	8.39943	8.44541	8.45400	8.46170	8.53417
log tan δ	0.09805	0.14573	0.08015	0.15567	0.15404	0.10338	0.14478	0.10652	0.12564	0.10309	0.11762	0.12355
log sin α tan δ	8.06260	8.14726	8.09041	8.29332	8.44607	8.45384	8.53966	8.50595	8.57105	8.55709	8.57932	8.65772
log n sin α tan δ	8.18878	8.27344	8.21659	8.41950	8.57225	8.58002	8.66584	8.63213	8.69723	8.68327	8.70550	8.78390
n sin α tan δ	.01544	.01876	.01646	.02627	.03734	.03802	.04632	.04286	.04980	.04822	.05075	.06080
m + dα/dT	3.0870	3.0903	3.0880	3.0978	3.1089	3.1096	3.1179	3.1144	3.1214	3.1198	3.1223	3.1324
dα/dT	3 51.52	51.54 3 51.77	51.78 3 51.60	51.61 3 52.33	52.36 3 52.17	53.17 3 53.22	53.48 3 53.84	53.85 3 53.58	53.61 3 54.10	54.16 3 53.96	53.99 3 54.17	54.18 3 54.93 54.93
α0	0 0 11.37	0 0 22.77	0 0 25.51	0 1 13.25	0 2 33.39	0 3 12.19	0 3 45.06	0 3 50.80	0 4 26.98	0 4 34.71	0 4 41.70	0 5 53.63
α 1875.0	0 4 3.09	0 4 14.84	0 4 17.11	0 5 5.68	0 6 25.56	0 7 5.41	0 7 38.90	0 7 44.38	0 8 21.08	0 8 28.79	0 8 35.87	0 9 48.56
	-4 3.11	4 14.55	4 17.12	-5 5.65	-6 25.56	-7 5.57	-7 38.91	-7 44.37	-8 21.14	-8 28.80	-8 35.88	9 48.56
log cos α	9.99998	9.99997	9.99997	9.99995	9.99991	9.99989	9.99986	9.99986	9.99983	9.99982	9.99981	9.99974
log n'' cos α	11.30225	11.30224	11.30224	11.30222	11.30218	11.30216	11.30213	11.30213	11.30210	11.30209	11.30208	11.30201
n'' cos α	20.056	20.056	20.056	20.055	20.053	20.052	20.051	20.051	20.050	20.049	20.048	20.045
	+25 42	+25 42	+25 42	25 41	25 40	25 39	25 38	25 38	25 35	25 37	25 36	25 34
δ0	~~38 47 43.0~~	~~35 46 17.1~~	~~39 56 37~~	~~35 9 9.6~~	~~35 15 14.6~~	~~38 27 10.2~~	~~35 49 49~~	~~38 13 6.0~~	~~37 2 3.0~~	~~38 28 17.2~~	~~37 32 34.3~~	~~37 [illegible]~~
δ 1875.0	51 12 17.0	54 13 42.9	50 3 56.3	54 50 50.4	54 44 45.4	51 32 49.8	54 10 11	51 44 54.0	52 57 57.0	51 31 42.8	52 27 25.7	52 50 0.0
	51 37 2.5	54 38 47.1	50 29 0.5	55 15 54.5	55 9 49.4	51 57 53.7	54 35 14.8	52 9 57.8	53 23 0.5	51 56 46.5	52 52 29.3	53 15 3.4
	-25 34.2	-25 42	-25 4.2	-25 41	-25 40	-25 38	-25 39	-25 38	-25 37	-25 36	-25 36	-25 34
αm	0 11 11.8	0 11 50.8	0 12 39.7	0 13 14.5	0 13 37.2	0 14 4.3	0 14 14.8	0 14 33	0 14 37.9	0 15 28	0 15 31.3	0 16 20.2
°αm	2 47 57	2 57 42	3 9 56	3 18 38	3 24 18	3 31 5	3 33 42	3 38 15	3 39 29	3 52 0	3 52 50	4 5 3
δm	49 49 55	55 39 24	49 46 7	52 34 52	52 41 59	53 44 35	52 23 19	53 25 13	51 48 30	52 55 27	51 7 8	52 8 47
log sin α	8.68873	8.71322	8.74210	8.76153	8.77373	8.78790	8.79325	8.80238	8.80483	8.82888	8.83043	8.85261
log tan δ	0.07360	0.16641	0.07262	0.11629	0.11815	0.13464	0.12902	0.12952	0.10419	0.12169	0.09347	0.10947
log sin α tan δ	8.76233	8.87963	8.81472	8.87782	8.89188	8.92254	8.92227	8.93190	8.90902	8.95057	8.92390	8.96208
log n sin α tan δ	8.88851	9.00481	8.94090	9.00400	9.01806	9.04872	9.04845	9.05808	9.03520	9.07675	9.05108	9.08826
n sin α tan δ	.07736	0.10115	.08727	.10094	.10424	.11187	.11180	.11431	.10844	.11933	.11248	.12254
	37 21.2	38 47.1	29 0.5	15 54.5	9 49.4	57 53.6	35 14.9	9 57.8	23 0.7	56 46.4	52 29.3	15 3.4
m + dα/dT	3.1489	3.1727	3.1588	3.1725	3.1758	3.1834	3.1834	3.1869	3.1800	3.1909	3.1840	3.1941
dα/dT	3 56.17	56.18 3 57.95	3 56.91	3 57.94	57.94 3 55.16	58.19 3 58.75	58.76 3 58.75	58.76 3 58.94	58.95 3 58.50	58.52 3 59.32	59.33 3 58.80	58.80 3 59.56 59.47
α0	0 9 14.27	0 9 52.58	0 10 41.79	0 11 16.20	0 11 38.76	0 12 5.64	0 12 16.14	0 12 34.18	0 12 39.34	0 13 28.99	0 13 32.50	0 14 21.05
α 1875	0 13 10.44	0 13 50.53	0 14 38.70	0 15 14.14	0 15 36.94	0 16 4.39	0 16 14.89	0 16 33.12	0 16 37.84	0 17 28.31	0 17 31.30	0 18 20.61
	+3 10.45			+15 14.14	+15 36.95	16 4.40	16 14.90	16 33.13	16 37.86	17 28.32	17 31.30	18 20.57 .60
log cos α	9.99948	9.99941	9.99933	9.99927	9.99923	9.99918	9.99916	9.99912	9.99911	9.99901	9.99900	9.99889
log n'' cos α	11.30175	11.30168	11.30160	11.30154	11.30150	11.30145	11.30143	11.30139	11.30138	11.30128	11.30127	11.30116
n'' cos α	20.033	20.030	20.026	20.024	20.022	20.019	20.018	20.017	20.016	20.012	20.011	20.006
	25 2.5	2.5 25 2.3	25 2.0	25 1.8	1.8 25 1.6	1.6 25 1.4	1.4 25 1.3	1.3 25 1.3	1.2 25 1.2	1.2 25 0.9	0.8 25 0.8	0.8 25 0.5 0.4
δ0	~~40 22 36.8~~	~~34 33 8~~	~~40 26 23.8~~	~~37 37 39.2~~	~~37 30 32.1~~	~~36 27 53.9~~	~~36 49 12.3~~	~~36 47 18.2~~	~~38 24 0.8~~	~~37 17 3.8~~	~~39 5 23.3~~	~~38 34 44.5~~
δ 1875.0	49 37 23.2	55 26 52	49 33 36.2	52 22 20.8	52 29 27.9	53 32 4.1	53 10 47.7	53 12 41.8	51 35 59.2	52 42 56.2	50 54 36.7	51 56 15.5
	50 2 25.7	55 51 54.3	49 58 38.2	52 47 22.6	52 54 29.5	53 57 6.3	53 35 49.0	53 37 43.1	52 1 0.4	53 7 57.1	51 19 37.8	52 21 16.0
αm	0 23 41.6	0 24 10.9	0 25 0.2	0 25 13.5	0 25 40	0 26 10.4	0 26 16.1	0 26 16.3	0 26 27.1	0 26 27.5	0 26 35.9	0 27 7.2
°αm	5 55 24	6 2 44	6 15 3	6 18 23	6 25 0	6 32 36	6 34 2	6 34 5	6 36 47	6 36 53	6 38 59	6 46 48
δm	50 17 24	54 00 00	54 2 1	53 10 16	50 33 16	55 11 13	50 56 59	50 36 54	53 18 20	53 18 27	52 35 34	53 16 21
log sin α	9.01366	9.02250	9.03696	9.04078	9.04827	9.05673	9.05830	9.05836	9.06131	9.06142	9.06366	9.07209
log tan δ	0.08065	0.13873	0.13927	0.12558	0.08473	0.15779	0.09085	0.09083	0.12771	0.12774	0.11647	0.12718
log sin α tan δ	9.09431	9.16123	9.17622	9.16636	9.13300	9.21452	9.14915	9.14919	9.18902	9.18916	9.18013	9.19927
log n sin α tan δ	9.22049	9.28741	9.30240	9.29254	9.25918	9.34070	9.27533	9.27537	9.31520	9.31534	9.30631	9.32545
n sin α tan δ	.16615	.19382	.20063	.19613	.18163	.21913	.18851	.18853	.20663	.20670	.20245	.21157
	2 25.7			47 22.6	54 29.5	57 5.3	35 49.0	37 43.0	1 0.4	7 57.0	19 37.5	21 15.9
m + dα/dT	3.2377	3.2654	3.2722	3.2677	3.2632	3.2907	3.2601	3.2601	3.2782	3.2783	3.2746	3.2831
dα/dT	4 2.83	4 4.91	4.92 4 5.41	5.43 4 5.08	5.10 4 3.99	4.00 4 6.80	4 4.51	4 4.51	4.52 4 5.86	4 5.87	5.89 4 5.53	5.57 4 6.23 6.23
α0	0 21 40.84	0 22 9.15	0 22 58.19	0 23 11.64	0 23 38.67	0 24 7.81	0 24 14.48	0 24 14.71	0 24 24.90	0 24 25.53	0 24 33.86	0 25 4.82
α 1875.0	0 25 43.67	0 26 14.06	0 27 3.60	0 27 16.72	0 27 42.66	0 28 14.61	0 28 18.99	0 28 19.22	0 28 30.76	0 28 31.20	0 28 39.41	0 29 11.05
		26 14.07	27 3.62	27 16.74	27 42.67			28 19.23		28 31.22	28 39.43	29 11.05
log cos α	9.99767	9.99757	9.99741	9.99736	9.99727	9.99716	9.99714	9.99714	9.99710	9.99709	9.99706	9.99695
log n'' cos α	11.29994	11.29984	11.29968	11.29963	11.29954	11.29943	11.29941	11.29941	11.29937	11.29936	11.29933	11.29922
n'' cos α	19.950	19.945	19.938	19.936	19.932	19.926	19.926	19.926	19.924	19.923	19.922	19.917
	24 56.2	24 55.5	55.9 24 55.6	55.3 24 55.5	55.2 24 54.8	54.8 24 54.7	24 54.7	24 54.7	54.4 24 54.0	24 54.0	54.2 24 54.0	54.1 24 54.0 53.8
δ0	~~39 55 5.2~~	~~36 12 29.4~~	~~36 10 27.4~~	~~37 2 12.4~~	~~39 39 12.9~~	~~35 1 10.0~~	~~39 16 29.2~~	~~39 15 33.6~~	~~36 54 8.4~~	~~36 54 1.0~~	~~37 36 54~~	~~36 56 7.1~~
δ 1875.0	50 4 54.8	53 47 30.6	53 49 32.6	52 57 47.6	50 20 47.1	54 58 45.0	50 44 30.8	50 44 26.4	53 5 51.6	53 5 59.0	52 23 6	53 3 52.9
	50 29 51.9	54 12 26.1	54 14 28.1	53 22 43.1	50 45 41.9	55 23 39.7	51 9 25.5	51 9 21.1	53 30 45.6	53 30 53.0	52 48 0.9	53 28 46.9
αm	0 35 12.8	0 36 3.8	0 36 34	0 36 59.3	0 37 23.6	0 38 48.5	0 39 20.7	0 39 39	0 39 28.5	0 41 40.5	0 41 40.8	0 42 18.8
°αm	8 48 12	9 0 57	9 8 30	9 14 50	9 20 59	9 42 8	9 50 11	9 54 45	9 52 8	10 25 8	10 25 12	10 34 42
δm	53 15 42	54 19 57	54 5 27	54 24 54	54 15 21	50 33 29	54 54 39	50 4 5	51 12 51	50 37 25	50 37 20	50 41 13
log sin α	9.18481	9.19511	9.20105	9.20600	9.21074	9.22667	9.23257	9.23589	9.23399	9.25730	9.25734	9.26382
log tan δ	0.12701	0.14402	0.14018	0.14536	0.14282	0.08479	0.15333	0.07723	0.09495	0.08680	0.08678	0.08678
log sin α tan δ	9.31182	9.33913	9.34123	9.35136	9.35356	9.31146	9.38590	9.31312	9.32894	9.34310	9.34312	9.35060
log n sin α tan δ	9.43800	9.46531	9.46741	9.47754	9.47974	9.43764	9.51208	9.43930	9.45512	9.46928	9.46930	9.47678
n sin α tan δ	.27416	.29195	.29269	.30029	.30182	.27393	.32515	.27498	.28518	.29463	.29465	.29977
		12 21.54	14 27.9	22 42.8	45 41.9			9 20.8		30 53.2	48 0.1	28 46.7
m + dα/dT	3.3457	3.3635	3.3642	3.3718	3.3734	3.3455	3.3967	3.3465	3.3567	3.3662	3.3662	3.3713
dα/dT	4 10.93	10.93 4 12.26	12.27 4 12.31	12.39 4 12.88	12.90 4 13.00	13.01 4 10.96	11.53 4 14.75	14.68 4 10.99	11.01 4 11.75	11.77 4 12.46	4 12.46	12.49 4 12.85 12.85
α0	0 33 8.08	0 33 38.48	0 34 28.61	0 34 53.64	0 35 17.89	0 36 43.54	0 37 14.13	0 37 34.14	0 37 23.31	0 39 34.91	0 39 35.30	0 40 13.05
α 1875.0	0 37 19.01	0 38 10.74	0 38 40.92	0 39 6.52	0 39 30.89	0 40 54.51	0 41 28.88	0 41 45.13	0 41 35.06	0 43 47.37	0 43 47.76	0 44 25.90
	37 49.01	38 40.75	38 41.00	39 6.54	39 30.90	40 55.2	41 28.81	41 45.15	41 35.08		43 47.77	44 25.90
log cos α	9.99485	9.99460	9.99444	9.99481	9.99419	9.99374	9.99356	9.99346	9.99352	9.99277	9.99277	9.99255
log n'' cos α	11.29712	11.29687	11.29671	11.29658	11.29646	11.29601	11.29583	11.29573	11.29579	11.29504	11.29504	11.29482
n'' cos α	19.821	19.809	19.802	19.796	19.791	19.770	19.762	19.757	19.760	19.726	19.726	19.716
	24 46.5	46.3 24 45.7	45.7 24 45.2	45.1 24 45.0	44.9 24 44.3	44.3 24 42.7	42.0 24 42.0	42.2 24 42.0	41.8 24 42.0	42.0 24 39	24 39.7	39.5 24 39.0 38.8
δ0	~~36 56 42.1~~	~~35 52 32.1~~	~~36 6 57.3~~	~~35 47 30~~	~~35 57 22~~	~~38 49 7.2~~	~~35 17 42.7~~	~~40 7 31.2~~	~~38 59 31.1~~	~~39 34 55.9~~	~~39 35 10~~	~~39 31 7.7~~
δ 1875.0	53 3 17.9	54 7 26.9	53 53 2.7	54 12 31	54 2 57.8	51 10 58.6	54 42 17.3	49 52 28.8	51 0 28.6	50 25 4.1	50 24 59.0	50 28 52.3
	53 28 4.9	54 32 12.6	54 17 47.9	54 37 15.0	54 27 42.1	51 35 41.5	55 6 59.3	50 17 10.8	51 25 10.6	50 49 43.8	50 49 38.7	50 53 31.3

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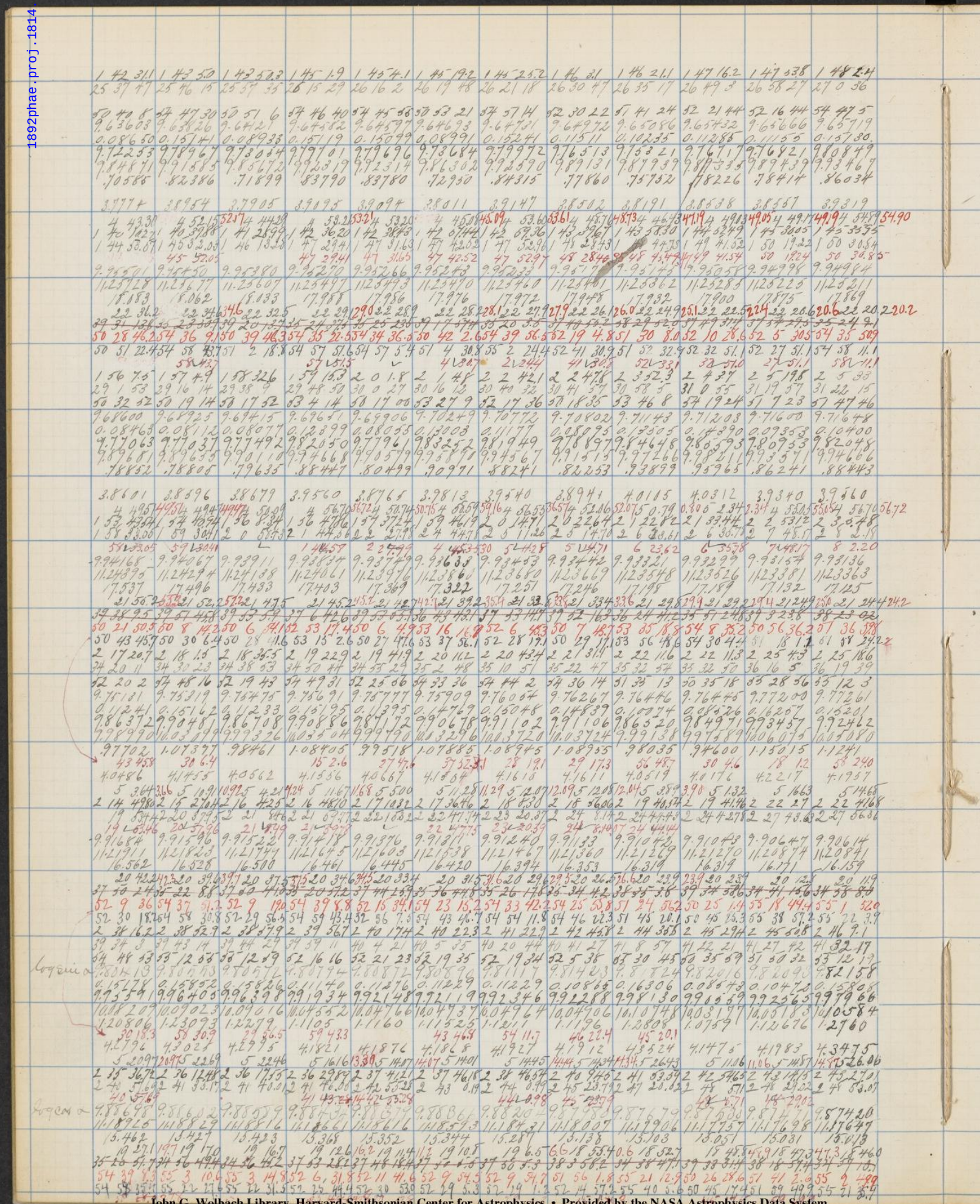


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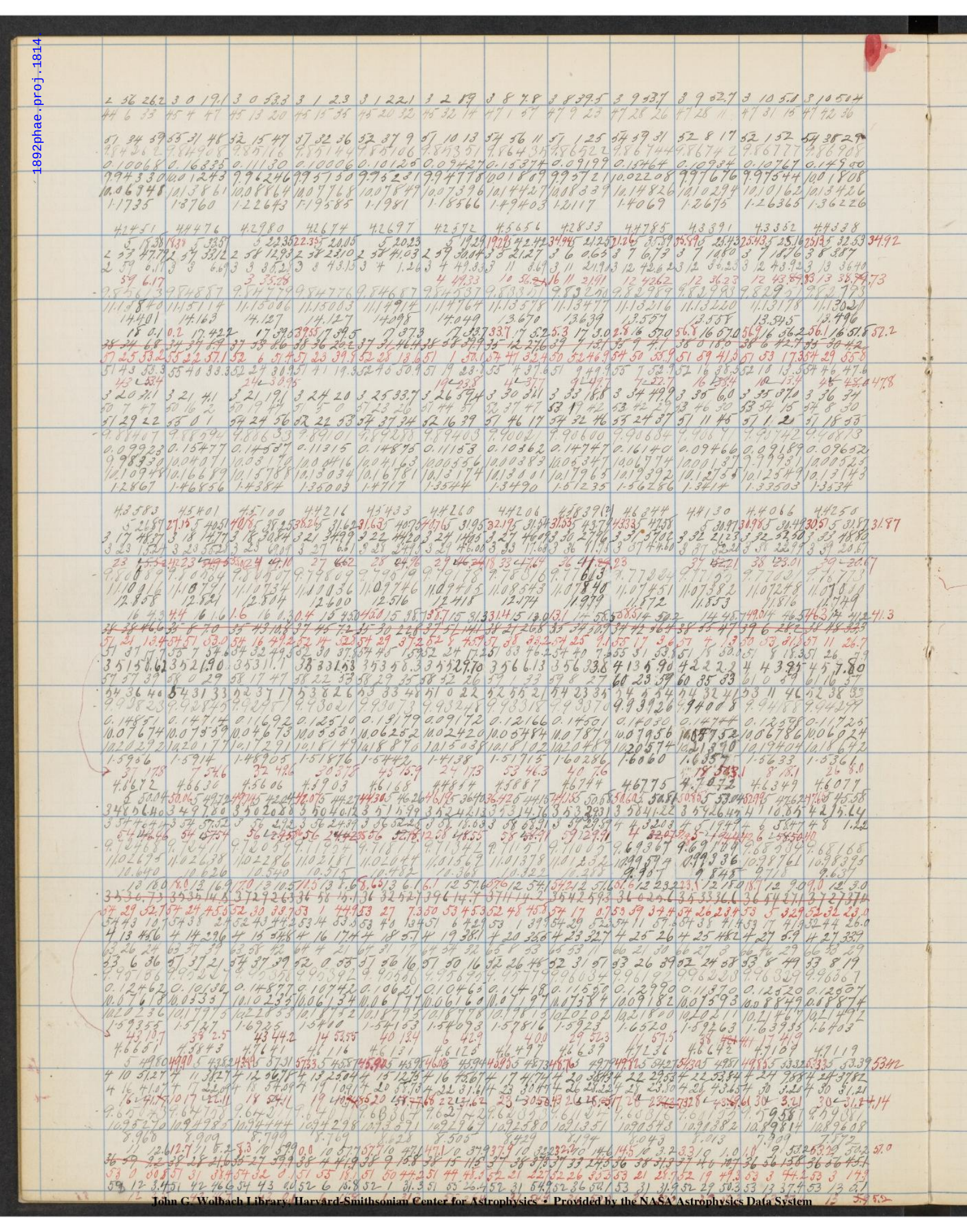


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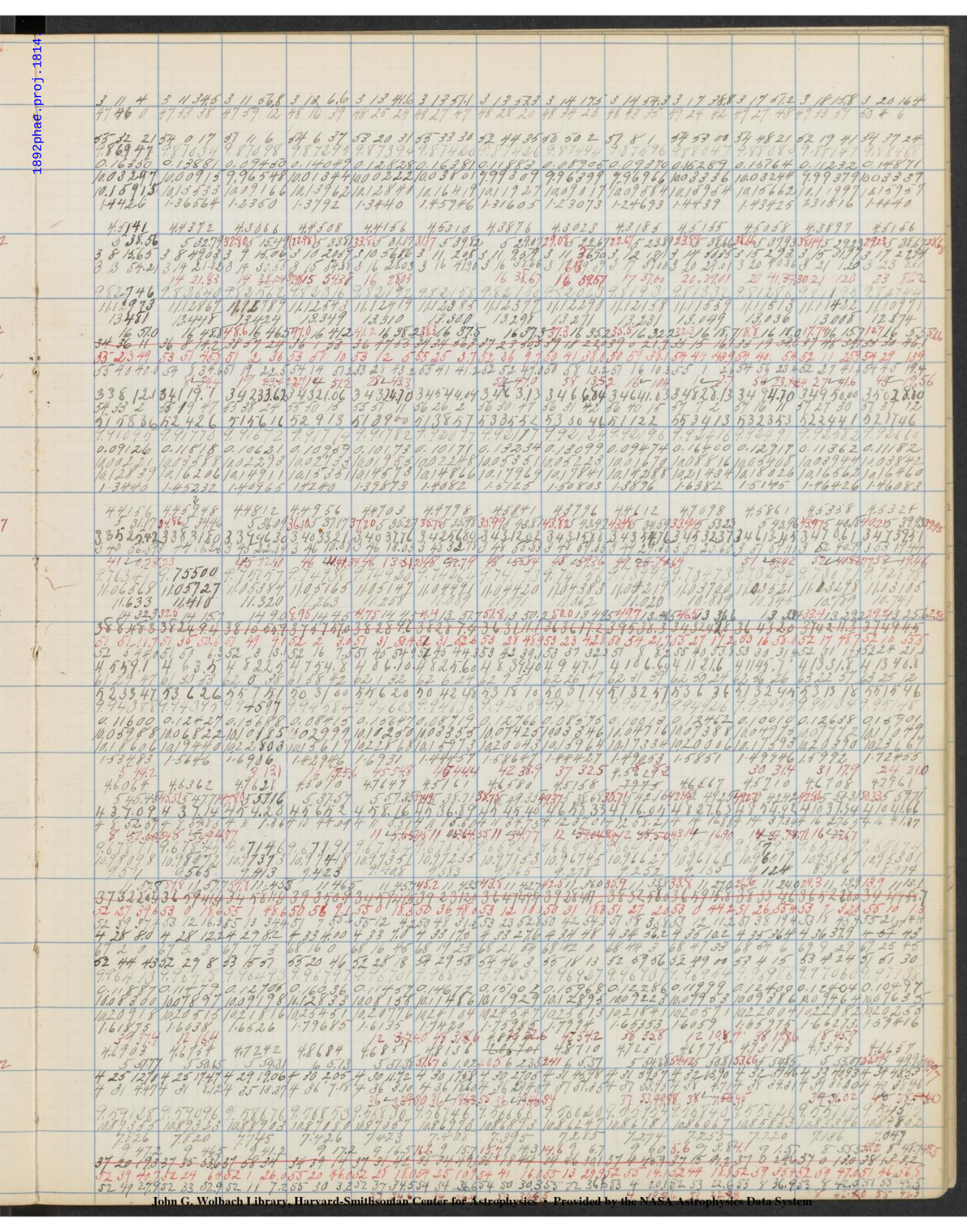
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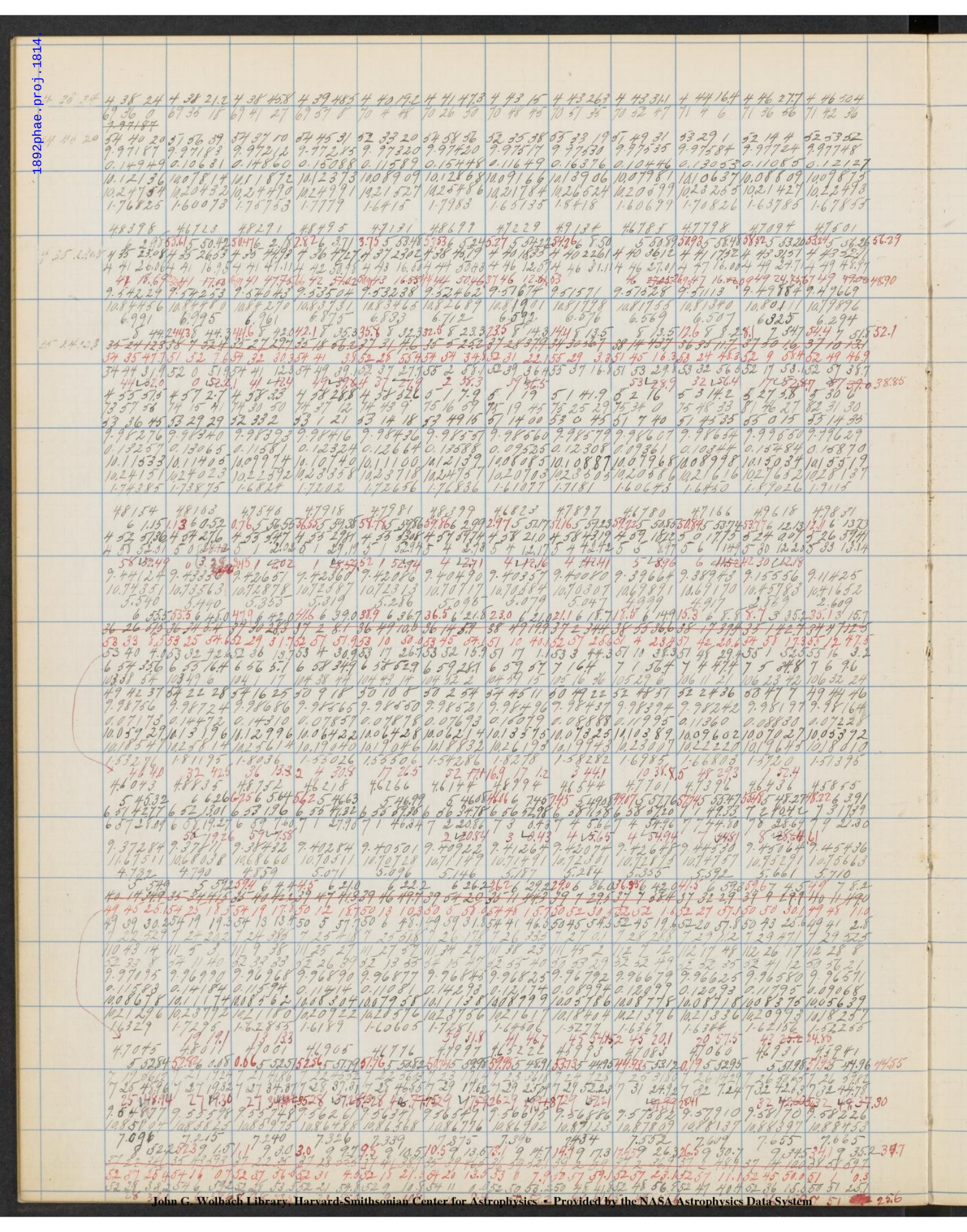
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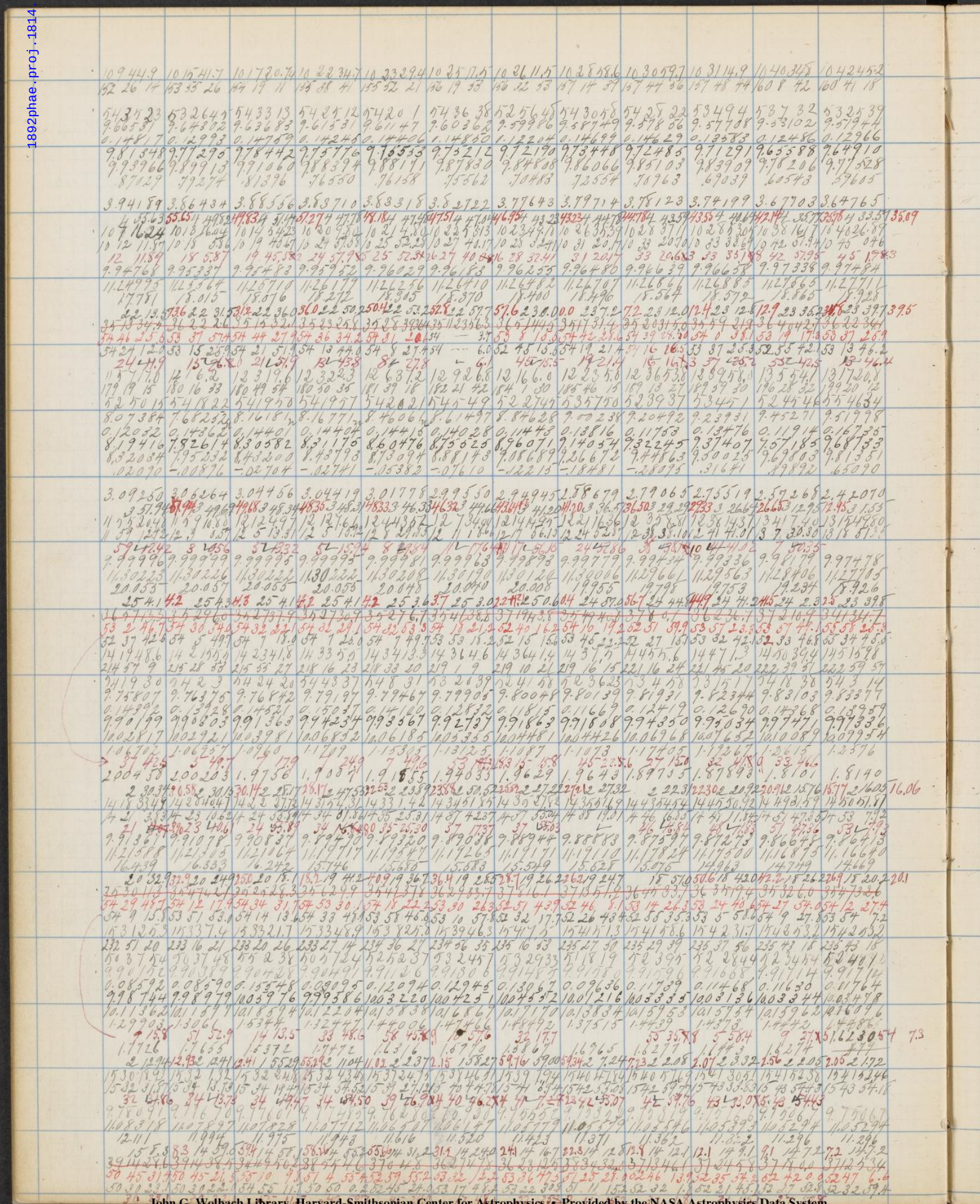
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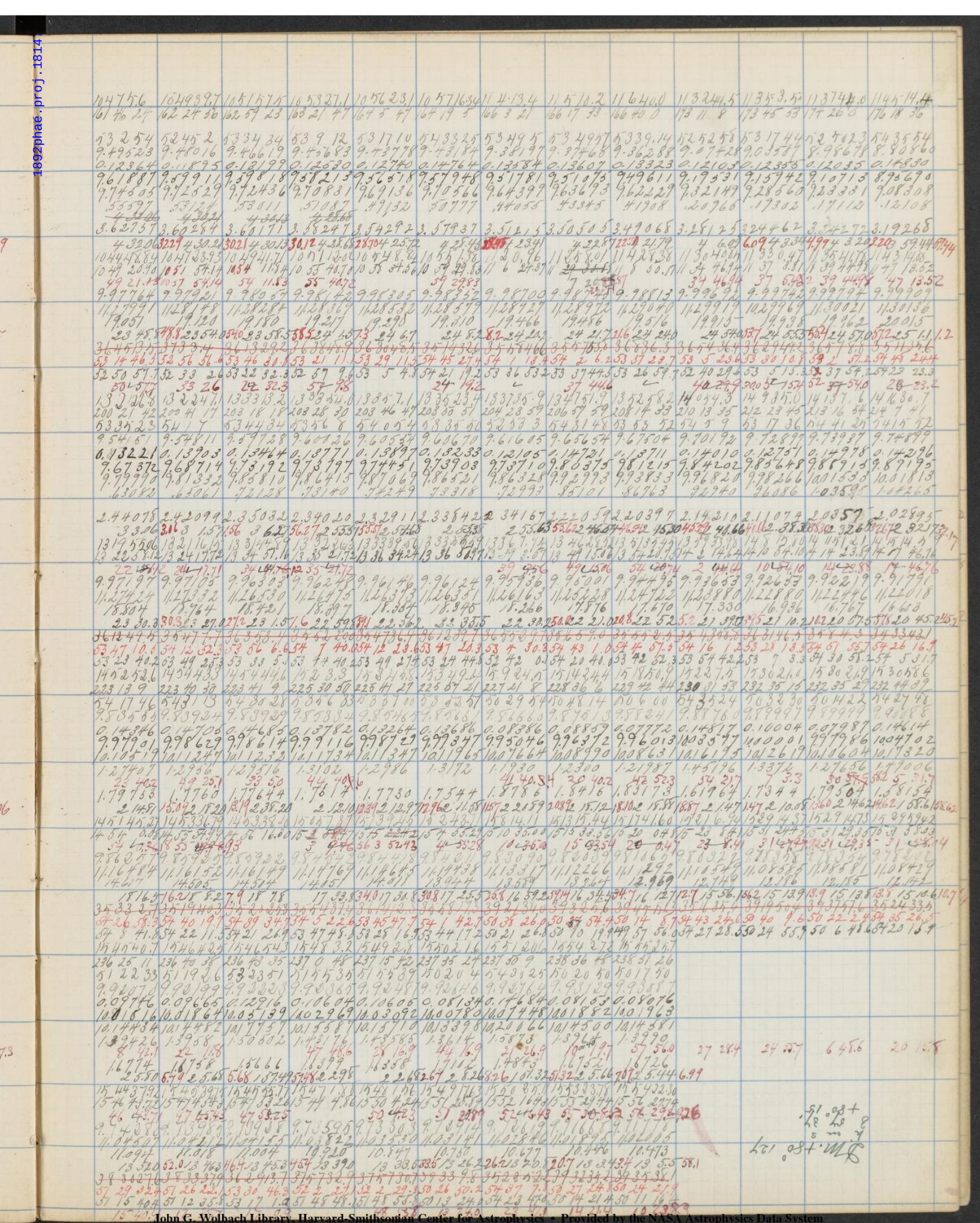
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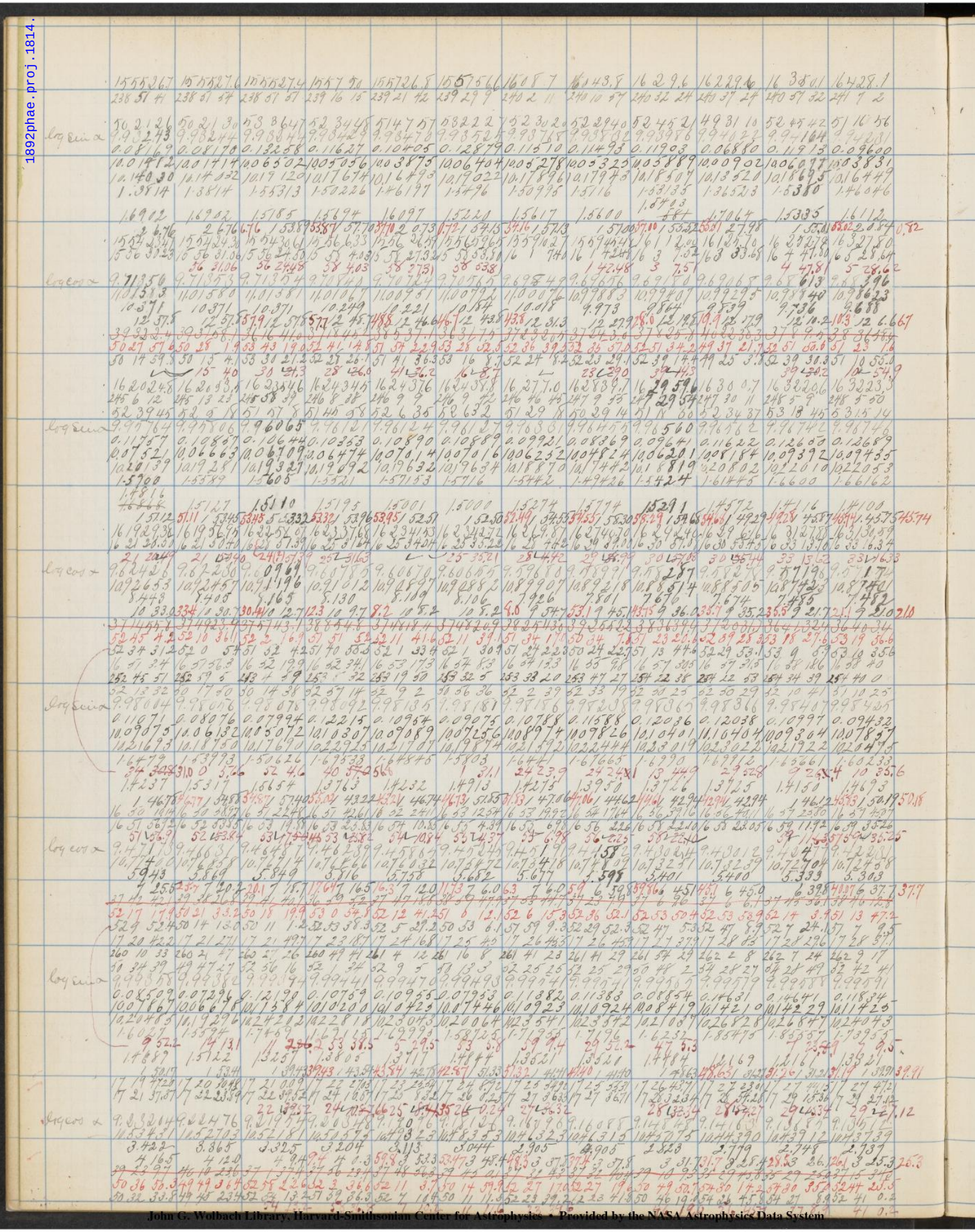
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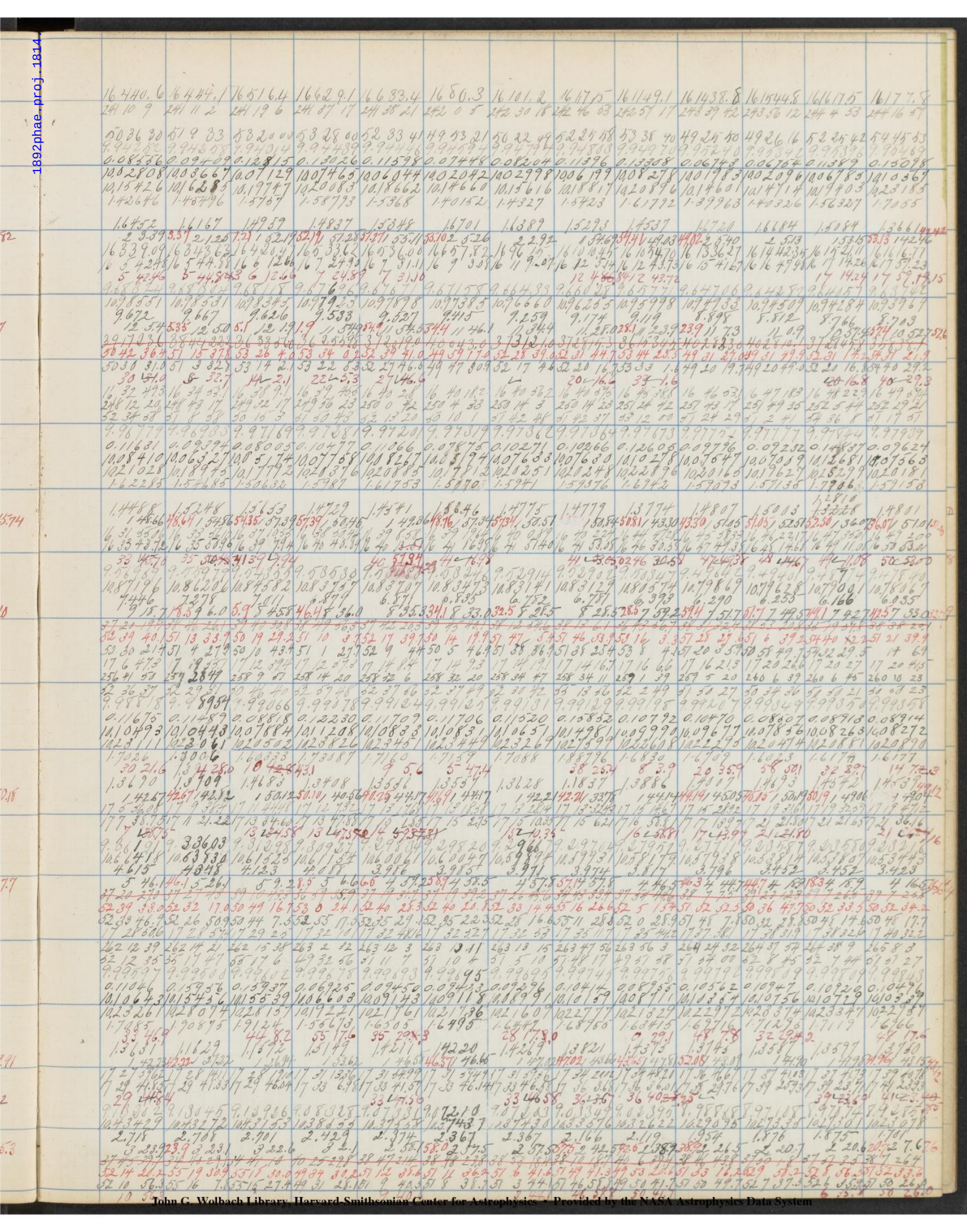
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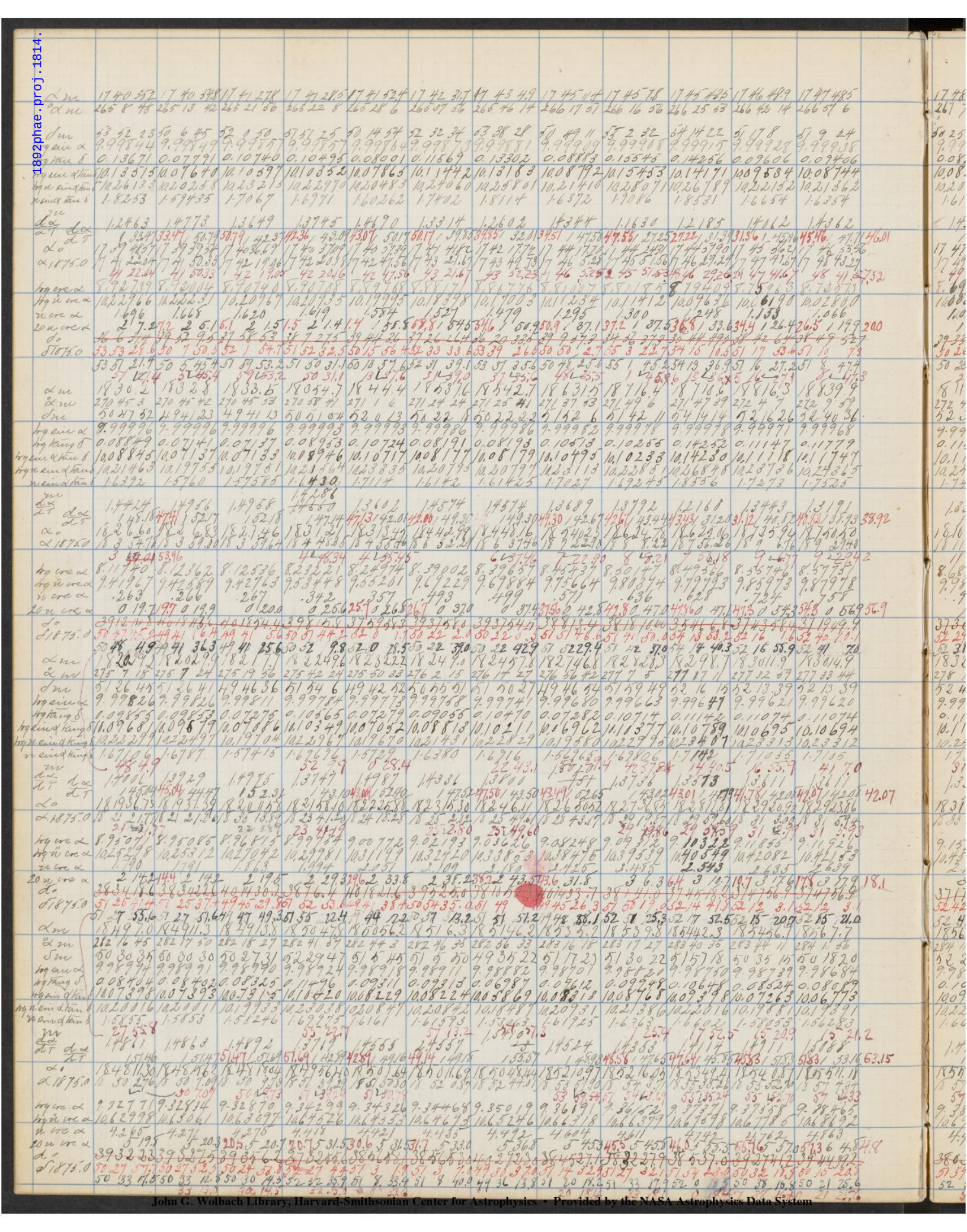
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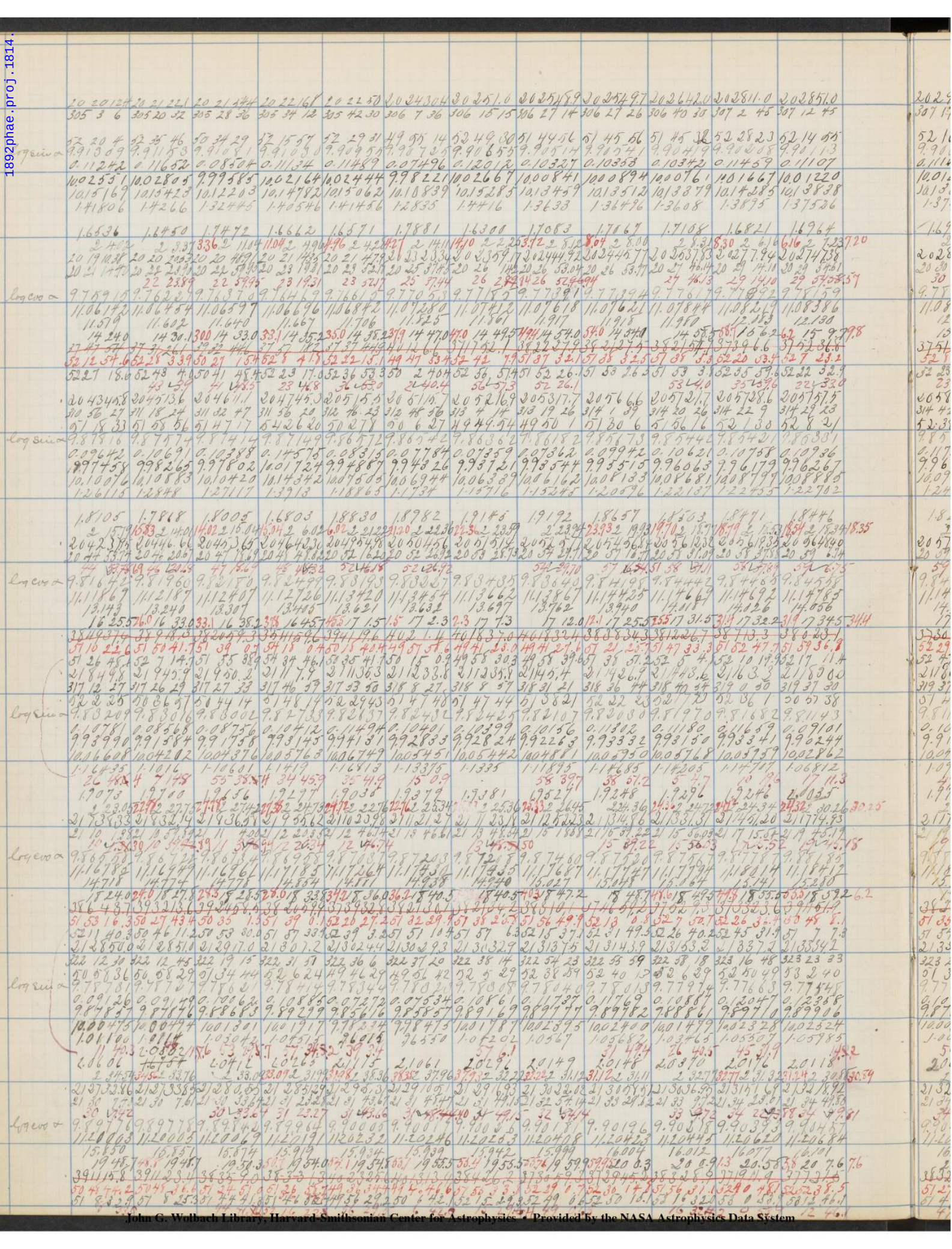
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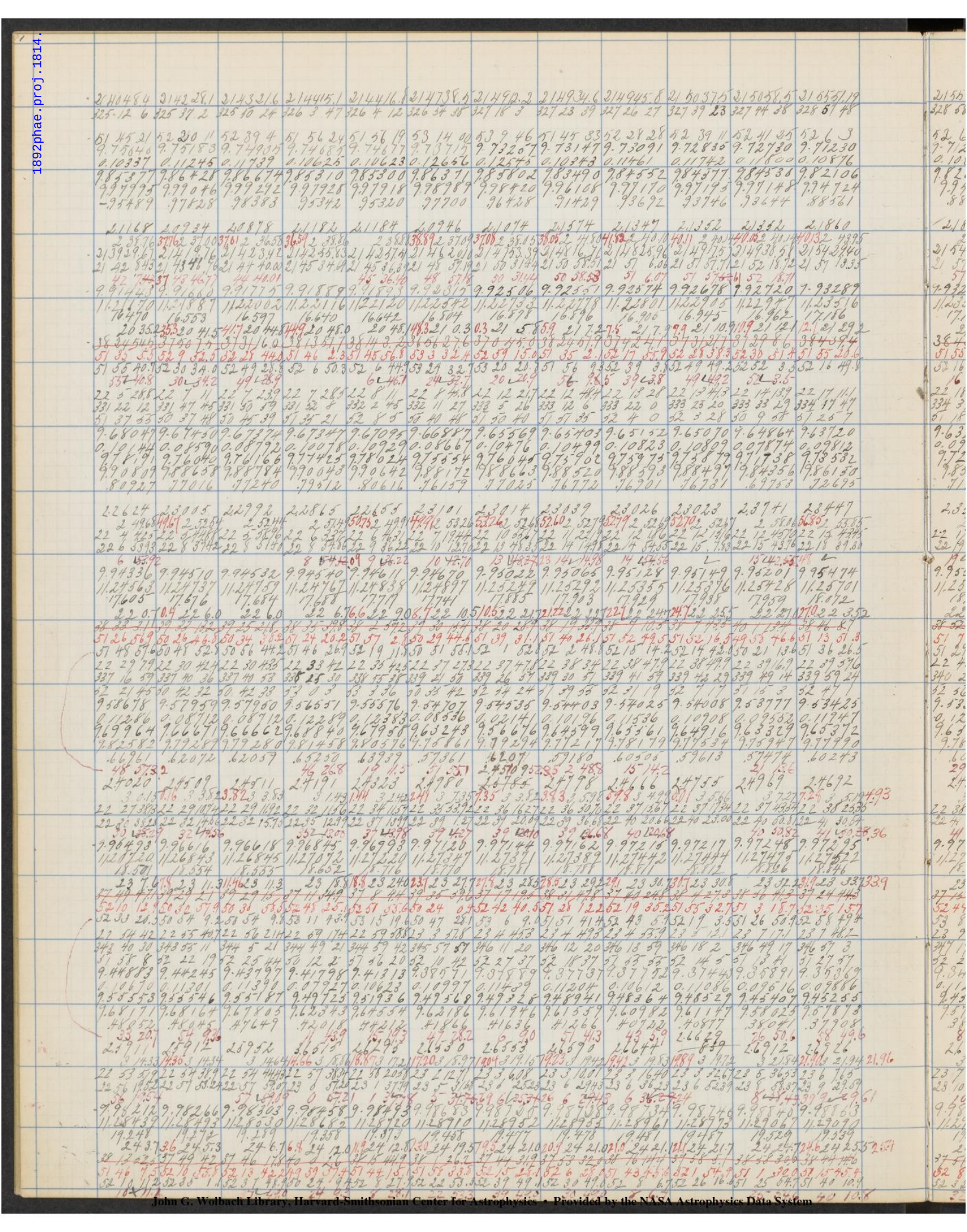


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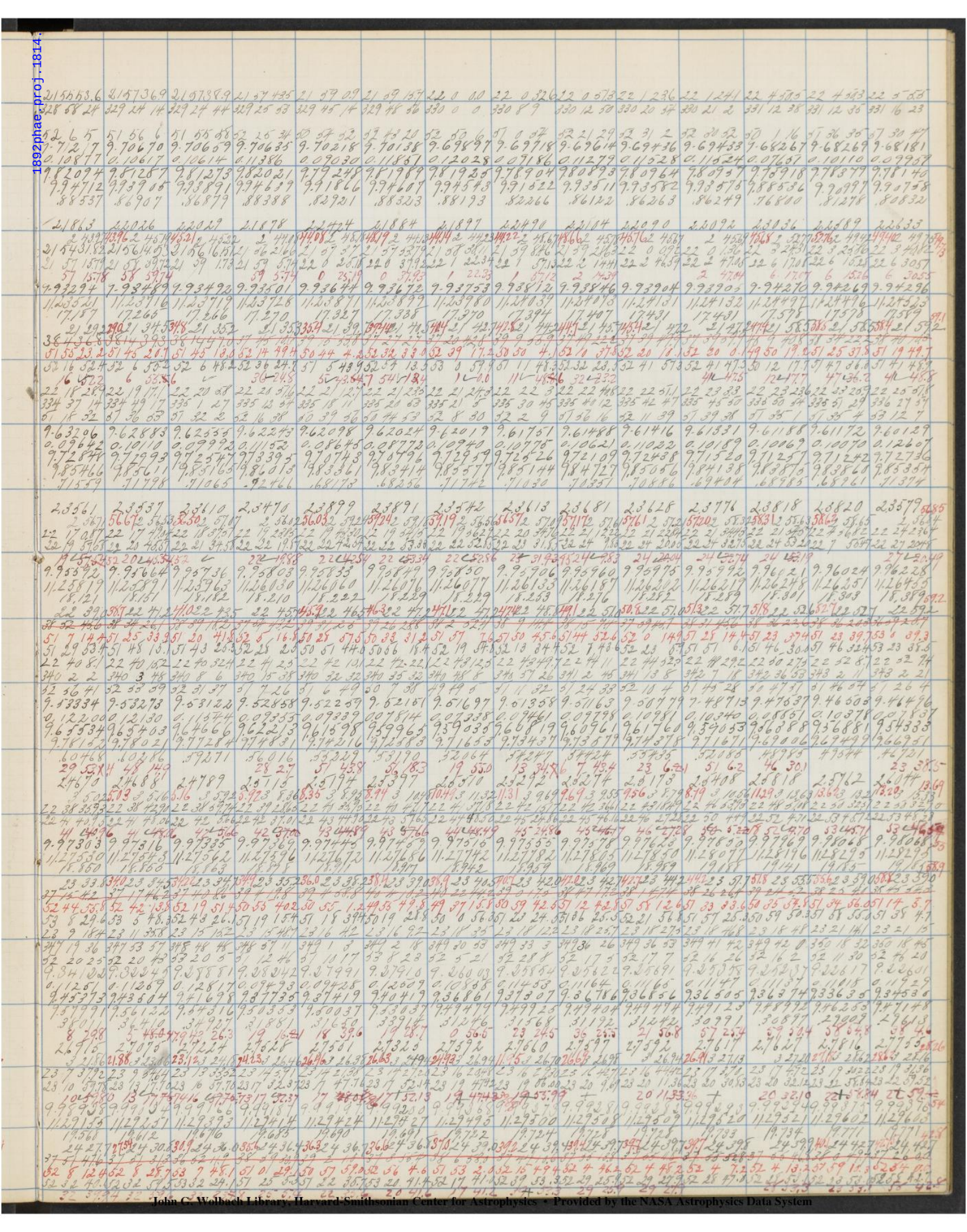
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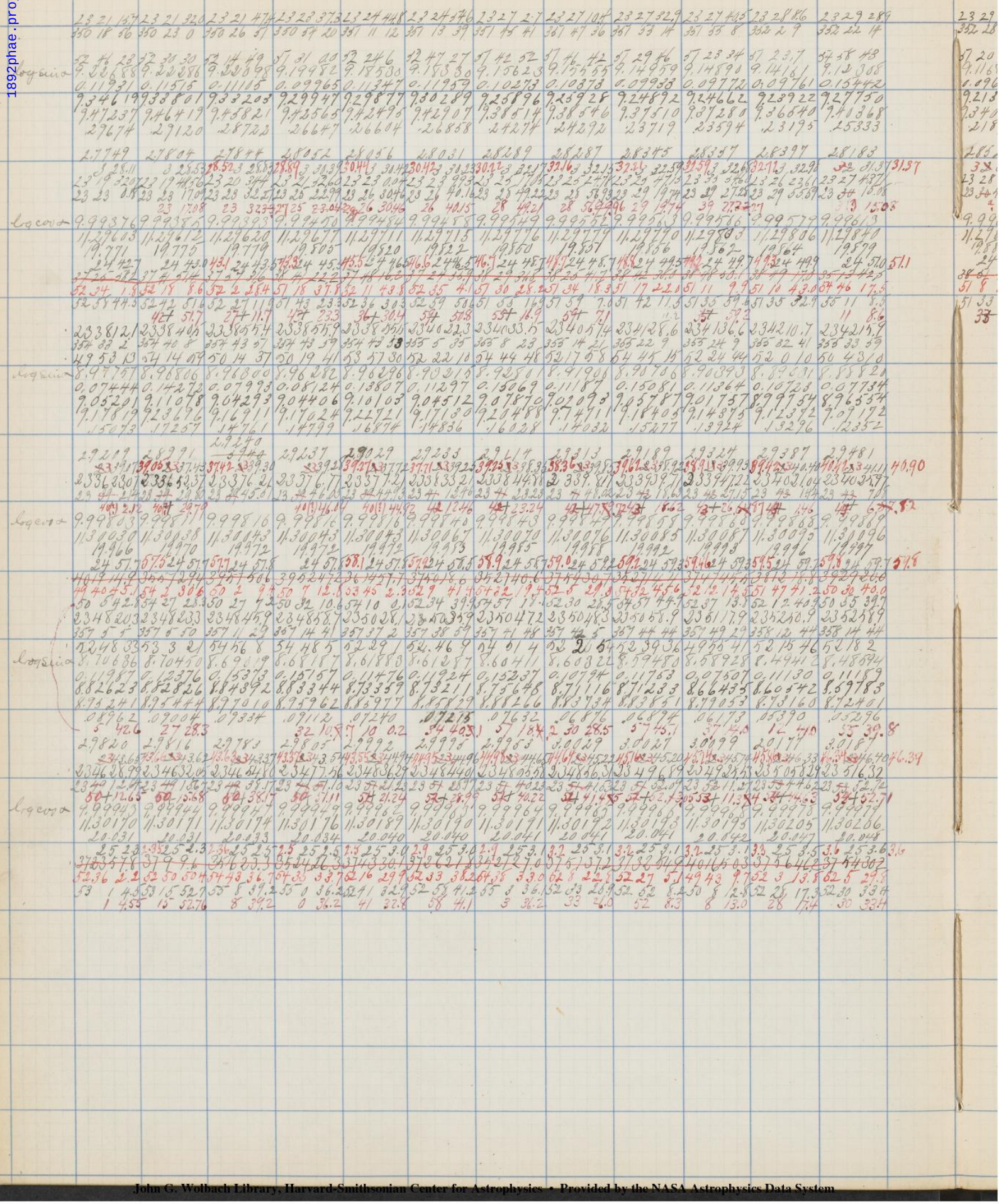
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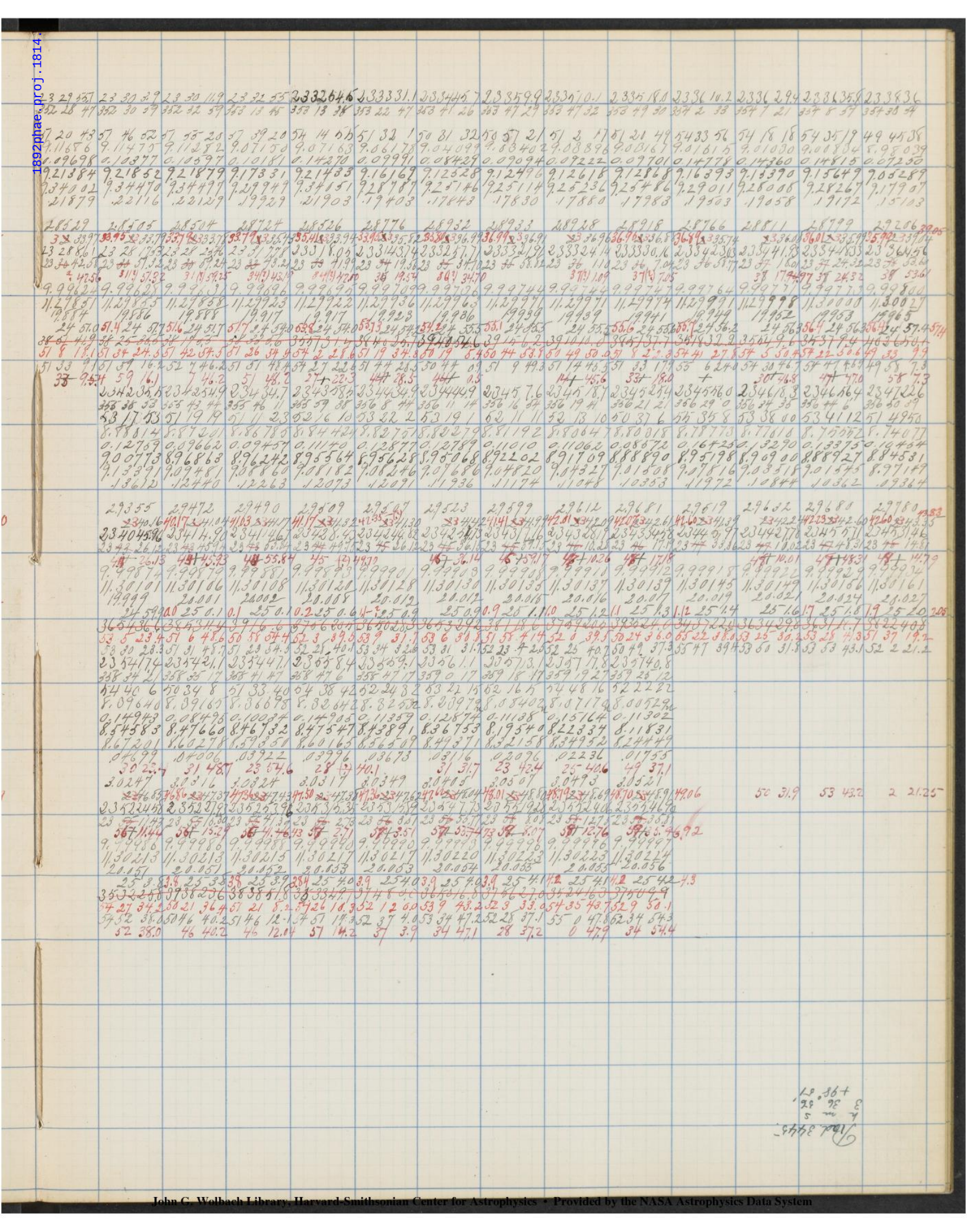
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