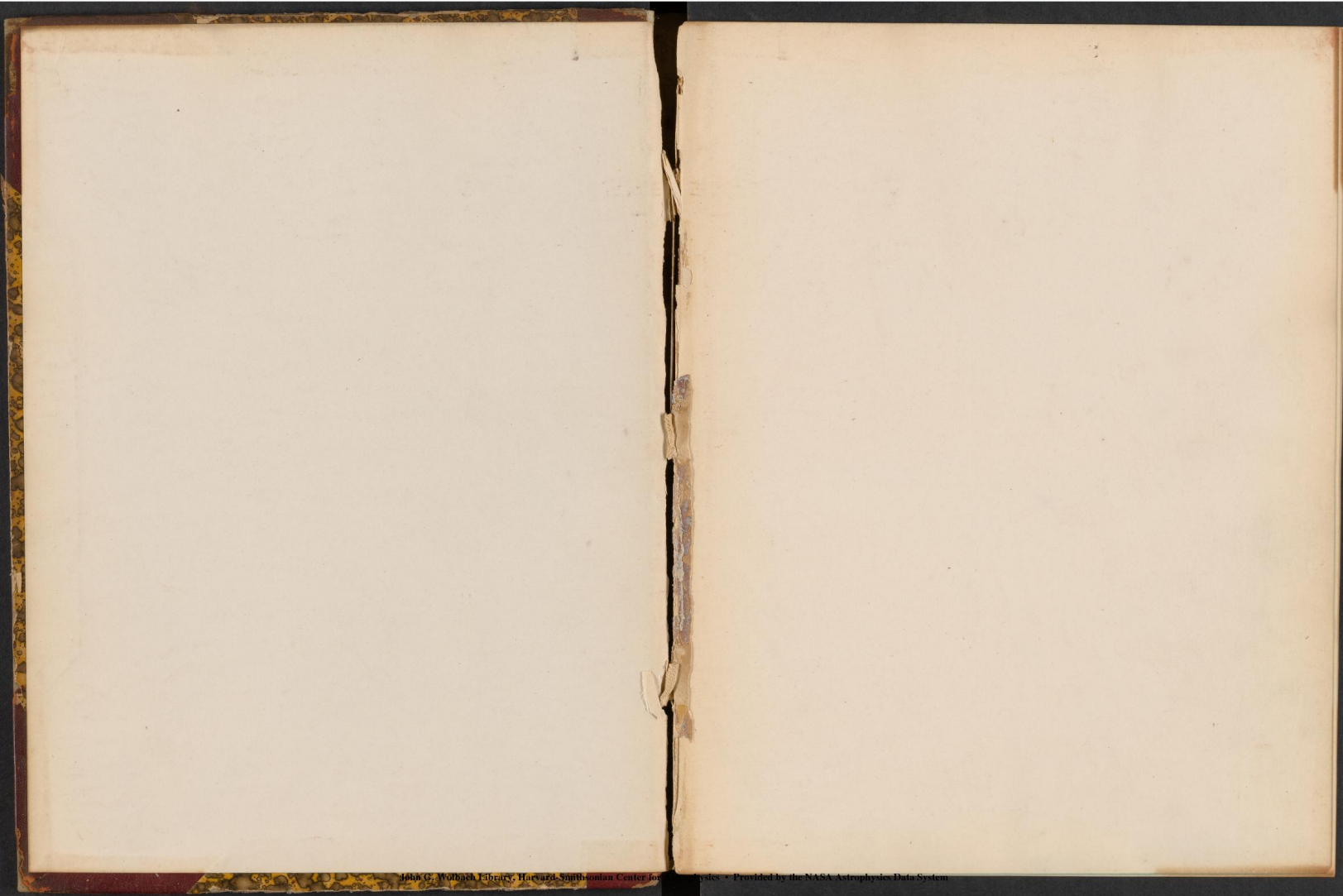


HENRY DRAPER MEMORIAL.

*Wave Lengths.*

*Continuation of Book IX.*





June 4, 1901

Computation of wave lengths in Nova Persei  
on Feb. 24, 1901. C 13158, measured in  
C. S. M. 17

Centers of bright H $\alpha$ , H $\beta$ , & H $\gamma$  ~~as standards~~  
as standards.

	H $\beta$	H $\gamma$	H $\delta$	
	82476	83169	16831 = 4'	4861.5 - 5-20.8 = $\gamma'$
	100337	100000		4340.7 - 891.3 = $\gamma_2$
	116854	117547	34378 = 4'	370.2 - 772.4 = $\gamma_2$

$$\log \gamma' = 2.716671$$

$$\log 4' = 4.226110$$

$$8.490561$$

$$\log \gamma_2 = 2.987845$$

$$\log 4' = 4.586281$$

$$8.451564$$

$$1.3743$$

$$-0.0282805$$

$$-0.0259264$$

$$-520.8 - 0.0309429 c + d = 0$$

$$-972.4 - 0.0282805 c + d = 0$$

$$+451.6 - 0.0026574 c = 0$$

$$370.5 - 0.0050165 c = 0$$

$$C = 457.6370.5 =$$

$$2.568788$$

$$7.700401$$

$$4.868387$$

$$8.490561$$

$$3.358948$$

$$2285.3$$

$$520.8$$

$$764.5$$

$$c = 73856$$

$$\log d = 3.44810$$

$$= \log 2$$

$$2.654854$$

$$7.424157$$

$$2.30297$$

$$2.654$$

$$8.413743$$

$$4.868387$$

$$3.282130$$

$$1914.8$$

$$891.3$$

$$2806.123.6$$

June 4, 1901  
Mora Penn

C 13.158

$$a = 83169$$

$$c = 73856$$

$$d = 3.44810$$

$$\lambda_0 = 4861.5$$

$\lambda =$  micron reading.  
"39"

				end to	end to
(1) = 4	100000	112228	112888	124297	124633
(2) = 4 - 2	16831	29059	29719	41128	41464
(3) = <del>21</del> + 9	90.687	102915	103575	114984	115320
(4) = <del>24</del> + 4	4.22611	446328	447303	4.61414	4.61767
(6) = <del>64</del> + 4	7.67421	7.91128	7.92113	8.06224	8.06577
(6) = log(3)	4.95754	5.01248	5.01526	5.06064	5.06190
(7) = (5) - (6)	2.71667	2.89890	2.90587	3.00160	3.00387
8 = h <sub>h</sub> h(7)	520.8	792.3	805.1	1006.0	1009.0
9 = 70 - 8	4340.7	4069.2	4056.4	3855.8	3852.5

$\lambda_0$  when dish was standard) 4358.1 4085.1 4072.1 3871.9 3866.6  
Diff. 17.4 15.9 15.7 16.4 14.1

"50"

center	end to v.	Remind H	Remind K	H
124834	125141	117582	119560	117547
41665	41972	34413	36391	34378
115521	115828	108269	110247	108234
4.61977	4.62296	4.53672	4.56099	4.53628
8.06787	8.07106	7.98482	8.00909	7.98438
5.06266	5.06381	5.03450	5.04237	5.03436
3.00521	3.00725	2.95032	2.96672	2.95002
1012.1	1016.8	891.9	926.2	891.3
3849.4	3844.7	3969.6	3935.3	3970.2

3863.4 3858.6 37867 3950.1  
14.0 13.9 15.5 14.8



Nov. 20, 1901

Mra Perri C13158

$a = 83/69$

$c = 73856$

$d = 3.44810$

$\lambda_0 = 4861.5$

(1) = $\lambda$ =	63525	64320	66969	69033	72452	72820
(2) = $\lambda - a$	-19644	-18849	-16200	-14136	-10717	-10349
(3) = (2) + c	54212	58007	57656	59720	63139	63507
(4) = $\log(2)$	4.29323 <sub>n</sub>	4.27529 <sub>n</sub>	4.20952 <sub>n</sub>	4.10033 <sub>n</sub>	4.03007 <sub>n</sub>	4.01490 <sub>n</sub>
(5) = $d + (4)$	7.74133 <sub>n</sub>	7.72339 <sub>n</sub>	7.65762 <sub>n</sub>	7.59843 <sub>n</sub>	7.47817 <sub>n</sub>	7.46310 <sub>n</sub>
(6) = $\log(3)$	4.73410	4.74824	4.76054	4.77612	4.80030	4.80282
(7) = (5) - (6)	3.00723 <sub>n</sub>	2.97515 <sub>n</sub>	2.89678 <sub>n</sub>	2.82231 <sub>n</sub>	2.67787 <sub>n</sub>	2.66028 <sub>n</sub>
(8) = $\log \lambda_0$	-1016.8	-944.4	-788.5	-664.2	-476.3	-457.4
(9) = $\lambda_0 - 8$	5878.3	5800.2	5650.0	5525.7	5337.8	5318.9

$7.72339_n$

$4.74042$

$2.98297$

$-961.5$

$\checkmark 5823.0$

73107	73351	73707	73942	74241	74545	74754
-10062	-9818	-9462	-9227	-8928	-8624	-8415
63794	64038	64394	64629	64928	65232	65441
4.00268 <sub>n</sub>	4.01920 <sub>n</sub>	4.07578 <sub>n</sub>	4.09506 <sub>n</sub>	4.10507 <sub>n</sub>	4.11571 <sub>n</sub>	4.12505 <sub>n</sub>
7.45078 <sub>n</sub>	7.44012 <sub>n</sub>	7.42408 <sub>n</sub>	7.43316 <sub>n</sub>	7.39885 <sub>n</sub>	7.38381 <sub>n</sub>	7.37315 <sub>n</sub>
4.90478	4.80644	4.80885	4.81043	4.81243	4.81446	4.81585
2.64600 <sub>n</sub>	2.63368 <sub>n</sub>	2.61523 <sub>n</sub>	2.64273 <sub>n</sub>	2.58642 <sub>n</sub>	2.56935 <sub>n</sub>	2.55730 <sub>n</sub>
-442.6	-430.2	-412.3	-400.6	-385.9	-371.0	-360.8
5304.1	5291.7	5273.8	5262.1	5247.4	5232.5	5222.3

(1)	75124	75462	75938	76157	76417	76586
(2)	- 8045	- 7707	- 7231	- 7010	- 6752	- 6583
(3)	65811	66149	66625	66846	67104	67273
(4)	3.90553 <sub>n</sub>	3.88689 <sub>n</sub>	3.85920 <sub>n</sub>	3.84572 <sub>n</sub>	3.82943 <sub>n</sub>	3.81842 <sub>n</sub>
(5)	7.35363 <sub>n</sub>	7.33499 <sub>n</sub>	7.30730 <sub>n</sub>	7.29382 <sub>n</sub>	7.27753 <sub>n</sub>	7.26652 <sub>n</sub>
(6)	<u>4.81830</u>	<u>4.82052</u>	<u>4.82364</u>	<u>4.82508</u>	<u>4.82675</u>	<u>4.82764</u>
(7)	2.53533 <sub>n</sub>	2.51447 <sub>n</sub>	2.48366 <sub>n</sub>	2.46874 <sub>n</sub>	2.45078 <sub>n</sub>	2.43864 <sub>n</sub>
(8)	-343.0	-326.9	-304.5	-294.3	-282.3	-274.6
9	✓ 5214.5	5188.4	5166.0	5155.8	5143.8	5136.1

79078	79247	79395	79608	79820	81331	817057
- 4091	- 3922	- 3774	- 3561	- 3279	- 1838	- 1464
69765	69934	70082	70295	70577	72018	72392
3.61183 <sub>n</sub>	3.59351 <sub>n</sub>	3.57680 <sub>n</sub>	3.55157 <sub>n</sub>	3.52574 <sub>n</sub>	3.26435 <sub>n</sub>	3.16504 <sub>n</sub>
7.25993 <sub>n</sub>	7.04161 <sub>n</sub>	7.02490 <sub>n</sub>	6.99967 <sub>n</sub>	6.96384 <sub>n</sub>	6.71245 <sub>n</sub>	6.61364 <sub>n</sub>
<u>4.84364</u>	<u>4.84467</u>	<u>4.84561</u>	<u>4.84692</u>	<u>4.84866</u>	<u>4.85744</u>	<u>4.85969</u>
2.471629 <sub>n</sub>	2.19692 <sub>n</sub>	2.17929 <sub>n</sub>	2.15275 <sub>n</sub>	2.11518 <sub>n</sub>	1.85501 <sub>n</sub>	1.75395 <sub>n</sub>
<del>260.8</del>	-157.4	-157.1	-142.1	-130.4	-71.6	-56.7
5122.3	✓ 5018.9	5012.6	5003.6	4991.9	4933.1	4918.2
-164.5						
4697.0						
5026.0						



HP light

HP dark

(1)	81962	82224	82939	83387	83638	83876
(2)	- 1207	- 945	- 230	+ 218	+ 469	707
(3)	72649	72911	73626	74074	74325	74563
(4)	3.08171 <sub>m</sub>	2.97543 <sub>m</sub>	2.36173 <sub>m</sub>	2.33846	2.67117	2.84942
(5)	6.52981 <sub>m</sub>	6.42353 <sub>m</sub>	5.80983 <sub>m</sub>	5.78656	6.11927	6.29752
(6)	4.86123	4.86279	4.86703	4.86967	4.87113	4.87252
(7)	1.66858 <sub>m</sub>	1.56074 <sub>m</sub>	0.94280 <sub>m</sub>	0.91689	1.24814	1.42500
(8)	-46.6	-36.4	-8.8	+8.3	17.7	26.6
(9)	4908.1	4897.9	4870.3	4853.2	4843.8	4834.9

84571	84795	85390	85665	87502	87720	87993
1342	1626	2221	2496	4333	4551	4824
75198	75482	76077	76352	78189	78407	78680
3.12775	3.21112	3.34658	3.39724	3.63679	3.65811	3.68341
6.57585	6.65922	6.79465	6.84634	7.08489	7.10621	7.13151
4.87621	4.87784	4.88125	4.88282	4.89315	4.89435	4.89586
1.69964	1.78138	1.91340	1.96252	2.19174	2.21186	2.23565
50.1	60.4	81.9	91.7	155.5	162.9	172.0
4811.4	4801.1	4779.6	4769.8	4706.0	4698.6	4689.5

(1)	88308	88659	88839	89227	89630	89904
(2)	5139	5490	5670	6058	6461	6735
(3)	78995	79346	79526	79914	80317	80591
(4)	3.71088	3.73957	3.75358	3.78233	3.81030	3.82834
(5)	7.16898	7.18767	7.20168	7.23043	7.25840	7.27644
(6)	4.89760	4.89952	4.90057	4.90262	4.90481	4.90629
(7)	2.26138	2.28815	2.30117	2.32781	2.35359	2.37015
(8)	182.5	184.2	200.1	212.7	225.7	234.5
(9)	4679.8	4667.3	4661.4	4648.8	4635.8	4627.0

21

Br. spec 22 23 24

90114	90457	90702	91149	91425	92647	94588
6945	7288	7733	7980	8256	9478	11419
80801	81144	81589	81836	82112	83334	85275
3.84167	3.86261	3.88835	3.90200	3.91677	3.97672	4.05763
7.28977	7.31071	7.33645	7.35010	7.36487	7.42482	7.50573
4.90742	4.90926	4.91163	4.91294	4.91441	4.92082	4.93082
2.38235	2.40145	2.42482	2.43716	2.45046	2.50400	2.57491
241.2	252.0	266.0	273.6	282.1	319.2	375.8
4620.3	4609.5	4595.5	4587.9	4579.4	4542.3	4485.7



"25"

On face

(1)	94835	95084	95445	95848	96057	96262
(2)	11666	11915	12276	12679	12890	13093
(3)	85522	85771	86132	86535	86746	86949
(4)	4.06692	4.07609	4.08706	4.10308	4.11025	4.11704
(5)	7.51502	7.52419	7.53716	7.55118	7.55835	7.56574
(6)	4.93208	4.93334	4.93516	4.93719	4.93825	4.93926
(7)	2.58294	2.59085	2.60200	2.61399	2.62010	2.62588
(8)	382.8	387.5	399.9	411.1	417.0	422.6
(9)	4478.7	4471.7	4461.6	4450.4	4444.5	4438.9

"26"

96527	96911	97105	97331	97543	97766	97977
13358	13742	13986	14162	14374	14597	14808
87214	87598	87842	88018	88230	88453	88664
4.12574	4.13805	4.14569	4.15712	4.15758	4.16426	4.17050
7.57384	7.58615	7.59379	7.59922	7.60568	7.61236	7.61860
4.94057	4.94249	4.94370	4.94457	4.94562	4.94671	4.94770
2.63325	2.64366	2.65009	2.65465	2.66006	2.66565	2.67085
429.8	440.2	446.8	457.5	457.2	463.1	468.7
✓ 4431.7	4411.3	4414.7	4410.0	4404.3	4398.4	4392.8

4.19568  
 7.64378  
 4.95206  
 2.69173  
 491.7  
 4369.8

light

dark

(1)	98129	98861	99594	100356	100693	101030
(2)	14960	15692	16425	17217	17524	17861
(3)	88816	89548	90281	91073	91380	91717
(4)	417493	4.19568 4.20040	4.21551	4.23596	4.24363	4.25191
(5)	7.62303	7.65119	7.66361	7.68406	7.69173	7.70001
(6)	4.94849	4.95206	4.95560	4.95939	4.96085	4.96245
(7)	2.67454	2.69913	2.70801	2.71467	2.73088	2.73756
(8)	472.7	509.2	510.5	512.8	538.1	546.5
(9)	4388.8	4311.1	4351.0	4311.0	4333.4	4315.0

See above.

4331.0

101576	101976	102155	102784	102943	104175	105252
18347	18807	18986	19615	19774	21006	22083
92203	92663	92842	93471	93630	94862	95939
4.26357	4.27432	4.27843	4.29259	4.29609	4.32234	4.34406
7.71167	7.72242	7.72653	7.74069	7.74419	7.77044	7.79218
4.96475	4.96691	4.96774	4.97068	4.97142	4.97709	4.98200
2.74692	2.75551	2.75879	2.77012	2.77277	2.79335	2.81016
538.4	569.5	573.8	588.9	592.6	621.4	645.9
4303.1	4292.0	4287.7	4242.6	4268.9	4240.1	4215.6



Br  
2Br  
1

	106455	107004	107485	108915	109234	109622
(1)	106455	107004	107485	108915	109234	109622
(2)	23286	23835	24316	25746	26065	26453
(3)	97142	97691	98172	99602	99921	100389
(4)	4.36709	4.37722	4.38589	4.41071	4.41606	4.42249
(5)	7.81519	7.82532	7.83399	7.85881	7.86416	7.87057
(6)	4.98741	4.98985	4.99199	4.99827	4.99966	5.00134
(7)	2.82778	2.83547	2.84200	2.86054	2.86450	2.86923
(8)	672.6	684.7	695.0	725.3	732.0	740.0
(9)	4188.9	4176.8	4166.5	4136.2	4129.5	4121.5

Br. H5.

Dark H5

Br  
2

end to 2

	110339	110652	110968	111346	111694	111956	113442
(1)	110339	110652	110968	111346	111694	111956	113442
(2)	27170	27483	27799	28177	28525	28787	30273
(3)	101026	101339	101655	102033	102381	102643	104129
(4)	4.43409	4.43906	4.44403	4.44989	4.45523	4.45920	4.48106
(5)	7.88219	7.88716	7.89213	7.89799	7.90333	7.90730	7.92916
(6)	5.00443	5.00577	5.00712	5.00874	5.01022	5.01133	5.01757
(7)	2.87776	2.88139	2.88501	2.88925	2.89311	2.89597	2.91159
(8)	754.7	761.0	767.4	774.9	781.8	787.0	815.8
(9)	4106.8	4100.5	4094.1	4086.6	4079.7	4074.5	4045.7

Sup 2 for line  
"1139"

117071  
 33902  
 107758  
 4.53022  
 7.97832  
5.03245  
 2.94597  
 883.0  
 3978.5

1/2 inch  
 Centre

	End to v	End to v	End to v	End to v	Centre
(1)	114331	114579	115400	115607	116785
(2)	31162	31410	32231	32438	33616
(3)	105018	105266	106087	106294	107472
(4)	449363	4.49707	4.50827	4.51105	4.52655
(5)	7.94173	7.94517	7.95637	7.95915	7.97565
(6)	<u>5.02126</u>	<u>5.02228</u>	<u>5.02566</u>	<u>5.02651</u>	<u>5.03129</u>
(7)	2.92047	2.92289	2.93071	2.93264	2.94236
(8)	832.7	837.3	852.5	856.3	875.7
(9)	4028.8	4024.2	4009.0	4005.2	3985.8
					3978.5

118024  
~~81193~~  
 34355  
 108711  
 4.54226  
 7.99036  
5.03627  
 2.95409  
 899.7  
 3961.8

End to v	June line?	Revised June K	End to v. Jading	End to v	Centre	End to v
118779	119120	119560	119902	119963	120249	120854
35610	35951	36391	36731	36794	37080	37685
109466	109807	100247	110587	110650	110936	111541
4.55157	4.55571	4.56099	4.56503	4.56878	4.56914	4.57617
7.99967	8.00581	8.00909	8.01313	8.01888	8.01724	8.02427
<u>5.03928</u>	<u>5.04063</u>	<u>5.04236</u>	<u>5.04371</u>	<u>5.04395</u>	<u>5.04507</u>	<u>5.04743</u>
2.96039	2.96318	2.96674	2.96942	2.96993	2.97217	2.97684
912.8	922.0	926.3	932.0	933.1	937.9	948.1
3948.7	3938.5	3935.2	3929.5	3928.4	3923.6	3913.4

Hy

	Br 2	End to n fading	end to 2	End to 2	end to 5	Br 2
(1)	121216	121665	122700	123134	123509	123972
(2)	38047	38496	39531	39965	40340	40803
(3)	111903	112352	113387	113821	114196	114659
(4)	458032	458542	459694	460168	460574	461069
(5)	802842	803352	804504	804978	805384	805879
(6)	504884	505058	505456	505622	505765	505941
(7)	297958	298294	299048	299356	299619	299938
(8)	9541	961.5	978.3	985.3	991.3	998.6
(9)	39874	398000	3883.2	3876.2	3870.2	3862.9

Sup. 2 for reduction of line "50"

Br. 1

H<sub>2</sub> darkH<sub>2</sub>

Br. 1	H <sub>2</sub> dark	H <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub>
125577	125728	126564	127282	128195	128874	129619
42408	42759	43395	44113	45026	45705	46450
116264	116615	117251	117969	118832	119561	120306
462745	463103	463744	464457	465346	465996	466699
807555	807913	808554	809267	810156	810806	811509
506545	506675	506911	507177	507572	507759	508029
301010	301238	301643	302090	302644	303047	303480
1023.8	1028.9	1038.6	1049.3	1062.8	1072.7	1083.4
3838.2	3832.6	3822.9	3812.2	3798.7	3788.8	3778.1

Hy



	$H_2$ center?	center?
(1)	130663	131560
(2)	47494	48391
(3)	121350	122247
(4)	467664	468476
(5)	8.12474	8.13286
(6)	5.08404	5.08724
(7)	3.04070	3.04562
(8)	1098.2	1110.8
(9)	3763.3	3750.7

November 26, 1901  
Derivation of formula for C13195  
using centers of  $H_2$ ,  $H\gamma$  and  $H\beta$  light

		Diff	$\lambda$	
$H\beta$	41670	83054	16946 = $4'$	4861.5
$H\gamma$	58616	100000		4340.7
$H_2$	76030	114414	34360 = $2''$	3770.2
				520.8 = $4'$
				891.3 = $2''$

$$\log y' = 2.716671$$

$$\log y'' = 4.229067$$

$$\frac{8.487604}{8.487604}$$

$$\log y' = 2.950024$$

$$\log y'' = 4.536053$$

$$\frac{8.413971}{8.413971}$$

$$0.0307329$$

$$0.0259401$$

$$-520.8 - 0.0307329c + d = 0$$

$$-891.3 - 0.0259401c + d = 0$$

$$370.5 - \frac{9952072c}{0.0047928c} = 0$$

$$\begin{array}{r} 4.888199 \\ 8.487604 \\ \hline 3.375803 \end{array}$$

$$\begin{array}{r} 2375.8 \\ 520.8 \\ \hline 2896.6 \end{array}$$

$$\begin{array}{r} 2.568788 \\ 7.680589 \\ \hline 4.888199 \\ c = 77304 \end{array}$$

$$\begin{array}{r} 4.888199 \\ 8.413971 \\ \hline 3.302170 \end{array}$$

$$\begin{array}{r} 2005.3 \\ 891.3 \\ \hline 2896.6 \end{array}$$

$$\log d = 3.46189$$

November 26, 1901.  
Nova Puc. C/3195

$$a = 83054$$

$$c = 77304$$

$$\log d = 3.46189$$

$$\lambda_0 = 4861.5$$

mel = 4.384

Orig measure	22262	24492	24677	24858	25258
(1) = $\lambda - a$	63646	65876	66061	66242	66642
(2) = $\lambda - c$	55572	57802	57993	58172	58572
(3) = (2) + c	56896	60126	60311	60492	60892
(4) = $\log(2)$	4.30980	4.23497	4.23027	4.22562	4.21576
(5) = $\lambda - (4)$	7.77169	7.69686	7.69216	7.68701	7.67705
6 = $\log(3)$	4.75508	4.77906	4.78040	4.78170	4.78456
(7) = (5) - (6)	3.01661	2.91780	2.91176	2.90581	2.89249
(8) = $\log(7)$	1037.0	827.6	816.1	805.0	780.7
(9) = $\lambda - 8$	5900.5	5689.1	5677.6	5666.5	5642.2

63646				
- 19408	5691.4	5679.9	5668.8	
57896	+ 2.3	+ 2.3	+ 2.3	
4.28798				
7.74987				
4.76265				
2.98722				
4.113	5837.8			
- 441.0				
✓ 5832.5	+ 53			

26235	26611	26774	26873	26985	27127	27327
67619	67995	68158	68257	68369	68511	68711
- 15435	- 15059	- 14896	- 14797	- 14685	- 14543	- 14343
61869	62245	62408	62507	62619	62761	62961
4.18851	4.17780	4.17307	4.17017	4.16687	4.16265	4.15664
7.65040	7.63969	7.63496	7.63206	7.62876	7.62454	7.61853
4.79147	4.79410	4.79524	4.79593	4.79671	4.79769	4.79907
2.85893	2.84559	2.83972	2.83613	2.83205	2.82685	2.81946
- 722.7	- 700.8	- 691.4	- 685.7	- 679.3	- 671.2	- 657.9
5584.2	5562.3	5552.9	5547.2	5540.8	5532.7	5521.4

62841	62841
- 20213	- 20213
67091	57091
4.00916	4.30563
7.47105	7.76752
4.82667	4.75657
2.64438	3.01095
- 440.9	1625.5
	5887.0

5542.5 + 17.3



	27462	27745	29037	30879	30970	31310
1	68846	69129	70421	72263	72354	72674
2	-14208	-13925	-12633	-10791	-10700	-10360
3	63096	63379	64671	66513	66604	66944
4	4.15253 <sub>m</sub>	4.14380 <sub>m</sub>	4.10151 <sub>m</sub>	4.03306 <sub>m</sub>	4.02938 <sub>m</sub>	4.01536 <sub>m</sub>
5	7.61442 <sub>m</sub>	7.60569 <sub>m</sub>	7.56348 <sub>m</sub>	7.49495 <sub>m</sub>	7.49127 <sub>m</sub>	7.47725 <sub>m</sub>
6	4.80000	4.80195	4.81071	4.82291	4.82350	4.82571
7	2.81442 <sub>m</sub>	2.80374 <sub>m</sub>	2.75269 <sub>m</sub>	2.67204 <sub>m</sub>	2.66777 <sub>m</sub>	2.65154 <sub>m</sub>
8	-652.3	-636.4	-565.8	-469.9	-465.3	-448.3
9	5513.8	5497.9	5427.3	5331.4	5326.8	5309.8

5499.5  
+1.6

31476	31678	32643	33849	34178	34296	34458
72860	73062	75027	75233	75562	75680	75842
-10194	-9992	-8027	-7821	-7492	-7374	-7212
67110	67812	69277	69483	69812	69930	70092
4.00834 <sub>m</sub>	4.99965 <sub>m</sub>	4.90455 <sub>m</sub>	4.89326 <sub>m</sub>	4.87460 <sub>m</sub>	4.86770 <sub>m</sub>	4.85806 <sub>m</sub>
7.47023 <sub>m</sub>	7.46154 <sub>m</sub>	7.36644 <sub>m</sub>	7.35515 <sub>m</sub>	7.33649 <sub>m</sub>	7.32959 <sub>m</sub>	7.31995 <sub>m</sub>
4.82679	4.82807	4.84059	4.84188	4.84393	4.84466	4.84567
2.64344 <sub>m</sub>	2.63345 <sub>m</sub>	2.52585 <sub>m</sub>	2.51327 <sub>m</sub>	2.49256 <sub>m</sub>	2.48493 <sub>m</sub>	2.47428 <sub>m</sub>
-440.0	-430.0	-335.6	-326.0	-310.9	-305.4	-288.0
5301.5	5291.5	5197.1	5187.5	5172.4	5166.9	5159.5

5172.9  
+0.5



	34740	34871	37227	37720	38153	39592
1	76124	76255	78611	79104	79537	80976
2	- 6930	- 6799	- 4443	- 3950	- 3517	- 2078
3	70374	70505	72861	73354	73787	75226
4	3.84073 <sub>n</sub>	3.83244 <sub>n</sub>	3.64768 <sub>n</sub>	3.57660 <sub>n</sub>	3.54617 <sub>n</sub>	3.31765 <sub>n</sub>
5	7.30262 <sub>n</sub>	7.29433 <sub>n</sub>	7.10957 <sub>n</sub>	7.05849 <sub>n</sub>	7.00806 <sub>n</sub>	6.77954 <sub>n</sub>
6	4.84741	4.84822	4.86250	4.86542	4.86798	4.87637
7	2.45521 <sub>n</sub>	2.44611 <sub>n</sub>	2.24707 <sub>n</sub>	2.19307 <sub>n</sub>	2.14008 <sub>n</sub>	1.90317 <sub>n</sub>
8	- 285.2	- 279.3	- 176.6	- 156.0	- 138.1	- 80.0
9	5146.7	5140.8	5038.1	5017.5	4999.6	4941.5

	40052	40237	40505	40893	41143	41500	41670
	81436	81621	81889	82277	82527	82884	83054
	- 1618	- 1433	- 1165	- 777	- 527	- 170	- 0
	75686	75871	76139	76527	76777	77134	
	3.20898 <sub>n</sub>	3.15625 <sub>n</sub>	3.06633 <sub>n</sub>	2.89042 <sub>n</sub>	2.72181 <sub>n</sub>	2.23045 <sub>n</sub>	
	6.67087 <sub>n</sub>	6.61814 <sub>n</sub>	6.52822 <sub>n</sub>	6.35231 <sub>n</sub>	6.18370 <sub>n</sub>	5.69234 <sub>n</sub>	
	4.87902	4.88008	4.88161	4.88381	4.88523	4.88725	
	1.79185 <sub>n</sub>	1.73806 <sub>n</sub>	1.64661 <sub>n</sub>	1.46850 <sub>n</sub>	1.29847 <sub>n</sub>	0.80509 <sub>n</sub>	
	- 61.9	- 54.7	- 44.3	- 29.4	- 19.9	- 6.4	
	4923.4	4916.2	4905.8	4890.9	4881.4	4867.9	

4923.4<sup>5</sup>+0.1  
-0.4

	41845	42176	42341	42507	42757	43001
1	83229	83560	83725	83891	84141	84385
2	+ 175	+ 506	671	837	1087	1331
3	77479	77810	77975	78141	78391	78635
4	2.24304	2.70415	2.82672	2.92273	3.03623	3.12418
5	5.70493	6.16604	6.28861	6.38462	6.49812	6.58607
6	4.88918	4.89104	4.89196	4.89288	4.89427	4.89562
7	0.81575	1.27500	1.39665	1.49174	1.60385	1.69045
8	6.5	18.8	24.9	31.0	40.2	49.0
9	4855.0	4842.7	4836.6	4830.5	4821.3	4812.5

4812.4

- 0.1

43163	48821	49048	49282	50221	53220	53471
84547	90205	90432	90666	91605	94604	94855
1493	7151	7378	7612	8551	11550	11801
78797	84455	84682	84916	85855	88854	89105
3.17406	3.85437	3.86794	3.88150	3.93202	4.06258	4.07192
6.63595	7.31626	7.32983	7.34339	7.39391	7.52447	7.53381
4.89651	4.92663	4.92779	4.92899	4.93377	4.94868	4.94990
1.73944	2.38963	2.40204	2.41440	2.46014	2.57579	2.58391
54.9	245.3	252.4	259.7	288.5	376.5	383.6
4806.6	4616.2	4609.1	4601.8	4573.0	4485.0	4477.9

4609.0

- 0.1

4484.9

- 0.1

	53547	53823	57623	57885	58122	58497
1	94931	95207	99007	99269	99506	99881
2	11877	12153	15953	16215	16452	16827
3	89181	89457	93257	93519	93756	94131
4	4.07471	4.08468	4.20284	4.20992	4.21622	4.22601
5	7.53660	7.54657	7.66473	7.67181	7.67811	7.68790
6	4.95027	4.95161	4.96968	4.97090	4.97200	4.97373
7	2.58633	2.59496	2.69505	2.70091	2.70611	2.71417
8	385.8	393.5	495.5	502.2	508.3	517.8
9	4475.7	4468.0	4366.0	4359.3	4353.2	4343.7

4359.3

0

58616	58830	59195	59398	59762	62463	63065
100000	100214	100579	100782	101346	103847	104449
17946	17160	17525	17728	18292	20793	21395
92250	94464	94829	95032	95596	98097	98699
4.23452	4.23452	4.24366	4.24866	4.26226	4.31792	4.33031
7.68096	7.69641	7.70555	7.71055	7.72415	7.77981	7.79220
4.96438	4.97527	4.97694	4.97787	4.98044	4.99166	4.99431
2.71658	2.72114	2.72861	2.73268	2.74371	2.78815	2.79789
526.2	535.3	540.4	554.3	614.0	627.9	
520.8	4335.3	4326.2	4321.1	4307.2	4247.5	4233.6
4340.7						

4307.8<sup>3</sup>

+0.1



	63543	64832	65029	65496	65610	65769
1	104927	106216	106413	106880	106994	107153
2	21873	23162	23359	23826	23940	24099
3	99177	<sup>10</sup> 80466	100663	101130	101244	101403
4	433991	436478	436845	437705	437912	438200
5	780180	782667	783034	783894	784101	784389
6	499641	<del>500327</del> 500767	500287	500488	500537	500605
7	280539	<del>282700</del> 282465	282747	283406	283564	283784
8	638.8	<del>674.5</del> 667.8	672.2	682.4	684.9	688.4
9	4222.7	4193.7	4189.3	4179.1	4176.6	4173.1

4176.8

+0.2

	ul	r	culat	<sup>45</sup> r	violet	apart
66246	68229	68827	69095	69427	69855	70058
107630	109613	110211	110479	110811	111239	111442
245.76	266.59	271.57	27425	277.57	281.85	28388
101880	103863	104461	104729	105061	105489	105692
439051	<del>44054</del> 44338	44388	443815	444337	445002	445313
785240	<del>786943</del> 789577	789577	790004	790526	791191	791502
500809	<del>501646</del> 501895	501895	502007	502144	502321	502405
284431	<del>285297</del> 287682	287682	287997	288382	288870	289097
698.7	<del>712.8</del> 753.0	753.0	758.5	765.3	773.9	778.0
4162.8	<del>4148.7</del> 4108.5	4108.5	4103.0	4096.2	4087.6	4083.5

4.24

4.42421

4096.6

7.88610

+0.4

5.01646

2.86964

740.7

4120.8

$H_2$   
center disk      outer disk

	70109	70372	71221	71524	71668	74837
1	111493	111756	112605	112908	113252	116221
2	28439	28702	29551	29854	30198	33167
3	105743	106006	106855	107158	107502	110471
4	4.45391	4.45791	4.47057	4.47500	4.47998	4.52071
5	7.91580	7.91980	7.93246	7.93689	7.94187	7.98260
6	5.02425	5.02533	5.02879	5.03002	5.03142	5.04324
7	2.89155	2.89447	2.90369	2.90687	2.91045	2.93936
8	779.0	784.3	801.1	807.0	813.7	867.7
9	4082.5	4077.2	4060.4	4054.5	4047.8	39918

4082.9  
+0.4

4055.0  
+0.5

$H_2$  Br

	Center	Ring	R	
75075	75660	75931	76030	76158
116459	117044	117315	117414	117542
33405	33990	34261	34360	34488
110789	111294	111565	111664	111792
4.52381	4.53135	4.53480	4.53605	4.53767
7.98570	7.99324	7.99669	7.99794	7.99956
5.04418	5.04648	5.04753	5.04792	5.04841
2.94152	2.94676	2.94916	2.95002	2.95115
874.0	884.6	889.5	891.3	893.6
3987.5	3976.9	3972.0	3970.2	3967.9

3977.6  
+0.7

3968.6  
+0.7



77946  
 (1) 119330  
 (2) 36276  
 (3) 113580  
 (4) 4.55962  
 (5) 8.02151  
 (6)  $\frac{5.05830}{2.96621}$   
 1.7051  
 3936.4

	76930	77188	77481	77765	78132	78324
1	118314	118572	118865	119149	119516	119708
2	35260	35518	35811	36095	36462	36654
3	112564	112822	113115	113399	113766	113958
4	4.54728	4.55045	4.55402	4.55745	4.56184	4.56412
5	8.00917	8.01234	8.01591	8.01934	8.02373	8.02601
6	5.05140	5.05239	5.05352	5.05461	5.05601	5.05674
7	2.95777	2.95995	2.96239	2.96473	2.96772	2.96928
8	907.3	911.9	917.0	922.0	928.4	931.7
9	3954.2	3949.6	3944.5	3939.5	3933.1	3929.8

3934.0  
 +0.9

Hy duck

78445	79075	79573	81575	81972	82347	84776
120129	120459	120897	122899	123356	123731	126160
37075	37405	37843	39845	40302	40677	43106
114379	114709	115147	117149	117606	117981	120410
4.56908	4.57293	4.57799	4.60037	4.60533	4.60935	4.63454
8.03097	8.03482	8.03988	8.06226	8.06722	8.07124	8.09643
5.05835	5.05760	5.06125	5.06874	5.07043	5.07181	5.08066
2.97262	2.97522	2.97863	2.99352	2.99679	2.99943	3.01577
938.9	944.5	952.0	985.2	992.6	998.7	1037.0
3922.6	3917.0	3909.5	3876.3	3868.9	3862.8	3824.5

3917.8  
 +0.8

3869.9  
 +1.0



	85284	85738
1	126668	127122
2	43614	44068
3	120918	121372
4	463963	464412
5	810152	810601
6	508249	508412
7	301903	302189
8	10448	10517
9	38167	38098

3811.0

+1.2

Insufficient  
The revised  
line is  
H (calcium)  
and not  
H $\epsilon$  (hydrogen)

Monday, Dec. 8, 1902

Computation of formulas for computing  
wave lengths for C 13158 measured  
C. S. M. 17.

Centuries of bright H $\beta$ , H $\gamma$ , and revised  
H $\epsilon$  taken as standards.

H $\beta$	83169	16831 = $\gamma'$	4861.5	-520.8 = $\gamma'$
H $\gamma$	100000	37413 = $\gamma''$	4340.7	-891.3 = $\gamma''$
H $\epsilon$	117582		3970.2	

$\log \gamma = 2.716671$	$\log \gamma' = 2.950024$
" $\gamma'' = 4.226110$	$\log \gamma'' = 4.536722$
8.496561	8.413302
-0.6309429	-0.0259001
-520.8 - 0.0309429 c + d = 0	
-891.3 - 0.0259001 c + d = 0	
370.5 - 0.0050428 c = 0	
c = 370.5	2.568788
0.0050428 =	7.702672
	4.866116
	= 7347.1
4.866116	
8.490561	4.866116
3.356677	8.413302
2273.4	3.279418
520.8	1202.7
2794.2 = d	891.3
	2794.2 = d

Formulas

a = 83169  
c = 73471  
d = 3.44626  
 $\gamma_0 = 4861.5$

Dec. 8, 1902.

$a = 83169$

$c = 73471$

$d = 344626$

$\lambda_0 = 4861.5$

Rem. H<sub>2</sub>

"50"

rem. H<sub>2</sub>

"39"

Rem. H <sub>2</sub>	"50"	rem. H <sub>2</sub>	"39"	
117582	124834	119560	112228	125141
34413	41665	26391	29059	41972
107884	115136	109862	102580	115443
453672	461977	456099	446328	462296
798298	806603	800725	790954	806922
503296	506121	504085	501085	506237
295002	300482	296640	289869	300685
891.3	1018.2	925.6	791.9	1015.9
3970.3	3850.3	3835.9	4069.6	3845.6
69.6	3849.0	383	49.2	40.7
0.6	0.9	0.6	0.4	0.9

C13158

Jan. 20, 1903

Derivation of formula for C13151, memo. in h.b. 17, p. 49.

Centers of dark H<sub>3</sub>, H<sub>4</sub> and H<sub>2</sub> used as standards.

Memo. Diff.

$H_3 \quad 80768 \quad 19232 = \gamma'$

$H_4 \quad 100000 \quad 39206 = \gamma''$

$H_2 \quad 119974$

$4861.5 - 520.8 = \gamma'$

$4340.7 - 891.3 = \gamma''$

$3970.2$

$\log \gamma' = 2.716671$

$\log \gamma'' = 2.950024$

$\log \gamma' = 4.284024$

$\log \gamma'' = 4.593352$

$8.432647$

$8.356672$

$-0.0270799$

$-0.0227338$

$-520.8 - 0.0270799c + d = 0$

$-891.3 - 0.0227338c + d = 0$

$370.5 - 0.0043461c = 0$

$c = \frac{370.5}{0.0043461} =$

$\frac{2.568788}{7.638490}$

$\frac{4.930688}{4.930688} \log c$

$c = 85249$

$4.930688$

$8.432647$

$3.363335$

$2308.5$

$520.8$

$2829.3 = d$

$4.930688$

$8.356672$

$3.287360$

$1838.0$

$891.3$

$2829.3 = d$

$a = 80768$

$c = 85249$

$d = 345168$

$\lambda_0 = 4861.5$



Jan. 20, 1903.  
 Trial of the preceding formula  
 $a = 80768$   
 $ck = 86249$   
 $d = 3.45768$   
 $\lambda^0 = 4861.5$

1 (4)	119974	60199	60934	61365	61692
2) $\mu a$	39206	-20569	-19834	-19403	-19076
(3) (2) + c	124455	64880	65415	<del>65846</del>	<del>66183</del>
(4) $\log(2)$	4.59335	4.31321	4.29741	4.28787	4.28049
(5) $d + \mu$	8.04503	7.76489	7.74909	7.73955	7.73217
(6) $\log(3)$	<u>5.09501</u>	<u>4.81077</u>	<u>4.81568</u>	<u>4.81522</u>	<u>4.82068</u>
(7) (5) - (6)	2.95002	2.95412	2.93341	2.92433	2.91149
(8)	891.3	-899.7	<del>-898.3</del>	<del>-840.0</del>	-815.6
	<u>4861.5</u>	<u>3961.8</u>	<u>5699.8</u>	<u>833.7</u>	<u>5677.1</u>
	3970.2	5761.2	5719.3	5695.2	5677.1

✓

66465	67154	68764	75978	80060	<del>80468</del>	85467
-14303	-13614	-12004	-83458	-708		+ 4699
<del>66465</del>	<del>67154</del>	<del>68764</del>	<del>75978</del>	<del>80060</del>		89948
415543	413399	407933	3.25285	2.85003		3.67201
7.60711	7.58567	7.53101	6.70453	6.30171		7.12369
4.85093	4.85513	4.86478	4.92147	4.92707		4.95399
2.75618	2.73054	2.66623	1.78306	1.37464		2.16970
-570.4	-537.7	-463.7	-60.7	-23.7		147.8
5431.9	5399.2	5325.2	4922.2	4885.2		<del>4714.3</del>
						4713.7

1)	87132	87915	88591	90489	91225	92102
2	+ 6364	+ 7147	+ 8123	+ 9721	10457	11334
3	91613	92396	93372	94970	95706	96583
4	3.80873	3.85412	3.90972	3.98771	4.01941	4.05438
5	7.25541	7.30580	7.36140	7.43939	7.47109	7.50606
6	4.96196	4.96565	4.97022	4.97759	4.98094	4.98490
7	2.29345	2.34015	2.39118	2.46180	2.49015	2.52116
8	196.5	218.8	246.1	289.6	309.1	332.0
	4665.0	4642.7	4615.4	4571.9	4552.4	4529.5

92867	94027	94456	95715	96730	97885	98590
12.099	132.59	13688	15147	15962	17117	18122
97348	98508	98937	100396	101211	102366	103371
4.08275	4.12251	4.13634	4.18033	4.20309	4.23343	4.25821
7.53443	7.57419	7.58802	7.63201	7.65477	7.68511	7.70989
4.98833	4.99347	4.99536	5.00172	5.00523	5.01016	5.01440
2.54610	2.58072	2.59266	2.63029	2.64954	2.67495	2.69549
351.6	380.8	391.4	426.9	446.2	473.1	496.0
4509.9	4480.7	4570.1	4434.6	4416.3	4388.4	4365.5



(1)

102220	103447	109349	110695	112067	113481
19232	22709	28581	29927	31299	32718
104481	107958	113830	115176	116548	117962
4.28402	4.35620	4.45608	4.47606	4.49553	4.51472
7.73570	7.80788	7.90776	7.92774	7.94721	7.96640
5.01903	5.03325	5.05628	5.06136	5.06650	5.07174
2.71667	2.77463	2.85158	2.86638	2.88071	2.89466
520.8	575.1	710.4	735.1	759.8	784.6
4340.7	4266.4	4151.1	4126.4	4101.7	4076.9

125098
44330
129579
4.64670
8.09838
5.11253
2.98585
967.9
3893.6

February 7, 1903

This is incorrect since the reversed line is  $\frac{1}{2}$  (calculated) instead of  $\frac{1}{2}$  (observed) could be much more accurately measured.

$$\begin{aligned} H\beta & 83054 \\ H\gamma & 10000 \\ H\delta & 117542 \end{aligned} \quad \begin{aligned} 16946 &= x' \\ 34488 &= x'' \end{aligned}$$

$$\log x' = 4.5376680$$

$$\log y' = 2.850024$$

$$\begin{aligned} & 4.537668 \\ & 8.412356 \\ & 0.0258438 \end{aligned}$$

$$-520.8 - 0.0307329c + d = 0$$

$$-891.3 - 0.0258438c + d = 0$$

$$370.5 - 0.0048891c = 0$$

$$\log c = 2.568788$$

$$1.687229$$

$$4.879559$$

$$c = 75781$$

$$\begin{aligned} & 4.879559 \\ & 8.487604 \\ & 3.367163 \end{aligned}$$

$$2329.0$$

$$520.8$$

$$d = 2849.8$$

$$4.879559$$

$$8.412356$$

$$3.291915$$

$$1958.5$$

$$891.3$$

$$d = 2849.8$$

$$\log d = 3.454814$$

Feb 7, 1903.  
Trial of the preceding formula.

$$a = 83054$$

$$c = 75781$$

$$d = 3.45481$$

$$\lambda_0 = 4561.5$$

			$\lambda_0$ reversed		
(1)	117542	83229	83054	119516	719708
(2) $\psi - a$	34488	175	170	36462	36654
(3) $2Hc$	110269	75256	75611	112243	112435
(4) $\log(2)$	4.53767	2.23045	4.56184	4.56412	
(5) $H(4)$	7.99248	5.67785	5.68526	8.01665	8.01893
(6) $\log(3)$	5.04245	4.85056	4.87858	5.05016	5.05090
	2.95003	0.81729	0.80668	2.96649	2.96803
	891.3	6.6	6.4	925.7	929.0
	3970.2	4868.1	4855.1	3938.8	3932.5

$$3923.8$$



Feb. 9, 1903.

C 13195

Considering  $\Delta f$  = original meas. 58497 (reversed line)  
Diff

$$\begin{array}{rcl} \Delta f & 58497 & 83173 \\ \Delta f & 10000 & 16827 = x^1 \\ \Delta f & 117661 & 34488 = x^2 \end{array} \quad \begin{array}{rcl} 4860.5 & 520.8 = y^1 \\ 4340.7 & & \\ 3970.2 & 891.3 = y^2 \end{array}$$

$$\log y^1 = 2.716671$$

$$\log x^1 = 4.226007$$

$$8.490664$$

$$0.0369503$$

$$\log y^2 = 2.950024$$

$$\log x^2 = 4.537668$$

$$8.412356$$

$$0.0258438$$

$$-520.8 - 0.0302803 \quad c+d=0$$

$$-891.3 - 0.0258438 \quad c+d=0$$

$$370.5 - 0.0051065 \quad c = 0$$

$$2.568788$$

$$7.708123$$

$$4.860665$$

$$8.490664$$

$$3.351329$$

$$2245.6$$

$$520.8$$

$$2766.4$$

$$4.860665$$

$$8.412356$$

$$3.273021$$

$$1875.1$$

$$891.3$$

$$2766.4$$

$$d = 3.44191$$

Feb. 9, 1903.

$$a = 83173$$

$$c = 72558$$

$$d = 3.44191$$

(1)

$$117661$$

$$119635$$

(2)

$$34488$$

$$38462$$

(3)

$$107043$$

$$109817$$

(4)

$$4.53767$$

$$4.56184$$

(5)

$$7.97968$$

$$8.00375$$

(6)

$$5.02956$$

$$5.03750$$

(7)

$$2.95002$$

$$2.96025$$

$$891.3$$

$$925.2$$

$$3970.2$$

$$3936.3$$

Feb. 28, 1903

C. 13195

$\frac{H}{3}$  83054  
 $\frac{H}{1}$  157223  
 (calcium)  $\frac{H}{1}$  117542  
~~116760~~  
 $\log y' = 2.716671$   
 $\log x' = 4.229067$   
~~8.457604~~  
 $0.0307329$

$$-520.8 - 0.0307329 c + d = 0$$

$$-892.9 - 0.0258907 c + d = 0$$

$$-774.1 - 0.0048427 c = 0$$

$$a = 2.568788$$

$$7.685076$$

$$4.883700$$

$$c = 66805$$

$$\begin{array}{r}
 4.883692 \\
 8.487604 \\
 3.371296 \\
 2.350.3 \\
 52.8 \\
 28711
 \end{array}$$

$$\begin{array}{r}
 4.883692 \\
 8.413135 \\
 3.296827 \\
 1980.7 \\
 892.9 \\
 2873.6
 \end{array}$$

$$\begin{array}{r}
 4.883700 \\
 8.487604 \\
 3.371304 \\
 2.350.3 \\
 52.8 \\
 2871.1
 \end{array}$$

$$\begin{array}{r}
 4.883700 \\
 8.413135 \\
 3.296835 \\
 1980.7 \\
 892.9 \\
 2878.6
 \end{array}$$

$4861.5$   
 $520.8 = y^1$   
 $4340.7$   
 $892.9 = y^2$   
 $3868.8$   
 $\log y^2 = 2.7508028$   
 $4.537668$   
 $.0360$   
 $2.850803$   
 $4.537668$   
 $8.413135$   
 $0.0258907$

$$-520.8 - 0.0307329 c + d = 0$$

$$-892.9 - 0.0258902 c + d = 0$$

$$372.1 - 0.0048427 c = 0$$

$$\begin{array}{r}
 c = 2.570660 \\
 7.685088 \\
 4.885672
 \end{array}$$

$$c = 76306$$

$$76837$$

$$\begin{array}{r}
 4.885572 \\
 8.487604 \\
 3.373176
 \end{array}$$

$$\begin{array}{r}
 4.885572 \\
 8.413135 \\
 3.298707
 \end{array}$$

$$\begin{array}{r}
 2361.4 \\
 520.8 \\
 2882.2
 \end{array}$$

$$\begin{array}{r}
 4.883700 \\
 8.413135 \\
 3.298707 \\
 1989.3 \\
 892.9 \\
 2882.2
 \end{array}$$

$$d = 3.45972$$



March 24, 1962

$$a = 83054$$

$$c = 76206.76837$$

$$\log d = 3.45972$$

$$\lambda_0 = 4861.5$$

$$C \frac{13195}{13158}$$

(1) $\lambda$	117542	119516	<del>100000</del>
(2) $\lambda - a$	34488	36402	16946
(3) (2) + c	110794	112788	93252
(4) $\log(2)$	4.53767	4.56184	
(5) $d(4)$	7.98739	8.02156	
(6) $\log(3)$	0.04452	0.05218	
(7) (5) - (6)	2.95287	2.96938	
(8) $\log(7)$	8.972	9.019	
(9) $\lambda_0 - 8$	3964.3	3929.6	

66061	66242
-18993	-16812
59844	60025
4.23027	4.22562
7.68999	7.68584
4.77702	4.77833
2.91297	2.90701
-818.4	-807.3
3679.9	5668.8

69129	100000
-13925	16946
62912	93783
4.14380 m	4.22907
6.60352 m	7.68879
4.79873	4.77212
2.80479 m	2.71667
-638.0	520.8
5499.5	4340.7

117542	119516	84385	68369
34488	36462	<del>4331</del>	-14685
111325	113299	78168	62152
4.53767	4.56184	3.12418	4.16687
7.99739	8.02156	6.58390	7.62659
5.04659	5.05423	4.89303	4.79346
2.95080	2.96733	1.69087	2.83313
892.9	927.5	49.1	-681.0
3968.6	3934.0	4812.4	5642.5
"H"	"K"		

63525	22262	63646	65876	66061
-19529	-792	-19408	-17178	-16993
57308		57429	59659	60344
4.29068 m		4.28798	4.23497	4.23027
7.75040 m		7.74770	7.69469	7.68999
4.75821		4.75813	4.77568	4.78042
2.99219 m		2.98957	2.91901	2.90959
-782.2		-976.3	-828.9	-812.1
5843.7		5837.8	5691.4	5673.6

March 30, 1903

Derivation of formula for C/1368 measured  
in C.S.M. 17, 184.

H <sub>B</sub>	83123	4861.5	
H <sub>Y</sub>	100,000	4340.7	-520.8 = y'
normal H	117651	3965.6	-927.7 = y <sup>2</sup>
" L	119611	3933.8	

$\log y' = 2.716671$	$\log y^2 = 2.967408$
$\log y = 4.227295$	$\log x = 4.562150$
8.489376	8.405258
-0.0308586	-0.0254248

$$-520.8 - 0.0308586 c + d = 0$$

$$-927.7 - 0.0254248 c + d = 0$$

$$406.7 - 0.0054338 c = 0$$

$$c =$$

$$2.609488$$

$$\frac{7.735104}{4.874384} \log c$$

$$c = 74883$$

$$\begin{array}{r} 4.874384 \\ 8.489376 \\ \hline 3.363760 \\ 2310.6 \\ \hline 520.8 \\ \hline 2831.6 \end{array}$$

$$\begin{array}{r} 4.874384 \\ 8.405258 \\ \hline 3.279642 \end{array}$$

$$\begin{array}{r} 1903.9 \\ 927.7 \\ \hline 2831.6 \end{array}$$

$$d = 3.45203$$

March 30, 1903

C-1368

$$a = 83123$$

$$c = 74883$$

$$d = 3.45203$$

$$x_0 = 4861.5$$

 $y = \text{microm. reading when } H = 100,000$ 

(1) = y	119611	117651	62841	62640	64453
(2) = y - a	36488	34528			
(3) = (2) + c	111371	109411			
(4) = log(2)	4.56215	4.53817			
(5) = d + (4)	8.01418	7.99020			
(6) = log(3)	5.04677	5.03906			
(7) = 5 - 6	2.96741	2.95114			
(8) = $\log x_0$	927.7	893.6			
(9) = 10 - 8	3933.8	3967.9			

See p. 62 for continuation.



March 30, 1903  
C 13168

$$\begin{array}{rcl}
 H\beta & 83123 & 16877 = \psi^1 \\
 H\gamma & 100000 & 4340.7 \\
 H & 117651 & 34528 = \psi^2 \\
 & & 3968.6
 \end{array}
 \quad
 \begin{array}{rcl}
 & 4861.5 & \\
 & -520.8 = \psi^1 & \\
 & -892.9 = \psi^2 & 
 \end{array}$$

$$\begin{array}{rcl}
 \log \psi^1 & = & 2.716671 \\
 \log \psi^2 & = & 4.538171 \\
 \log \psi^2 & = & 4.538171 \\
 & & 8.412632 \\
 & & -0.0258602
 \end{array}$$

$$-520.8 - 0.0308586c + d = 0$$

$$-892.9 - 0.0258602c + d = 0$$

$$372.1 - 0.0049984c + d = 0$$

$$c = 2.570660$$

$$7.695831$$

$$4.871829$$

$$8.489376$$

$$3.361205$$

$$c = 74444$$

$$2297.2$$

$$520.8$$

$$2818.0$$

$$4.871829$$

$$8.412632$$

$$3.284461$$

$$1925.1$$

$$892.9$$

$$2818.0$$

$$d = 3.44994$$

March 30, 1903  
C 13168

$$a = 83123$$

$$c = 74444$$

$$d = 3.44994$$

$$\lambda_0 = 4861.5$$

	H	K	D			
1 = 4	47657	119611	62841	63640	64453	64211
2 = 4 + 2	34528	36488	54162	64961	55774	
3 = (2) + c	108972	110932	4.30611	4.28966	4.2714	
4 = log(2)	4.53817	4.5625	7.75605	7.73960	7.72108	
5 = d + (4)	7.98811	8.01209	4.73369	4.74005	4.74643	
6 = log(3)	5.03732	5.04506				
(7) = 5 + (6)	2.95079	2.96703	3.02236	2.99965	2.97465	
8 = red. 127	892.9	926.9	-105.28	-99.0	-94.3	
9 = $\lambda_0 - 8$	3068.6	3934.6	5914.3	5860.5	5804.8	

Br. band

centr.				maxi.?				end loc.				revised?			
64738	65965	66526	67133	67340	67781	68412		67781	68412			67781	68412		
- 18385	- 17158	- 16597	- 15990	- 15783	- 15342	- 14711		- 15342	- 14711			- 15342	- 14711		
56059	57286	57847	58454	58661	59102	59733		59102	59733			59102	59733		
426446 n	423447 n	422003 n	420385 n	419819 n	418588 n	416764 n		418588 n	416764 n			418588 n	416764 n		
7.71440 n	7.68441 n	7.66997 n	7.65379 n	7.64813 n	7.63582 n	7.61758 n		7.63582 n	7.61758 n			7.63582 n	7.61758 n		
<u>474865</u>	<u>475805</u>	<u>476228</u>	<u>476681</u>	<u>476835</u>	<u>477160</u>	<u>477621</u>		<u>477160</u>	<u>477621</u>			<u>477160</u>	<u>477621</u>		
2.96575 n	2.92636 n	2.90769 n	2.88698 n	2.87978 n	2.86422 n	2.84137 n		2.86422 n	2.84137 n			2.86422 n	2.84137 n		
- 924.2	- 844.0	- 808.5	- 770.9	- 758.2	- 731.5	- 694.0		- 731.5	- 694.0			- 731.5	- 694.0		
5785.7	5705.5	5670.0	5632.4	5619.7	5599.0	5555.5		5599.0	5555.5			5599.0	5555.5		

Cont. up.

Br. band

centr.				maxi.?				end loc.				revised?			
68576	68976	69258	69336	69439	69697	69844		69258	69336	69439	69697	69844			
- 14547	- 14147	- 13865	- 13787	- 13684	- 13426	- 13279		- 13865	- 13787	- 13684	- 13426	- 13279			
59897	60297	60579	61096	60760	61018	61165		60579	61096	60760	61018	61165			
4.16277 n	4.15066 n	4.14192 n	4.13947 n	4.13621 n	4.12791 n	4.12317 n		4.14192 n	4.13947 n	4.13621 n	4.12791 n	4.12317 n			
7.61271 n	7.60060 n	7.59186 n	7.59150 n	7.58615 n	7.57785 n	7.57311 n		7.59186 n	7.59150 n	7.58615 n	7.57785 n	7.57311 n			
<u>477741</u>	<u>478030</u>	<u>478232</u>	<u>478691</u>	<u>478362</u>	<u>478546</u>	<u>478650</u>		<u>478232</u>	<u>478691</u>	<u>478362</u>	<u>478546</u>	<u>478650</u>			
2.83530 n	2.82030 n	2.80954 n	2.80549 n	2.80253 n	2.79239 n	2.78661 n		2.80954 n	2.80549 n	2.80253 n	2.79239 n	2.78661 n			
- 684.4	- 666.1	- 645.0	- 639.0	- 634.6	- 620.0	- 611.8		- 645.0	- 639.0	- 634.6	- 620.0	- 611.8			
5545.9	5542.6	5506.5	5500.5	5496.1	5481.5	5473.3		5506.5	5500.5	5496.1	5481.5	5473.3			

5"

69336  
 - 13787  
 60657  
 4.13947 n  
 7.58941 n  
4.78288  
 2.80653 n  
 - 640.5  
 5502.0



Br. band			Br. line?		Br. line?		"6"
70149	70485	70825	71159	71722	71888	72371	
-12974	-12638	-12298	-11964	-11401	-10935	-10782	
61470	61806	62146	62480	63043	63509	63692	
4.11307	4.10168	4.08983	4.07788	4.05694	4.03882	4.03149	
7.56301	7.55162	7.53977	7.52782	7.50688	7.48876	7.48143	
4.78866	4.79103	4.79341	4.79574	4.79964	4.80284	4.80408	
2.77435	2.76059	2.74636	2.73208	2.70724	2.68592	2.67735	
-574.8	-576.2	-577.6	-579.6	-580.6	-486.2	-475.7	
5456.3	5437.7	5419.1	5401.1	5371.1	5346.7	5337.2	

Br. band			Br. line?		Br. line?		"6"
72512	72700	72942	73169	73310	73678	73706	
-10611	-10423	-10181	-9954	-9808	-9605	-9417	
63833	64031	64263	64490	64636	64839	65027	
4.02576	4.01799	4.00779	3.99800	3.99158	3.98250	3.97381	
7.47570	7.46793	7.45773	7.44794	7.44152	7.43244	7.42385	
4.80505	4.80632	4.80796	4.80948	4.81047	4.81184	4.81309	
2.67065	2.66161	2.64977	2.63845	2.63105	2.62056	2.61876	
-468.4	-458.8	-446.4	-435.0	-427.6	-417.4	-408.1	
5329.9	5320.3	5307.9	5296.5	5289.1	5278.9	5269.6	

width	"8"	B. n. h. u. l.				line "9"	width
73916	74052	74259	74503	74778	74956	75133	
- 9207	- 9071	- 8864	- 8620	- 8345	- 8167	- 7990	
<del>65237</del>	65373	65580	65824	66099	66716	66454	
3.96412 n	3.95766 n	3.94763 n	3.93551 n	3.92143 n	3.91206 n	3.90205 n	
7.41406 n	7.40760 n	7.39757 n	7.38545 n	7.37137 n	7.36469 n	7.35247 n	
4.81449	4.81540	4.81677	4.81838	4.82019	4.82423	4.82252	
2.59957 n	2.59220 n	2.58080 n	2.56707 n	2.55118 n	2.53986 n	2.52997 n	
- 397.7	- 391.0	- 372.2	- 369.0	- 355.8	- 346.6	- 338.8	
5259.2	5252.5	5233.7	5230.5	5217.3	5208.1	5200.3	
		5242.4					

74956  
 - 8167  
 66277  
 3.91206 n  
 7.36200 n  
 4.82136  
 2.54064 n  
 - 347.2  
 5208.1

normal?	center	normal? end to	"8"	reversal	86	
<del>75367</del>	75260	75366	75427	75528	75676	75752
- 7756	- 7859	- 7757	- 7696	<del>7585</del>	- 7447	- 7371
82200	66585	68687	66748	67288	66997	67073
3.8876 n	3.89537 n	3.88769 n	3.88627 n	3.88053 n	3.87198 n	3.86753 n
7.3398 n	7.34531 n	7.33963 n	7.33621 n	7.33256 n	7.32192 n	7.31747 n
4.81487	4.82338	4.83617	4.82444	4.82794	4.82606	4.82655
2.42473 n	2.52193 n	2.50276 n	2.51177 n	2.50462 n	2.49586 n	2.49092 n
- 265.7	- 332.6	- 318.4	- 324.9	<del>319.6</del>	- 313.2	- 309.7
5127.4	5194.1	5177.7	5186.4	5183.5	5174.7	5171.2

75366  
 - 7757  
 66787  
 3.88769 n  
 7.33963 n  
 4.82404  
 2.51559 n  
 - 327.8  
 5189.3



<i>ab</i>	<i>ab</i>	<i>"b" dark</i>	<i>Br. band</i>	<i>Cent.</i> <i>dk. space</i>
76060	76202	76342	76538	76771
- 7063	- 6921	- 6781	- 6545	- 6352
67381	67523	68102	67859	68092
3.84899	3.84017	3.83129	3.81866	3.80291
7.29893	7.29011	7.28332	7.26850	7.25285
<u>4.82854</u>	<u>4.82945</u>	<u>4.83316</u>	<u>4.83161</u>	<u>4.83310</u>
2.47039	2.46066	2.45016	2.43689	2.41975
- 295.4	- 288.8	- 281.9	- 273.5	- 262.9
5156.9	5150.3	5143.4	5135.0	5124.4

76342  
- 6781  
67663

<i>ad</i>	<i>2?</i>	<i>Br. band</i>	<i>Cent.</i>	<i>Violet</i>
78774	79093	79256	79423	79632
- 4349	- <del>4030</del>	- 3867	- 3700	- 3791
70095	70414	70577	70744	70953
3.63848	3.60530	3.58737	3.56820	3.54295
7.08842	7.05524	7.03731	7.01814	6.99289
<u>4.84569</u>	<u>4.84766</u>	<u>4.84866</u>	<u>4.84969</u>	<u>4.85097</u>
2.24273	2.20758	2.18866	2.16845	2.14192
- 174.9	- 161.3	- 154.4	- 147.4	- 138.6
5036.4	5022.8	5015.9	5008.9	5000.1

Coch. sp.?

			red	$\lambda$	Br. band cent.
79990	80497	81102	81121	81404	81567
			-2002	-1719	-1556
			72442	72725	72888
			3.30146m	3.23528m	3.19201m
			6.75140m	6.68522m	6.64195m
			<u>4.85799</u>	<u>4.86168</u>	<u>4.86266</u>
			1.89141m	1.82354m	1.76929m
			-77.9	-66.6	-58.8
			✓ 4439.4	4928.1	4920.3

$\lambda$	red	Br. map?	$\lambda$	cent.
81742	81962	82117	82467	82768
-1381	-1261	-1006	-656	-355
73063	73183	73438	73788	74089
3.14019m	3.10072m	3.00260m	2.81690m	2.58023m
6.59013m	6.55066m	6.45254m	6.26684m	6.00017m
4.86370	4.86441	4.86592	4.86789	4.86975
1.72643m	1.68625m	1.58662m	1.39885m	1.13042m
-53.3	-48.6	-38.6	-25.1	-13.5
4914.8	4910.1	4900.1	4886.6	4875.0



$\lambda\beta$	violet	$\lambda\beta$ dark	"15"			
mag.		center	violet			
83510	83726	83842	84010	84571	84685	84824
+ 387	603	719	887	1448	1562	1701
74831	75047	75163	75331	75892	76006	76145
2.58771	2.78032	2.85673	2.94792	3.16077	3.19368	3.23070
<del>6.03765</del>	6.23026	<del>6.30667</del>	<del>6.39786</del>	<del>6.61071</del>	6.64362	6.68064
4.87408	4.87533	4.87600	4.87697	4.88020	4.88085	4.88164
1.16357	1.34493	1.43067	1.52089	1.73061	1.76277	1.79900
14.6	22.1	27.0	33.2	53.8	57.9	63.0
4846.9	4839.4	4834.5	4828.9	4807.7	4803.6	4798.5

$\lambda\beta$	$\lambda\beta$ dark	$\lambda\beta$ dark	$\lambda\beta$ dark	$\lambda\beta$ dark	$\lambda\beta$ dark	$\lambda\beta$ dark
mag.						
85794	87011	88103	88350	88636	88775	89640
2071	3888	4980	5177	5513	5852	6517
76515	78332	79424	799621	79957	8.80296	80961
3.31618	3.58973	3.69723	3.71408	3.74139	3.76730	3.81405
6.76612	7.03967	7.14717	7.16402	7.19133	7.21724	7.26399
4.88375	4.89394	4.89925	4.90003	4.90286	4.90469	4.90828
1.88237	2.14573	2.24722	2.26399	2.28847	2.31275	2.35571
76.3	139.9	176.7	183.6	194.3	205.5	226.8
4785.2	4721.6	4684.8	4677.9	4667.2	4666.0	4634.7

~~1364~~  
~~8241~~  
~~82885~~  
~~3.91578~~  
~~7.36592~~  
~~4.91743~~  
~~2.44849~~  
~~280.9~~  
~~4580.6~~

centre	n?	violet	"21"		
89968	90027	90317	90340	90631	90983
6845	6904	7194	7217	7508	7860
81289	81348	81638	81661	81952	82304
3.83537	3.83910	3.85697	3.85836	3.87552	3.89542
7.28531	7.28904	7.30691	7.30830	7.32546	7.34536
<u>4.91003</u>	<u>4.91035</u>	<u>4.91189</u>	<u>4.91201</u>	<u>4.91356</u>	<u>4.91542</u>
2.37528	2.37869	2.39502	2.39629	2.41190	2.42994
237.3	239.2	248.3	249.1	258.2	269.1
4624.2	4622.3	4613.2	4612.4	4603.3	4592.4
Br band					
91504	94976	94642	91008	91364	91843
8381	11853	11519	7885	8241	8720
82825	86297	85963	82329	82685	83164
3.92330	4.07383	4.06141	3.89680	3.91598	3.94052
7.37324	7.52377	7.51135	7.34674	7.36592	7.39046
<u>4.91816</u>	<u>4.93600</u>	<u>4.93431</u>	<u>4.91555</u>	<u>4.91743</u>	<u>4.91994</u>
2.45508	2.58777	2.57704	2.43119	2.44849	2.47052
285.2	387.9	377.6	269.9	280.9	295.5
4576.3	4473.6	4483.9	4591.6	4580.6	4566.0

"25"						Br band	
centre	n?	violet	Ok line	Ok line	Br band	Br band	
94309	95437	95583	95757	96711	97142	97416	
18186	12314	12460	12836	13588	14019	14293	
85630	86758	86904	87280	88032	88463	88737	
4.09040	4.09552	4.10843	4.13316	4.14672	4.15512		
7.54034	7.54546	7.55837	7.58310	7.59666	7.60506		
<u>4.93831</u>	<u>4.93904</u>	<u>4.94091</u>	<u>4.94464</u>	<u>4.94676</u>	<u>4.94810</u>		
2.60203	2.60642	2.61746	2.63846	2.64990	2.65696		
400.0	404.0	414.4	435.0	446.6	453.9		
4461.5	4457.5	4447.1	4426.5	4414.9	4407.6		
Br band							
94830	94334	93890	93415	92883	91633	9161	
11707	11211	10767	10292	9460	8510	10038	
86151	85655	85211	84736	83904	82954	84482	
4.06845	4.04964	4.03209	4.01250	3.97589	3.92993	4.00165	
7.51839	7.49958	7.48203	7.46244	7.42583	7.37987	7.45159	
<u>4.93526</u>	<u>4.93275</u>	<u>4.93050</u>	<u>4.92807</u>	<u>4.92378</u>	<u>4.91880</u>	<u>4.92676</u>	
2.58313	2.56683	2.55153	2.53437	2.50205	2.46103	2.52483	
382.9	368.8	356.1	342.3	317.7	289.1	334.8	
4478.6	4492.7	4505.4	4519.2	4543.8	4572.4	4526.7	



	red	h?	$\frac{H}{V}$ center	r?	violet
97628	99237	99746	100000	100274	100650
14505	16114	16623		17151	17527
88949	90558	91067		91585	91971
4.16152	4.20720	4.22071		4.23429	4.24371
7.61146	7.65714	7.67065		7.68423	7.69365
4.94914	4.95693	4.95936		4.96187	4.96365
2.66232	2.70021	2.71129		2.72236	2.73000
459.5	501.4	514.4		527.7	537.0
4402.0	4360.1	4347.1	4340.7	4333.8	4324.5

F.H. in hand		
97891	98161	98448
14768	15038	15325
89212	89482	89769
4.16932	4.17719	4.18540
7.61926	7.62713	7.63534
4.95042	4.95174	4.95313
2.66884	2.67539	2.68221
466.5	473.6	481.1
4394.9	4387.9	4380.4

$\frac{H}{V}$ dark center	violet	Cont. spec.?			Cont. alk spectral absorption
100863	101071	101088	101740	102454	102813
17740	17948		18617		19690
92184	92392		93061		94134
4.24895	4.25402		4.26991		4.29425
7.69889	7.70396		7.71985		7.74417
4.96466	4.96563		4.96877		4.97375
2.73423	2.73833		2.75108		2.77044
542.2	547.4		563.7		589.4
4319.3	4314.1		4297.8		4272.1

Br. band					
red	Br. band	Br. band	Br. band	Br. band	Br. band
103150	103491	103690	104150	104577	104781
20027	20368	20567	21027	21474	21658
94471	94812	95011	95471	95918	96102
4.30162	4.30895	4.31317	4.32278	4.33191	4.33562
7.75156	7.75889	7.76311	7.77272	7.78185	7.78566
4.97530	4.97686	4.97777	4.97987	4.98190	4.98273
2.77626	2.78203	2.78534	2.79285	2.79995	2.80283
597.4	605.4	610.0	620.7	630.9	635.1
4264.1	4256.1	4251.5	4240.8	4238.6	4226.4

Br. band					
red	Br. band	Br. band	Br. band	Br. band	Br. band
104914	105151	105707	106416	107161	107789
21791	22028	22628	23293	24038	24666
96235	96472	97072	97737	98482	99110
4.33828	4.34298	4.35465	4.36723	4.38090	4.39210
7.78822	7.79292	7.80459	7.81717	7.83084	7.84204
4.98333	4.98440	4.98709	4.99086	4.99336	4.99612
2.80489	2.80852	2.81750	2.82711	2.83748	2.84692
638.1	643.5	656.9	671.6	687.8	701.3
4223.4	4218.0	4204.6	4189.9	4173.7	4151.6



Br.	dk	H <sub>δ</sub>	centre	br. line?	br. line?
108699	109281	109706	110013	112606	111097
25576	26158	26583	26890	27483	27974
100020	100602	101027	101334	101927	102418
440783	441760	442460	442959	443906	444675
785777	786754	787454	787953	788900	789669
5.00009	5.00261	5.00444	5.00663	5.00829	5.01037
2.85768	2.86493	2.87010	2.87329	2.87871	2.88632
720.6	732.7	741.5	750.6	759.8	769.7
4140.9	4128.8	41200	41109	4102.7	4091.8

H<sub>δ</sub> measured

centre	br. line?	br. line?
110412	110768	110939
27289	27645	27816
101733	102089	102260
443599	444162	444429
788593	789156	789423
5.00746	5.00998	5.00971
2.87847	2.88158	2.88452
757.6	761.3	766.5
4103.9	4100.2	4095.0

violet	centre	br. line?	br. line?
111257	111495	111711	111838
28128	28372	28588	29715
102572	102816	103032	104159
444914	445289	445618	447298
788908	790283	790612	792292
5.05143	5.05237	5.05320	5.05451
2.88765	2.85046	2.85292	2.86541
708.7	708.7	712.7	733.5
4157.4	4152.8	4148.8	4122.0
7.87908	7.90283	7.90612	7.92292
5.01103	5.01206	5.01297	5.01770
2.88805	2.89077	2.89315	2.90522
772.8	777.6	781.9	803.9
4088.7	4083.9	4079.6	4057.6

"39"

centre	br. line?	br. line?
112971	113150	113150
29848	30027	30027
104292	104471	104471
447492	447751	447751
792486	792745	792745
5.05802	5.05869	5.05869
2.86684	2.86876	2.86876
735.9	739.2	739.2
4125.6	4122.3	4122.3
7.92292	7.92486	7.92745
5.01825	5.01899	5.01899
2.90661	2.90846	2.90846
806.5	810.0	810.0
4055.0	4051.5	4051.5

red	He br.		Sep. 61			
	normal density?		cubic	remark	n?	weight
116763	116990	117102	117402	117651	117836	118188
33640	33867	33979	34279	34528	34713	35075
108084	108311	108423	108723	108972	109157	109519
4.52686	4.52978	4.53121	4.53503	4.53817	4.54049	4.54500
7.97680	7.97972	7.98115	7.98497	7.98811	7.99043	7.99494
5.03377	5.03467	5.03512	5.03632	5.03732	5.03805	5.03949
2.94303	2.94505	2.94603	2.94865	2.95079	2.95238	2.95545
877.1	881.1	883.1	888.5	892.9	896.1	902.5
3984.4	3980.4	3978.4	3973.0	3968.6	3965.4	3959.0

Intermed. density						
113654	114188	114698	115217	115726	116078	116157
30531	31065	31575	32094	32603	32956	33436
104975	105509	106019	106538	107047	107399	107880
4.48474	4.48227	4.48934	4.50642	4.51326	4.51792	4.52421
7.93468	7.94221	7.94928	7.95636	7.96320	7.96786	7.97415
5.02109	5.02229	5.02539	5.02750	5.02958	5.03100	5.03294
2.91359	2.91892	2.92389	2.92886	2.93362	2.93866	2.94121
819.6	829.7	839.2	848.9	858.3	864.7	873.4
4041.9	4031.8	4022.3	4012.4	4003.2	3996.8	3988.1

He dark	He		Sep. 61			
	cubic	weight	red	n?	cubic	remark
118507	118877	118945	119215	119391	119611	119845
35384	35756	35822	36092	36268		36722
109828	110200	110266	110536	110712		111166
4.54881	4.55335	4.55415	4.55741	4.55952		4.56493
7.99875	8.00329	8.00409	8.00735	8.00946		8.01487
5.04171	5.04218	5.04245	5.04350	5.04420		5.04577
2.95704	2.96111	2.96164	2.96385	2.96526		2.96890
905.8	914.3	915.5	920.1	923.1		930.9
3955.7	3947.2	3946.0	3941.4	3938.4		3930.6



violet	K dash		centib.			
	centi	violet				
119862	120426	120985	121425	121948	122480	122945
36739	37303	37832	38302	38825	39357	39822
111183	111747	112276	112746	113269	113801	114266
4.56513	4.57174	4.57786	4.58322	4.58911	4.59502	4.60012
8.01507	8.02168	8.02780	8.03316	8.03905	8.04496	8.05006
5.04604	5.04824	5.05028	5.05210	5.05411	5.05614	5.05791
2.96903	2.97344	2.97752	2.98106	2.98494	2.98882	2.99215
931.1	940.7	949.6	957.3	965.9	974.6	982.1
39304	3920.8	3911.9	3904.2	3895.6	3886.9	3879.4

K <sub>g</sub>		B <sub>m</sub>	"50"			K <sub>g</sub> for?
123137	123433	124069	124530	124829	125141	125695
40814	40310	40946	41407	41706	42018	42572
114458	114754	115390	115851	116150	116462	117016
4.60221	4.60541	4.61221	4.61707	4.62020	4.62344	4.62912
8.05215	8.05535	8.06215	8.06701	8.07014	8.07338	8.07906
5.06864	5.05977	5.06217	5.06390	5.06502	5.06619	5.06824
2.99351	2.99558	2.99998	3.00311	3.00512	3.00719	3.01082
985.2	989.7	1000.0	1007.2	1011.9	1016.7	1025.2
3876.3	3871.6	3861.5	3854.3	3849.6	3844.8	3836.3

$H_0$	$H_1$	$H_2$
126179	126640	127152
43056	43517	44029
117500	117961	118473
4.63403	4.63866	4.64374
8.08397	8.08860	8.09368
5.07004	5.07173	5.07362
3.01393	3.01687	3.02006
1032.6	1039.6	1047.3
3828.9	3821.9	3814.2

$H_1$	$H_2$
128776	120701
45853	47778
120297	122222
4.66137	4.67923
8.11131	8.12917
5.08026	5.08626
3.03105	3.04202
1074.1	1101.6
3787.4	3759.9

April 14, 1903

C 13158.

$\frac{d}{dt}$   
#

8369 16831 =  $\gamma'$   
100,000  
117582 34413 =  $\gamma''$

7861.5 - 520.8 =  $\gamma'$

4340.7 - 892.9 =  $\gamma''$   
3968.6

$\log \gamma'$   
 $\log \gamma''$

$\frac{41}{1.1}$

$\log \gamma' = 2.950803$

$\log \gamma'' = 4.536722$

8.414081

- 0.0259466

$$- 520.8 - 0.0309429c + d = 0$$

$$- 892.9 - 0.0259466c + d = 0$$

$$372.1 - 0.0049963c = 0$$

$$c = 2.570660$$

$$7.698648$$

$$4.872812 \quad c = 74475$$

$$4.872012$$

$$8.490561$$

$$3.362573$$

$$2304.5$$

$$520.8$$

$$2825.3 = d$$

$$4.872012$$

$$8.414081$$

$$3.286093$$

$$1932.4$$

$$892.9$$

$$2825.3$$

$$\log d = 3.45106$$



April 14, 1903.

C13158.

$$\begin{aligned}
 a &= 83169 \\
 c &= 74475 \\
 \log d &= 3.46706 \\
 p &= 4861.5
 \end{aligned}$$

117582	119560	64320	63525
34413	36391	-18849	-19644
108888	110866	55626	54831
4.53672	4.56099	4.29529 <sub>m</sub>	4.29323
7.98778	8.01205	7.72635 <sub>m</sub>	7.74429
<u>5.03698</u>	<u>5.04479</u>	<u>4.74528</u>	<u>4.73903</u>
2.95080	2.96726	2.98107 <sub>m</sub>	3.00526
8929	927.4	-957.3	1012.8
3968.6	3934.1	5818.8	5874.3

+1.0

+1.8

+4.2

+4.0

"50"

124633	124834	125141	<del>119560</del>	131560
	41668	41972		48391
	116140	116447		122866
	4.61977	4.62296		4.68476
	8.07083	8.07402		8.13582
	<u>5.06498</u>	<u>5.06813</u>		<u>5.08943</u>
	3.00585	3.00889		3.04639
	1013.86	1020.7		1112.7
	3847.89	3840.8		3748.8
		1018.3		
		3843.2		

+1.5

+1.5

+1.9

110652	111346	107004	100693	95445
27483	28177	23835	17524	12276
101958	102652	98310	91999	86751
443906	44489	437722	424363	408906
789012	790095	782828	769469	754012
500842	501137	499260	496378	493827
288170	288958	283568	273691	260185
76.6	775.5	685.0	538.8	399.8
1099.9	4086.0	4176.5	4323.3	4461.7

69033		87993
-14136		+4824
60339		<del>78279</del>
415033	7.13447	3.68341
6.60139	489927	7.13447
475000	2.23520	4.84293
2.82079	171.9	2.29154
66.2	4689.6	+185.7
727.7		<del>5057.5</del>
5523.4		4665.8

90457	84511	79247	75462	73942
7288	1342	-3922	-7707	-9227
81763	75817	70553	66768	65248
3.86261	3.12775	3.57351	3.88687	3.96506
7.31367	6.57881	7.04457	7.33795	7.41612
4.91256	4.87977	4.84852	4.82457	4.81457
2.40111	1.69904	2.19605	2.51388	2.60155
251.8	500.1	-157.0	-326.1	-399.5
4609.7	48115.4	5018.5	5187.6	5261.0

66969	72452	76157
-16200	-10717	-7010
58275	63758	67465
4.20951	4.03007	3.84572
7.66057	7.48113	7.29678
4.76548	4.80452	4.82908
2.89509	2.67660	2.46770
-785.4	-474.9	-293.6
56469	5336.4	5755.1



April 15, 1903

C 13195

Certain lines reduced by formula of  
p. 56, to get correction for  $\lambda$ 's red.  
by formula of p. 56.

$$a = 83054$$

$$c = 76837$$

$$d = 3.45972$$

$$\lambda_0 = 4861.5$$

127122	123356	120459	117044
44068	40302	37405	33990
120905	117139	114242	110827
460412	460533	457293	453135
8.10384	8.06505	8.03265	7.99107
5.08244	5.06870	5.05783	5.04665
3.62140	2.99635	2.97482	2.94642
1050.5	991.6	943.7	883.9
3811.0	3869.9	✓3917.8	3977.6

112908	111493	110816	106994	101346
29854	28439	27757	23940	18292
106691	105276	104594	100777	95129
4.47500	4.45391	4.44337	4.37912	4.26226
7.93472	7.91363	7.90309	7.83884	7.72198
5.02812	5.02233	5.01951	5.00336	4.97831
2.90660	2.89130	2.88358	2.83548	2.74367
806.5	778.6	764.9	684.7	554.2
4055.0	4082.9	4096.6	4176.8	4307.3

99269	94604	90432	81436	75562
16215	11550	7378	- 1618	- 7492
93052	88387	84215	75219	69345
4.20992	4.06258	3.86794	3.20898 <sup>m</sup>	3.87460 <sup>m</sup>
7.66964	7.52230	7.32766	6.66870 <sup>m</sup>	7.33432 <sup>m</sup>
4.96873	4.94639	4.92539	4.87633	4.84102
2.70091	2.57591	2.40227	1.79237 <sup>m</sup>	2.49330 <sup>m</sup>
502.2	376.6	252.5	- 620.0	- 311.4
4359.3	4484.9	4609.0	5481.5	5172.9
			4923.8	

Oct. 1, 1953

Thursday

Derivation of a formula for line  $P$  for  $\lambda$   
 than  $H\beta$ , using  $H\beta$ ,  $H\gamma$ , and  $H\delta$ , determined  
 by Campbell for center of  $H\alpha$  band which  
 appears also to have been measured on  $C$   
 13158.

5523

69033  $\psi' = -14136$  $H\beta$ 

83169

 $H\gamma$ 10000  $\psi' = -16831$ log  $\psi'$ 

55230

4341 4862

4341

 $\psi' = -1182$  $\psi' = -521$





