

A P P E N D I X I.

ON THE CORRECTIONS

OF

BOUVARD'S ELEMENTS OF THE ORBITS

OF

JUPITER AND SATURN,

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GREENWICH OBSERVATIONS, 1868.

[A]

ADVERTISEMENT BY THE ASTRONOMER ROYAL.

The following investigation of the correction of Bouvard's Elements of the Orbits of Jupiter and Saturn was made by Mr. Breen, under the sanction and at the expense of the Royal Society.

It was judged to be desirable that an investigation of this character should be published rather in the Greenwich Observations than in the Philosophical Transactions. An arrangement to this effect was made between the Board of Visitors of the Royal Observatory and the President and Council of the Royal Society ; and, by instruction of the Board of Visitors, the investigation is printed as Appendix to the Greenwich Observations.

G. B. AIRY.

E R R A T A.

Page 17, 1844, October 8, *for* 10463 *read* 104363.
Page 18, 1849, February 18, *for* 1·15451 *read* 1·15877.
for 0·06449 *read* 0·06023.
1849, March 12, *for* 5424 *read* 5355.
for 266034 *read* 391239.
for 1·08180 *read* 1·11428.
for 0·09020 *read* 0·05772.
1849, April 2, *for* 7222 *read* 7145.
for 267626 *read* 367501.
for 1·02248 *read* 1·04887.
for 0·08152 *read* 0·05513.
1850, March 10, *for* 7·25 *read* 17·25.
Page 19, 1854, October 29, *for* 367505 *read* 387505.
1856, November 16, *for* 2·54 *read* 2·51.
Page 20, 1862, April 22, *for* - 65110 *read* + 160296.
for 1·10903 *read* 1·05146.
for 0·11297 *read* 0·10357.
The final results are corrected for these changes.

ON THE CORRECTIONS OF BOUVARD'S ELEMENTS OF JUPITER AND SATURN,

(PARIS, 1821,)

By HUGH BRENN, Esq.,

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COMMUNICATED TO THE ROYAL SOCIETY BY PROFESSOR G. G. STOKES, Sec. R. S.

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The Second Edition of the tables of Jupiter and Saturn, which was published by M. Bouvard in 1821, is the authority from which the places of these Planets given in the improved Berlin Ephemeris and Nautical Almanac are at present derived. In their construction M. Bouvard used the observations made at the Greenwich and Paris Observatories from 1747 to 1814, and, in addition, the tables are corrected for an important theoretical error discovered since the publication of the First Edition of 1808. The comparisons, however, with recent observations show that their errors are so considerable that an investigation of the elements from the ancient observations in the Greenwich Planetary Reductions from 1750 to 1830, its continuation from 1831 to 1835 (Appendix to the Greenwich Observations for 1864), and the results of the tabular differences at the Royal Observatory from 1836 to 1865, would be a valuable improvement in astronomy. The present work, which has been undertaken for this purpose, with the sanction of the Royal Society, is founded exclusively on the foregoing series of Greenwich Observations (1750 to 1865), throughout which period the tables of Bouvard (1821) have been made use of. In the Greenwich Planetary Reductions from 1750 to 1830 the Astronomer Royal has, however, adopted a Mass of Jupiter different from that of Bouvard, and in the case of the formation of the Tabular Places of Saturn the correction arising from this alteration is explained in the Introduction to the Greenwich Planetary Reductions, page XXXI. The results of this increased value in the perturbations of Saturn have been calculated and applied to the tabular comparisons of the Berlin Ephemeris (1831 to 1833) and Nautical Almanac (1834 to 1865), in order to render all the work identical with the series from 1750 to 1830. For Jupiter the results derived from Bouvard's tables have been adopted without alteration.

I will now proceed with the formation of the Equations of Condition.

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AXIS MAJOR, ECCENTRICITY, EPOCH, AND LONGITUDE OF PERIHELION.

Tabular values of δL and δR have been calculated by formulæ analogous to those given in my paper in the Corrections of the Elements of Venus (Memoirs of the Royal Astronomical Society, Vol. XVIII., page 105), and have been substituted in the Equations of the Greenwich Planetary Reductions, &c., neglecting the factors of the Earth's Heliocentric Errors, which, in the case of Jupiter and Saturn, are so small that it has not been thought of sufficient importance to reduce the solar tables of Carlini, used in the Greenwich Planetary Reductions and Nautical Almanac, to the improved tables of Le Verrier (Annals of the Paris Observatory, Vol. IV.), which were first introduced in the latter publication in 1864.

The Equations of Condition thus formed are given in the following tables, and the weights are adopted as follows :—

$$\sqrt{\text{No. of observations in Group}} \times \text{Coefficient of } \delta L.$$

The Equations of Condition, multiplied by the above weights, have been solved by the method of *Minimum Squares*. This laborious work has received a careful examination.

NODE AND INCLINATION.

The errors in Heliocentric E.P.D. have been extracted from the publications before mentioned. In the case of Saturn, however, the error of Bouvard's Table XLII., discovered by Professor Adams since the publication of the Greenwich Planetary Reductions 1750 to 1830, has been calculated for each mean group from 1750 to 1851, and applied to the printed results. This correction is given in one of the tables in the Introduction to the Equations. Subsequently to 1851, the accurate Table XLII. has been used in the computations of the Nautical Almanac.

The co-efficients of δI and δN have been computed by the formula :—

$$-\delta E = \frac{\sin 2 \beta}{\sin 2 I} \delta I + \frac{1}{2} \sin 2 \beta \cot (I' - N) (\delta I' - \delta N).$$

Where β = Heliocentric Latitude

$$E = \frac{\pi}{2} - \beta = \text{Heliocentric E.P.D.}$$

I' = Heliocentric Longitude

N = Longitude of Node

I = The inclination of the Orbit to the Ecliptic.

The weights in Heliocentric Latitude are adopted as follows :—

$$\sqrt{\text{No. of observations of N.P.D.}} \times \frac{1}{\text{Coeff. of Error of Geocentric Latitude}};$$

and the Equations, multiplied by these adopted weights, have been solved by the method of *Minimum Squares*.

The effect of $\delta I'$ has been neglected in the equations as being inconsiderable, except in the first equation for Jupiter, in which it has been approximately introduced. In this case the error of the Node is very slightly altered, but in the case of Saturn, where the value of $\delta I'$ is larger, the change in δN will be probably more perceptible.

28, Vansittart Street,

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December 16, 1868.

HUGH BREEN.

EQUATIONS OF CONDITION
FOR THE
ELEMENTS OF JUPITER'S ORBIT
FOR EACH GROUP
FROM
1750 TO 1865.

δa is the Error of the Semi-axis Major, expressed in terms of the Earth's Mean Distance from the Sun.

e is the Error of the Eccentricity.

$\delta \epsilon$ is the Error of the Mean Longitude.

$\delta \pi$ is the Error of the Longitude of the Perihelion.

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1750.		$+ 1115 \delta a + 177877 \delta e + 1'36192 \delta \epsilon - 0'11342 \delta \pi = + 2'91$						1'75
October	29							
December	9	+ 7094	+ 162553	+ 1'24279	- 0'10489	= - 0'08		1'61
1751.								
July	31	- 6495	+ 297830	+ 0'97403	- 0'06033	= - 7'07		1'82
August	30	- 7994	+ 338159	+ 1'06563	- 0'06141	= - 9'40		2'22
October	5	- 7649	+ 390232	+ 1'17977	- 0'06597	= - 6'60		1'57
November	29	+ 200	+ 431478	+ 1'31567	- 0'07427	= - 12'05		2'15
December	31	+ 5422	+ 408484	+ 1'25147	- 0'07167	= - 7'87		2'36
1752.								
February	24	+ 7689	+ 354162	+ 1'04973	- 0'05753	= - 6'69		1'71
September	12	- 6770	+ 390465	+ 0'96532	- 0'03032	= - 5'38		2'82
October	13	- 7832	+ 427727	+ 1'03320	- 0'01060	= - 3'01		2'04
1753.								
January	1	+ 255	+ 509820	+ 1'23829	- 0'01079	= - 1'26		2'13
March	29	+ 7521	+ 405302	+ 0'99876	- 0'00556	= - 4'42		1'71
September	24	- 5226	+ 329523	+ 0'86123	+ 0'03107	= - 0'82		1'54
November	2	- 7238	+ 348718	+ 0'94221	+ 0'04089	= + 1'94		2'20
1754.								
January	31	- 226	+ 422563	+ 1'17177	+ 0'05513	= + 4'59		1'73
December	5	- 7068	+ 190983	+ 0'90850	+ 0'08140	= + 1'60		1'40
1755.								
March	14	- 1799	+ 222474	+ 1'11675	+ 0'10225	= - 2'85		1'22
April	29	- 7039	+ 201168	+ 1'00809	+ 0'09301	= - 1'56		2'20
December	16	- 6350	+ 1051	+ 0'81886	+ 0'08954	= - 1'39		1'88
1756.								
February	22	- 5792	- 30208	+ 1'04064	+ 0'11096	= - 3'57		1'15
April	23	+ 3371	- 23278	+ 1'08631	+ 0'11569	= - 5'21		1'69
May	15	+ 6188	- 21105	+ 1'03699	+ 0'11064	= - 6'93		1'62
1757.								
January	19	- 6582	- 194040	+ 0'87068	+ 0'08502	= - 2'34		1'35
May	5	+ 368	- 271367	+ 1'03277	+ 0'09523	= - 8'09		3'26
	24	+ 3396	- 264977	+ 1'11582	+ 0'09418	= - 7'53		2'96
June	8	+ 5464 δa	- 256347 δe	+ 1'08089 $\delta \epsilon$	+ 0'09131 $\delta \pi$	= - 7'10		3'10

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1757.								
July	6	$+ 7452 \delta a - 241160 \delta e + 0.99878 \delta \epsilon + 0.08362 \delta \pi = - 3.39$						1.52
1758.								
March	1	- 7288	- 355481	+ 0.92757	+ 0.05263	= - 7.43		0.98
April	7	- 7190	- 407372	+ 1.04690	+ 0.05320	= - 10.50		1.55
June	3	- 312	- 456425	+ 1.19105	+ 0.04235	= - 14.58		2.76
	23	+ 3089	- 450411	+ 1.17777	+ 0.04183	= - 13.39		3.45
July	18	+ 6216	- 427578	+ 1.11559	+ 0.03971	= - 13.43		1.64
August	15	+ 7646	- 396288	+ 1.02425	+ 0.03475	= - 12.46		1.83
1759.								
July	9	- 43	- 513206	+ 1.26844	- 0.02624	= - 13.29		3.56
August	13	+ 5417	- 490574	+ 1.20894	- 0.02484	= - 13.00		2.89
September	22	+ 7908	- 434988	+ 1.07153	- 0.02343	= - 13.98		2.10
October	25	+ 7083	- 390322	+ 0.97330	- 0.02550	= - 9.73		1.64
1760.								
August	15	+ 202	- 389792	+ 1.33878	- 0.08678	= - 2.22		2.16
October	18	+ 8039	- 336514	+ 1.15578	- 0.07508	= - 5.95		1.08
1761.								
July	10	- 8388	- 95215	+ 1.15145	- 0.09455	= + 1.83		2.37
August	8	- 6945	- 140201	+ 1.26840	- 0.10640	= - 0.07		2.32
	31	- 3790	- 124300	+ 1.34905	- 0.11705	= + 2.26		2.13
October	5	+ 2675	- 90230	+ 1.35604	- 0.11739	= + 0.96		3.29
November	11	+ 7430	- 52516	+ 1.23643	- 0.10713	= + 1.87		2.77
December	3	+ 8198	- 33721	+ 1.14481	- 0.09961	= - 2.71		2.35
1762.								
January	6	+ 7072	- 150483	+ 1.02897	- 0.09017	= - 4.88		2.49
July	15	- 7659	+ 147974	+ 1.03797	- 0.08647	= + 2.23		0.95
September	6	- 7638	+ 203946	+ 1.22051	- 0.09977	= + 0.71		2.26
October	7	- 3996	+ 222939	+ 1.33345	- 0.10825	= + 0.03		2.13
November	8	+ 2130	+ 219424	+ 1.34815	- 0.11015	= - 1.44		3.29
1763.								
January	5	+ 8009	+ 193965	+ 1.14970	- 0.09410	= - 1.28		3.18
February	19	+ 6671	+ 194590	+ 1.00057	- 0.07947	= + 3.83		0.92
March	7	+ 5571	+ 199578	+ 0.96396	- 0.07516	= + 1.03		1.54
August	2	- 6282 δa	+ 312849 δe	+ 0.96022 $\delta \epsilon$	- 0.05492 $\delta \pi$	= - 0.40		2.04

CORRECTION OF THE ELEMENTS

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1763.								
August	31	— 7851 δa	+ 351272 δe	+ 1'03188 $\delta \epsilon$	— 0'05508 $\delta \pi$	= + 2'16		1'70
October	6	— 7760	+ 404951	+ 1'66836	— 0'05846	= + 0'60		2'69
November	29	— 740	+ 452913	+ 1'29251	— 0'06601	= — 0'60		3'72
1764.								
January	5	+ 5433	+ 430312	+ 1'24449	— 0'05439	= — 3'45		3'54
February	9	+ 7863	+ 390707	+ 1'11477	— 0'05667	= — 7'60		3'67
March	2	+ 7643	+ 368874	+ 1'03457	— 0'05047	= — 5'82		1'96
September	14	— 6632	+ 387265	+ 0'95051	— 0'02351	= — 5'31		0'93
1765.								
January	6	+ 338	+ 505502	+ 1'22520	— 0'00140	= — 8'58		1'72
February	3	+ 5026	+ 477287	+ 1'17134	+ 0'01555	= — 8'43		1'68
March	2	+ 7446	+ 442964	+ 1'08415	+ 0'01514	= — 3'30		1'10
November	12	— 7468	+ 334430	+ 0'9501	+ 0'04912	= — 9'80		1'00
1766.								
February	2	— 480	+ 399491	+ 1'16230	+ 0'06320	= — 10'15		3'26
May	4	+ 7555	+ 294135	+ 0'94300	+ 0'05470	= — 10'67		1'41
December	16	— 7368	+ 163697	+ 0'92324	+ 0'08746	= — 0'30		1'01
1767.								
March	7	— 127	+ 188625	+ 1'11677	+ 0'10703	= — 2'78		1'22
June	11	+ 7341	+ 139492	+ 0'89296	+ 0'08794	= — 1'45		0'98
1768.								
April	5	— 211	— 62558	+ 1'10756	+ 0'11714	= + 6'66		2'44
July	1	+ 7608	— 59570	+ 0'91502	+ 0'10592	= + 0'91		1'01
1769.								
February	8	— 7318	— 236514	+ 0'92175	+ 0'07525	= + 6'43		1'00
May	9	+ 255	— 302246	+ 1'13898	+ 0'09132	= + 6'76		1'23
August	8	+ 7528	— 255765	+ 0'92231	+ 0'06979	= + 9'34		1'40
1770.								
March	16	— 7809	— 349958	+ 0'98113	+ 0'02977	= + 1'96		1'01
June	10	+ 14	— 507350	+ 1'20535	+ 0'03284	= + 3'88		1'75
September	8	+ 7694	— 404540	+ 0'97393	+ 0'02327	= — 1'82		1'41
1771.								
April	17	— 7882	— 414223	+ 1'03193	— 0'02593	= — 2'36		1'01
July	14	— 158 δa	— 508552 δe	+ 1'28211 $\delta \epsilon$	— 0'03553 $\delta \pi$	= — 2'28		2'50

OF THE ORBIT OF JUPITER.

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Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1772.		" " "						
August	31	$+ 2197 \delta a - 357745 \delta e + 1'33688 \delta \epsilon - 0'09231 \delta \pi = - 3'36$						1'24
November	14	$+ 8033 - 280314 + 1'07845 - 0'07645 = - 3'58$						1'41
1773.								
June	30	$- 8357 - 61505 + 1'10238 - 0'09678 = - 0'67$						1'01
September	28	$+ 362 - 59721 + 1'37298 - 0'12009 = + 4'57$						1'25
December	30	$+ 7724 - 26356 + 1'06530 - 0'09390 = + 3'87$						1'37
1774.								
August	10	$- 8334 + 204515 + 1'09798 - 0'08748 = + 7'77$						1'42
November	3	$+ 115 + 263439 + 1'35497 - 0'10667 = + 14'82$						1'25
1775.								
January	28	$+ 7943 + 223042 + 1'08018 - 0'08458 = + 13'11$						1'00
December	9	$+ 229 + 472558 + 1'29805 - 0'05834 = + 5'11$						1'24
1776.								
March	5	$+ 7735 + 384358 + 1'03505 - 0'04445 = + 10'26$						0'99
October	16	$- 7716 + 413260 + 1'00506 + 0'00409 = + 6'37$						1'41
1777.								
January	9	$- 99 + 502662 + 1'22330 + 0'00810 = - 1'95$						1'73
April	6	$+ 7647 + 405407 + 0'98734 + 0'00946 = - 1'17$						1'41
November	17	$- 7447 + 315218 + 0'94553 + 0'05567 = - 1'69$						1'00
1778.								
February	7	$- 437 + 375077 + 1'15462 + 0'07087 = - 7'34$						1'23
May	10	$+ 7488 + 296386 + 0'93824 + 0'06045 = - 5'39$						1'40
December	19	$- 7330 + 136084 + 0'91651 + 0'09019 = - 3'64$						1'01
1779.								
March	12	$0 + 155276 + 1'11293 + 0'11056 = - 7'98$						1'22
1780.								
April	17	$+ 1101 - 95686 + 1'10650 + 0'11777 = - 0'83$						1'22
July	11	$+ 7500 - 89907 + 0'90487 + 0'09035 = + 2'09$						1'00
1782.								
March	16	$- 7563 - 381954 + 0'97448 + 0'02251 = + 6'28$						1'00
June	16	$+ 226 - 489086 + 1'21301 + 0'02608 = + 6'03$						1'75
September	10	$+ 7807 \delta a - 404024 \delta e + 0'99077 \delta \epsilon + 0'01643 \delta \pi = + 0'63$						1'01

GREENWICH OBSERVATIONS, 1868.

[B]

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1783.		$\begin{array}{c} \text{"} \qquad \qquad \qquad \text{"} \qquad \qquad \qquad \text{"} \\ - 7821 \delta a - 402749 \delta e + 1'00526 \delta \epsilon - 0'01165 \delta \pi = + 6'60 \end{array}$						0'99
April	18	- 460	- 498863	+ 1'29120	- 0'04380	= - 2'00		1'25
July	17	+ 7890	- 398122	+ 1'03739	- 0'03849	= - 1'57		1'00
1784.								
May	27	- 8195	- 271837	+ 1'08210	- 0'07860	= - 6'36		1'00
August	24	- 99	- 323645	+ 1'35211	- 0'09922	= - 4'25		1'25
November	20	+ 8021	- 248746	+ 1'08153	- 0'08083	= - 7'27		1'00
1785.								
October	1	- 87	- 12753	+ 1'37359	- 0'12070	= - 2'92		1'25
December	28	+ 7977	+ 4598	+ 1'09168	- 0'09643	= - 5'03		1'00
1786.								
November	7	- 86	+ 301602	+ 1'34884	- 0'10173	= - 1'79		1'25
1787.								
January	31	+ 7950	+ 253541	+ 1'08312	- 0'08122	= - 2'07		1'00
September	28	- 8097	+ 408347	+ 1'07795	- 0'04255	= + 4'09		1'04
December	12	- 98	+ 487722	+ 1'28806	- 0'04971	= + 4'22		1'24
1788.								
March	8	+ 7751	+ 397299	+ 1'03375	- 0'03795	= + 1'27		1'00
October	20	- 7643	+ 405517	+ 1'00457	- 0'00707	= + 7'86		1'41
1789.								
January	14	+ 99	+ 493315	+ 1'21323	+ 0'01737	= - 2'17		1'25
April	9	+ 7657	+ 400976	+ 0'98586	+ 0'01554	= - 4'03		1'73
November	26	- 7514	+ 296586	+ 0'96759	+ 0'04851	= 0'00		1'02
1790.								
February	14	+ 42	+ 349093	+ 1'14691	+ 0'07799	= - 0'97		2'44
May	10	+ 7581	+ 280203	+ 0'93832	+ 0'06658	= - 5'09		2'00
December	20	- 7255	+ 112384	+ 0'90425	+ 0'09165	= - 6'09		1'41
1791.								
March	14	- 339	+ 120870	+ 1'10976	+ 0'11344	= - 8'71		2'99
1792.								
April	14	- 156	- 131790	+ 1'11345	+ 0'11295	= - 10'85		2'13
July	17	+ 7455 δa	- 118386 δe	+ 0'89906 $\delta \epsilon$	+ 0'09014 $\delta \pi$	= - 10'35		1'40

OF THE ORBIT OF JUPITER.

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Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1793.								
February	18	- 7409 δa	- 284725 δe	+ 0.93613 $\delta \epsilon$	+ 0.06487 $\delta \pi$	= - 7.60	1.00	
May	19	+ 400	- 358874	+ 1.15599	+ 0.07631	= - 5.70	1.23	
August	14	+ 7272	- 302669	+ 0.94336	+ 0.05964	= - 1.42	1.00	
1794.								
June	19	- 100	- 500752	+ 1.22609	+ 0.01421	= + 1.94	1.75	
September	16	+ 7799	- 378997	+ 0.99471	+ 0.00859	= + 0.47	1.41	
1795.								
April	23	- 7845	- 391998	+ 1.03329	- 0.04059	= + 7.64	1.71	
July	25	+ 58	- 485641	+ 1.30158	- 0.05358	= + 8.85	2.50	
October	14	+ 7907	- 397754	+ 1.07178	- 0.04588	= + 3.20	2.06	
1796.								
June	1	- 8222	- 242644	+ 1.08539	- 0.08289	= + 3.67	1.00	
August	30	+ 43	- 286695	+ 1.35764	- 0.10442	= + 1.47	1.25	
November	30	+ 7868	- 211761	+ 1.06853	- 0.08383	= - 1.70	0.98	
1797.								
July	13	- 8397	+ 12331	+ 1.11066	- 0.09806	= + 1.28	1.01	
October		+ 72	+ 34321	+ 1.37275	- 0.12043	= - 6.50	1.25	
December	31	+ 8027	+ 41322	+ 1.09661	- 0.09661	= - 4.71	1.44	
1798.								
August	16	- 8186	+ 260877	+ 1.07659	- 0.07869	= - 5.31	1.73	
November	12	- 87	+ 337097	+ 1.34254	- 0.09624	= - 8.19	2.16	
1799.								
February	13	+ 7693	+ 278492	+ 1.05106	- 0.07406	+ - 2.64	0.98	
October	1	- 8061	+ 416118	+ 1.06403	- 0.03523	= + 4.00	1.03	
December	19	+ 328	+ 498358	+ 1.27635	- 0.04095	= - 12.01	1.24	
1800.								
March	8	+ 7861	+ 466130	+ 1.04642	- 0.03202	= - 5.96	1.01	
October	28	- 7681	+ 399658	+ 0.98716	+ 0.01954	= - 1.20	1.01	
1801.								
January	20	+ 194	+ 481030	+ 1.20315	+ 0.02655	= - 6.83	1.23	
April	15	+ 7398	+ 388255	+ 0.97575	+ 0.02455	= - 6.31	1.00	
November	25	- 6941 δa	+ 255935 δe	+ 0.92942 $\delta \epsilon$	+ 0.06688 $\delta \pi$	= + 0.06	1.00	

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Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.					Weight.
1802.		$+ 691 \delta a + 321822 \delta e + 1'14007 \delta \varepsilon + 0'08463 \delta \pi = - 6'15$					1'22
February	23						
May	21	$+ 7473 + 251275 + 0'91897 + 0'07143 = - 6'29$					0'99
December	26	$- 7284 + 80235 + 0'90587 + 0'09413 = - 6'51$					1'00
1803.							
March	22	$- 14 + 86857 + 1'10815 + 0'11565 = - 6'64$					1'72
1804.							
January	25	$- 7292 - 126070 + 0'90991 + 0'09229 = - 11'32$					1'00
July	16	$+ 7603 - 145442 + 0'92027 + 0'08953 = - 13'17$					1'01
1805.							
May	23	$+ 156 - 386273 + 1'16586 + 0'06731 = - 16'14$					1'23
1806.							
May	6	$- 6895 - 466664 + 1'13167 + 0'00393 = - 10'82$					1'14
June	28	$+ 585 - 508980 + 1'23588 + 0'00492 = - 16'15$					1'24
1807.							
July	31	$+ 100 - 469151 + 1'31119 - 0'06199 = + 0'45$					1'25
October	28	$+ 7899 - 370388 + 1'04970 - 0'05189 = - 6'15$					1'00
1808.							
November	30	$+ 8043 - 186460 + 1'09006 - 0'08837 = + 6'40$					1'41
1809.							
October	13	$+ 72 + 79438 + 1'37176 - 0'11976 = + 11'29$					1'25
1810.							
January	9	$+ 7955 + 78308 + 1'08634 - 0'09484 = + 7'96$					0'99
1811.							
February	12	$+ 7903 + 306217 + 1'06775 - 0'07115 = + 1'43$					1'41
December	22	$- 86 + 475414 + 1'26697 - 0'03091 = - 4'64$					2'78
1813.							
February	6	$+ 2339 + 461359 + 1'18065 + 0'03475 = - 3'25$					2'99
March	11	$+ 6614 + 430801 + 1'09990 + 0'03150 = - 4'34$					3'91
April	8	$+ 7720 + 391822 + 1'00537 + 0'03173 = - 4'41$					3'12
1814.							
February	22	$- 184 + 291862 + 1'13374 + 0'09066 = - 1'32$					2'99
1815.							
April	7	$+ 1999 \delta a + 54044 \delta e + 1'09631 \delta \varepsilon + 0'11599 \delta \pi = - 1'83$					2'42

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1816.		$- 28 \delta a - 198483 \delta e + 1'12126 \delta \epsilon + 0'10624 \delta \pi = - 9'21$						1'73
1817.								
May	26	- 114	- 410027	+ 1'17302	+ 0'06098	= - 11'34		1'73
1818.								
June	30	+ 72	+ 514717	+ 1'24737	- 0'00477	= - 20'30		1'24
1819.								
August	15	+ 1845	- 446712	+ 1'31431	- 0'07291	= - 8'42		4'29
September	11	+ 6326	- 426801	+ 1'24568	- 0'06528	= - 10'14		4'08
November	9	+ 8031	- 342413	+ 1'03634	- 0'05814	= - 4'87		1'38
	29	+ 7084	- 314922	+ 0'98125	- 0'05735	= - 3'52		1'30
1820.								
September	14	+ 885	- 206254	+ 1'36390	- 0'11250	= + 1'95		4'15
October	6	+ 4978	- 203686	+ 1'32492	- 0'10902	= + 3'36		3'45
	29	+ 7285	- 189902	+ 1'24077	- 0'10227	= + 2'43		3'42
November	22	+ 8159	- 166485	+ 1'14173	- 0'09483	= + 2'57		2'97
December	20	+ 7456	- 135795	+ 1'04613	- 0'08803	= + 0'74		2'15
1821.								
September	14	- 5861	+ 124314	+ 1'30647	- 0'11217	= + 5'76		1'19
November	3	+ 2991	+ 120015	+ 1'34916	- 0'11626	= + 2'15		4'60
	24	+ 6140	+ 113375	+ 1'28967	- 0'11147	= - 0'06		3'54
December	12	+ 7658	+ 110419	+ 1'21708	- 0'10528	= + 2'39		3'69
1822.								
January	2	+ 8040	+ 112102	+ 1'13029	- 0'09821	= + 3'16		2'73
February	3	+ 7011	+ 122003	+ 1'02089	- 0'08699	= + 1'45		1'31
December	1	+ 1398	+ 395983	+ 1'32078	- 0'08338	= + 3'70		4'12
	31	+ 6075	+ 372523	+ 1'24695	- 0'07955	= + 1'05		3'88
1823.								
February	4	+ 7917	+ 339392	+ 1'11058	- 0'06968	= + 1'71		2'55
	28	+ 7436	+ 323322	+ 1'05857	- 0'09427	= + 0'26		1'35
1824.								
January	7	+ 1892	+ 507626	+ 1'24901	- 0'02301	= - 5'85		3'48
February	3	+ 5952 δa	+ 481971 δe	+ 1'18587 $\delta \epsilon$	- 0'02247 $\delta \pi$	= - 4'75		3'28

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.					Weight.
1824.		"					
March	11	$+ 7852 \delta a + 429774 \delta e + 1'05160 \delta \epsilon - 0'01780 \delta \pi = - 6'06$					1'78
November	4	$- 7551 + 372199 + 0'96528 + 0'03362 = - 8'83$					1'41
1825.							
January	28	$+ 57 + 448361 + 1'18344 + 0'04536 = - 13'60$					2'46
1826.							
March	6	$+ 1096 + 267667 + 1'13037 + 0'08953 = - 15'83$					4'22
April	12	$+ 6124 + 248072 + 1'05346 + 0'09024 = - 13'46$					3'60
	30	$+ 7385 + 232731 + 0'99734 + 0'08616 = - 11'50$					2'16
1827.							
April	6	$+ 1239 + 63007 + 1'10348 + 0'11746 = - 9'82$					2'44
1828.							
May	6	$+ 1241 - 229739 + 1'12405 + 0'10005 = + 0'07$					4'72
June	5	$+ 5522 - 217275 + 1'07918 + 0'09012 = + 0'19$					3'31
	24	$+ 7099 - 208578 + 1'02840 + 0'08260 = + 0'21$					2'72
1829.							
May	21	$- 1784 - 431416 + 1'17776 + 0'05224 = - 5'78$					2'13
June	22	$+ 3720 - 423165 + 1'16015 + 0'05245 = - 1'76$					1'71
August	3	$+ 7531 - 382881 + 1'03933 + 0'04587 = - 0'87$					3'27
1830.							
July	5	$+ 86 - 516274 + 1'25686 - 0'01426 = - 7'52$					2'78
	30	$+ 4358 - 503904 + 1'22336 - 0'01296 = - 1'95$					3'42
August	23	$+ 7120 - 474573 + 1'14934 - 0'01244 = - 4'52$					3'23
September	16	$+ 8126 - 439856 + 1'06503 - 0'01323 = - 3'01$					3'79
October	12	$+ 7651 - 405163 + 0'98554 - 0'01555 = - 7'61$					2'75
November	9	$+ 6036 - 375632 + 0'92424 - 0'01924 = - 2'54$					2'23
1831.							
August	3	$- 1469 - 422933 + 1'32597 - 0'07797 = - 1'74$					4'68
September	7	$+ 4801 - 414421 + 1'18962 - 0'07437 = - 2'65$					3'42
October	11	$+ 7875 - 372049 + 1'15984 - 0'06784 = - 5'13$					3'62
November	15	$+ 7677 - 320764 + 1'03754 - 0'06354 = - 6'11$					2'91
1832.							
August	8	$- 6455 - 148976 + 1'28988 - 0'10988 = + 2'40$					1'66
October	14	$+ 4946 \delta a - 161135 \delta e + 1'32159 \delta \epsilon - 0'11159 \delta \pi = + 2'02$					4'02

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.					Weight.
1832.		$+ 7895 \delta a - 142791 \delta e + 1'20188 \delta \epsilon - 0'10188 \delta \pi = + 1'20$					3'11
November	14						
December	41	$+ 7696 - 106801 + 1'06214 - 0'09114 = + 1'96$					3'07
1833.							
October	22	$- 318 + 169473 + 1'36508 - 0'11508 = + 5'58$					2'80
November	23	$+ 5317 + 158006 + 1'31009 - 0'11109 = + 11'54$					2'40
December	17	$+ 7661 + 149866 + 1'21629 - 0'10329 = + 10'24$					3'33
1834.							
January	12	$+ 8091 + 148175 + 1'11083 - 0'09383 = + 9'66$					2'89
December	5	$+ 1186 + 423748 + 1'31642 - 0'07642 = + 10'42$					3'92
1835.							
January	16	$+ 7106 + 386439 + 1'20161 - 0'07071 = + 9'93$					3'57
February	8	$+ 7988 + 362359 + 1'11016 - 0'06416 = + 8'70$					2'35
October	14	$- 7876 + 340770 + 1'03265 - 0'01465 = + 6'80$					1'44
December	14	$- 3334 + 505453 + 1'22722 - 0'01222 = + 4'70$					3'86
1836.							
January	11	$+ 1404 + 415371 + 1'01120 - 0'01120 = + 1'32$					3'47
February	4	$+ 4623 + 415633 + 1'01167 - 0'01167 = + 1'05$					3'53
	29	$+ 6866 + 416199 + 1'01101 - 0'01101 = - 0'35$					2'67
March	24	$+ 7687 + 416311 + 1'00865 - 0'00865 = - 0'25$					2'26
October	12	$- 6867 + 366545 + 0'97937 + 0'02063 = - 5'28$					1'85
November	15	$- 7450 + 355323 + 0'95864 + 0'04136 = - 4'63$					3'06
December	12	$- 6241 + 349646 + 0'95669 + 0'04331 = - 5'36$					2'22
1837.							
January	11	$- 3055 + 347958 + 0'95634 + 0'04366 = - 6'16$					2'41
February	15	$+ 1935 + 350254 + 0'95322 + 0'04678 = - 8'27$					4'39
March	20	$+ 5795 + 317096 + 0'95716 + 0'04284 = - 9'61$					3'59
April	12	$+ 7250 + 348372 + 0'95575 + 0'04425 = - 10'44$					2'64
May	3	$+ 7572 + 356779 + 0'95345 + 0'04655 = - 10'77$					1'40
November	17	$- 6886 + 209947 + 0'92051 + 0'07949 = - 11'18$					1'63
December	7	$- 7314 + 198638 + 0'91864 + 0'08136 = - 10'43$					2'62
1838.							
January	12	$- 6071 + 186449 + 0'91686 + 0'08314 = - 10'60$					2'22
February	14	$- 2550 \delta a + 185670 \delta e + 0'91679 \delta \epsilon + 0'08321 \delta \pi = - 10'90$					3'19

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1838.								
March	14	+ 1360 δa + 189451 δe + 0.91715 $\delta \epsilon$ + 0.08285 $\delta \pi$ = - 12.05						3.86
April	15	+ 5273 + 191764 + 0.91703 + 0.08297 = - 11.86						3.25
May	9	+ 6996 + 188183 + 0.91621 + 0.08379 = - 11.96						4.01
December	22	- 6963 + 5152 + 0.90334 + 0.09666 = - 8.35						2.52
1839.								
January	17	- 7907 - 13256 + 0.90324 + 0.09676 = - 8.97						3.24
February	24	- 4913 - 18456 + 0.90357 + 0.09643 = - 9.57						3.47
April	19	+ 2112 - 12005 + 0.90398 + 0.09602 = - 7.78						3.84
May	10	+ 4679 - 10356 + 0.90355 + 0.09645 = - 6.88						2.86
	30	+ 6419 - 12309 + 0.90345 + 0.09655 = - 6.99						3.13
1840.								
January	18	- 6530 - 184138 + 0.86766 + 0.07834 = - 6.13						3.00
February	18	- 7453 - 218126 + 0.95280 + 0.08320 = - 5.96						2.33
March	7	- 7074 - 236287 + 1.00908 + 0.08692 = - 5.71						2.70
April	19	- 2484 - 263113 + 1.12136 + 0.09564 = - 6.03						5.03
May	21	+ 2904 - 258117 + 1.11993 + 0.09607 = - 5.38						3.45
June	14	+ 6028 - 245309 + 1.06640 + 0.09160 = - 4.59						3.28
1841.								
March	10	- 7518 - 361972 + 0.96390 + 0.03910 = + 1.16						3.16
April	4	- 7443 - 397942 + 1.04740 + 0.03960 = - 0.34						2.44
May	13	- 3891 - 444080 + 1.16639 + 0.04261 = + 3.18						3.82
June	13	+ 1336 - 391112 + 1.18962 + 0.04438 = + 0.39						4.60
July	25	+ 6878 - 416475 + 1.09494 + 0.04106 = + 1.08						3.02
1842.								
May	13	- 7524 - 459971 + 1.13042 - 0.02142 = + 7.68						2.22
June	14	- 4418 - 487071 + 1.23512 - 0.02412 = + 5.81						4.99
July	22	+ 2167 - 513098 + 1.26106 - 0.02306 = + 6.03						3.72
August	11	+ 5252 - 496818 + 1.21779 - 0.02179 = + 2.48						4.49
September	11	+ 7789 - 437518 + 1.11091 - 0.02091 = + 0.56						3.08
October	17	+ 7518 - 402498 + 0.99371 - 0.02271 = + 1.96						1.68
1843.								
July	25	- 3900 δa - 387733 δe + 1.31227 $\delta \epsilon$ - 0.08427 $\delta \pi$ = + 3.42						3.89

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1843.								
August	19	$+ 635'' \delta a - 396314'' \delta e + 1'33578 \delta \epsilon - 0'08478 \delta \pi = + 0'96$						4'33
September	14	$+ 5078 - 386584 + 1'28697 - 0'08097 = + 0'41$						4'99
October	17	$+ 7954 - 347053 + 1'16397 - 0'07397 = - 1'18$						3'62
November	11	$+ 8002 - 310897 + 1'07191 - 0'06991 = - 1'73$						2'65
December	3	$+ 7037 - 279803 + 1'00576 - 0'06775 = - 0'72$						1'88
1844.								
August	5	$- 7310 - 101843 + 1'26024 - 0'10924 = + 0'19$						3'45
September	11	$- 1988 - 115042 + 1'36589 - 0'11790 = - 2'02$						4'51
October	8	$+ 3128 - 10463 + 1'35352 - 0'11652 = - 3'94$						4'29
November	7	$+ 7129 - 76327 + 1'25414 - 0'10814 = - 4'26$						3'25
December	4	$+ 8195 - 51761 + 1'14329 - 0'09929 = - 3'97$						2'55
1845.								
January	21	$+ 6192 + 21836 + 0'99303 - 0'08704 = - 5'96$						0'91
September	14	$- 7061 + 200087 + 1'25810 - 0'10310 = - 1'71$						4'93
October	18	$- 2066 + 213069 + 1'35513 - 0'11113 = - 1'54$						4'48
November	15	$+ 3240 + 205512 + 1'34171 - 0'11071 = - 1'49$						4'26
December	15	$+ 7147 + 190815 + 1'24190 - 0'10289 = - 0'98$						3'78
1846.								
January	11	$+ 8098 + 182634 + 1'11144 - 0'09143 = - 1'97$						2'89
October	8	$- 7723 + 402125 + 1'16545 - 0'06045 = + 1'21$						1'92
November	18	$- 2904 + 445064 + 1'29459 - 0'06559 = - 0'17$						3'01
December	15	$+ 2159 + 444099 + 1'30178 - 0'06878 = + 0'12$						3'89
1847.								
January	18	$+ 6839 + 411253 + 1'20531 - 0'06431 = - 0'37$						2'28
February	18	$+ 7966 + 375500 + 1'08419 - 0'05619 = - 0'55$						3'09
November	5	$- 7646 + 448989 + 1'08149 - 0'00349 = - 1'68$						3'24
December	8	$- 4903 + 493431 + 1'19268 - 0'00268 = - 0'87$						2'67
1848.								
January	28	$+ 3812 + 499880 + 1'22842 - 0'00480 = - 1'32$						2'71
February	16	$+ 6247 + 477964 + 1'15767 - 0'00467 = - 2'92$						3'05
March	11	$+ 7681 \delta a + 443207 \delta e + 1'07202 \delta \epsilon - 0'00302 \delta \pi = - 2'96$						3'03

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[c]

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1848.		$\begin{array}{c} \text{"} \qquad \qquad \qquad \text{"} \qquad \qquad \qquad \text{"} \\ - 7119 \delta a + 337375 \delta e + 0.94349 \delta \epsilon + 0.04651 \delta \pi = - 5.26 \\ - 6860 \quad + 364516 \quad + 1.04143 \quad + 0.05467 \quad = - 5.84 \end{array}$						
November	10							2.80
December	12							3.11
1849.								
January	14	- 3861	+ 395564	+ 1.13871	+ 0.06029	= - 7.23		2.69
February	18	+ 2121	+ 405338	+ 1.15451	+ 0.06449	= - 9.31		3.45
March	12	+ 5424	+ 266034	+ 1.08180	+ 0.09020	= - 9.87		3.10
April	2	+ 7222	+ 267626	+ 1.02248	+ 0.08152	= - 9.39		2.46
December	13	- 7281	+ 171013	+ 0.91285	+ 0.08515	= - 11.82		2.45
1850.								
January	17	- 6708	+ 177935	+ 1.01826	+ 0.09674	= - 14.31		2.24
February	16	- 3414	+ 190984	+ 1.09767	+ 0.10433	= - 15.25		3.18
March	10	+ 240	+ 198064	+ 1.11806	+ 0.10594	= - 7.25		3.23
April	2	+ 3996	+ 197484	+ 1.09354	+ 0.10346	= - 16.41		3.60
	28	+ 6766	+ 184871	+ 1.02460	+ 0.09740	= - 15.04		2.97
December	22	- 6434	- 193960	+ 0.85193	+ 0.09107	= - 16.27		2.11
1851.								
January	17	- 7347	- 36872	+ 0.91721	+ 0.09779	= - 17.68		2.89
February	7	- 7133	- 47813	+ 0.98076	+ 0.10424	= - 17.84		2.44
March	29	- 1730	- 54529	+ 1.10239	+ 0.11661	= - 21.01		2.73
April	24	+ 2732	- 48862	+ 1.09863	+ 0.11537	= - 19.83		3.42
May	18	+ 5883	- 45103	+ 1.04695	+ 0.11105	= - 19.90		4.01
1852.								
January	15	- 6152	- 200129	+ 0.85526	+ 0.07374	= - 13.57		2.46
February	16	- 7431	- 236592	+ 0.93758	+ 0.07742	= - 14.17		2.70
March	15	- 6949	- 267348	+ 1.02638	+ 0.08262	= - 15.28		2.94
April	16	- 3658	- 291252	+ 1.11597	+ 0.08903	= - 15.94		4.19
May	8	- 71	- 294332	+ 1.13934	+ 0.09066	= - 15.60		3.26
June	16	+ 5770	- 276481	+ 1.08005	+ 0.08694	= - 15.05		3.70
1853.								
March	31	- 7666	- 400573	+ 1.02539	+ 0.03161	= - 3.47		2.57
April	26	- 6464	- 437381	+ 1.11465	+ 0.03235	= - 2.77		2.30
May	23	- 3109	- 465363	+ 1.18673	+ 0.03427	= - 1.89		2.73
June	16	+ 1024 δa	- 469368 δe	+ 1.20052 $\delta \epsilon$	+ 0.03548 $\delta \pi$	= - 2.04		3.92

Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1853.								
July	14	+ 5333 δa - 450344 δe + 1'15135 $\delta \epsilon$ + 0'03465 $\delta \pi$ = - 2'31						2'67
August	7	+ 7412 - 423114 + 1'07633 + 0'03167 = - 2'42						1'92
1854.								
May	21	- 7415 - 459471 + 1'15030 - 0'03030 = + 8'58						1'91
June	20	- 4289 - 497215 + 1'24828 - 0'03328 = + 7'72						1'72
July	21	+ 1089 - 509607 + 1'27597 - 0'03197 = + 8'02						3'92
August	16	+ 5253 - 491945 + 1'22672 - 0'03072 = + 6'64						3'40
September	5	+ 7267 - 465529 + 1'15938 - 0'02938 = + 5'49						3'91
	26	+ 8018 - 433732 + 1'08294 - 0'02894 = + 4'19						3'63
October	29	+ 7195 - 387505 + 0'98238 - 0'03038 = + 4'13						2'69
1855.								
July	13	- 6293 - 389705 + 1'26856 - 0'08756 = + 9'09						2'04
August	22	+ 231 - 367213 + 1'34369 - 0'09169 = + 6'84						4'84
September	16	+ 4619 - 359677 + 1'30306 - 0'08807 = + 5'18						4'56
October	12	+ 7438 - 326411 + 1'21017 - 0'08217 = + 3'50						3'57
November	20	+ 7912 - 280417 + 1'06665 - 0'07465 = + 2'79						2'43
December	7	+ 7097 - 256240 + 1'01348 - 0'07248 = + 1'33						1'88
1856.								
August	21	- 6186 - 72442 + 1'30185 - 0'11385 = + 1'01						2'92
September	21	- 1097 - 70743 + 1'37176 - 0'11976 = - 1'36						4'15
October	22	+ 4598 - 74473 + 1'33219 - 0'11619 = - 2'99						3'45
November	16	+ 7536 - 67654 + 1'23935 - 0'10835 = - 2'51						3'20
December	16	+ 8158 - 48509 + 1'11709 - 0'09809 = - 2'94						2'28
1857.								
January	12	+ 7205 + 94795 + 1'03114 - 0'09246 = - 2'40						2'49
September	26	- 6327 + 243111 + 1'27923 - 0'10123 = - 5'57						2'89
October	22	- 2291 + 253487 + 1'34789 - 0'10689 = - 5'67						4'48
November	22	+ 3582 + 244682 + 1'33258 - 0'10659 = - 6'05						3'01
December	13	+ 6508 + 232117 + 1'26560 - 0'10160 = - 5'99						3'28
1858.								
January	14	+ 8116 + 217975 + 1'13456 - 0'09056 = - 5'51						3'45
February	2	+ 7774 + 214147 + 1'06500 - 0'08400 = - 6'23						3'10
October	1	- 8099 δa + 401431 δe + 1'11312 $\delta \epsilon$ - 0'05212 $\delta \pi$ = - 6'11						1'06

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Year and Day.		Equations of Condition for the Elements of Jupiter's Orbit.						Weight.
1858.		$\begin{array}{c} \text{"} \\ \text{"} \\ \text{"} \end{array}$						
November	14	-	4356 δa	+ 458837 δe	+ 1'26699 $\delta \epsilon$	- 0'05799 $\delta \pi$	= - 6'19	4'02
December	16	+	1452	+ 465555	+ 1'29366	- 0'05766	= - 7'25	3'72
1859.								
January	18	+	6407	+ 435348	+ 1'21484	- 0'05784	= - 7'67	3'67
February	17	+	7947	+ 398624	+ 1'09899	- 0'05098	= - 7'80	3'49
March	7	+	7731	+ 363944	+ 1'03324	- 0'04615	= - 7'84	2'80
November	9	-	7657	+ 421498	+ 1'07134	+ 0'00466	= - 5'38	1'87
December	17	-	4253	+ 486603	+ 1'19366	+ 0'00634	= - 6'26	3'79
1860.								
January	16	+	978	+ 504151	+ 1'22482	+ 0'00518	= - 7'97	3'89
February	17	+	5874	+ 477973	+ 1'15986	+ 0'00414	= - 9'43	4'49
March	14	+	7648	+ 440769	+ 1'06894	+ 0'00506	= - 10'35	2'84
December	13	-	7304	+ 339826	+ 1'02438	+ 0'06072	= - 6'44	1'54
1861.								
January	14	-	4475	+ 368456	+ 1'12070	+ 0'06730	= - 7'82	3'95
February	16	+	1029	+ 382960	+ 1'05650	+ 0'06850	= - 10'18	3'89
March	15	+	5197	+ 370125	+ 1'11058	+ 0'06542	= - 9'81	4'86
April	9	+	7299	+ 291350	+ 1'03320	+ 0'06180	= - 9'83	3'48
December	19	-	7344	+ 143667	+ 0'91401	+ 0'08899	= - 9'62	2'00
1862.								
February	9	-	4960	+ 153749	+ 1'06845	+ 0'10555	= - 10'44	2'02
March	13	+	28	+ 164734	+ 1'11430	+ 0'10970	= - 12'82	2'44
April	22	+	5906	- 65110	+ 1'10903	+ 0'11297	= - 11'69	4'19
December	13	-	5674	- 35738	+ 0'82610	+ 0'08790	= - 13'03	1'57
1863.								
January	18	-	7296	- 63489	+ 0'90907	+ 0'09593	= - 14'14	1'75
March	17	-	4210	- 89301	+ 1'07847	+ 0'11253	= - 16'83	4'45
April	22	+	1635	- 85325	+ 1'10648	+ 0'11552	= - 16'53	4'56
May	21	+	5725	- 78534	+ 1'05285	+ 0'11016	= - 16'21	4'78
1864.								
March	12	-	7284	- 285489	+ 1'00834	+ 0'07566	= - 20'24	1'08
April	19	-	3884 δa	- 319086 δe	+ 1'11937 $\delta \epsilon$	+ 0'08263 $\delta \pi$	= - 21'04	3'18

Year and Day.		Equations and Condition for the Elements of Jupiter's Orbit.					Weight.
1864.							
May	16	$+ 567'' \delta a - 323006'' \delta e + 1'14502 \delta \epsilon + 0'08498 \delta \pi = -21'34$					3.69
June	12	$+ 4785 - 310612 + 1'11555 + 0'07445 = -20'56$					3.57
July	5	$+ 7009 - 294367 + 1'03346 + 0'07754 = -19'20$					1.12
1865.							
April	30	$- 6541 - 450313 + 1'12218 + 0'02382 = -16'79$					1.62
June	4	$- 1899 - 483239 + 1'20634 + 0'02566 = -18'87$					3.26
	19	$+ 741 - 484964 + 1'21168 + 0'02632 = -20'21$					2.78
July	15	$+ 4886 - 468486 + 1'16983 + 0'02617 = -20'87$					3.98
August	8	$+ 7209 \delta a - 441069 \delta e + 1'09701 \delta \epsilon + 0'02399 \delta \pi = -19'90$					1.94

FINAL EQUATIONS FOR THE ELEMENTS OF JUPITER'S ORBIT.

First Period.—1750, October 29, to 1771, July 14.

$$\begin{array}{rclclclclcl}
 + & 11296056053'' & \times & \delta \alpha & - & 102191922088'' & \times & \delta e & + & 143544'0765 & \times & \delta \epsilon & - & 10636'8515 & \times & \delta & = & - & 4218754'32 \\
 - & 102191922088 & \times & \delta \alpha & + & 42942540854561 & \times & \delta e & + & 18076666'3140 & \times & \delta \epsilon & - & 3462032'7111 & \times & \delta \pi & = & + & 87588440'87 \\
 + & 143544 & \times & \delta \alpha & + & 18076666 & \times & \delta e & + & 490'25634 & \times & \delta \epsilon & - & 9'83153 & \times & \pi & = & - & 1822'77 \\
 - & 10637 & \times & \delta \alpha & - & 3462033 & \times & \delta e & - & 9'83153 & \times & \delta \epsilon & + & 2'07405 & \times & \pi & = & - & 6'68
 \end{array}$$

SOLUTION.

$$\begin{array}{rcl}
 \delta \alpha & = & - \quad 0'000331805 \\
 \delta e & = & + \quad 0'0000011659 \\
 \delta \epsilon & = & - \quad 4'11470'' \\
 \delta \pi & = & - \quad 22'4778
 \end{array}$$

Second Period.—1772, August 31, to 1810, January 9.

$$\begin{array}{rclclclclcl}
 + & 4604506829'' & \times & \delta \alpha & - & 16632594830'' & \times & \delta e & + & 40472'1457 & \times & \delta \epsilon & - & 4669'1827 & \times & \delta \pi & = & - & 6670'7475'' \\
 - & 16632594830 & \times & \delta \alpha & + & 17079106061629 & \times & \delta e & + & 10546977'4868 & \times & \delta \epsilon & + & 336344'4732 & \times & \delta \pi & = & - & 62302349'22 \\
 + & 40472 & \times & \delta \alpha & + & 10546977 & \times & \delta e & + & 197'25448 & \times & \delta \epsilon & - & 1'15762 & \times & \delta \pi & = & - & 279'82 \\
 - & 4669 & \times & \delta \alpha & + & 336344 & \times & \delta e & - & 1'15762 & \times & \delta \epsilon & + & 0'90788 & \times & \delta \pi & = & - & 36'01
 \end{array}$$

SOLUTION.

$$\begin{array}{rcl}
 \delta \alpha & = & - \quad 0'00018149 \\
 \delta e & = & - \quad 0'0000020662 \\
 \delta \epsilon & = & - \quad 1'5158'' \\
 \delta \pi & = & - \quad 41'7566''
 \end{array}$$

FINAL EQUATIONS FOR THE ELEMENTS OF JUPITER'S ORBIT—continued.

THIRD PERIOD.—1811, February 12, to 1839, May 30.

+	25158050766	$\delta \alpha$	+	4599166986	δe	+	30233269817	δe	—	1064034668	$\delta \pi$	=	—	3696421'21
+	4599166986	$\delta \alpha$	+	88801778030916	δe	+	497480437747	δe	+	26163203215	$\delta \pi$	=	—	183508738'68
+	3023327	$\delta \alpha$	+	49748044	δe	+	1085.4370	δe	—	15.39043	$\delta \pi$	=	—	2360'62
—	106403	$\delta \alpha$	+	2616320	δe	—	15.39043	δe	+	5.38722	$\delta \pi$	=	—	264'67

SOLUTION.

$$\delta \alpha = - 0'00004084$$

$$\delta e = + 0'0000013333$$

$$\delta e = - 2'95890$$

$$\delta \pi = - 59'0305$$

FOURTH PERIOD.—1840, January 18, to 1865, August 8.

+	40689208328	$\delta \alpha$	—	26415254553	δe	+	20861108613	δe	—	162411'9493	$\delta \pi$	=	—	8842429'53
—	26415254553	$\delta \alpha$	+	164433622032303	δe	—	63440019'1145	δe	—	805935'6411	$\delta \pi$	=	—	679362258'51
+	2086111	$\delta \alpha$	—	63440019	δe	+	1995'83909	δe	—	15'03706	$\delta \pi$	=	—	8802'82
—	162412	$\delta \alpha$	—	805936	δe	—	15'03706	δe	+	9'10950	$\delta \pi$	=	—	576'36

SOLUTION.

$$\delta \alpha = - 0'00027680$$

$$\delta e = - 0'0000064452$$

$$\delta e = - 4'9053$$

$$\delta \pi = - 76'8725$$

[c] 4 +

EQUATIONS FOR THE NODE AND INCLINATION OF JUPITER'S ORBIT.

Year and Day.		Equation.			Weight.
1750.					
October	29	$- 0.9221 \delta I + 0.0086 (\delta l - \delta N) = - 0.86$			1.75
December	9	$- 0.8944 + 0.0099 = - 0.13$			1.62
1751.					
July	31	$- 0.6719 + 0.0165 = - 7.77$			1.86
August	30	$- 0.6364 + 0.0172 = - 6.52$			2.26
October	5	$- 0.5926 + 0.0179 = - 7.26$			1.59
November	29	$- 0.5214 + 0.0189 = - 5.09$			2.15
December	31	$- 0.4785 + 0.0194 = - 2.42$			2.38
1752.					
February	24	$- 0.4036 + 0.0201 = + 0.97$			1.73
September	12	$- 0.1116 + 0.0198 = - 6.87$			2.85
October	13	$- 0.0658 + 0.0182 = - 8.16$			2.08
1753.					
January	1	$+ 0.0512 + 0.0342 = - 3.41$			2.11
March	29	$+ 0.2017 + 0.0287 = - 0.90$			1.73
September	24	$+ 0.4186 + 0.0219 = + 0.14$			1.61
November	2	$+ 0.4658 + 0.0212 = - 2.08$			2.24
1754.					
January	31	$+ 0.5744 + 0.0195 = - 0.95$			1.73
December	5	$+ 0.8589 + 0.0123 = - 0.90$			1.41
1755.					
March	14	$+ 0.9198 + 0.0096 = 0.00$			1.00
April	29	$+ 0.9424 + 0.0082 = + 1.11$			2.24
December	16	$+ 1.0013 + 0.0014 = - 1.23$			1.90
1756.					
February	22	$+ 0.9941 - 0.0025 = + 1.13$			1.48
April	23	$+ 0.9899 - 0.0032 = - 0.19$			1.71
May	15	$+ 0.9901 - 0.0032 = + 3.60$			2.12
1757.					
January	19	$+ 0.8862 - 0.0103 = + 3.96$			1.37
May	5	$+ 0.8114 - 0.0129 = + 3.11$			3.15
May	24	$+ 0.7966 \delta I - 0.0155 (\delta l - \delta N) = + 3.48$			2.96

Year and Day.		Equation.			Weight.
1757.					
June	8	$+ 0.7837 \delta I - 0.0139 (\delta l - \delta N) = + 4.07$			3.13
July	6	$+ 0.7596 - 0.0145 = + 5.25$			1.55
1758.					
March	1	$+ 0.5123 - 0.0190 = + 1.93$			1.00
April	7	$+ 0.4677 - 0.0196 = + 2.43$			1.57
June	3	$+ 0.3698 - 0.0204 = + 2.61$			2.76
June	23	$+ 0.3707 - 0.0204 = + 2.61$			3.45
July	18	$+ 0.3375 - 0.0206 = + 2.22$			1.65
August	15	$+ 0.2998 - 0.0208 = + 4.26$			1.87
1759.					
July	9	$- 0.1668 - 0.0251 = + 4.01$			3.51
August	13	$- 0.2174 - 0.0242 = + 3.38$			2.92
September	22	$- 0.2753 - 0.0240 = + 4.13$			2.14
October	25	$- 0.3225 - 0.0231 = + 2.26$			1.66
1760.					
August	15	$- 0.7027 - 0.0169 = + 0.18$			2.11
October	18	$- 0.7704 - 0.0152 = + 3.17$			1.19
1761.					
July	10	$- 0.9641 - 0.0066 = + 0.91$			2.42
August	8	$- 0.9755 - 0.0055 = + 3.32$			2.34
August	31	$- 0.9840 - 0.0047 = - 0.07$			2.23
October	5	$- 0.9928 - 0.0035 = + 4.07$			3.29
November	11	$- 0.9992 - 0.0021 = + 1.91$			2.82
December	3	$- 1.0013 - 0.0014 = + 5.80$			2.37
1762.					
January	6	$- 1.0021 - 0.0001 = + 6.68$			2.52
July	15	$- 0.9525 + 0.0068 = + 8.64$			0.97
September	6	$- 0.9231 + 0.0086 = + 1.58$			2.30
October	7	$- 0.9026 + 0.0096 = - 0.89$			2.13
November	8	$- 0.8788 + 0.0107 = + 0.90$			3.31
1763.					
January	5	$- 0.8308 + 0.0124 = - 4.30$			3.21
February	19	$- 0.7900 \delta I + 0.0137 (\delta l - \delta N) = + 4.85$			0.94

GREENWICH OBSERVATIONS, 1868.

[D]

Year and Day.		Equation.			Weight.
1763.					
March	7	$- 0.7742 \delta I + 0.0142 (\delta l - \delta N) =$	$- 1.57$		1.56
August	2	$- 0.6078 + 0.0177 =$	$- 0.51$		2.06
August	31	$- 0.5713 + 0.0183 =$	$+ 2.14$		1.73
October	6	$- 0.5243 + 0.0190 =$	$- 5.09$		2.74
November	29	$- 0.4518 + 0.0198 =$	$- 0.09$		3.66
1764.					
January	5	$- 0.4009 + 0.0202 =$	$- 0.43$		3.57
February	9	$- 0.3518 + 0.0206 =$	$+ 0.44$		3.70
March	2	$- 0.3201 + 0.0208 =$	$+ 1.41$		2.00
September	14	$+ 0.1324 + 0.0256 =$	$+ 7.84$		0.94
1765.					
January	6	$+ 0.1518 + 0.0250 =$	$- 1.41$		1.99
February	3	$+ 0.1723 + 0.0248 =$	$+ 2.60$		1.68
March	2	$+ 0.2098 + 0.0242 =$	$- 2.33$		1.12
November	12	$+ 0.5410 + 0.0200 =$	$- 1.83$		1.02
1766.					
February	2	$+ 0.6328 + 0.0184 =$	$+ 0.11$		3.13
May	4	$+ 0.7234 + 0.0164 =$	$- 0.40$		1.44
December	16	$+ 0.8982 + 0.0106 =$	$- 0.28$		1.03
1767.					
March	7	$+ 0.9404 + 0.0083 =$	$- 2.41$		1.22
June	11	$+ 0.9766 + 0.0055 =$	$- 2.43$		1.00
1768.					
April	5	$+ 0.9871 - 0.0036 =$	$- 1.31$		2.44
July	1	$+ 0.9613 - 0.0061 =$	$+ 4.77$		1.03
1769.					
February	8	$+ 0.8378 - 0.0122 =$	$+ 1.37$		1.01
May	9	$+ 0.7659 - 0.0144 =$	$- 3.09$		1.23
August	8	$+ 0.6808 - 0.0164 =$	$- 2.32$		1.42
1770.					
March	16	$+ 0.4313 - 0.0200 =$	$+ 4.84$		1.03
June	10	$+ 0.3208 - 0.0208 =$	$- 3.29$		1.75
September	8	$+ 0.1969 \delta I - 0.0210 (\delta l - \delta N) =$	$- 3.12$		1.44

Year and Day.		Equation.			Weight.
1771.					
April	17	$- 0.1216 \delta I - 0.0258 (\delta l - \delta N) = - 4.15$			1.03
July	14	$- 0.2480$	$- 0.0236$	$= - 2.02$	2.50
1772.					
August	31	$- 0.7740$	$- 0.0150$	$= - 3.77$	1.25
November	14	$- 0.8435$	$- 0.0128$	$= + 0.74$	1.45
1773.					
June	30	$- 0.9800$	$- 0.0051$	$= - 4.73$	1.03
September	28	$- 0.9996$	$- 0.0018$	$= - 4.62$	1.25
December	30	$- 0.9977$	$+ 0.0016$	$= - 1.39$	1.40
1774.					
August	10	$- 0.9060$	$+ 0.0095$	$= + 3.19$	1.45
November	3	$- 0.8405$	$+ 0.0121$	$= + 9.11$	1.25
1775.					
January	28	$- 0.6960$	$+ 0.0134$	$= + 4.62$	1.01
December	9	$- 0.3662$	$+ 0.0206$	$= - 8.64$	1.24
1776.					
March	5	$- 0.2417$	$+ 0.0211$	$= + 4.28$	1.01
October	16	$+ 0.0880$	$+ 0.0267$	$= - 1.01$	1.44
1777.					
January	9	$+ 0.2081$	$+ 0.0240$	$= - 2.10$	1.73
April	6	$+ 0.3277$	$+ 0.0226$	$= + 1.17$	1.44
November	17	$+ 0.6045$	$+ 0.0188$	$= - 5.96$	1.02
1778.					
February	7	$+ 0.6898$	$+ 0.0171$	$= - 1.04$	1.23
May	10	$+ 0.7750$	$+ 0.0149$	$= - 2.96$	1.42
December	19	$+ 0.9271$	$+ 0.0090$	$= - 6.39$	1.02
1779.					
March	12	$+ 0.9631$	$+ 0.0066$	$= - 3.42$	1.22
1780.					
April	17	$+ 0.9692$	$- 0.0055$	$= - 6.59$	1.23
July	11	$+ 0.9351 \delta I - 0.0079 (\delta l - \delta N) = - 1.46$			1.01

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Year and Day.		Equation.			Weight.
1782.					
March	16	$+ 0.3649 \delta I - 0.0207 (\delta l - \delta N) = + 2.86$			1.01
June	16	$+ 0.2425 - 0.0212 = - 1.69$			1.75
September	10	$+ 0.1216 - 0.0208 = + 1.62$			1.02
1783.					
April	18	$- 0.1981 - 0.0239 = + 4.63$			1.01
July	17	$- 0.3271 - 0.0226 = - 2.01$			1.25
October	17	$- 0.4542 - 0.0211 = + 0.18$			1.00
1784.					
May	27	$- 0.7279 - 0.0161 = - 4.81$			1.03
August	24	$- 0.8158 - 0.0136 = - 3.15$			1.24
November	20	$- 0.8878 - 0.0109 = - 5.73$			1.02
1785.					
October	1	$- 1.0004 + 0.0003 = - 2.14$			1.25
December	28	$- 0.9875 + 0.0035 = - 3.38$			1.01
1786.					
November	7	$- 0.7898 + 0.0138 = - 1.94$			1.25
1787.					
January	31	$- 0.7015 + 0.0160 = - 0.09$			1.00
September	28	$- 0.3960 + 0.0205 = - 4.27$			1.06
December	12	$- 0.2901 + 0.0211 = + 0.65$			1.25
1788.					
March	8	$- 0.1639 + 0.0212 = - 0.55$			1.02
October	20	$+ 0.1649 + 0.0242 = + 8.05$			1.44
1789.					
January	14	$+ 0.2852 + 0.0229 = - 2.63$			1.23
April	9	$+ 0.3977 + 0.0217 = + 1.46$			1.76
November	26	$+ 0.6670 + 0.0175 = - 2.98$			1.04
1790.					
February	14	$+ 0.7439 + 0.0157 = - 1.75$			2.44
May	10	$+ 0.8158 + 0.0136 = - 2.43$			2.04
December	20	$+ 0.9502 + 0.0075 = - 2.09$			1.42
1791.					
March	14	$+ 0.9791 \delta I + 0.0050 (\delta l - \delta N) = - 1.49$			2.99

Year and Day.		Equation.			Weight.
1792.					
April	14	$+ 0.9503 \delta I - 0.0069 (\delta l - \delta N) = - 1.25$			2.11
July	17	$+ 0.9039 \quad - 0.0096 \quad = + 2.12$			1.41
1793.					
February	18	$+ 0.6810 \quad - 0.0137 \quad = - 2.54$			1.02
May	19	$+ 0.6579 \quad - 0.0169 \quad = + 3.34$			1.23
August	14	$+ 0.5641 \quad - 0.0185 \quad = + 0.12$			1.00
1794.					
June	19	$+ 0.1662 \quad - 0.0104 \quad = + 2.70$			1.75
September	16	$+ 0.0389 \quad - 0.0181 \quad = + 2.96$			1.44
1795.					
April	23	$- 0.2787 \quad - 0.0229 \quad = + 2.80$			1.75
July	25	$- 0.4098 \quad - 0.0215 \quad = + 3.25$			2.50
October	14	$- 0.5174 \quad - 0.0201 \quad = + 1.46$			2.10
1796.					
June	1	$- 0.7845 \quad - 0.0145 \quad = + 2.95$			1.02
August	30	$- 0.8637 \quad - 0.0118 \quad = - 0.30$			1.23
November	30	$- 0.9276 \quad - 0.0088 \quad = + 2.23$			1.00
1797.					
July	13	$- 0.9998 \quad - 0.0008 \quad = - 0.51$			1.00
October	7	$- 0.9939 \quad + 0.0024 \quad = + 0.82$			1.26
December	31	$- 0.9694 \quad + 0.0054 \quad = + 0.20$			1.55
1798.					
August	16	$- 0.8194 \quad + 0.0129 \quad = - 4.40$			1.76
November	12	$- 0.7327 \quad + 0.0153 \quad = + 0.10$			2.08
1799.					
February	13	$- 0.6273 \quad + 0.0175 \quad = - 0.42$			1.00
October	1	$- 0.3197 \quad + 0.0211 \quad = - 2.60$			1.05
December	19	$- 0.2057 \quad + 0.0215 \quad = - 1.18$			1.24
1800.					
March	8	$- 0.0901 \quad + 0.0207 \quad = + 5.44$			1.03
October	28	$+ 0.2476 \delta I + 0.0231 (\delta l - \delta N) = - 1.11$			1.03

CORRECTION OF THE ELEMENTS

Year and Day.		Equation.			Weight.
1801.					
January	20	$+ 0.3609 \delta I + 0.0220 (\delta l - \delta N) = + 2.02$			1.23
April	15	$+ 0.4692$	$+ 0.0207$	$= + 0.38$	1.02
November	25	$+ 0.7160$	$+ 0.0163$	$= + 2.64$	1.02
1802.					
February	23	$+ 0.7957$	$+ 0.0142$	$= - 2.16$	1.23
May	21	$+ 0.8608$	$+ 0.0119$	$= + 5.31$	1.01
December	26	$+ 0.9711$	$+ 0.0057$	$= - 2.60$	1.02
1803.					
March	22	$+ 0.9918$	$+ 0.0032$	$= + 2.70$	1.72
1804.					
January	25	$+ 0.9616$	$- 0.0061$	$= - 0.53$	1.02
July	16	$+ 0.8733$	$- 0.0109$	$= + 1.98$	1.03
1805.					
May	23	$+ 0.6009$	$- 0.0180$	$= - 2.36$	1.23
1806.					
May	6	$+ 0.1588$	$- 0.0216$	$= - 0.33$	1.02
June	28	$+ 0.0839$	$- 0.0209$	$= - 0.37$	1.03
1807.					
July	31	$- 0.4823$	$- 0.0205$	$= + 1.09$	1.25
October	28	$- 0.5960$	$- 0.0187$	$= + 3.33$	1.02
1808.					
November	30	$- 0.9531$	$- 0.0071$	$= + 3.69$	1.44
1809.					
October	13	$- 0.9801$	$+ 0.0044$	$= + 1.37$	1.25
1810.					
January	9	$- 0.9428$	$+ 0.0075$	$= + 4.14$	1.01
1811.					
February	12	$- 0.5666$	$+ 0.0186$	$= + 1.21$	1.44
December	22	$- 0.1275$	$+ 0.0215$	$= + 1.93$	2.76
1813.					
February	6	$+ 0.0679$	$+ 0.0032$	$= + 2.63$	2.99
March	11	$+ 0.4897 \delta I + 0.0203 (\delta l - \delta N) = + 2.70$			3.91

Year and Day.		Equation.			Weight.
1813.					
April	8	$+ 0.5229 \delta I + 0.0199 (\delta l - \delta N) = + 3.16$			3.15
1814.					
February	22	$+ 0.8348$	$+ 0.0128$	$= + 0.64$	2.99
1815.					
April	7	$+ 0.9987$	$+ 0.0011$	$= + 1.33$	2.42
1816.					
April	25	$+ 0.8930$	$- 0.0101$	$= + 5.46$	1.73
1817.					
May	26	$+ 0.5398$	$- 0.0190$	$= + 1.37$	1.75
1818.					
June	30	$+ 0.0076$	$- 0.0128$	$= - 1.94$	1.25
1819.					
August	15	$- 0.5675$	$- 0.0191$	$= - 1.15$	4.29
September	11	$- 0.6011$	$- 0.0185$	$= + 1.18$	4.15
November	9	$- 0.6708$	$- 0.0172$	$= + 0.64$	1.41
November	29	$- 0.6937$	$- 0.0167$	$= + 1.01$	1.33
1820.					
September	14	$- 0.9404$	$- 0.0079$	$= + 0.96$	4.15
October	6	$- 0.9398$	$- 0.0080$	$= + 1.31$	3.45
October	29	$- 0.9690$	$- 0.0074$	$= + 0.38$	3.48
November	22	$- 0.9719$	$- 0.0052$	$= + 0.91$	3.03
December	20	$- 0.9806$	$- 0.0045$	$= + 1.59$	2.20
1821.					
September	14	$- 0.9723$	$+ 0.0052$	$= + 0.93$	1.20
November	3	$- 0.9398$	$+ 0.0077$	$= + 2.26$	4.60
November	24	$- 0.9297$	$+ 0.0083$	$= + 3.60$	3.57
December	12	$- 0.9187$	$+ 0.0090$	$= + 2.07$	3.75
1822.					
January	2	$- 0.9174$	$+ 0.0090$	$= + 2.70$	2.78
February	3	$- 0.8948$	$+ 0.0101$	$= + 0.62$	1.34
December	1	$- 0.5943$	$+ 0.0187$	$= + 1.80$	4.12
December	31	$- 0.5520 \delta I + 0.0187 (\delta l - \delta N) = + 1.65$			3.88

Year and Day.		Equation.			Weight.
1823.					
February	4	$- 0.5104 \delta I + 0.0195 (\delta l - \delta N) = 1.081$			2.60
February	28	$- 0.4783 + 0.0199 = + 0.02$			1.41
1824.					
January	7	$- 0.0296 + 0.0198 = + 2.10$			3.48
February	3	$+ 0.0104 + 0.0408 = + 1.93$			3.34
March	11	$+ 0.0643 + 0.0246 = + 2.72$			1.82
November	4	$+ 0.3929 + 0.0213 = + 2.93$			1.44
1825.					
January	28	$+ 0.4994 + 0.0201 = + 2.14$			2.46
1826.					
March	6	$+ 0.8766 + 0.0111 = + 0.50$			4.22
April	12	$+ 0.8993 + 0.0101 = + 0.90$			3.67
April	30	$+ 0.9098 + 0.0096 = + 1.38$			2.20
1827.					
April	6	$+ 0.9987 - 0.0005 = - 1.96$			2.44
1828.					
May	6	$+ 0.8318 - 0.0116 = - 2.00$			4.84
June	5	$+ 0.8170 - 0.0131 = - 1.58$			3.34
June	24	$+ 0.8154 - 0.0131 = - 2.27$			2.74
1829.					
May	21	$+ 0.4857 - 0.0198 = - 3.97$			2.13
June	22	$+ 0.4459 - 0.0203 = - 2.99$			1.72
August	3	$+ 0.3931 - 0.0208 = - 2.04$			3.30
1830.					
July	5	$- 0.0738 - 0.0241 = - 1.50$			2.78
July	30	$- 0.1108 - 0.0236 = - 2.68$			3.45
August	23	$- 0.1455 - 0.0233 = - 1.83$			3.25
September	16	$- 0.1804 - 0.0231 = - 0.36$			3.79
October	12	$- 0.2178 - 0.0228 = - 0.88$			2.83
November	9	$- 0.2578 - 0.0224 = + 0.07$			2.11
1831.					
August	3	$- 0.6148 - 0.0182 = - 0.56$			4.68
September	7	$- 0.6562 \delta I - 0.0174 (\delta l - \delta N) = - 1.10$			3.45

Year and Day.		Equation.			Weight.
1831.					
October	11	$- 0.6951 \delta I - 0.0165 (\delta l - \delta N) = + 0.01$			3.32
November	15	$- 0.7332 \quad - 0.0157 \quad = + 1.08$			3.00
1832.					
August	8	$- 0.9462 \quad - 0.0074 \quad = - 0.76$			1.69
October	14	$- 0.9749 \quad - 0.0050 \quad = + 1.06$			4.05
November	14	$- 0.9842 \quad - 0.0039 \quad = + 1.83$			3.17
December	21	$- 0.9929 \quad - 0.0026 \quad = + 1.93$			3.13
1833.					
October	22	$- 0.9286 \quad + 0.0084 \quad = + 3.54$			2.80
November	23	$- 0.9086 \quad + 0.0095 \quad = + 0.89$			2.40
December	17	$- 0.8925 \quad + 0.0102 \quad = + 1.56$			3.39
1834.					
January	12	$- 0.8726 \quad + 0.0111 \quad = + 1.49$			2.91
December	5	$- 0.5231 \quad + 0.0194 \quad = + 2.57$			3.92
1835.					
January	16	$- 0.4673 \quad + 0.0201 \quad = + 1.20$			3.60
February	8	$- 0.4360 \quad + 0.0205 \quad = + 2.29$			2.40
October	14	$- 0.0795 \quad + 0.0221 \quad = + 1.48$			1.45
December	14	$+ 0.0097 \quad + 0.0319 \quad = + 1.38$			3.86
1836.					
January	11	$+ 0.0505 \quad + 0.0241 \quad = + 2.04$			3.48
February	4	$+ 0.0854 \quad + 0.0236 \quad = + 2.26$			3.56
February	29	$+ 0.1214 \quad + 0.0233 \quad = + 2.23$			2.72
March	24	$+ 0.1556 \quad + 0.0231 \quad = + 2.08$			2.30
October	12	$+ 0.4284 \quad + 0.0208 \quad = - 0.17$			1.88
November	15	$+ 0.4708 \quad + 0.0203 \quad = + 0.98$			3.11
December	12	$+ 0.5036 \quad + 0.0199 \quad = + 0.53$			1.96
1837.					
January	11	$+ 0.5391 \quad + 0.0194 \quad = - 0.66$			2.70
February	15	$+ 0.5791 \quad + 0.0188 \quad = + 0.81$			4.40
March	20	$+ 0.6154 \quad + 0.0181 \quad = + 0.56$			4.13
April	12	$+ 0.6399 \quad + 0.0177 \quad = + 0.76$			2.63
May	3	$+ 0.6619 \delta I + 0.0172 (\delta l - \delta N) = + 1.18$			1.42

GREENWICH OBSERVATIONS, 1868.

[E]

CORRECTION OF THE ELEMENTS

Year and Day.		Equation.			Weight.
1837.					
November	17	$+ 0.8363 \delta I + 0.0126 (\delta l - \delta N) = - 0.43$			1.91
December	7	$+ 0.8507$	$+ 0.0121$	$= - 0.79$	2.67
1838.					
January	12	$+ 0.8749$	$+ 0.0111$	$= + 0.30$	2.25
February	14	$+ 0.8952$	$+ 0.0102$	$= - 1.82$	3.20
March	14	$+ 0.9111$	$+ 0.0094$	$= - 1.47$	3.86
April	15	$+ 0.9278$	$+ 0.0085$	$= - 0.90$	3.28
May	9	$+ 0.9390$	$+ 0.0079$	$= - 1.40$	4.07
December	22	$+ 0.9974$	$+ 0.0011$	$= - 1.56$	2.56
1839.					
January	17	$+ 0.9985$	$+ 0.0004$	$= - 1.89$	3.30
February	24	$+ 0.9979$	$- 0.0008$	$= - 2.50$	3.49
April	19	$+ 0.9918$	$- 0.0024$	$= - 2.51$	3.85
May	10	$+ 0.9894$	$- 0.0031$	$= - 1.52$	2.88
May	30	$+ 0.9854$	$- 0.0037$	$= - 2.61$	3.17
1840.					
January	18	$+ 0.8902$	$- 0.0103$	$= - 2.30$	3.07
February	18	$+ 0.8707$	$- 0.0112$	$= - 2.11$	2.35
March	7	$+ 0.8587$	$- 0.0116$	$= - 0.41$	2.67
April	19	$+ 0.8281$	$- 0.0128$	$= - 2.10$	5.03
May	21	$+ 0.8033$	$- 0.0136$	$= - 2.66$	3.45
June	14	$+ 0.7839$	$- 0.0141$	$= - 2.43$	3.28
1841.					
March	10	$+ 0.5108$	$- 0.0196$	$= - 2.12$	3.22
April	4	$+ 0.4808$	$- 0.0200$	$= - 2.58$	2.46
May	13	$+ 0.4328$	$- 0.0205$	$= - 2.24$	3.82
June	13	$+ 0.3935$	$- 0.0210$	$= - 2.68$	4.64
July	25	$+ 0.3389$	$- 0.0214$	$= - 2.23$	3.05
1842.					
May	13	$- 0.0713$	$- 0.0234$	$= - 1.38$	2.24
June	14	$- 0.1178$	$- 0.0236$	$= - 2.03$	5.03
July	22	$- 0.1730$	$- 0.0228$	$= - 2.46$	3.72
August	11	$- 0.2020 \delta I - 0.0226 (\delta l - \delta N) = - 2.34$			4.49

Year and Day.		Equation.			Weight.
1842.					
September	11	$- 0.2465 \delta I - 0.0223 (\delta l - \delta N) = - 1.33$			3.11
October	17	$- 0.2979$	$- 0.0220$	$= - 1.09$	1.73
1843.					
July	25	$- 0.6660$	$- 0.0172$	$= - 1.02$	3.89
August	19	$- 0.6941$	$- 0.0165$	$= - 0.62$	4.29
September	14	$- 0.7226$	$- 0.0159$	$= - 1.26$	4.99
October	17	$- 0.7568$	$- 0.0150$	$= - 0.34$	3.72
November	11	$- 0.7818$	$- 0.0143$	$= - 0.65$	2.68
December	3	$- 0.8027$	$- 0.0137$	$= - 1.25$	1.90
1844.					
August	5	$- 0.9677$	$- 0.0056$	$= + 0.05$	3.60
September	11	$- 0.9803$	$- 0.0043$	$= + 0.50$	4.55
October	8	$- 0.9876$	$- 0.0034$	$= + 0.57$	4.26
November	7	$- 0.9935$	$- 0.0023$	$= + 0.61$	3.28
December	4	$- 0.9966$	$- 0.0013$	$= + 1.32$	2.60
1845.					
January	21	$- 0.9979$	$+ 0.0005$	$= + 3.48$	0.92
September	14	$- 0.9200$	$+ 0.0089$	$= + 1.14$	4.93
October	18	$- 0.8978$	$+ 0.0100$	$= + 0.01$	3.61
November	15	$- 0.8775$	$+ 0.0109$	$= + 2.25$	4.26
December	15	$- 0.8538$	$+ 0.0118$	$= + 1.37$	3.82
1846.					
January	16	$- 0.8268$	$+ 0.0128$	$= + 1.41$	2.94
October	8	$- 0.5326$	$+ 0.0193$	$= + 3.12$	1.94
November	18	$- 0.4785$	$+ 0.0201$	$= + 1.68$	3.01
December	15	$- 0.4419$	$+ 0.0205$	$= + 2.23$	3.89
1847.					
January	18	$- 0.3952$	$+ 0.0210$	$= + 1.76$	2.36
February	18	$- 0.3516$	$+ 0.0214$	$= + 1.71$	3.15
November	5	$+ 0.0262$	$+ 0.0238$	$= + 0.81$	3.30
December	8	$+ 0.0740 \delta I + 0.0231 (\delta l - \delta N) = + 1.00$			2.67

Year and Day.		Equation.			Weight.
1848.					
January	28	$+ 0.1472 \delta I + 0.0228 (\delta l - \delta N) = + 1.79$			2.71
February	16	$+ 0.1742$	$+ 0.0227$	$= + 1.58$	3.07
March	11	$+ 0.2079$	$+ 0.0225$	$= + 2.23$	3.06
November	10	$+ 0.5252$	$+ 0.0195$	$= + 1.50$	2.86
December	12	$+ 0.5622$	$+ 0.0189$	$= + 0.82$	3.33
1849.					
January	14	$+ 0.5992$	$+ 0.0183$	$= + 0.17$	2.64
February	18	$+ 0.6370$	$+ 0.0177$	$= + 0.36$	3.45
March	12	$+ 0.6598$	$+ 0.0172$	$= + 0.47$	3.10
April	2	$+ 0.6788$	$+ 0.0167$	$= - 0.47$	2.46
December	13	$+ 0.8874$	$+ 0.0105$	$= - 0.90$	2.47
1850.					
January	17	$+ 0.9077$	$+ 0.0095$	$= + 0.94$	2.26
February	16	$+ 0.9235$	$+ 0.0087$	$= - 0.70$	3.18
March	10	$+ 0.9343$	$+ 0.0081$	$= - 0.98$	3.26
April	2	$+ 0.9445$	$+ 0.0074$	$= - 1.08$	3.40
April	28	$+ 0.9550$	$+ 0.0007$	$= - 0.89$	3.02
December	22	$+ 0.9977$	$- 0.0005$	$= - 3.73$	2.15
1851.					
January	17	$+ 0.9964$	$- 0.0012$	$= - 2.23$	2.91
February	7	$+ 0.9945$	$- 0.0019$	$= - 2.81$	2.46
March	29	$+ 0.9871$	$- 0.0034$	$= - 3.14$	2.73
April	24	$+ 0.9814$	$- 0.0041$	$= - 3.05$	3.45
May	18	$+ 0.9751$	$- 0.0048$	$= - 2.80$	4.05
1852.					
January	15	$+ 0.8585$	$- 0.0117$	$= - 2.92$	2.49
February	16	$+ 0.8361$	$- 0.0125$	$= - 3.47$	2.73
March	15	$+ 0.8150$	$- 0.0132$	$= - 2.36$	2.97
April	16	$+ 0.7896$	$- 0.0140$	$= - 3.12$	4.19
May	8	$+ 0.7712$	$- 0.0145$	$= - 3.39$	3.26
June	16	$+ 0.7368 \delta I - 0.0154 (\delta l - \delta N) = - 3.26$			3.70

Year and Day.		Equation.			Weight.
1853.					
March	31	$+ 0.4218 \delta I - 0.0207 (\delta l - \delta N) = -$			2.42
April	26	$+ 0.3888 - 0.0211 = -$			2.32
May	23	$+ 0.3537 - 0.0214 = -$			2.76
June	16	$+ 0.3222 - 0.0217 = -$			3.89
July	14	$+ 0.2848 - 0.0219 = -$			2.67
August	7	$+ 0.2523 - 0.0126 = -$			1.94
1854.					
May	21	$- 0.1573 - 0.0255 = -$			1.97
June	20	$- 0.2007 - 0.0224 = -$			1.71
July	21	$- 0.2453 - 0.0222 = -$			3.92
August	16	$- 0.2824 - 0.0220 = -$			3.42
September	5	$- 0.3110 - 0.0218 = -$			3.98
September	26	$- 0.3406 - 0.0215 = -$			3.74
October	29	$- 0.3865 - 0.0211 = -$			2.75
1855.					
July	13	$- 0.7091 - 0.0161 = -$			2.06
August	22	$- 0.7514 - 0.0151 = -$			4.00
September	16	$- 0.7763 - 0.0144 = -$			4.60
October	12	$- 0.8012 - 0.0136 = -$			3.16
November	20	$- 0.8361 - 0.0125 = -$			2.24
December	7	$- 0.8502 - 0.0120 = +$			1.92
1856.					
August	21	$- 0.9878 - 0.0032 = +$			2.96
September	21	$- 0.9935 - 0.0021 = +$			3.98
October	22	$- 0.9968 - 0.0010 = +$			3.66
November	16	$- 0.9977 - 0.0001 = +$			3.23
December	16	$- 0.9966 + 0.0010 = +$			2.08
1857.					
January	12	$- 0.9939 + 0.0020 = +$			2.52
September	26	$- 0.8766 + 0.0110 = +$			2.92
October	22	$- 0.8564 + 0.0118 = +$			4.48
November	22	$- 0.8302 + 0.0127 = +$			3.01
December	13	$- 0.8114 \delta I + 0.0133 (\delta l - \delta N) = +$			3.54

Year and Day.		Equation.			Weight.
1858.					
January	14	$- 0.7811 \delta I + 0.0143 (\delta l - \delta N) = + 3.54$			3.52
February	2	$- 0.7623 + 0.0148 = + 3.45$			3.16
October	1	$- 0.4747 + 0.0202 = + 2.05$			1.08
November	14	$- 0.4146 + 0.0209 = + 3.59$			4.05
December	16	$- 0.3700 + 0.0213 = + 3.30$			3.72
1859.					
January	18	$- 0.3233 + 0.0217 = + 3.10$			3.70
February	17	$- 0.2804 + 0.0220 = + 3.42$			3.55
March	7	$- 0.2544 + 0.0222 = + 3.43$			2.86
November	9	$+ 0.1059 + 0.0225 = + 4.06$			1.19
December	17	$+ 0.1603 + 0.0225 = + 2.91$			3.82
1860.					
January	16	$+ 0.2026 + 0.0223 = + 3.05$			3.89
February	17	$+ 0.2472 + 0.0221 = + 2.67$			4.53
March	14	$+ 0.2829 + 0.0219 = + 2.80$			2.89
December	13	$+ 0.6203 + 0.0179 = + 2.10$			1.55
1861.					
January	14	$+ 0.6541 + 0.0173 = + 1.27$			3.95
February	16	$+ 0.6875 + 0.0166 = + 1.31$			3.89
March	15	$+ 0.7137 + 0.0160 = + 1.09$			4.86
April	9	$+ 0.7370 + 0.0154 = + 0.96$			3.51
December	19	$+ 0.9197 + 0.0088 = + 0.31$			2.06
1862.					
February	9	$+ 0.9443 + 0.0074 = + 0.29$			2.34
March	13	$+ 0.9571 + 0.0064 = - 0.72$			2.46
April	22	$+ 0.9709 + 0.0053 = - 0.61$			4.34
December	13	$+ 0.9950 - 0.0018 = - 2.91$			1.61
1863.					
January	18	$+ 0.9903 - 0.0029 = - 3.22$			1.76
March	17	$+ 0.9778 - 0.0046 = - 3.55$			4.45
April	22	$+ 0.9673 - 0.0057 = - 3.31$			4.56
May	21	$+ 0.9574 \delta I - 0.0065 (\delta l - \delta N) = - 3.22$			4.82

Year and Day.		Equation.			Weight.
1864.					
March	12	+ 0.7761	$\delta I - 0.0014 (\delta l - \delta N) = -$	1.95	1.10
April	19	+ 0.7431	$- 0.0153 = -$	4.39	3.21
May	16	+ 0.7184	$- 0.0160 = -$	4.06	3.69
June	12	+ 0.6926	$- 0.0165 = -$	4.18	3.60
July	5	+ 0.6700	$- 0.0170 = -$	3.71	1.14
1865.					
April	30	+ 0.3180	$- 0.0218 = -$	3.48	1.64
June	4	+ 0.2711	$- 0.0222 = -$	4.15	3.26
June	19	+ 0.2508	$- 0.0223 = -$	4.39	2.78
July	15	+ 0.2150	$- 0.0226 = -$	3.97	4.19
August	8	+ 0.1819	$\delta I - 0.0228 (\delta l - \delta N) = -$	3.99	2.55

SOLUTIONS OF THE EQUATIONS FOR THE NODE AND INCLINATION OF JUPITER'S ORBIT
BY THE METHOD OF *Minimum Squares*.

FIRST PERIOD.—1750, October 29, to 1771, July 14.

$$\begin{aligned}
 166.09541 \delta I - 0.91804 (\delta l - \delta N) &= + 43.98 \\
 - 0.91804 \delta I + 0.10814 (\delta l - \delta N) &= - 10.44 \\
 \delta I &= - 0.291 \\
 (\delta l - \delta N) &= - 100.382
 \end{aligned}$$

NOTE.—By applying *Tabular Values* of δl to the Equations of Condition, and proceeding by the method of least squares, the value of $\delta N = + 98''.18$, and δI is unaltered.

SECOND PERIOD.—1772, August 31, to 1810, January 9.

$$\begin{aligned}
 + 79.60924 \delta I + 0.30629 (\delta l - \delta N) &= - 52.33 \\
 + 0.30629 \delta I + 0.03966 (\delta l - \delta N) &= - 1.16 \\
 \delta I &= - 0.561 \\
 (\delta l - \delta N) &= - 24.911
 \end{aligned}$$

THIRD PERIOD.—1811, February 12, to 1839, May 30.

$$\begin{aligned}
 + 457.39175 \delta I + 1.82884 (\delta l - \delta N) &= - 523.65 \\
 + 1.82884 \delta I + 0.23315 (\delta l - \delta N) &= + 14.18 \\
 \delta I &= - 1.433 \\
 (\delta l - \delta N) &= + 72.0634
 \end{aligned}$$

FOURTH PERIOD.—1840, January 18, to 1865, August 8.

$$\begin{aligned}
 + 722.83789 \delta I - 0.72818 (\delta l - \delta N) &= - 1224.59 \\
 - 0.72818 \delta I + 0.37762 (\delta l - \delta N) &= + 44.46 \\
 \delta I &= - 1.579 \\
 (\delta l - \delta N) &= + 114.692
 \end{aligned}$$

EQUATIONS OF CONDITION
FOR THE
ELEMENTS OF SATURN'S ORBIT
FROM
1751 TO 1865.

GREENWICH OBSERVATIONS, 1868.

[F]

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.						Weight.			
1751.											
February	19	— 2062	δa	+ 124271	δe	+ 0.87795	$\delta \epsilon$	+ 0.10294	$\delta \pi$	= + 8.85	0.98
April	2	— 1985		+ 120628		+ 0.94018		+ 0.11182		= + 7.96	1.05
May	31	+ 14		+ 138248		+ 0.99531		+ 0.11746		= + 8.81	1.57
July	2	+ 1287		+ 140035		+ 0.97769		+ 0.11481		= + 14.69	2.18
1752.											
March	10	— 2127		+ 645352		+ 0.88315		+ 0.11065		= + 11.81	1.71
June	22	+ 453		+ 54395		+ 0.98460		+ 0.12330		= + 18.24	2.22
August	9	+ 1922		+ 54892		+ 0.93351		+ 0.11733		= + 17.69	1.82
1753.											
April	8	— 2104	— 33847		+ 0.90803		+ 0.11457		= + 6.95		1.44
June	29	+ 230	— 32774		+ 0.98593		+ 0.12427		= + 20.38		2.49
August	2	+ 1494	— 28149		+ 0.96183		+ 0.12137		= + 26.65		1.87
October	1	+ 2108	— 31138		+ 0.87528		+ 0.11032		= + 17.77		0.99
1754.											
July	9	+ 146	— 119004		+ 0.99265		+ 0.11915		= + 19.21		1.57
August	12	+ 1483	— 112082		+ 0.96886		+ 0.11663		= + 24.22		1.54
October	1	+ 2165	— 107765		+ 0.89645		+ 0.10755		= + 26.86		1.73
1755.											
July	19	+ 56	— 202218		+ 1.00464		+ 0.10816		= + 21.07		1.92
1756.											
August	4	+ 245	— 278606		+ 1.02038		+ 0.09192		= + 22.87		1.57
October	7	+ 2091	— 257101		+ 0.94674		+ 0.08551		= + 24.64		1.78
1757.											
June	29	— 1655	— 340818		+ 1.01287		+ 0.06813		= + 12.24		1.52
August	9	— 70	— 348088		+ 1.04275		+ 0.07105		= + 19.85		2.94
September	1	— 912	— 342470		+ 1.03114		+ 0.07096		= + 23.05		2.46
October	20	+ 2113	— 311626		+ 0.96414		+ 0.06728		= + 24.73		1.78
November	14	+ 2132	— 310488		+ 0.92607		+ 0.06238		= + 23.45		1.89
December	3	+ 1873	— 305107		+ 0.89996		+ 0.05886		= + 22.01		1.35
1758.											
September	1	+ 383	— 402160		+ 1.06439		+ 0.0711		= + 15.94		2.49
October	19	+ 1939	— 380876		+ 1.00951		+ 0.04539		= + 19.17		2.10
Decembor	12	+ 1947	δa	— 353152	δe	+ 0.92487	$\delta \epsilon$	+ 0.03873	$\delta \pi$	= + 14.44	1.35

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.						Weight.					
1759.													
July	29	—	1525 δa	—	433274 δe	+	1'06861 $\delta \varepsilon$	+	0'01872 $\delta \pi$	=	+	9'03	2'18
September	5	+	7	—	443869	+	1'09567	+	0'02043	=	+	12'40	1'94
November	15	+	2115	—	409291	+	1'00902	+	0'01948	=	+	11'08	1'45
December	11	+	2134	—	392813	+	0'96584	+	0'01726	=	+	9'08	1'38
1760.													
August	17	—	1346	—	455947	+	1'10608	—	0'00828	=	+	8'13	1'55
September	18	+	35	—	463607	+	1'12381	—	0'00711	=	+	5'02	1'94
December	16	+	2203	—	414311	+	1'00167	—	0'00647	=	+	2'86	2'00
1761.													
August	9	—	1984	—	438754	+	1'10128	—	0'03438	=	—	0'19	2'40
September	1	—	1281	—	456547	+	1'13594	—	0'03514	=	—	0'42	2'69
October	3	+	147	—	480919	+	1'17692	—	0'03425	=	—	0'34	2'97
November	6	+	1532	—	449585	+	1'12036	—	0'03216	=	+	0'64	2'67
December	1	+	2143	—	432192	+	1'07608	—	0'03088	=	—	4'14	2'10
1762.													
January	1	+	2198	—	407931	+	1'02013	—	0'03073	=	—	2'96	2'43
September	8	—	1518	—	420395	+	1'15223	—	0'06003	=	—	6'86	1'54
October	11	—	140	—	432426	+	1'17926	—	0'06026	=	—	10'26	2'51
November	2	+	903	—	430492	+	1'16846	—	0'05862	=	—	12'54	2'22
1763.													
January	5	+	2263	—	389298	+	1'05777	—	0'05357	=	—	11'51	3'00
August	17	—	2296	—	348311	+	1'11040	—	0'07760	=	—	7'44	1'45
October	8	—	905	—	374614	+	1'19404	—	0'08305	=	—	14'91	3'14
November	11	+	690	—	378237	+	1'19468	—	0'08189	=	—	19'34	3'33
December	10	+	1785	—	368794	+	1'15656	—	0'07856	=	—	16'62	2'65
1764.													
January	24	+	2263	—	337313	+	1'06824	—	0'07353	=	—	19'56	2'22
October	31	—	449	—	300968	+	1'22021	—	0'10071	=	—	22'93	1'12
December	19	+	1681	—	297592	+	1'18142	—	0'09742	=	—	26'93	1'87
1765.													
January	30	+	2344	—	273817	+	1'09744	—	0'09094	=	—	21'79	1'42
August	31	—	2416	—	185397	+	1'11107	—	0'10436	=	—	16'73	2'02
November	21	—	113 δa	—	207256 δe	+	1'23783 $\delta \varepsilon$	—	0'11573 $\delta \pi$	=	—	22'85	2'51

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.						Weight.
1766.		$+ 2367 \delta a - 183638 \delta e + 1'09866 \delta \epsilon - 0'10256 \delta \pi = - 29'12$						1'00
February	19							1'00
September	12	$- 2418 - 87001 + 1'11264 - 0'11184 = - 15'00$						1'00
December	8	$+ 28 - 104557 + 1'24649 - 0'12389 = - 22'11$						1'12
1767.								
March	3	$+ 2391 - 88347 + 1'11116 - 0'11046 = - 21'64$						1'00
September	29	$- 2425 + 31446 + 1'11922 - 0'11312 = - 14'50$						1'01
December	19	$- 112 + 18456 + 1'24830 - 0'12600 = - 22'34$						1'94
1768.								
March	15	$+ 2412 + 14881 + 1'11583 - 0'11283 = - 21'81$						1'73
October	10	$- 2398 + 119152 + 1'10864 - 0'10864 = - 20'84$						1'41
1769.								
January	2	$- 85 + 133107 + 1'24427 - 0'10867 = - 22'54$						1'94
October	24	$- 2385 + 213945 + 1'10008 - 0'09958 = - 26'40$						1'00
1770.								
January	19	$+ 35 + 238607 + 1'21055 - 0'08895 = - 23'06$						1'58
April	17	$+ 2395 + 212263 + 1'09603 - 0'09993 = - 15'91$						1'00
November	6	$- 2355 + 293979 + 1'08402 - 0'08562 = - 19'06$						1'00
1771.								
February	1	$+ 14 + 331683 + 1'21751 - 0'09651 = - 20'90$						1'12
November	18	$- 2315 + 354786 + 1'06255 - 0'06755 = - 19'28$						1'10
1772.								
February	14	$- 42 + 398598 + 1'19631 - 0'06894 = - 23'21$						1'94
1773.								
February	27	$- 28 + 444057 + 1'17149 - 0'05249 = - 21'24$						1'58
May	28	$+ 2350 + 395837 + 1'04440 - 0'04720 = - 22'06$						1'00
1774.								
March	13	$+ 36 + 464218 + 1'24008 - 0'02625 = - 19'69$						1'12
June	16	$+ 2294 + 411079 + 1'01255 - 0'00765 = - 28'82$						0'99
December	29	$- 2237 + 413165 + 0'99915 + 0'00135 = - 24'36$						1'00
1775.								
March	30	$+ 217 + 459403 + 1'11532 + 0'00107 = - 19'11$						1'12
1776.								
April	5	$- 56 \delta a + 437530 \delta e + 1'08663 \delta \epsilon + 0'02867 \delta \pi = - 18'50$						1'12

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.						Weight.
1799.								
October	30	$- 2356 \delta a + 257329 \delta e + 1'08881 \delta \varepsilon - 0'09251 \delta \pi = - 24'74$						1'00
1800.								
January	25	- 63	+ 289092	+ 1'22552	- 0'10432	= - 21'42		1'58
April	23	+ 2396	+ 257700	+ 1'09425	- 0'09375	= - 21'47		1'00
November	18	- 2344	+ 332550	+ 1'08276	- 0'07696	= - 21'85		1'01
1801.								
February	7	- 85	+ 368947	+ 1'20653	- 0'08623	= - 19'34		1'12
May	11	+ 2361	+ 327939	+ 1'07155	- 0'07705	= - 13'70		0'99
November	30	- 2310	+ 382571	+ 1'05951	- 0'05836	= - 21'82		1'00
1802.								
February	23	+ 4	+ 428836	+ 1'18154	- 0'06234	= - 12'18		1'58
May	21	+ 2364	+ 380767	+ 1'05884	- 0'05784	= - 9'91		1'41
December	13	- 2277	+ 411533	+ 1'03676	- 0'03436	= - 5'37		1'00
1803.								
March	12	+ 197	+ 457492	+ 1'15687	- 0'03897	= - 2'06		1'11
1804.								
March	21	+ 49	+ 463649	+ 1'12892	- 0'01172	= + 2'14		1'12
June	21	+ 2300	+ 413882	+ 1'00503	- 0'01033	= - 4'15		0'99
1805.								
April	7	+ 224	+ 448479	+ 1'09985	+ 0'01575	= + 4'51		1'12
1806.								
April	15	+ 7	+ 411592	+ 1'07215	+ 0'04275	= + 6'27		1'11
1807.								
April	27	- 42	+ 356503	+ 1'04484	+ 0'06766	= + 6'10		1'57
1808.								
February	8	- 2162	+ 262024	+ 0'91675	+ 0'07885	= + 9'31		1'00
May	9	- 21	+ 291424	+ 1'02457	+ 0'08872	= + 0'35		1'57
1809.								
May	22	+ 42	+ 215562	+ 1'00702	+ 0'10578	= + 2'82		1'11
1810.								
June	1	+ 63	+ 134153	+ 0'99482	+ 0'11767	= + 1'51		1'11
1811.								
June	13	- 77	δa	- 48820 δe	+ 0'98826 $\delta \varepsilon$	+ 0'12404 $\delta \pi$	= + 7'02	2'49

CORRECTION OF THE ELEMENTS

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.						Weight.
1812.		$- 21 \delta a - 39092 \delta e + 0.98796 \delta \epsilon + 0.12434 \delta \pi = + 12.45$						2.49
1813.								
June	25							
1813.								
July	8	$+ 14 - 124763 + 0.99412 + 0.11868 = + 5.67$						1.57
1814.								
July	19	$- 28 - 149061 + 0.99701 + 0.11599 = + 13.77$						1.92
1815.								
July	29	$- 17 - 284533 + 1.02271 + 0.09059 = + 15.97$						1.57
1816.								
August	15	$+ 98 - 351685 + 1.04449 + 0.06981 = + 18.94$						1.11
September	13	$+ 1289 - 342705 + 1.02349 + 0.06921 = + 18.48$						1.54
1817.								
August	25	$- 21 - 407072 + 1.06978 + 0.04532 = + 16.93$						1.12
1818.								
September	9	$+ 70 - 445664 + 1.09750 + 0.01863 = + 13.97$						1.94
1819.								
September	20	$+ 7 - 464414 + 1.12643 - 0.00903 = + 6.24$						2.51
1820.								
October	2	$- 21 - 459729 + 1.15454 - 0.03614 = + 2.00$						1.94
1822.								
October	30	$+ 14 - 375447 + 1.20424 - 0.08430 = - 15.53$						2.74
1823.								
January	18	$+ 2322 - 340135 + 1.08517 - 0.07538 = - 16.02$						2.02
November	16	$+ 147 - 298032 + 1.22352 - 0.10272 = - 24.12$						2.51
1824.								
February	4	$+ 2350 - 269631 + 1.09612 - 0.09172 = - 27.68$						1.00
November	25	$- 7 - 200939 + 1.23813 - 0.11633 = - 27.77$						1.58
1825.								
January	25	$+ 2238 - 193022 + 1.15725 - 0.10815 = - 25.52$						1.05
December	7	$- 169 - 90131 + 1.24621 - 0.12421 = - 23.32$						1.58
1826.								
December	25	$+ 21 \delta a + 25354 \delta e + 1.24801 \delta \epsilon - 0.12591 \delta \pi = - 28.24$						1.58

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.						Weight.
1828.		$+ 1895 \delta a + 128891 \delta e + 1'19647 \delta \epsilon - 0'11747 \delta \pi = - 24'14$						2'42
February	20							
March	27	+ 2407	+ 122964	+ 1'12308	- 0'11028	= - 23'39		2'68
1829.								
January	18	- 105	+ 245436	+ 1'23295	- 0'11135	= - 21'57		1'94
February	23	+ 1557	+ 234680	+ 1'20439	- 0'10939	= - 19'26		1'55
March	20	+ 2219	+ 238651	+ 1'15688	- 0'10368	= - 19'87		2'35
1830.								
March	5	+ 1371	+ 324934	+ 1'19602	- 0'09472	= - 15'61		2'20
March	23	+ 2205	+ 316191	+ 1'16614	- 0'09264	= - 12'96		3'21
November	4	- 2120	+ 345037	+ 1'03254	- 0'06555	= - 10'69		3'22
November	22	- 2315	+ 359612	+ 1'06502	- 0'06642	= - 10'25		2'45
December	19	- 2161	+ 380196	+ 1'11850	- 0'06890	= - 10'24		3'15
1831.								
January	15	- 1486	+ 380036	+ 1'16590	- 0'07190	= - 10'00		2'89
February	16	- 71	+ 402441	+ 1'19483	- 0'07473	= - 10'68		3'72
March	16	+ 1221	+ 394273	+ 1'17893	- 0'07493	= - 8'01		3'30
April	12	+ 2095	+ 379361	+ 1'13674	- 0'07274	= - 7'44		3'52
May	2	+ 2341	+ 367417	+ 1'09683	- 0'06983	= - 5'97		2'06
December	28	- 2265	+ 415797	+ 1'08366	- 0'04297	= (- 24'56)		1'47
1832.								
January	24	- 1626	+ 435454	+ 1'13495	- 0'04795	= - 10'45		2'89
March	18	+ 792	+ 442743	+ 1'16444	- 0'05144	= - 6'13		3'84
April	14	+ 1796	+ 428942	+ 1'13068	- 0'04968	= - 4'00		4'45
May	6	+ 2246	+ 413376	+ 1'09186	- 0'04707	= - 2'79		2'33
December	20	- 2265	+ 417665	+ 1'02357	- 0'02157	= (- 12'92)		1'00
1833.								
January	14	- 2117	+ 436887	+ 1'06953	- 0'02153	= - 3'35		1'82
March	6	- 427	+ 463724	+ 1'13894	- 0'02393	= - 3'73		1'58
April	13	+ 1286	+ 456833	+ 1'12532	- 0'02532	= - 2'92		3'81
May	12	+ 2112	+ 437602	+ 1'07767	- 0'02067	= - 0'92		3'83
1834.								
April	13	+ 725	+ 456873	+ 1'10862	+ 0'00237	= + 0'31		3'14
May	16	+ 1885 δa	+ 438927 δe	+ 1'07043 $\delta \epsilon$	+ 0'00157 $\delta \pi$	= + 2'12		3'86

GREENWICH OBSERVATIONS, 1868.

[G]

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.					Weight.
1835.		$- 42 \delta a + 430981 \delta e + 1'09862 \delta \epsilon + 0'03023 \delta \pi = - 5'24$					2'74
April	9						
May	21	$+ 1662 + 420813 + 1'05574 + 0'02826 = - 1'09$					3'74
1836.							
January	22	$- 2181 + 346467 + 0'94983 + 0'05017 = - 5'09$					2'22
February	19	$- 1990 + 343721 + 0'94865 + 0'05135 = - 3'88$					2'09
March	25	$- 1062 + 343641 + 0'94873 + 0'05127 = - 4'92$					2'46
April	21	$- 26 + 345278 + 0'94951 + 0'05049 = - 1'77$					2'23
May	13	$+ 842 + 346845 + 0'95018 + 0'04982 = - 2'62$					3'99
June	4	$+ 1580 + 347871 + 0'95054 + 0'04946 = - 2'93$					3'42
1837.							
February	12	$- 2157 + 290112 + 0'92866 + 0'07134 = - 6'33$					2'86
April	13	$- 805 + 288963 + 0'92831 + 0'07169 = - 7'65$					2'92
May	15	$+ 440 + 291860 + 0'92911 + 0'07089 = - 6'18$					4'16
June	14	$+ 1485 + 293966 + 0'92958 + 0'07042 = - 6'52$					3'42
1838.							
February	12	$- 2145 + 227597 + 0'91193 + 0'08807 = - 10'24$					1'98
March	16	$- 1936 + 222876 + 0'91098 + 0'08902 = - 8'95$					2'34
April	16	$- 1107 + 223378 + 0'91105 + 0'08895 = - 9'01$					1'90
May	17	$- 13 + 225989 + 0'91150 + 0'08850 = - 8'05$					3'60
June	12	$+ 1013 + 208582 + 0'91097 + 0'08803 = - 8'53$					3'30
July	8	$+ 1771 + 230235 + 0'91208 + 0'08792 = - 8'26$					2'38
1839.							
February	25	$- 2140 + 155190 + 0'89878 + 0'10122 = - 9'19$					2'43
April	19	$- 1424 + 150648 + 0'89811 + 0'10189 = - 11'02$					1'87
May	18	$- 415 + 153350 + 0'89841 + 0'10159 = - 9'32$					3'68
June	18	$+ 786 + 157357 + 0'89880 + 0'10120 = - 6'73$					2'21
July	13	$+ 1569 + 159063 + 0'89888 + 0'10112 = - 6'59$					3'04
1840.							
March	9	$- 2125 + 78672 + 0'88696 + 0'10618 = - 10'46$					2'65
April	16	$- 1873 + 76808 + 0'94453 + 0'11647 = - 7'02$					3'96
May	29	$- 461 + 86081 + 0'98834 + 0'12166 = - 7'61$					2'49
June	16	$+ 314 \delta a + 88948 \delta e + 0'98936 \delta \epsilon + 0'12164 \delta \pi = - 7'04$					2'72

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.						Weight.
1840.								
July	17	$+ 1491 \delta a + 90598 \delta e + 0.96718 \delta \varepsilon + 0.11879 \delta \pi = - 5.16$						3.08
August	4	$+ 1929 \quad + 88694 \quad + 0.94309 \quad + 0.11591 \quad = - 4.55$						2.37
1841.								
April	28	$- 1880 \quad + 2962 \quad + 0.94172 \quad + 0.11928 \quad = - 4.79$						2.12
May	20	$- 1279 \quad - 2916 \quad + 0.96918 \quad + 0.12282 \quad = - 5.71$						2.89
June	11	$- 426 \quad - 132 \quad + 0.98531 \quad + 0.12469 \quad = - 6.00$						2.94
August	2	$+ 1598 \quad + 6415 \quad + 0.95863 \quad + 0.12138 \quad = - 2.90$						2.86
August	25	$+ 2066 \quad + 5944 \quad + 0.92572 \quad + 0.11727 \quad = - 2.44$						3.29
1842.								
May	7	$- 1939 \quad - 51187 \quad + 0.94111 \quad + 0.11589 \quad = - 7.49$						1.83
June	15	$- 759 \quad - 73759 \quad + 0.98476 \quad + 0.12123 \quad = - 5.38$						4.01
July	20	$+ 724 \quad - 82042 \quad + 0.98514 \quad + 0.12186 \quad = - 3.15$						3.51
August	11	$+ 1522 \quad - 78065 \quad + 0.96480 \quad + 0.11920 \quad = - 3.35$						4.18
September	15	$+ 2145 \quad - 75223 \quad + 0.91503 \quad + 0.11297 \quad = - 2.04$						2.31
1843.								
July	8	$- 314 \quad - 176280 \quad + 0.99976 \quad + 0.11224 \quad = - 5.77$						2.22
August	10	$+ 1072 \quad - 163968 \quad + 0.98678 \quad + 0.11222 \quad = - 2.81$						4.11
September	13	$+ 1994 \quad - 155954 \quad + 0.94449 \quad + 0.10751 \quad = - 0.37$						4.06
October	12	$+ 2154 \quad - 152196 \quad + 0.90011 \quad + 0.10189 \quad = + 0.79$						2.24
1844.								
January	14	$- 1629 \quad - 215773 \quad + 0.97824 \quad + 0.10176 \quad = - 8.51$						1.87
July	29	$+ 104 \quad - 248955 \quad + 1.01129 \quad + 0.09905 \quad = - 6.64$						3.69
August	25	$+ 1206 \quad - 242216 \quad + 0.99794 \quad + 0.09805 \quad = - 4.40$						2.70
September	22	$+ 1953 \quad - 231940 \quad + 0.96054 \quad + 0.09446 \quad = - 2.89$						3.00
October	19	$+ 2172 \quad - 225008 \quad + 0.91835 \quad + 0.08965 \quad = - 2.49$						2.47
1845.								
July	5	$- 1369 \quad - 325645 \quad + 1.01439 \quad + 0.07761 \quad = - 10.43$						2.18
August	11	$+ 140 \quad - 321344 \quad + 1.03391 \quad + 0.08009 \quad = - 10.64$						3.33
September	8	$+ 1278 \quad - 313172 \quad + 1.01468 \quad + 0.07932 \quad = - 8.87$						4.08
October	15	$+ 2120 \quad - 297030 \quad + 0.96100 \quad + 0.07500 \quad = - 6.25$						3.45
November	9	$+ 2143 \delta a - 288026 \delta e + 0.92214 \delta \varepsilon + 0.07086 \delta \pi = - 5.70$						2.80

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Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.						Weight.
1846.								
July	24	$- 1161 \delta a - 380177 \delta e + 1'04453 \delta \epsilon + 0'05547 \delta \pi = - 17'03$						2'70
August	23	+ 112	- 383067	+ 1'05785	+ 0'05715	= - 15'29		3'17
September	20	+ 1273	- 374401	+ 1'03802	+ 0'05698	= - 13'77		2'92
October	16	+ 1970	- 361069	+ 1'00095	+ 0'05505	= - 11'81		2'81
November	13	+ 2185	- 346204	+ 0'95448	+ 0'05152	= - 11'79		2'26
1847.								
July	28	- 1493	- 422145	+ 1'06157	+ 0'02943	= - 21'26		2'89
August	24	- 419	- 429864	+ 1'08312	+ 0'03088	= - 20'82		3'33
September	20	+ 785	- 426657	+ 1'07718	+ 0'03182	= - 15'76		3'14
October	18	+ 1768	- 412744	+ 1'04258	+ 0'03142	= - 15'63		2'84
November	14	+ 2195	- 395706	+ 0'99744	+ 0'02956	= - 14'53		2'52
December	6	+ 2169	- 382484	+ 0'96080	+ 0'02720	= - 14'37		2'22
1848.								
August	20	- 1108	- 454049	+ 1'10210	+ 0'00290	= - 20'83		3'14
September	16	+ 85	- 458473	+ 1'11294	+ 0'00407	= - 19'72		3'36
October	17	+ 1400	- 448804	+ 1'08882	+ 0'00518	= - 17'98		2'68
November	14	+ 2102	- 432394	+ 1'04298	+ 0'00502	= - 16'86		3'15
December	12	+ 2212	- 410419	+ 0'99349	+ 0'00351	= - 17'00		2'65
1849.								
August	13	- 1808	- 448337	+ 1'10325	- 0'02425	= - 17'47		1'52
September	16	- 525	- 463916	+ 1'14008	- 0'02408	= - 19'09		2'51
October	24	+ 1181	- 458915	+ 1'12411	- 0'02211	= - 18'72		3'30
November	21	+ 2010	- 441542	+ 1'07990	- 0'02090	= - 16'79		3'00
December	18	+ 2259	- 420767	+ 1'02981	- 0'02080	= - 15'41		2'47
1850.								
January	7	+ 2119	- 405795	+ 0'99548	- 0'02148	= - 16'10		0'97
August	26	- 1849	- 429516	+ 1'12995	- 0'05095	= - 16'10		2'86
September	18	- 1043	- 441923	+ 1'15968	- 0'05068	= - 14'87		3'69
October	17	+ 301	- 447065	+ 1'16775	- 0'04975	= - 15'85		2'42
November	17	+ 1631	- 436703	+ 1'13528	- 0'04728	= - 16'45		3'62
December	14	+ 2200	$\delta a - 418029 \delta e + 1'08631 \delta \epsilon - 0'04531 \delta \pi = - 16'12$					2'55

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.						Weight.					
1851.													
January	9	+	2261 δa	-	397438 δe	+	1'03739 $\delta \epsilon$	-	0'04439 $\delta \pi$	=	-	14'40	0'99
September	25	-	1335	-	398087	+	1'17624	-	0'07424	=	-	11'34	2'46
November	13	+	920	-	402614	+	1'18380	-	0'07280	=	-	12'53	3'84
December	15	+	2022	-	387544	+	1'13416	-	0'06916	=	-	12'80	2'40
1852.													
January	7	+	2301	-	370445	+	1'08779	-	0'06679	=	-	12'36	2'28
January	26	+	2253	-	355429	+	1'05143	-	0'06543	=	-	12'93	2'22
September	11	-	2155	-	314627	+	1'15099	-	0'09099	=	-	6'88	1'83
October	17	-	971	-	300694	+	1'20681	-	0'09481	=	-	8'33	2'94
November	14	+	379	-	337091	+	1'21332	-	0'09432	=	-	10'53	2'51
December	21	+	1870	-	328106	+	1'16796	-	0'08997	=	-	10'07	2'86
1853.													
January	13	+	2287	-	313950	+	1'12048	-	0'08648	=	-	10'23	3'56
September	16	-	2319	-	226742	+	1'14699	-	0'10399	=	-	4'69	2'08
October	11	-	1758	-	235528	+	1'19530	-	0'10831	=	-	4'10	2'18
November	13	-	359	-	240951	+	1'23188	-	0'11088	=	-	5'75	3'54
December	31	+	1774	-	213997	+	1'19015	-	0'10615	=	-	6'45	1'08
1854.													
January	17	+	2183	-	237988	+	1'15723	-	0'10323	=	-	6'10	2'35
February	5	+	2365	-	227475	+	1'11693	-	0'09993	=	-	7'14	2'50
September	23	-	2393	-	127792	+	1'13974	-	0'11174	=	-	4'41	2'31
October	22	-	1866	-	132457	+	1'19960	-	0'11760	=	-	3'49	3'24
November	18	-	814	-	139360	+	1'23692	-	0'12092	=	-	3'76	3'36
December	16	-	584	-	145060	+	1'23973	-	0'12074	=	-	3'39	3'72
1855.													
January	15	+	1807	-	143924	+	1'19959	-	0'11659	=	-	2'38	2'16
February	17	+	2382	-	133458	+	1'13111	-	0'11011	=	-	2'60	2'89
March	6	+	2339	-	125238	+	1'09594	-	0'10695	=	-	3'38	1'71
October	3	-	2426	-	13402	+	1'13369	-	0'11469	=	-	4'49	1'02
December	18	-	28	-	28690	+	1'24785	-	0'12585	=	-	1'61	3'72
1856.													
January	20	+	1513	-	33696	+	1'22111	-	0'12311	=	-	1'46	3'48
February	17	+	2262 δa	-	32394 δe	+	1'16670 $\delta \epsilon$	-	0'11771 $\delta \pi$	=	-	0'73	2'35

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.						Weight.
1856.		$+ 2404 \delta a - 26794 \delta e + 1'11452 \delta \epsilon - 0'11253 \delta \pi = - 1'25$						
March	12							1'41
November	30							1'90
December	25							1'94
1857.								
January	23							3'69
February	19							3'38
March	14							2'31
November	6							1'03
December	15							2'20
1858.								
January	20							4'04
February	12							3'65
March	6							3'03
March	29							2'73
October	30							0'99
December	27							1'55
1859.								
January	20							2'51
February	18							3'84
March	14							3'59
April	12							2'06
November	17							1'73
December	15							1'48
1860.								
January	21							2'94
February	19							4'04
March	12							3'30
April	13							3'15
December	13							1'44
1861.								
February	10							3'33
March	15							4'30

Year and Day.		Equations of Condition for the Elements of Saturn's Orbit.					Weight.
1861.							
April	16	— 2002 δa	+ 405746 δe	+ 1'13017 $\delta \epsilon$	— 0'06117 $\delta \pi$	= + 8'38	3'55
December	24	— 2281	+ 419869	+ 1'05175	— 0'03275	= + 7'00	1'44
1862.							
February	7	— 1349	+ 451640	+ 1'13193	— 0'03493	= + 10'61	1'90
March	11	+ 70	+ 458987	+ 1'15498	— 0'03699	= + 10'24	2'24
April	22	+ 1786	+ 442843	+ 1'11827	— 0'03727	= + 10'84	3'90
December	13	— 2132	+ 407429	+ 0'98632	— 0'00932	= + 12'12	1'70
1863.							
February	20	— 1334	+ 455895	+ 1'10427	— 0'00827	= + 13'01	3'97
March	25	+ 105	+ 464415	+ 1'12682	— 0'00982	= + 13'53	4'19
April	28	+ 1524	+ 453730	+ 1'10189	— 0'01089	= + 12'31	4'75
December	10	— 1872	+ 384936	+ 0'94107	+ 0'01293	= + 18'27	0'95
1864.							
January	4	— 2193	+ 398622	+ 0'97730	+ 0'01570	= + 13'93	1'71
January	30	— 2147	+ 415940	+ 1'02220	+ 0'01780	= + 15'41	1'04
March	18	— 1177	+ 441848	+ 1'08843	+ 0'01957	= + 13'11	2'94
April	19	+ 691	+ 445096	+ 1'09385	+ 0'01715	= + 10'97	3'84
May	15	+ 1668	+ 434586	+ 1'06697	+ 0'01603	= + 9'80	3'41
1865.							
April	5	— 524	+ 406513	+ 1'06709	+ 0'04491	= + 12'14	3'51
April	29	+ 566	+ 408183	+ 1'06805	+ 0'04395	= + 9'60	4'01
May	24	+ 1541	+ 400696	+ 1'04565	+ 0'04235	= + 7'22	2'18
June	9	+ 1964 δa	+ 392060 δe	+ 1'02261 $\delta \epsilon$	+ 0'04139 $\delta \pi$	= + 6'00	2'81

CORRECTIONS TO THE HELIOCENTRIC LONGITUDES AND RADII VECTORES OF SATURN, (FORMED FROM BOUVARD'S TABLES), PRODUCED BY AN INCREASED MASS OF JUPITER.

Year and Day.		$\frac{1}{30}$ Part of the Terms in Heliocentric Longitude.	Correction to Planet's Radius Vector.	Year and Day.		$\frac{1}{30}$ Part of the Terms in Heliocentric Longitude.	Correction to Planet's Radius Vector.
1831.		"		1837.		"	
January	15	— 14'92	— 0'0000868	February	12	— 8'29	— 0'0002904
February	16	— 14'95	— 0'0924	April	13	— 7'90	— 2856
March	16	— 14'96	— 0'0976	May	15	— 7'67	— 2844
April	12	— 15'01	— 1'020	June	14	— 7'47	— 2818
May	2	— 15'00	— 1'060	1838.			
December	28	— 15'04	— 1'476	February	12	— 5'79	— 2576
1832.				March	16	— 5'59	— 2536
January	24	— 15'07	— 1'580	April	16	— 5'35	— 2494
March	18	— 14'89	— 1'600	May	17	— 5'21	— 2474
April	12	— 15'00	— 1'646	June	12	— 4'93	— 2450
May	6	— 14'97	— 1'680	July	8	— 4'75	— 2396
December	20	— 14'73	— 1'996	1839.			
1833.				February	25	— 3'11	— 2038
January	14	— 14'74	— 2'026	April	19	— 2'75	— 1944
March	6	— 14'56	— 2'128	May	18	— 2'56	— 1900
April	13	— 14'49	— 2'178	June	18	— 2'26	— 1838
May	12	— 14'42	— 2'218	July	13	— 2'13	— 1796
1834.				1840.			
April	13	— 13'49	— 2'600	March	9	— 0'56	— 1340
May	16	— 13'36	— 2'634	April	16	— 0'34	— 1268
1835.				May	29	— 0'09	— 1184
April	9	— 12'07	— 2'878	June	16	+ 0'02	— 1150
May	21	— 11'68	— 2'918	July	17	+ 0'19	— 1096
1836.				August	4	+ 0'28	— 1054
January	22	— 10'58	— 2'982	1841.			
February	19	— 10'39	— 2'990	April	28	+ 1'83	— 0628
March	25	— 10'21	— 2'990	May	20	+ 1'91	— 0572
April	21	— 10'07	— 2'974	June	11	+ 2'01	— 0556
May	13	— 9'96	— 2'974	August	2	+ 2'23	— 0476
June	4	— 9'80	— 0'0002972	August	25	+ 2'32	— 0'0000444

OF THE ORBIT OF SATURN.

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Year and Day.	$\frac{1}{100}$ Part of the Terms in Heliocentric Longitude.	Correction to Planet's Radius Vector.	Year and Day.	$\frac{1}{100}$ Part of the Terms in Heliocentric Longitude.	Correction to Planet's Radius Vector.
1842.	"		1847.	"	
May 7	+ 3.39	- 0.0000146	October 18	+ 6.53	+ 0.0000242
June 15	+ 3.52	- 0.0108	November 14	+ 6.46	+ 0.0246
July 20	+ 3.63	- 0.0084	December 6	+ 6.42	+ 0.0250
August 11	+ 3.70	- 0.0070	1848.		
September 15	+ 3.84	- 0.0044	August 20	+ 5.69	+ 0.0316
1843.			September 16	+ 5.59	+ 0.0318
July 8	+ 4.82	+ 0.0102	October 17	+ 5.49	+ 0.0330
August 10	+ 4.93	+ 0.0112	November 14	+ 5.39	+ 0.0338
September 13	+ 5.05	+ 0.0116	December 12	+ 5.29	+ 0.0344
October 12	+ 5.04	+ 0.0106	1849.		
1844.			August 13	+ 4.25	+ 0.0400
January 14	+ 5.42	+ 0.0102	September 16	+ 4.09	+ 0.0402
July 29	+ 6.02	+ 0.0124	October 24	+ 3.91	+ 0.0412
August 25	+ 6.00	+ 0.0104	November 21	+ 3.78	+ 0.0420
September 22	+ 6.09	+ 0.0108	December 18	+ 3.64	+ 0.0420
October 19	+ 6.17	+ 0.0104	1850.		
1845.			January 7	+ 3.54	+ 0.0430
July 5	+ 6.59	+ 0.0130	August 26	+ 2.28	+ 0.0474
August 11	+ 6.66	+ 0.0124	September 18	+ 2.13	+ 0.0486
September 8	+ 6.78	+ 0.0128	October 17	+ 1.98	+ 0.0488
October 15	+ 6.83	+ 0.0126	November 17	+ 1.74	+ 0.0502
November 9	+ 6.84	+ 0.0132	December 14	+ 1.60	+ 0.0496
1846.			1851.		
July 24	+ 6.90	+ 0.0142	January 9	+ 1.45	+ 0.0502
August 23	+ 6.95	+ 0.0164	September 25	- 0.19	+ 0.0534
September 20	+ 6.90	+ 0.0164	November 13	- 0.52	+ 0.0544
October 16	+ 6.82	+ 0.0168	December 15	- 0.74	+ 0.0548
November 13	+ 6.80	+ 0.0182	1852.		
1847.			January 7	- 0.64	+ 0.0548
July 28	+ 6.67	+ 0.0236	January 26	- 0.51	+ 0.0552
August 24	+ 6.64	+ 0.0236	September 11	- 2.53	+ 0.0574
September 20	+ 6.59	+ 0.0000238	October 17	- 2.78	+ 0.0000582

GREENWICH OBSERVATIONS, 1868.

[H]

CORRECTION OF THE ELEMENTS

Year and Day.	$\frac{1}{10}$ Part of the Terms in Heliocentric Longitude.	Correction to Planet's Radius Vector.	Year and Day.	$\frac{1}{10}$ Part of the Terms in Heliocentric Longitude.	Correction to Planet's Radius Vector.
1852.	"		1857.	"	
November 14	— 2.95	+ 0.0000590	November 6	— 10.09	+ 0.0000886
December 21	— 3.21	+ 0.586	December 15	— 10.09	+ 0.896
1853.			1858.		
January 13	— 3.37	+ 0.592	January 20	— 10.10	+ 0.902
September 16	— 4.88	+ 0.610	February 12	— 10.08	+ 0.914
October 11	— 5.05	+ 0.614	March 6	— 10.06	+ 0.914
November 13	— 5.27	+ 0.622	March 29	— 10.06	+ 0.914
December 31	— 5.50	+ 0.618	October 30	— 9.96	+ 0.956
1854.			December 27	— 9.82	+ 0.970
January 17	— 5.66	+ 0.626	1859.		
February 5	— 5.78	+ 0.630	January 20	— 9.81	+ 0.972
September 23	— 7.07	+ 0.652	February 18	— 9.72	+ 0.980
October 22	— 7.21	+ 0.656	March 14	— 9.72	+ 0.978
November 18	— 7.30	+ 0.660	April 12	— 9.90	+ 0.984
December 16	— 7.45	+ 0.664	November 17	— 9.38	+ 0.992
1855.			December 15	— 9.34	+ 0.982
January 15	— 7.68	+ 0.666	1860.		
February 17	— 7.80	+ 0.672	January 21	— 9.27	+ 0.980
March 6	— 7.88	+ 0.670	February 19	— 9.23	+ 0.972
October 3	— 8.72	+ 0.696	March 12	— 9.20	+ 0.968
December 18	— 8.94	+ 0.718	April 13	— 9.10	+ 0.962
1856.			December 13	— 8.70	+ 0.830
January 20	— 9.05	+ 0.726	1861.		
February 17	— 9.17	+ 0.728	February 10	— 8.64	+ 0.756
March 12	— 9.28	+ 0.736	March 15	— 8.51	+ 0.732
November 30	— 9.81	+ 0.790	April 16	— 8.46	+ 0.702
December 5	— 9.84	+ 0.790	December 24	— 7.90	+ 0.320
1857.			1862.		
January 23	— 9.89	+ 0.800	February 7	— 7.78	+ 0.230
February 19	— 9.94	+ 0.818	March 11	— 7.76	+ 0.160
March 14	— 9.95	+ 0.0000822	April 22	— 7.68	+ 0.076
			December 13	— 6.65	— 0.0000518

OF THE ORBIT OF SATURN.

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Year and Day.		$\frac{1}{30}$ Part of the Terms in Heliocentric Longitude.	Correction to Planet's Radius Vector.	Year and Day.		$\frac{1}{30}$ Part of the Terms in Heliocentric Longitude.	Correction to Planet's Radius Vector.
1863.		"		1864.		"	
February	20	— 6.36	— 0.0000708	April	19	— 3.73	— 0.0002034
March	25	— 6.16	— 0.0804	May	15	— 3.53	— 2.116
April	28	— 5.95	— 0.0908	1865.			
December	10	— 4.65	— 1.606	April	5	— 0.76	— 3.110
1864.				April	29	— 0.56	— 3.182
January	4	— 4.50	— 1.692	May	24	— 0.35	— 3.260
January	30	— 4.31	— 1.772	June	9	— 0.20	— 0.0003298
March	18	— 3.94	— 0.0001926				

FINAL EQUATIONS FOR THE ELEMENTS OF SATURN'S ORBIT.

FIRST PERIOD.—1751, February 19, to 1783, September 28.

+	773802972	δa	—	36083624664	δe	+	91283.3979	$\delta \epsilon$	—	31.3669	$\delta \pi$	=	+	972404.44
—	36083624664	δa	+	33709982042647	δe	—	61298624.2513	$\delta \epsilon$	+	2743791.5464	$\delta \pi$	=	—	161645561.78
+	91284	δa	—	61298624	δe	+	327.19917	$\delta \epsilon$	—	2.65151	$\delta \pi$	=	—	883.21
—	32	δa	+	2743792	δe	—	2.65151	$\delta \epsilon$	+	1.81673	$\delta \pi$	=	+	313.58

SOLUTION.

δa	=	+	0.0005092
δe	=	—	0.000036084
$\delta \epsilon$	=	—	7.85354
$\delta \pi$	=	+	215.651

SECOND PERIOD.—1784, July 12, to 1814, July 19.

+	223604363	δa	—	5540601545	δe	+	22634.8709	$\delta \epsilon$	—	302.9333	$\delta \pi$	=	—	104068.79
—	5540601545	δa	+	11999016838776	δe	—	10486342.8499	$\delta \epsilon$	+	141294.5798	$\delta \pi$	=	+	10654610.41
+	22635	δa	—	10486343	δe	+	146.25454	$\delta \epsilon$	—	2.49901	$\delta \pi$	=	—	902.64
—	303	δa	+	141295	δe	—	2.49901	$\delta \epsilon$	+	0.94208	$\delta \pi$	=	+	125.36

SOLUTION.

δa	=	+	0.00003736
δe	=	—	0.0000043833
$\delta \epsilon$	=	—	4.40643
$\delta \pi$	=	+	122.0387

FINAL EQUATIONS FOR THE ELEMENTS OF SATURN'S ORBIT—continued.

THIRD PERIOD.—1815, July 29, to 1839, July 13.

+	1027138005"	δa +	68530308363	δe +	241697'9379	$\delta \epsilon$ —	9878'1812	$\delta \pi$ =	—	1168670'65"
+	65830308363	δa +	54478668028608	δe +	129754344'8811	$\delta \epsilon$ —	804317'9863	$\delta \pi$ =	—	816189545'10
+	241698	δa +	129754345	δe +	524'84210	$\delta \epsilon$ —	4'67123	$\delta \pi$ =	—	3500'15
—	9878	δa —	804318	δe —	4'67123	$\delta \epsilon$ +	2'35765	$\delta \pi$ =	—	117'88

SOLUTION.

δa =	+	0'00081250
δe =	+	0'00000129540
$\delta \epsilon$ =	—	" 7'00780
$\delta \pi$ =	+	" 39'9593

FOURTH PERIOD.—1840, March 9, to 1865, June 9.

+	2452637094	δa —	68686204548	δe +	622718'0523	$\delta \epsilon$ —	7'2157	$\delta \pi$ =	—	1905519'82"
—	68686204548	δa +	106201895574900	δe —	27595335'2113	$\delta \epsilon$ —	4008966'6134	$\delta \pi$ =	+	3078575411'57
+	622718	δa —	27595335	δe +	1319'99397	$\delta \epsilon$ —	19'12431	$\delta \pi$ =	—	4054'81
—	7	δa —	4008967	δe —	19'12431	$\delta \epsilon$ +	8'07844	$\delta \pi$ =	—	84'98

SOLUTION.

δa =	+	0'00075368
δe =	+	0'0000286109
$\delta \epsilon$ =	—	" 2'87271
$\delta \pi$ =	—	3'12189

CORRECTIONS TO BOUVARD'S TABLES AFFECTING THE LATITUDE OF SATURN.

Year and Day.	Correction to Bouvard's Table XLII.	Year and Day.	Correction to Bouvard's Table XLII.	Year and Day.	Correction to Bouvard's Table XLII.
1751.	"	1758.	"	1764.	"
February 19	— 2'50	October 19	— 7'13	December 19	— 1'20
April 2	— 2'69	December 12	— 7'03	1765.	
May 31	— 2'98	1759.		January 30	— 1'10
July 2	— 3'14	July 29	— 6'58	August 31	— 0'65
1752.		September 5	— 6'48	November 21	— 0'52
March 10	— 4'31	November 15	— 6'32	1766.	
June 22	— 4'73	December 11	— 6'25	February 19	— 0'36
August 9	— 4'92	1760.		September 12	— 0'06
1753.		August 17	— 5'67	December 8	+ 0'03
April 8	— 5'86	September 18	— 5'57	1767.	
June 29	— 6'12	December 16	— 5'35	March 3	+ 0'16
August 2	— 6'22	1761.		September 29	+ 0'36
October 1	— 6'42	August 9	— 4'67	December 19	+ 0'36
1754.		September 1	— 4'54	1768.	
July 9	— 7'10	October 3	— 4'50	March 15	+ 0'39
August 12	— 7'16	November 6	— 4'37	October 10	+ 0'39
October 1	— 7'23	December 1	— 4'31	1769.	
1755.		1762.		January 2	+ 0'36
July 19	— 7'61	January 1	— 4'24	October 24	+ 0'13
1756.		September 8	— 3'47	1770.	
August 4	— 7'84	October 11	— 3'37	January 19	— 0'03
October 7	— 7'84	November 2	— 3'34	April 17	— 0'10
1757.		1763.		November 6	— 0'42
June 29	— 7'74	January 5	— 3'12	1771.	
August 9	— 7'71	August 17	— 3'53	February 1	— 0'58
September 1	— 7'71	October 8	— 3'92	November 18	— 1'30
October 20	— 7'61	November 11	— 4'15	1772.	
November 16	— 7'61	December 10	— 4'37	February 14	— 1'52
December 3	— 7'58	1764.		1773.	
1758.		January 24	— 2'07	February 27	— 2'66
September 1	— 7'26	October 31	— 1'30	May 28	— 2'95

OF THE ORBIT OF SATURN.

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Year and Day.	Correction to Bouvard's Table XLII.	Year and Day.	Correction to Bouvard's Table XLII.	Year and Day.	Correction to Bouvard's Table XLII.
1774.	"	1787.	"	1797.	"
March 13	— 3.99	August 17	— 6.48	October 6	+ 16.49
June 16	— 4.37	1788.		December 30	+ 16.75
December 29	— 5.12	August 30	— 4.63	1798.	
1775.		November 25	— 4.05	March 23	+ 16.95
March 30	— 5.51	1789.		October 18	+ 17.46
1776.		September 10	— 2.07	1799.	
April 5	— 6.97	December 4	— 1.52	January 12	+ 17.63
1777.		1790.		April 5	+ 17.76
January 28	— 8.16	September 21	+ 0.62	October 30	+ 17.98
April 18	— 8.46	December 20	+ 1.30	1800.	
July 17	— 8.78	1791.		January 25	+ 18.01
1778.		October 7	+ 3.47	April 22	+ 18.05
February 23	— 9.56	1792.		November 18	+ 17.95
May 1	— 9.82	July 23	+ 5.51	1801.	
1779.		October 22	+ 6.22	February 7	+ 17.82
February 17	— 10.76	1793.		May 11	+ 17.76
May 9	— 10.95	January 13	+ 6.84	November 30	+ 17.40
1780.		August 7	+ 8.33	1802.	
May 24	— 11.83	November 6	+ 8.97	February 23	+ 17.24
1782.		1794.		May 21	+ 17.01
March 23	— 12.51	January 26	+ 9.53	December 13	+ 16.39
June 17	— 12.54	August 20	+ 10.85	1803.	
1783.		November 14	+ 11.37	March 12	+ 16.07
July 28	— 12.21	1795.		1804.	
September 28	— 12.12	February 9	+ 11.89	March 21	+ 14.55
1784.		September 5	+ 13.09	June 21	+ 14.16
July 12	— 11.57	December 1	+ 13.61	1805.	
October 10	— 11.31	1796.		April 7	+ 12.60
1785.		February 24	+ 14.00	1806.	
July 23	— 10.40	September 17	+ 15.00	April 15	+ 10.50
1786.		December 24	+ 15.39	1807.	
August 5	— 8.85	1797.		April 27	+ 8.10
November 2	— 8.42	March 13	+ 15.75		

CORRECTION OF THE ELEMENTS

Year and Day.		Correction to Bouvard's Table XLII.	Year and Day.		Correction to Bouvard's Table XLII.	Year and Day.		Correction to Bouvard's Table XLII.
1808.		"	1824.		"	1832.		"
February 8	+	6.29	February 4	-	2.95	December 20	-	1.46
May 9	+	5.70	November 25	-	2.75	1833.		
1809.			1825.			January 14	-	1.52
May 22	+	3.24	January 25	-	1.98	March 6	-	1.65
1810.			December 7	-	1.17	April 13	-	1.78
June 1	+	0.87	1826.			May 12	-	1.81
1811.			December 25	-	0.39	1834.		
June 13	-	1.53	1828.			April 13	-	2.88
1812.			February 20	+	0.19	May 16	-	2.98
June 25	-	3.24	March 17	+	0.23	1835.		
1813.			1829.			April 9	-	4.21
July 8	-	4.92	January 18	+	0.36	May 21	-	4.37
1814.			February 23	+	0.36	1836.		
July 19	-	6.25	March 20	+	0.39	January 22	-	5.22
1815.			1830.			February 19	-	5.38
July 29	-	7.16	March 5	+	0.29	March 25	-	5.54
1816.			March 23	+	0.29	April 21	-	5.64
August 15	-	7.71	November 4	+	0.06	May 13	-	5.73
September 13	-	7.74	November 22	+	0.06	June 4	-	5.80
1817.			December 19	+	0.03	1837.		
August 25	-	7.87	1831.			February 12	-	6.90
1818.			January 15		0.00	April 13	-	7.13
September 9	-	7.65	February 16	-	0.03	May 15	-	7.29
1819.			March 16	-	0.10	June 14	-	7.39
September 20	-	6.80	April 12	-	0.13	1838.		
1820.			May 2	-	0.13	February 12	-	8.36
October 2	-	6.38	December 28	-	0.55	March 16	-	8.49
1822.			1832.			April 16	-	8.62
October 30	-	4.34	January 24	-	0.65	May 17	-	8.68
1823.			March 18	-	0.75	June 12	-	8.78
January 18	-	4.11	April 14	-	0.81	July 8	-	8.94
November 16	-	3.18	May 6	-	0.87			

Year and Day.	Correction to Bouvard's Table XLII.	Year and Day.	Correction to Bouvard's Table XLII.	Year and Day.	Correction to Bouvard's Table XLII.
1839.	"	1843.	"	1847.	"
February 25	— 9'69	August 10	— 12'51	November 14	— 8'20
April 19	— 9'88	September 13	— 12'47	December 6	— 8'13
May 18	— 10'01	October 12	— 12'47	1848.	
June 18	— 10'11	1844.		August 20	— 6'71
July 13	— 10'17	January 14	— 12'41	September 16	— 6'54
1840.		July 29	— 12'15	October 17	— 6'35
March 9	— 10'85	August 25	— 12'12	November 14	— 6'29
April 16	— 10'95	September 22	— 12'09	December 12	— 5'96
May 29	— 11'08	October 19	— 12'02	1849.	
June 16	— 11'15	1845.		August 13	— 4'57
July 17	— 11'21	July 5	— 11'47	September 16	— 4'31
August 4	— 11'24	August 11	— 11'40	October 26	— 4'05
1841.		September 8	— 11'31	November 21	— 3'86
April 28	— 11'83	October 15	— 11'21	December 18	— 3'66
May 20	— 11'89	November 9	— 11'11	1850.	
June 11	— 11'92	1846.		January 7	— 3'56
August 2	— 11'99	July 24	— 10'34	August 26	— 2'01
August 25	— 12'05	August 23	— 10'21	September 18	— 1'81
1842.		September 20	— 10'08	October 17	— 1'62
May 7	— 12'41	October 16	— 9'98	November 17	— 1'39
June 15	— 12'41	November 13	— 9'85	December 14	— 1'17
July 20	— 12'44	1847.		1851.	
August 11	— 12'44	July 28	— 8'72	January 9	— 1'04
September 15	— 12'47	August 24	— 8'62	September 25	+ 0'91
1843.		September 20	— 8'46	November 13	+ 1'26
July 8	— 12'54	October 18	— 8'36	December 15	+ 1'56

EQUATIONS FOR THE NODE AND INCLINATION OF SATURN'S ORBIT.

Year and Day.		Equation.			Weight.
1751.					
February	19	$+ 0.7010 \delta I - 0.0303 (\delta l - \delta N) = - 3.80$			0.99
April	2	$+ 0.6850 - 0.0309 = + 3.49$			1.05
May	31	$+ 0.6617 - 0.0318 = - 1.34$			1.57
July	2	$+ 0.6490 - 0.0323 = - 1.34$			2.20
1752.					
March	10	$+ 0.5427 - 0.0358 = + 2.48$			1.73
June	22	$+ 0.4959 - 0.0367 = + 0.85$			2.22
August	9	$+ 0.4742 - 0.0371 = - 0.66$			1.83
1753.					
April	8	$+ 0.3587 - 0.0391 = + 2.84$			1.45
June	29	$+ 0.3183 - 0.0395 = + 4.09$			2.49
August	2	$+ 0.3015 - 0.0396 = - 1.78$			1.89
October	1	$+ 0.2713 - 0.0398 = + 0.70$			0.99
1754.					
July	9	$+ 0.1264 - 0.0388 = + 4.93$			1.57
August	12	$+ 0.1085 - 0.0383 = + 4.77$			1.54
October	1	$+ 0.0824 - 0.0371 = + 10.70$			1.75
1755.					
July	19	$- 0.0711 - 0.0541 = + 8.35$			1.92
1756.					
August	4	$- 0.2711 - 0.0442 = + 7.91$			1.61
October	7	$- 0.2913 - 0.0444 = + 6.35$			1.80
1757.					
June	29	$- 0.4374 - 0.0406 = + 6.96$			1.52
August	9	$- 0.4172 - 0.0401 = + 9.54$			2.97
September	1	$- 0.4687 - 0.0398 = + 9.02$			2.46
October	20	$- 0.4918 - 0.0392 = + 10.63$			1.80
November	14	$- 0.5038 - 0.0389 = + 9.79$			1.73
December	3	$- 0.5131 - 0.0386 = + 9.65$			1.35
1758.					
September	1	$- 0.6589 \delta I - 0.0359 (\delta l - \delta N) = + 12.06$			2.49

Year and Day.		Equation.			Weight.
1758.					
October	19	— 0.6560 δI — 0.0338 (δl — δN) = + 12.12			2.12
December	12	— 0.6784	— 0.0329	= + 14.22	1.37
1759.					
July	29	— 0.7671	— 0.0287	= + 13.21	2.18
September	5	— 0.7810	— 0.0280	= + 12.07	1.94
November	15	— 0.8057	— 0.0266	= + 13.47	1.45
December	11	— 0.8144	— 0.0261	= + 13.94	1.40
1760.					
August	17	— 0.8891	— 0.0207	= + 10.60	1.55
September	18	— 0.8975	— 0.0199	= + 11.80	1.94
December	16	— 0.9192	— 0.0179	= + 13.00	2.00
1761.					
August	9	— 0.8983	— 0.0113	= + 14.54	2.40
September	1	— 0.9686	— 0.0115	= + 14.00	2.70
October	3	— 0.9732	— 0.0107	= + 15.91	2.97
November	6	— 0.9777	— 0.0156	= + 14.16	2.67
December	1	— 0.9808	— 0.0092	= + 14.61	2.10
1762.					
January	1	— 0.9843	— 0.0092	= + 17.72	2.43
September	8	— 0.9991	— 0.0019	= + 13.11	1.55
October	11	— 0.9997	— 0.0010	= + 14.75	2.51
November	2	— 0.9999	— 0.0003	= + 13.59	2.22
1763.					
January	5	— 0.9997	+ 0.0013	= + 9.11	3.03
August	17	— 0.9842	+ 0.0073	= + 12.88	1.47
October	8	— 0.9779	+ 0.0087	= + 5.21	3.14
November	11	— 0.9732	+ 0.0096	= + 9.27	3.33
December	10	— 0.9689	+ 0.0103	= + 10.74	2.65
1764.					
January	24	— 0.9614	+ 0.0115	= + 9.45	2.24
October	31	— 0.8976	+ 0.0187	= + 6.53	1.12
December	19	— 0.8834 δI + 0.0197 (δl — δN) = + 4.59			1.89

Year and Day.		Equation.			Weight.
1765.					
January	30	$- 0.8702 \delta I + 0.0209 (\delta l - \delta N) = + 3.42$			1.42
August	31	$- 0.7949$	$+ 0.0258$	$= - 1.80$	2.02
November	21	$- 0.7619$	$+ 0.0276$	$= - 0.87$	2.51
1766.					
February	19	$- 0.7230$	$+ 0.0294$	$= + 0.43$	1.00
September	12	$- 0.6247$	$+ 0.0333$	$= + 0.26$	1.00
December	8	$- 0.5795$	$+ 0.0347$	$= - 3.78$	1.12
1767.					
March	3	$- 0.5336$	$+ 0.0359$	$= - 4.99$	1.01
September	29	$- 0.4124$	$+ 0.0385$	$= - 8.60$	1.01
December	19	$- 0.3240$	$+ 0.0393$	$= - 8.08$	1.94
1768.					
March	15	$- 0.3102$	$+ 0.0399$	$= - 4.46$	1.75
October	10	$- 0.0178$	$+ 0.0403$	$= - 7.71$	1.42
1769.					
January	2	$- 0.1235$	$+ 0.0396$	$= - 5.47$	1.94
October	24	$+ 0.0680$	$+ 0.0518$	$= - 9.03$	1.01
1770.					
January	19	$+ 0.1235$	$+ 0.0475$	$= - 9.54$	1.58
April	17	$+ 0.1798$	$+ 0.0456$	$= - 5.96$	1.00
November	6	$+ 0.3063$	$+ 0.0431$	$= - 13.85$	1.00
1771.					
February	1	$+ 0.3584$	$+ 0.0420$	$= - 9.99$	1.03
November	18	$+ 0.5224$	$+ 0.0380$	$= - 15.30$	1.00
1772.					
February	14	$+ 0.6083$	$+ 0.0393$	$= - 15.22$	1.94
1773.					
February	27	$+ 0.7432$	$+ 0.0298$	$= - 11.02$	1.58
May	28	$+ 0.7787$	$+ 0.0279$	$= + 5.74$	1.01
1774.					
March	13	$+ 0.8753$	$+ 0.0216$	$= - 17.74$	1.12
June	16	$+ 0.9011$	$+ 0.0194$	$= - 16.57$	0.99
December	29	$+ 0.9449 \delta I + 0.0147 (\delta l - \delta N) = + 6.11$			1.00

Year and Day.		Equation.			Weight.
1775.					
March	30	+ 0'9608 δI + 0'0125 ($\delta l - \delta N$) = - 10'18			1'12
1776.					
April	5	+ 0'9973	+ 0'0034	= - 16'00	1'11
1777.					
January	28	+ 0'9890	- 0'0058	= - 11'87	1'01
April	18	+ 0'9889	- 0'0058	= - 9'16	1'58
July	17	+ 0'9806	- 0'0079	= - 2'57	1'01
1778.					
February	23	+ 0'9498	- 0'0130	= - 9'62	1'04
May	1	+ 0'9379	- 0'0145	= - 7'61	1'12
1779.					
February	17	+ 0'8718	- 0'0207	= - 9'13	1'00
May	9	+ 0'8498	- 0'0223	= - 5'84	1'11
1780.					
May	24	+ 0'7263	- 0'0292	= - 11'93	1'57
1782.					
March	23	+ 0'4455	- 0'0379	= - 1'54	1'01
June	17	+ 0'4048	- 0'0387	= - 1'28	1'11
1783.					
July	28	+ 0'2028	- 0'0405	= - 4'42	1'11
September	28	+ 0'1711	- 0'0404	= + 1'67	1'42
1784.					
July	12	+ 0'0303	- 0'0435	= - 0'97	1'03
October	10	- 0'0172	- 0'0435	= - 0'23	1'01
1785.					
July	23	- 0'1783	- 0'0454	= - 5'97	1'57
1786.					
August	5	- 0'3730	- 0'0416	= + 5'13	1'12
November	2	- 0'4171	- 0'0406	= + 5'36	1'00
1787.					
August	17	- 0'5955	- 0'0357	=(+ 30'28)	(1'11)
1788.					
August	30	- 0'7162	- 0'0310	= + 9'60	2'24
November	25	- 0'7497 δI - 0'0293 ($\delta l - \delta N$)	= + 10'72		1'41

Year and Day.		Equation.			Weight.
1789.					
September	10	$- 0.8480 \delta I - 0.0235 (\delta l - \delta N) = + 10.19$			2.51
December	4	$- 0.8730 - 0.0217 = + 10.70$			1.42
1790.					
September	21	$- 0.9429 - 0.0149 = + 9.05$			1.94
December	10	$- 0.9592 - 0.0127 = + 11.53$			1.75
1791.					
October	7	$- 0.0937 - 0.0053 = + 9.31$			2.24
1792.					
July	23	$- 0.9979 + 0.0024 = + 6.29$			1.01
October	22	$- 0.9927 + 0.0048 = + 10.61$			1.94
1793.					
January	13	$- 0.9851 + 0.0071 = + 11.26$			1.41
August	7	$- 0.9551 + 0.0125 = + 5.34$			1.42
November	6	$- 0.9364 + 0.0149 = + 7.55$			1.58
1794.					
January	26	$- 0.9173 + 0.0169 = + 10.63$			1.75
August	20	$- 0.8572 + 0.0220 = + 9.06$			1.75
November	14	$- 0.8276 + 0.0240 = + 5.61$			2.24
1795.					
February	9	$- 0.7948 + 0.0259 = + 5.06$			1.42
September	5	$- 0.6654 + 0.0319 = + 3.40$			1.01
December	1	$- 0.6644 + 0.0320 = + 1.61$			1.58
1796.					
February	24	$- 0.6230 + 0.0334 = + 3.00$			1.01
September	17	$- 0.5123 + 0.0367 = - 0.22$			1.00
December	24	$- 0.4563 + 0.0379 = - 5.86$			1.12
1797.					
March	13	$- 0.4097 + 0.0388 = - 0.23$			1.00
October	6	$- 0.2823 + 0.0404 = - 0.94$			1.01
December	30	$- 0.2287 + 0.0408 = 2.78$			1.58
1798.					
March	23	$- 0.1752 + 0.0408 = - 3.27$			1.42
October	18	$- 0.0484 \delta I + 0.0357 (\delta l - \delta N) = - 5.32$			1.01

Year and Day.		Equation.			Weight.
1799.					
January	12	+ 0.0073	$I + 0.0436 (\delta l - \delta N) =$	$- 5.56$	1.12
April	5	+ 0.0610	+ 0.0435	$= - 2.23$	1.01
October	30	+ 0.2031	+ 0.0445	$= - 9.67$	1.00
1800.					
January	25	+ 0.2570	+ 0.0436	$= - 6.32$	1.57
April	23	+ 0.3112	+ 0.0426	$= - 8.56$	1.01
November	18	+ 0.4346	+ 0.0401	$= - 6.22$	1.09
1801.					
February	7	+ 0.4800	+ 0.0390	$= - 11.22$	1.12
May	11	+ 0.5302	+ 0.0376	$= - 7.09$	1.00
November	30	+ 0.6333	+ 0.0343	$= - 10.94$	1.01
1802.					
February	23	+ 0.6726	+ 0.0328	$= - 10.82$	1.58
May	21	+ 0.6725	+ 0.0328	$= - 7.49$	1.42
December	13	+ 0.7939	+ 0.0269	$= - 12.69$	1.01
1803.					
March	12	+ 0.8253	+ 0.0250	$= - 13.14$	1.12
1804.					
March	21	+ 0.9299	+ 0.0164	$= - 12.93$	1.12
June	21	+ 0.9485	+ 0.0142	$= - 5.16$	1.00
1805.					
April	7	+ 0.9884	+ 0.0071	$= - 8.87$	1.11
1806.					
April	15	+ 0.9992	- 0.0021	$= - 7.67$	1.12
1807.					
April	27	+ 0.9662	- 0.0111	$= - 1.77$	1.57
1808.					
February	8	+ 0.9137	- 0.0175	$= - 3.78$	1.00
May	9	+ 0.8927	- 0.0194	$= + 4.16$	1.57
1809.					
May	22	+ 0.7835	- 0.0268	$= - 5.12$	1.11
1810.					
June	1	+ 0.6451	$\delta I - 0.0329 (\delta l - \delta N) =$	$- 2.07$	1.11

Year and Day.		Equation.			Weight.
1811.					
June	13	$+ 0.4819 \delta I - 0.0377 (\delta l - \delta N) = + 2.96$			2.49
1812.					
June	25	$+ 0.2995$	$- 0.0408$	$= + 2.50$	2.49
1813.					
July	8	$+ 0.0985$	$- 0.0386$	$= + 5.52$	1.58
1814.					
July	19	$- 0.0934$	$- 0.0458$	$= + 7.15$	1.92
1815.					
July	29	$- 0.2892$	$- 0.0424$	$= + 7.07$	1.41
1816.					
August	15	$- 0.4805$	$- 0.0386$	$= + 10.57$	1.11
September	13	$- 0.4945$	$- 0.0383$	$= + 12.30$	1.54
1817.					
August	25	$- 0.6503$	$- 0.0334$	$= + 10.61$	1.12
1818.					
September	9	$- 0.7964$	$- 0.0265$	$= + 9.83$	1.92
1819.					
September	20	$- 0.9076$	$- 0.0184$	$= + 11.36$	2.51
1820.					
October	2	$- 0.9642$	$- 0.0091$	$= + 10.44$	1.94
1822.					
October	30	$- 0.9674$	$+ 0.0107$	$= + 8.83$	2.74
1823.					
January	18	$- 0.9536$	$+ 0.0128$	$= + 7.18$	2.02
November	16	$- 0.8799$	$+ 0.0196$	$= + 5.71$	2.51
1824.					
February	4	$- 0.8547$	$+ 0.0224$	$= + 6.21$	1.01
November	25	$- 0.7415$	$+ 0.0290$	$= + 3.80$	1.58
1825.					
January	25	$- 0.7149$	$+ 0.0302$	$= + 2.07$	1.11
December	7	$- 0.5576$	$+ 0.0359$	$= + 0.26$	1.52
1826.					
December	25	$- 0.3352 \delta I + 0.0407 (\delta l - \delta N) = - 1.18$			1.58

Year and Day.		Equation.			Weight.
1828.					
February	20	$- 0.0682 \delta I + 0.0419 (\delta l - \delta N) = -$			2.42
March	27	$- 0.0453 + 0.0412 = -$			2.70
1829.					
January	18	$+ 0.1485 + 0.0437 = -$			1.94
February	23	$+ 0.1717 + 0.0434 = -$			1.54
March	20	$+ 0.1871 + 0.0432 = -$			2.37
1830.					
March	5	$+ 0.4001 + 0.0401 = -$			2.20
March	23	$+ 0.4102 + 0.0399 = -$			3.24
November	4	$+ 0.5351 + 0.0369 = -$			3.22
November	22	$+ 0.5450 + 0.0366 = -$			2.45
December	19	$+ 0.5595 + 0.0362 = -$			3.18
1831.					
January	15	$+ 0.5748 + 0.03598 = -$			2.92
February	16	$+ 0.5910 + 0.0354 = -$			3.72
March	16	$+ 0.6052 + 0.0350 = -$			3.30
April	12	$+ 0.6183 + 0.0345 = -$			3.55
May	2	$+ 0.6280 + 0.0342 = -$			2.06
December	28	$+ 0.7359 + 0.0298 = (-12.27)$			
1832.					
January	24	$+ 0.7464 + 0.0292 = -$			2.89
March	18	$+ 0.7680 + 0.0281 = -$			3.88
April	14	$+ 0.7788 + 0.0276 = -$			4.49
May	6	$+ 0.7869 + 0.0271 = -$			2.35
December	20	$+ 0.8639 + 0.0222 = (-13.24)$			
1833.					
January	14	$+ 0.8714 + 0.0216 = -$			1.83
March	6	$+ 0.8859 + 0.0204 = -$			1.58
April	13	$+ 0.8962 + 0.0196 = -$			3.77
May	12	$+ 0.9037 + 0.0189 = -$			3.83
1834.					
April	13	$+ 0.9679 + 0.0108 = -$			3.14
May	16	$+ 0.9724 \delta I + 0.0100 (\delta l - \delta N) = -$			3.86

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Year and Day.		Equation.			Weight.
1835.					
April	9	$+ 0.9958 \delta I + 0.0019 (\delta l - \delta N) = - 10.95$			2.74
May	21	$+ 0.9984 + 0.0009 = - 11.27$			3.77
1836.					
January	22	$+ 0.9914 - 0.0051 = - 9.32$			2.45
February	19	$+ 0.9894 - 0.0057 = - 9.48$			2.34
March	25	$+ 0.9866 - 0.0066 = - 9.43$			2.46
April	21	$+ 0.9842 - 0.0072 = - 9.26$			2.49
May	13	$+ 0.9821 - 0.0077 = - 9.46$			3.99
June	4	$+ 0.9799 - 0.0083 = - 9.63$			3.25
1837.					
February	12	$+ 0.9437 - 0.0141 = - 8.21$			2.69
April	13	$+ 0.9326 - 0.0154 = - 8.63$			3. 3
May	15	$+ 0.9263 - 0.0161 = - 8.19$			4.31
June	14	$+ 0.9201 - 0.0168 = - 7.80$			3.43
1838.					
February	12	$+ 0.8614 - 0.0219 = - 7.82$			2.23
March	16	$+ 0.8526 - 0.0225 = - 5.23$			2.35
April	16	$+ 0.8439 - 0.0237 = - 6.46$			2.19
May	17	$+ 0.8349 - 0.0237 = - 6.52$			3.69
June	12	$+ 0.8272 - 0.0242 = - 6.04$			3.30
July	8	$+ 0.8193 - 0.0247 = - 5.36$			2.62
1839.					
February	25	$+ 0.7427 - 0.0289 = - 4.30$			2.45
April	19	$+ 0.7237 - 0.0298 = - 5.35$			1.88
May	18	$+ 0.7130 - 0.0303 = - 5.26$			3.68
June	18	$+ 0.7014 - 0.0308 = - 4.46$			2.21
July	13	$+ 0.6920 - 0.0248 = - 4.50$			3.24
1840.					
March	9	$+ 0.5955 - 0.0348 = - 2.64$			2.65
April	16	$+ 0.5794 - 0.0353 = - 2.90$			4.00
May	29	$+ 0.5607 - 0.0358 = - 4.62$			2.49
June	16	$+ 0.5530 \delta I - 0.0360 (\delta l - \delta N) = - 4.10$			2.72

Year and Day.		Equation.			Weight.
1840.					
July	17	1 0.5393 δI - 0.0364 (δl - δN) = - 3.69			3.08
August	4	+ 0.5301 - 0.0366 = - 3.25			2.37
1841.					
April	28	+ 0.4081 - 0.0398 = - 2.76			2.14
May	20	+ 0.3975 - 0.0397 = - 2.57			2.89
June	11	+ 0.3869 - 0.0398 = - 2.30			2.94
August	2	+ 0.3617 - 0.0403 = - 1.71			2.86
August	25	+ 0.3504 - 0.0405 = - 1.49			3.32
1842.					
May	7	+ 0.2225 - 0.0420 = + 0.71			1.83
June	15	+ 0.2026 - 0.0421 = - 0.48			4.01
July	20	+ 0.1846 - 0.0423 = - 0.12			3.51
August	11	+ 0.1732 - 0.0424 = + 0.47			4.22
September	15	+ 0.1552 - 0.0425 = + 1.05			2.31
1843.					
July	8	- 0.0015 - 0.0436 = + 2.28			2.22
August	10	- 0.0160 - 0.0435 = + 2.16			4.11
September	13	- 0.0341 - 0.0435 = + 2.74			4.10
October	12	- 0.0492 - 0.0435 = + 3.35			2.26
1844.					
January	14	- 0.1005 - 0.0439 = + 3.05			1.87
July	29	- 0.2041 - 0.0429 = + 4.10			3.69
August	25	- 0.2182 - 0.0427 = + 3.97			2.67
September	22	- 0.2328 - 0.0426 = + 4.23			2.97
October	19	- 0.2468 - 0.0424 = + 4.00			2.47
1845.					
July	5	- 0.3790 - 0.0404 = + 4.85			2.18
August	11	- 0.3975 - 0.0400 = + 5.19			3.33
September	8	- 0.4114 - 0.0398 = + 5.25			4.08
October	15	- 0.4296 - 0.0394 = + 5.46			3.49
November	9	- 0.4419 - 0.0391 = + 5.52			2.83
1846.					
July	24	- 0.5632 δI - 0.0360 (δl - δN) = + 7.91			2.70

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Year and Day.		Equation.			Weight.
1846.					
August	23	$- 0.5768 \delta I - 0.0356 (\delta l - \delta N) = + 8.16$			3.14
September	20	$- 0.5893$	$- 0.0352$	$= + 8.03$	2.92
October	16	$- 0.6009$	$- 0.0348$	$= + 8.03$	2.81
November	13	$- 0.6132$	$- 0.0344$	$= + 8.81$	2.24
1847.					
July	28	$- 0.7197$	$- 0.0302$	$= + 8.55$	2.45
August	24	$- 0.7301$	$- 0.0298$	$= + 7.56$	3.51
September	20	$- 0.7404$	$- 0.0293$	$= + 7.21$	3.14
October	18	$- 0.7510$	$- 0.0287$	$= + 9.33$	2.84
November	14	$- 0.7609$	$- 0.0282$	$= + 8.69$	2.50
December	6	$- 0.7689$	$- 0.0278$	$= + 8.81$	2.22
1848.					
August	20	$- 0.8543$	$- 0.0226$	$= + 10.35$	3.14
September	16	$- 0.8623$	$- 0.0220$	$= + 10.06$	3.36
October	17	$- 0.8711$	$- 0.0213$	$= + 10.45$	3.65
November	14	$- 0.8789$	$- 0.0207$	$= + 11.21$	3.32
December	12	$- 0.8865$	$- 0.0201$	$= + 11.32$	2.65
1849.					
August	13	$- 0.9430$	$- 0.0144$	$= + 11.15$	1.52
September	16	$- 0.9494$	$- 0.0136$	$= + 10.32$	2.51
October	24	$- 0.9562$	$- 0.0126$	$= + 10.59$	3.30
November	21	$- 0.9609$	$- 0.0120$	$= + 11.13$	3.00
December	18	$- 0.9651$	$- 0.0113$	$= + 11.07$	2.50
1850.					
January	7	$- 0.9681$	$- 0.0108$	$= + 11.66$	0.98
August	26	$- 0.9930$	$- 0.0049$	$= + 12.00$	2.86
September	18	$- 0.9944$	$- 0.0043$	$= + 12.04$	3.69
October	17	$- 0.9960$	$- 0.0035$	$= + 11.24$	2.42
November	17	$- 0.9973$	$- 0.0027$	$= + 12.64$	3.62
December	14	$- 0.9981$	$- 0.0020$	$= + 12.21$	2.35
1851.					
January	9	$- 0.9988$	$- 0.0013$	$= + 11.03$	1.00
September	25	$- 0.9908 \delta I + 0.0056 (\delta l - \delta N) = + 11.94$			2.70

Year and Day.		Equation.			Weight.
1851.					
November	13	— 0.9864 δI + 0.0069 ($\delta l - \delta N$) = + 11.78			3.84
December	15	— 0.9830 + 0.0078 = + 11.93			2.40
1852.					
January	7	— 0.9807 + 0.0084 = + 12.01			2.31
January	26	— 0.9783 + 0.0089 = + 11.75			2.30
September	11	— 0.9392 + 0.0149 = + 10.35			1.83
October	17	— 0.9312 + 0.0158 = + 10.46			2.94
November	14	— 0.9246 + 0.0165 = + 10.78			2.51
December	21	— 0.9155 + 0.0175 = + 10.69			2.86
1853.					
January	13	— 0.9096 + 0.0181 = + 11.05			3.60
September	16	— 0.8339 + 0.0240 = + 9.40			2.08
October	11	— 0.8250 + 0.0248 = + 8.57			2.18
November	12	— 0.8127 + 0.0254 = + 8.40			3.54
December	31	— 0.7944 + 0.0265 = + 8.34			1.09
1854.					
January	17	— 0.7878 + 0.0268 = + 9.09			2.37
February	5	— 0.7802 + 0.0273 = + 8.98			2.56
September	23	— 0.6790 + 0.0320 = + 7.04			2.31
October	22	— 0.6651 + 0.0326 = + 6.59			3.27
November	18	— 0.6519 + 0.0331 = + 5.74			3.36
December	16	— 0.6381 + 0.0336 = + 6.18			3.72
1855.					
January	15	— 0.6229 + 0.0341 = + 5.82			2.18
February	17	— 0.6060 + 0.0347 = + 6.59			2.89
March	6	— 0.5972 + 0.0350 = + 5.60			1.71
October	3	— 0.4815 + 0.0383 = + 2.60			1.03
December	18	— 0.4374 + 0.0393 = + 3.74			3.72
1856.					
January	20	— 0.4179 + 0.0397 = + 3.46			3.65
February	17	— 0.4013 + 0.0400 = + 4.58			2.37
March	12	— 0.3868 δI + 0.0403 ($\delta l - \delta N$) = + 4.18			1.42

CORRECTION OF THE ELEMENTS

Year and Day.		Equation.			Weight.
1856.					
May	30	$- 0.2234 \delta I + 0.0427 (\delta l - \delta N) = + 0.40$			2.20
December	25	$- 0.2075$	$+ 0.0430$	$= + 0.84$	1.94
1857.					
January	23	$- 0.1890$	$+ 0.0432$	$= + 0.85$	3.72
February	19	$- 0.1716$	$+ 0.0433$	$= + 0.83$	3.38
March	14	$- 0.1567$	$+ 0.0435$	$= + 0.85$	2.26
November	6	$- 0.0012$	$+ 0.0436$	$= - 0.52$	1.04
December	15	$+ 0.0239$	$+ 0.0435$	$= - 1.32$	2.20
1858.					
January	20	$+ 0.0478$	$+ 0.0413$	$= - 1.99$	4.04
February	12	$+ 0.0626$	$+ 0.0419$	$= - 1.75$	3.65
March	6	$+ 0.0745$	$+ 0.0421$	$= - 1.71$	3.03
March	29	$+ 0.0894$	$+ 0.0423$	$= - 1.75$	2.73
October	30	$+ 0.2260$	$+ 0.0419$	$= - 3.27$	0.99
December	27	$+ 0.2620$	$+ 0.0416$	$= - 4.41$	1.55
1859.					
January	20	$+ 0.2767$	$+ 0.0414$	$= - 4.49$	2.51
February	18	$+ 0.2946$	$+ 0.0412$	$= - 4.85$	3.84
March	14	$+ 0.3092$	$+ 0.0410$	$= - 5.05$	3.59
April	12	$+ 0.3267$	$+ 0.0408$	$= - 5.59$	2.06
November	17	$+ 0.4542$	$+ 0.0385$	$= - 5.40$	1.73
December	15	$+ 0.4698$	$+ 0.0381$	$= - 6.19$	1.49
1860.					
January	21	$+ 0.4902$	$+ 0.0377$	$= - 7.02$	2.94
February	19	$+ 0.5059$	$+ 0.0373$	$= - 6.93$	4.04
March	12	$+ 0.5178$	$+ 0.0369$	$= - 7.51$	2.92
April	13	$+ 0.5348$	$+ 0.0365$	$= - 7.55$	3.32
December	13	$+ 0.6560$	$+ 0.0326$	$= - 7.78$	1.45
1861.					
February	10	$+ 0.6828$	$+ 0.0315$	$= - 9.95$	3.33
March	15	$+ 0.6975$	$+ 0.0309$	$= - 9.78$	4.26
April	16	$+ 0.7113$	$+ 0.0303$	$= - 9.74$	3.38
December	24	$+ 0.8097 \delta I + 0.0253 (\delta l - \delta N) = - 11.34$			1.45

Year and Day.		Equation.			Weight.
1862.					
February	7	$+ 0.8253 \delta I + 0.0243 (\delta l - \delta N) = - 10.22$			1.89
March	11	$+ 0.8359$	$+ 0.0236$	$= - 11.02$	2.24
April	22	$+ 0.8493$	$+ 0.0227$	$= - 10.99$	3.93
December	13	$+ 0.9140$	$+ 0.0173$	$= - 11.34$	1.70
1863.					
February	20	$+ 0.9294$	$+ 0.0157$	$= - 11.56$	3.86
March	25	$+ 0.9363$	$+ 0.0149$	$= - 11.38$	4.19
April	26	$+ 0.9430$	$+ 0.0141$	$= - 11.23$	4.75
December	10	$+ 0.9776$	$+ 0.0086$	$= (- 24.11)$	1.00
1864.					
January	4	$+ 0.9804$	$+ 0.0080$	$= - 11.54$	1.73
January	30	$+ 0.9831$	$+ 0.0074$	$= - 10.72$	1.05
March	18	$+ 0.9874$	$+ 0.0062$	$= - 10.67$	2.94
April	19	$+ 0.9899$	$+ 0.0054$	$= - 11.02$	3.84
May	15	$+ 0.9917$	$+ 0.0048$	$= - 10.52$	3.44
1865.					
April	5	$+ 0.9955$	$- 0.0032$	$= - 9.57$	3.51
April	29	$+ 0.9944$	$- 0.0038$	$= - 9.28$	4.01
May	24	$+ 0.9932$	$- 0.0044$	$= - 8.76$	2.18
June	9	$+ 0.9922 \delta I - 0.0048 (\delta l - \delta N) = - 9.71$			2.62

SOLUTIONS OF THE EQUATIONS FOR THE NODE AND INCLINATION OF SATURN'S ORBIT,
BY THE METHOD OF *Minimum Squares*.

FIRST PERIOD.—1751, February 19, to 1783, September 28.

$$\begin{aligned}
 + 161.44541 \delta I + 0.35700 (\delta l - \delta N) &= - 1816''.12 \\
 + 0.35700 \delta I + 0.22678 (\delta l - \delta N) &= - 40.86 \\
 \delta I &= - 10''.889 \\
 (\delta l - \delta N) &= - 163.034
 \end{aligned}$$

SECOND PERIOD.—1784, July 12, to 1814, July 19.

$$\begin{aligned}
 + 62.78979 \delta I - 0.01979 (\delta l - \delta N) &= - 556''.57 \\
 - 0.01979 \delta I + 0.11494 (\delta l - \delta N) &= - 14.94 \\
 \delta I &= - 8.900 \\
 (\delta l - \delta N) &= - 115.244
 \end{aligned}$$

THIRD PERIOD.—1815, July 29, to 1839, July 13.

$$\begin{aligned}
 + 304.61047 \delta I + 1.00976 (\delta l - \delta N) &= - 3283''.37 \\
 + 1.00976 \delta I + 0.32257 (\delta l - \delta N) &= - 44.20 \\
 \delta I &= - 10''.330 \\
 (\delta l - \delta N) &= - 104.366
 \end{aligned}$$

FOURTH PERIOD.—1840, March 9, to 1865, June 9.

$$\begin{aligned}
 + 500.98332 \delta I + 2.69561 (\delta l - \delta N) &= - 5735''.24 \\
 + 2.69561 \delta I + 1.11669 (\delta l - \delta N) &= - 72.86 \\
 \delta I &= - 11''.243 \\
 (\delta l - \delta N) &= - 38.11
 \end{aligned}$$