www.e-rara.ch

Theoria motuum planetarum et cometarum

Euler, Leonhard

Berolini, [1744]

ETH-Bibliothek Zürich

Shelf Mark: Rar 4397

Persistent Link: https://doi.org/10.3931/e-rara-551

Investigatio orbitae huius cometae.

www.e-rara.ch
Die Plattform e-rara.ch macht die in Schweizer Bibliotheken vorhandenen Drucke online verfügbar. Das Spektrum reicht von Büchern über Karten bis zu illustrierten Materialien – von den Anfängen des Buchdrucks bis ins 20. Jahrhundert.

e-rara.ch provides online access to rare books available in Swiss libraries. The holdings extend from books and maps to illustrated material – from the beginnings of printing to the 20th century.

e-rara.ch met en ligne des reproductions numériques d'imprimés conservés dans les bibliothèques de Suisse. L'éventail va des livres aux documents iconographiques en passant par les cartes – des débuts de l'imprimerie jusqu'au 20e siècle.

e-rara.ch mette a disposizione in rete le edizioni antiche conservate nelle biblioteche svizzere. La collezione comprende libri, carte geografiche e materiale illustrato che risalgono agli inizi della tipografia fino ad arrivare al XX secolo.

Nutzungsbedingungen Dieses Digitalisat kann kostenfrei heruntergeladen werden. Die Lizenzierungsart und die Nutzungsbedingungen sind individuell zu jedem Dokument in den Titelinformationen angegeben. Für weitere Informationen siehe auch [Link]

Terms of Use This digital copy can be downloaded free of charge. The type of licensing and the terms of use are indicated in the title information for each document individually. For further information please refer to the terms of use on [Link]

Conditions d'utilisation Ce document numérique peut être téléchargé gratuitement. Son statut juridique et ses conditions d'utilisation sont précisés dans sa notice détaillée. Pour de plus amples informations, voir [Link]

Condizioni di utilizzo Questo documento può essere scaricato gratuitamente. Il tipo di licenza e le condizioni di utilizzo sono indicate nella notizia bibliografica del singolo documento. Per ulteriori informazioni vedi anche [Link]

Visual Library

Inveſtigatio Orbitæ hujus Cometæ.

Eligantur tres ſequentes obſervationes Menſe Januario A. 1681. factæ

Tempus	Long. Solis	Diſt. Sol. a Ter.	Long. Comet.	Lat. Cometæ
$5^d, 6^h, 1', 38''$	$9^s, 26°, 22', 18''$	9 8 3 6 3, 5	$0^s, 8°, 49', 10''$	$26°, 15', 26''$
9, 7 ,0 ,53	10, 0 ,29 , 2	9 8 4 0 7, 0	0 ,18,43 ,18	24 ,12 ,42
13,7 ,8 ,55	10, 4 ,33 ,20	9 8 4 5 8, 8	0 ,25,59 ,34	22 ,17 , 36

Hinc erit

$\alpha = 4^d, 0^h, 59', 15'' = 4, 0411$; $l\,\alpha = 0, 6064996$

$\beta = 4^d, 0^h, 8', 2'' = 4, 0055$; $l\,\beta = 0, 6026567$

$\alpha + \beta = 8, 0466$; & $l(\alpha + \beta) = 0, 9056124$

$f = 9^s, 26°, 22', 18''$; $F = 0^s, 8°, 49', 10''$; $\zeta = 26°, 15', 26''$

$g = 10, 0, 29, 2$; $G = 0, 18, 43, 18$; $\eta = 24, 12, 42$

$b = 10, 4, 33, 20$; $H = 0, 25, 59, 34$; $\theta = 22, 17, 36$

$f\,m\,g = \zeta\,m\,\eta = G - F = 9°, 54', 8''$

$g\,n\,b = \eta\,n\,\theta = H - G = 7°, 16', 16''$

$f\,k\,b = \zeta\,k\,\theta = H - F = 17, 10, 24$

$S\,f\,\zeta = F - f = 72, 26, 52$

$S\,g\,\eta = G - g = 78, 14, 16$

$S\,b\,\theta = H - b = 81, 26, 14$

$S\,r\,\eta = G - f = 82, 21, 0$

$S\,p\,\zeta = F - g = 68, 20, 8$

$S\,s\,\theta = H - g = 85, 30, 32$

$S\,q\,\eta = G - b = 74, 9, 58$

$Sf = 9\,8\,3\,6\,3, 5$; $l\,Sf = 4, 9\,9\,2\,8\,3\,4\,0$

$Sg = 9\,8\,4\,0\,7, 0$; $l\,Sg = 4, 9\,9\,3\,0\,2\,6\,0$

$Sb = 9\,8\,4\,5\,8, 8$; $l\,Sb = 4, 9\,9\,3\,2\,5\,4\,5$

Jam ſequentes calculi inſtituantur. $l\,Sf$

$l\,S\,f$ = 4, 9928340	$l\,S\,g$ = 4, 9930260
subt. $l \sin fmg$ = 9, 2354458	$l \sin gnb$ = 9, 1023116
5, 7573882	5, 8907144
$l \sin S r\eta$ = 9, 9961174	$l \sin S s\theta$ = 9, 9986644
$l \sin S f\zeta$ = 9, 9792946	$l \sin S g\eta$ = 9, 9907836
$l \frac{\sin S r\eta}{\sin fmg} Sf$ = 5, 7535056	$l \frac{\sin S s\theta}{\sin gnb} Sg$ = 5, 8893788
$l \frac{\sin S f\zeta}{\sin fmg} Sf$ = 5, 7366828	$l \frac{\sin S g\eta}{\sin gnb} Sg$ = 5, 8814980
$l\,S\,g$ = 4, 9930260	$l\,S\,b$ = 4, 9932545
$l \sin fmg$ = 9, 2354458	$l \sin gnb$ = 9, 1023116
5, 7575802	5, 8909429
$l \sin S g\eta$ = 9, 9907836	$l \sin Sb\theta$ = 9, 9951318
$l \sin S p\zeta$ = 9, 9681848	$l \sin S q\eta$ = 9, 9832008
$l \frac{\sin S g\eta}{\sin fmg} Sg$ = 5, 7483638	$l \frac{\sin Sb\theta}{\sin gnb} Sb$ = 5, 8860747
$l \frac{\sin S p\zeta}{\sin fmg} Sg$ = 5, 7257650	$l \frac{\sin S q\eta}{\sin gnb} Sb$ = 5, 8741437
$\frac{\sin S r\eta}{\sin fmg} Sf$ = 566898, 9	$\frac{\sin S s\theta}{\sin gnb} Sg$ = 775137, 7
$\frac{\sin S g\eta}{\sin fmg} Sg$ = 560226, 8	$\frac{\sin Sb\theta}{\sin gnb} Sb$ = 769262, 7
fm = 6672, 1	gn = 5875, 0
$\frac{\sin S f\zeta}{\sin fmg} Sf$ = 545359, 4	$\frac{\sin S g\eta}{\sin gnb} Sg$ = 761198, 5
$\frac{\sin S p\zeta}{\sin fmg} Sg$ = 531820, 4	$\frac{\sin S q\eta}{\sin gnb} Sb$ = 748417, 0
gm = 13539, 0	bn = 12781, 5
gn = 5875, 0	$l\,m\,n$ = 3, 8844555
mn = 7664, 0	$l \sin fkb$ = 9, 4702096
	4, 4142459

mk	= 3285, 168	$l \sin gnb$	= 9, 1023116
nk	= 4463, 666	$l \sin fmg$	= 9, 2354458
		$l\, mk$	= 3, 5165575
		$l\, nk$	= 3, 6496917

Ut jam labori in ſcrutando valore diſtantiæ $g\,G = r$ vero proximo parcamus, conſulamus Theoriam Neutoni, quæ pro hoc tempore exhibet diſtantiam cometæ a ſole = 110970, unde elicitur diſtantia cometæ a terra = 72747. Hanc obrem pro r aſſumam hos duos valores 72700 & 72800.

Sit ergo r	=	72700	72800
$l\,r$	=	4, 8615344	4, 8621314
add $l \sin \eta$	=	9, 6128990	9, 6128990
add $l \cos \eta$	=	9, 9600122	9, 9600122
$l\,G\,\eta$	=	4, 4744334	4, 4750304
$l\,g\,\eta$	=	4, 8215466	4, 8221436
$g\,\eta$	=	66305, 05	66396, 26
$g\,m$	=	13539, 0	13539, 0
$g\,n$	=	5875, 0	5875, 0
$m\,\eta$	=	52766, 05	52857, 26
$n\,\eta$	=	60430, 05	60521, 26
Sg	=	98407, 0	98407, 0
$g\,\eta$	=	66305, 05	66396, 26
$Sg + g\eta$	=	164712, 05	164803, 26
$Sg - g\eta$	=	32101, 95	32010, 74
$l(Sg - g\eta)$	=	4, 5065314	4, 5052957
$l(Sg + g\eta)$	=	5, 2167254	5, 2169658
		9, 2898060	9, 2883299
$l \tan g\,(90 - \frac{1}{2}Sg\eta)$	=	10, 0897890	10, 0897890
$l \tan g \frac{1}{2}(g\eta S - gS\eta)$	=	9, 3795950	9, 3781189

$\frac{1}{2}(g\eta S - gS\eta)$

$Sg\eta = 78°, 14', 16''$
$\frac{1}{2}Sg\eta = 39,\ 7',\ 8$
Compl. $= 50,\ 52',\ 52''$

$\frac{1}{2}(g\eta S - gS\eta) =$	13°,28′,38″	13°,25′,59″
$90 - \frac{1}{2}Sg\eta =$	50, 52, 52	50, 52, 52′
$g\eta S =$	64, 21 30	64, 18, 51
$gS\eta =$	37, 24, 14	37, 26, 53
$\mathrm{Ad}\, l\, Sg =$	4, 9930260	4, 9930260
add l sin $Sg\eta =$	9, 9907836	9, 9907836
	14, 9838096	14, 9838096
subtr. l sin $g\eta S =$	9, 9549744	9, 9548136
$l\, S\eta =$	5, 0288352	5, 0289960
$a\ \ l G\eta =$	4, 4744334	4, 4750304
l tang $GS\eta =$	9, 4455982	9, 4460344
$GS\eta =$	15°,35′,20″	15°,36′,14″
$\mathrm{A}\, l G\eta =$	4, 4744334	4, 4750304
subtr. l sin $GS\eta =$	9, 4293210	9, 4297284
$lSG =$	5, 0451124	5, 0453020
$l\tau =$	3, 2489776	
$l\alpha =$	0, 6064996	
$l\mathfrak{G} =$	0, 6026567	
$l\alpha\tau =$	3, 8554772	
$l\mathfrak{G}\tau =$	3, 8516343	
$\alpha\tau =$	7169″,3 =	1°,59′,29″
$\mathfrak{G}\tau =$	7106″,1 =	1°,58′,26″
$(\alpha - \mathfrak{G})\tau =$	63, 2 =	1′, 3″
l sin $\alpha\tau =$	8, 5409422	
l sin $\mathfrak{G}\tau =$	8, 5371103	
$l\, 2c^3 =$	15, 3010300	
	32, 3790825	
subt. l cos$(\alpha - \beta)\tau =$	10, 0000000	
	12, 3790825	12, 3790825
subtr $2\, lSG =$	10, 0902248	10, 0906040

lGO =	2, 2888577	2, 2884785
add. l cos G S η =	9, 9837231	9, 9836924
$l\,\eta\,o$ =	2, 2725808	2, 2721709
$\eta\,o$ =	187,32	187,14
ab Sη =	106864,9	106904,5
So =	106677,6	106717,4
Ang. $g\eta$S =	64°,24′,30″	64°,18′,51″
$\zeta m\eta$ =	9, 54, 8	9, 54, 8
$\zeta l o$ =	74, 15, 38	74, 12, 59″
$lm\eta$ =	4, 7223546	4, 7231046
subtr. l sin $\zeta l o$ =	9, 9834031	9, 9833086
	4, 7389515	4, 7397960
add l sin $\zeta m\eta$ =	9, 2354458	9, 2354458
l sin $g\eta$S =	9, 9549744	9, 9548136
1 $l\eta$ =	3, 9743973	3, 9752418
lml =	4, 6939259	4, 6946096
Ergo $l\eta$ =	9427, 52	9445, 87
subtr. ηo =	187, 32	187, 14
$l o$ =	9240, 20	9258, 73
1 $l o$ =	3, 9656814	3, 9665515
add $l\frac{(\alpha+\beta)}{\alpha}$ =	0, 2991128	0, 2991128
erit $l\lambda\theta$ =	4, 2647942	4, 2656643
Ang. $\zeta l o$ =	74°,15′,38′	74°,12′,59″
subtr. $\zeta k\theta$ =	17°,10,24	17, 10, 24
$k\theta\lambda$ =	57 ,5 ,14	57 ,2 ,35
$l\lambda\theta$ =	4, 2647942	4, 2656643
subtr. l sin $\zeta k\theta$ =	9, 4702096	9, 4702096
	4, 7945846	4, 7954547
add l sin $\zeta l o$ =	9, 9834031	9, 9833086
l sin $k\theta\lambda$ =	9, 9240200	9, 9238032

$lk\theta$ =

$l\,k\theta$ =	4, 7779877	4, 7787633
$l\,k\lambda$ =	4, 7186046	4, 7192579
$m\,l$ =	49422, 63	49500, 50
$k\,m$ =	3285, 17	3285, 17
$k\,l$ =	52707, 80	52785, 67
subtr. $k\lambda$ =	52312, 40	52391, 15
$l\lambda$ =	395, 40	394, 52
$l\,l\lambda$ =	2, 5970367	2, 5960690
add. $l\frac{\alpha}{\beta}$ =	0, 0038429	0, 0038429
$l.\ l\zeta$ =	2, 6008796	2, 5999119
$\frac{1}{2}\zeta k\theta$ =	8°,35′,12″	8°,35′,12″
$90-\frac{1}{2}\zeta k\theta$ =	81°,24′,48″	81°,24′,48″
$k\,\zeta$ =	3285, 17	3285, 17
$m\,l$ =	49422, 63	49500, 50
$l\,\zeta$ =	398, 91	398, 02
$k\zeta$ =	53106, 71	53183, 69
$k\theta$ =	59977, 42	60084, 63
$k\theta + k\zeta$ =	113084, 13	113268, 32
$k\theta - k\zeta$ =	6870, 71	6900, 94
$l\,(k\theta - k\zeta)$ =	3, 8370016	3, 8389082
$l\,(k\theta + k\zeta)$ =	5, 0534016	5, 0541084
	8, 7836000	8, 7847998
$l\,\mathrm{tang}\,(90-\frac{1}{2}\zeta k\theta)$ =	10, 8210294	10, 8210294
	9, 6046294	9, 6058292
$\frac{1}{2}(k\zeta\theta - k\theta\zeta)$ =	21°,55′,7″	21°,58′,24″
$\frac{1}{2}(k\zeta\theta + k\theta\zeta)$ =	81, 24, 48	81, 24, 48
$k\zeta\theta$ =	103, 19,55	103, 23,12
$k\theta\zeta$ =	59, 29,41	59, 26,24
$k\zeta\theta + \zeta lo$ =	177, 35,33	177, 36,11
$So\zeta$ =	2°, 24,27	2, 23,49

A l sin $\zeta k\theta$ =	9, 4702096	9, 4702096
subtr. l sin $k\zeta\theta$ =	9, 9881354	9, 9880368
	9, 4820742	9, 4821728
add $l\, k\theta$ =	4, 7779877	4, 7787633
$l\theta\zeta$ =	4, 2600619	4, 2609361
fm =	6672, 1	6672, 1
ml =	49422, 6	49500, 5
$l\zeta$ =	398, 9	398, 0
erit $f\zeta$ =	56493, 6	56570, 6
bn =	12781, 5	12781, 5
nk =	4463, 6	4463, 6
$k\vartheta$ =	59977, 4	60084, 6
erit $b\vartheta$ =	77222, 6	77329, 8
ad $l\, f\zeta$ =	4, 7519993	4, 7525908
add l tang ζ =	9, 6931129	9, 6931129
lFζ =	4, 4451122	4, 4457037
$lb\vartheta$ =	4, 8877445	4, 8883470
add. l tang ϑ =	9, 6127775	9, 6127775
lHϑ =	4, 5005220	4, 5011245
Ergo Hϑ =	31660, 8	31704, 8
Fζ =	27868, 4	27906, 4
Hϑ – Fζ =	3792, 4	3798, 4
l (Hϑ – Fζ) =	3, 5789141	3, 5796007
subtr. $l\zeta\vartheta$ =	4, 2600619	4, 2609361
l tang HNϑ =	9, 3188522	9, 3186646
$a\, l$ Hϑ =	4, 5005220	4, 5011245
l Nϑ =	5, 1816698	5, 1824599
Ang. HNϑ =	11°,46′,15″	11°,45′,57″
Nϑ =	151939, 2	152215, 9

$l\zeta\vartheta$ =

$l\zeta\theta$ =	4, 2600619	4, 2609361
subt. $l\frac{\alpha+\beta}{\beta}$ =	0, 3029557	0, 3029557
$l\theta o$ =	3, 9571062	3, 9579804
θo =	9059, 5	9077, 8
$N o$ =	142879, 7	143138, 1
$\frac{1}{2}\,S o\zeta$ =	1°,12′,13½″	1°,11′,54½″
$90-\frac{1}{2}\,S o\zeta$ =	88°,47′,46½″	88°,48′, 5½″
$S o$ =	106677, 6	106717, 4
$N o$ =	142879, 7	143138, 1
$N o+S o$ =	249557, 3	249855, 5
$N o-S o$ =	36202, 1	36420, 7
$A\,l(N o-S o)$ =	4, 5587338	4, 5613482
subt. $l(N o+S o)$ =	5, 3971703	5, 3976889
	9, 1615635	9, 1636583
add l tang $(90-\frac{1}{2}\,S o\zeta)$ =	11, 6775226	11, 6794316
l tang $\frac{1}{2}\,(oSN-SNo)$ =	10, 8390861	10, 8430899
$\frac{1}{2}\,(oSN-SNo)$ =	81°,45′,29″½	81°,49′,58″
$\frac{1}{2}\,(oSN+SNo)$ =	88, 47, 46 ½	88, 48, 5½
oSN =	170, 33, 16	170, 38, 3½
SNo =	7, 2, 17	6, 58, 7½
ab l sin $S o\zeta$ =	8, 6233157	8, 6214086
subtr. l sin oSN =	9, 2151360	9, 2114815
	9, 4081797	9, 4099271
add. lNo =	5, 1549705	5, 1557552
lSN =	4, 5631502	4, 5656823
Ang. $gS\eta$ =	37°,24′,14″	37°,26′,53″
add oSN =	5ˢ,20, 33, 16	5ˢ,20, 38, 3
subtr.	6ˢ,27, 57, 30	6ˢ,28, 4, 56″
$a\,6^s+g$ =	16, 0, 29, 2	16, 0, 29 2

Long. Nodi Aſcend.	9ˢ,2°,31′,32″	9ˢ,2°,24′, 6″
l tang HNθ =	9, 3188523	9, 3186645
ſubtr. l ſin SNo =	9, 0882372	9, 0839610
l tang. Inclinat.	10, 2306151	10, 2347035
Inclin. Orbitæ ad Eclipt. =	59°,32′,38″	59°,46′,45″
l coſ SNo =	9, 9967152	9, 9967798
add. l coſ HNθ =	9, 9907700	9, 9907779
l coſ SNH =	9, 9874852	9, 9875577
Ergo SNH =	13°,41′,19″	13°,38′,59″
a l F ♋ =	4, 4451122	4, 4457037
a l Hθ =	4, 5005220	4, 5011245
ſubtr. l ſin HNθ =	9, 3096223	9, 3094424
l FN =	5, 1354899	5, 1362613
l HN =	5, 1908997	5, 1916821
½SNH =	6°, 50′,39½″	6°, 49′,29½″
90 − ½SNH =	83°, 9′,20½″	83°,10, 30½″
SN =	36572, 12	36785, 97
NF =	136612, 3	136855, 2
NF + SN =	173184, 4	173641, 2
NF − SN =	100040, 2	100069, 2
a l (NF − SN) =	5, 0001745	5, 0003004
ſubt. (l NF + SN) =	5, 2385087	5, 2396528
	9, 7616658	9, 7606476
add l tang (90 − ½SNH) =	10, 9207206	10, 9219679
l tang ½ (NSF − NFS) =	10, 6823864	10, 6826155
½ (NSF − NFS) =	78°,15′,42½″	78°,16′,4½″
½ (NSF + NFS) =	83, 9, 20½	83, 10, 30½
NSF =	161, 25, 3	161, 26, 35
NFS =	4, 53, 38	4, 54, 26½
A l ſin SNH =	9, 3740724	9, 3728853
ſubtr l ſin NFS =	8, 9310033	8, 9321860

add.

	0, 4430691	0, 4406993
add. l SN =	4, 5631502	4, 5656823
l SF =	5, 0062193	5, 0063816
NH =	155202, 8	155482, 7
SN =	36572, 12	36785, 97
NH + SN =	191774, 9	192268, 7
NH − SN =	118630, 7	118696, 7
A l (NH − SN) =	5, 0741971	5, 0744387
subt. l (NH + SN) =	5, 2827918	5, 2839086
	9, 7914053	9, 7905301
add l tang $(90 - \frac{1}{2}$ SNH) =	10, 9207206	10, 9219679
l tang $\frac{1}{2}$ (NSH − NHS) =	10, 7121259	10, 7124980
$\frac{1}{2}$ (NSH − NHS) =	79°,1′,9$\frac{1}{6}$″	79°,1′,42$\frac{1}{2}$
$\frac{1}{2}$ (NSH + NHS) =	83, 9, 20$\frac{1}{2}$	83,10, 30$\frac{1}{2}$
NSH =	162, 10,29$\frac{2}{3}$	162, 12,13
NHS =	4, 8,11$\frac{1}{3}$	4, 8,48
A l sin SNH =	9, 3740724	9, 3728853
subtr. l sin NHS =	8, 8581311	8, 8591973
	0, 5159413	0, 5136880
Add l SN =	4, 5631502	4, 5656823
l SH =	5, 0790915	5, 0793703
NSH =	162°,10′,29$\frac{2}{3}$″	162°,12′,13″
NSF =	161, 25, 3	161, 26, 35
FSH =	0°,45′,26$\frac{2}{3}$″	0°,45′,38″
FS = y =	101442, 3	101480, 3
HS = z =	119975, 2	120052, 2
l T =	0, 9056124	0, 9056124
Φ =	0°,45′,26$\frac{2}{3}$″	0°, 45′,38″
l sin Φ =	8, 1211936	8, 1229950
l cos Φ =	9, 9999635	9, 9999638

l cot Φ =

$l \cot \Phi =$	11, 8787699	11, 8769688
$l y =$	5, 0062193	5, 0063816
$l z =$	5, 0790915	5, 0793703
$l y z =$	10, 0853108	10, 0857519
$l y y z z =$	20, 1706216	20, 1715038
$l 4 =$	0, 6020600	
$l m^2 =$	10, 8691050	
$l T^2 =$	1, 8112248	
$l 4 m^2 T^2 =$	13, 2823898	13, 2823898
$l \frac{y y z z}{4 m^2 T^2} =$	6, 8882318	6, 8891140
add. $2 l \sin \Phi =$	16, 2423872	16, 2459900
	3, 1306190	3, 1351040
Pars prior $=$	1350, 887	1364, 910
$l \sqrt{y z} =$	5, 0426554	5, 0428759
ſubt. $l 3 =$	0, 4771213	0, 4771213
	4, 5655341	4, 5657546
add $2 l \Phi =$	16, 2423872	16, 2459900
	0, 8079213	0, 8117446
pars poſt. $=$	6, 426	6, 482
Ergo $b =$	1357, 313	1371, 392
$y =$	101442, 3	101480, 3
$z =$	119975, 2	120052, 2
$y - b =$	100085, 0	100108, 9
$z - b =$	118617, 9	118680, 8
A $l(z-b) =$	5, 0741502	5, 0743804
ſubtr. $l(y-b) =$	5, 0003690	5, 0004728
	0, 0737812	0, 0739076
Add $l \frac{y}{z} =$	9, 9271278	9, 9270113

ſubtr.

	10, 0009090	10, 0009189
subt. l sin Φ =	8, 1211936	8, 1229950
l post. subtr.	1, 8797154	1, 8779239
Pass subtrah. =	75, 80807	75, 49600
a cot Φ =	75, 64322	75, 33014
— tang v =	0, 16485	0, 16586
Ergo — v =	9°,21′,40″	9°,25′, 4″
Anom. vera loci F seu v =	170°,38′,20″	170°,34′,56″
subtr. FSN =	161°,25′, 3″	161°,26′,35″
Dist. Nodi ☊ a perihelio	9°,13′,17″	9°, 8′,21″
Ad. ly =	5, 0062193	5, 0063816
add. l — cos v =	9, 9941775	9, 9941065
l — y cos v =	5, 0003968	5, 0004881
add. lb =	3, 1326800	3, 1371615
l Num =	8, 1330768	8, 1376496
— y cos v =	100091, 41	100112, 45
add. $y-b$ =	100085, 0	100108, 9
Denom.	200176, 4	200221, 3
l Denom. =	5, 3014129	5, 3015103
la = =	2, 8316639	2, 8361393
Distantia perih. a Sole a =	678, 678	685, 708
Ergo $2a$ =	1357, 356	1371, 416
& b =	1357, 313	1371, 392
$\delta = 2a-b$ =	0, 043	0, 024

Est ergo orbita cometæ utroque casu Ellipsis maxime oblonga & parabolæ proxima;

$al\delta$ =	(−2), 6334685	(−2), 3802112
subtr. lb =	3, 1326800	3, 1371615
n = ln =	5, 5007885	5, 2430497

Charact. 10. minuatur.

$\frac{1}{2}v$ =

$\frac{1}{2}v$ =	85°,19′,10″	85°,17′,28″
lt =	1, 0868576	1, 0842248
n =	0, 0000316	0, 0000175
lt^3 =	3, 2605728	3, 2526744
lt^5 =	5, 4342880	5, 4211240
lt^7 =	7, 6080032	7, 5895736
lnt^5 =	0, 9350765	0, 6641737
$lnnt^7$ =	(−2), 6095802	(−2), 0756730
t =	12, 21399	12, 14017
$\frac{1}{3}t^3$ =	607, 36750	596, 4215
$t + \frac{1}{3}t^3$ =	619, 5815	608, 5616
subtr.	3, 4445	1, 8460
add.	0, 0174	0, 0051
$t + \frac{1}{3}t^3 - \frac{2}{5}nt^5 + \frac{3}{7}n^2t^7 -$ &c. =	616, 1544	606, 7207
hujus log.	2, 7896895	2, 7829888
$2la$ =	5, 6633278	5, 6722786
subtr. lVb =	1, 5663400	1, 5685808
	4, 0969878	4, 1036978
subtr. lm =	5, 4345525	5, 4345525
	8, 6624353	8, 6691473
add.	2, 7896895	2, 7829888
	1, 4521248	1, 4521361
A Perih. ad F dies. =	28, 3221	28, 3228
seu		
At est tempus in F =	28 ^{d},7^b,43′,50″	28^d,7^b,44′,50″
A 1680 Dec.	36^d,6, 1, 38	39^d,9 1, 38
Cometa per perihelium transiit A. 1680 Decembr.	7^d,22^b,17′,48″	7^d,22^b,16′,48″
Distantia Perih. a Sole =	678, 678	685, 708
semilatus rectum =	1357, 313	1371, 392
Dist. Nodi ☊ a Perihelio =	9°,13′,17″	9°, 8′,21″
Longitudo Nodi ☊ =	9^s,2°,31′,32″	9^s,2°,24′, 6″
Inclinatio Orbitæ ad Eclipt.	59°,32′,38″	59°,46′,45″

Compa-

Comparentur jam hæ binæ determinationes cum obſervatione quadam quarta; quem in finem eligatur obſervatio A. 1680 die 12 Decembris facta, quæ ita ſe habebat.

A. 1680. Dec. 12^d, 4^h, $46'$, $0''$
Longitudo Cometæ; 9^s, $6°$, $31'$, $21''$
Latitudo Cometæ bor. $8°$, $26'$, $0''$
Longitudo Solis $9,^s$ $1°$, $51'$, $23''$
Diſt. Solis a terra $=$ 98275, ejus log. $=$ 4,9924431

Temp. propoſitum		
A. 1680 Mens. Dec.	$12^d, 4^h, 46', 0''$	$12^d, 4^h, 46', 0''$
ſubtr. temp. Perihelii	7, 22, 17, 48	7, 22, 16, 48''
Erit tempus T $=$	4 , 6, 28, 12	4 , 6, 29, 12
& in diebus eſt T $=$	4, 26958	4, 27027
l T $=$	0, 6303852	0, 6304553
add $l\ m$ $=$	5, 4345525	5, 4345525
	6, 0649377	6, 0650078
ſubtr. $l \frac{a\,a}{\sqrt{b}}$ $=$	4, 0969878	4, 1036978
Vid. Probl. VII. $l\ n$ $=$	1, 9679499	1, 9613100
& n $=$	92, 88592	91, 47660
$\frac{1}{2} n$ $=$	46, 44296	45, 73830
Ergo $\frac{3}{2} n$ $=$	139, 32888	137, 21490
$l \frac{3}{2} n$ $=$	2, 1440412	2, 1374012
$2\ l \frac{3}{2} n$ $=$	4, 2880824	4, 2748024
$\frac{2}{4} n n$ $=$	19413, 55	18827, 93
ad 1	19414, 55	18828, 93
$l\ (\frac{2}{4} n n + 1)$ $=$	4, 2881271	4, 2748255
$l \sqrt{}\ (\frac{2}{4} n n + 1)$ $=$	2, 1440636	2, 1374128
$\sqrt{}\ (\frac{2}{4} n n + 1)$ $=$	139, 3361	137, 2185
add. $\frac{3}{2} n$ $=$	139, 3289	137, 2149

	278, 6650	274, 4334
$l(\frac{3}{2}n + \sqrt{(\frac{9}{4}nn + 1)}) =$	2, 4450823	2, 4384369
l partis majoris $=$	0, 8150274	0, 8128123
l partis minoris $=$	9, 1849725	9, 1871876
Pars major $=$	6, 531718	6, 498489
Pars minor $=$	0, 153099	0, 153882
Eritque $\theta =$	6, 378619	6, 344607
$l\,\theta =$	0, 8047267	0, 8024047
$l\,\frac{2\delta}{b} =$	(−5), 8018185	(−5), 5440797
$l\,\frac{2\delta}{b}\,\theta =$	(−4), 6065452	(−4), 3464844
$2\,l\theta =$	1, 6094534	1, 6048094
$l\,\frac{2\delta}{b}\,\theta^3 =$	(−2), 2159986	(−3), 9512938
	0, 4771213	0, 4771213
$l\,\frac{2\delta}{3b}\,\theta^3 =$	(−3), 7388773	(−3), 4741725
A tang $\theta =$	81°,5′,24″	81°,2′,35″
seu	291924″	291755″
huj. log. $=$	5, 4652698	5, 4650183
add.	4, 6855749	4, 6855749
$l\,\frac{2\delta}{b}$	0, 1508447	0, 1505932
$= l\,\frac{2\delta}{b} =$	(−5), 8018185	(−5), 5440797
$l\,\frac{2\delta}{b}$ A tang $\theta =$	(−5), 9526632	(−5), 6946729
$\theta =$	6, 378619	6, 344607
subtr. $\frac{2\delta}{b}\,\theta =$	0, 000404	0, 000222

add. 2δ

add. $\frac{2\delta}{3b}\theta^3$ =	6, 378215	6, 344385
	0, 005481	0, 002980
$\frac{2\delta}{b}$ A tang θ =	0, 000089	0, 000049
t = tang $\frac{1}{2}v$ =	6, 383785	6, 347414
l tang $\frac{1}{2}v$ =	10, 8050782	10, 8025969
$\frac{1}{2}v$ =	81°, 5′,50″	81°,2′,49″
& v =	162, 11, 40″	162, 5, 38
b =	1357, 313	1371, 392
a =	678, 678	685, 708
$b-a$ =	678, 635	685, 684
$l(b-a)$ =	2, 8316362	2, 8361240
la =	2, 8316639	2, 8361393
$l\frac{b-a}{a}$ =	9, 9999723	9, 9999847
$l-\cos v$ =	9, 9786825	9, 9784370
$l\frac{b-a}{a}$ =	9, 9999723	9, 9999847
	9, 9786548	9, 9784217
$-\frac{b-a}{a}\cos v$ =	0, 9520392	0, 9515284
Denom. =	0, 0479607	0, 0484715
lb = l num. =	3, 1326800	3, 1371615
l Den. =	8, 6808855	8, 6854865
ly =	4, 4517945	4, 4516750
Ab v =	162°,11′,40″	162°,5′,38″
ſubtr. diſt. Nodi a Perih. =	9, 13, 17	9, 8, 21
Diſt. Cometæ a Nodo =	152, 58, 23	152, 57,17

In triangulo ergo ſphærico ad Rectangulo CNP repræſentet N nodum aſcend. NP eclipticam & NC orbitam cometæ, dantur. Fig. 6.

 NC=

	N C =	152°,58′,23″	152°,57′,17″
	ang. CNP =	59, 32, 38	59, 46, 45
sin CP = sin NC. sin N.	*l* sin NC =	9, 6574473	9, 6577197
tang NP = cos N. tang NC.	*l* sin N =	9, 9355161	9, 9365599
	l sin C P =	9, 5929634	9, 5942796
	Latitudo heliocentr C P =	23°,3′,39″	23°,8′,6″
	l cos N =	9, 7049036	9, 7018564
	l — tang N C =	9, 7076705	9, 7080138
	l — tang N P =	9, 4125741	9, 4098702
	Ergo N P =	165°,30′,10″	165°,35′,20″
	seu N P =	5′,15°,30′,10″	5′,15°,35′,20″
	Add. longitudo Nodi =	9, 2, 31, 32	9, 2, 24, 6
	Longitudo heliocentrica	2, 18, 1, 42	2, 17, 59, 26
	Longitudo terræ =	3, 1, 51, 23	3, 1, 51, 23
Fig. 7.	Ergo ang. *c* S T =	13, 49, 41	13°, 51, 57
	C S *c* =	23, 3, 39	23, 8, 6
	l y = *l* C S =	4, 4517945	4, 4516750
	add. *l* sin C S *c* =	9, 5929634	9, 5942796
	l cos C S *c* =	9, 9638300	9, 9635903
	l C *c* =	4, 0447579	4, 0459546
	l S *c* =	4, 4156245	4, 4152653
	add. *l* sin *c* S T =	9, 3784143	9, 3795762
	l cos *c* S T =	9, 9872269	9, 9871565
	l c P =	3, 7940388	3, 7948415
	l S P =	4, 4028514	4, 4024218
	S P =	25284, 32	25259, 32
	ab S T =	98275	98275
	Erit T P =	72990, 68	73015, 68
	A *l c* P =	3, 7940388	3, 7948415
	subtr. *l* T P =	4, 8632675	4, 8634162

l tang.

l tang. $STc =$	8, 9307713	8, 9314253
$STc =$	4°,52′,24″	4°,52′,51″
Addatur long. Solis	9ˢ,1,51,23	9ˢ,1,51,23
Long. Com. Geocentrica	9ˢ, 6°,43′,47″	9ˢ, 6°,44′,14″
$A\ l\Gamma P =$	4, 8632675	4, 8634162
subtr. l cos $STc =$	9, 9984272	9, 9984223
$l c\Gamma =$	4, 8648403	4, 8649939
$a\ lCc =$	4, 0447579	4, 0459546
l tang $CTc =$	9, 1799176	9, 1809607
Latitudo Geocentrica	8°,36′,18″	8°,37′,32″

Accedit ergo prior hypotheſis qua ſumſimus $r = 72700$ propius ad veritatem, ex quo concludimus valorem verum ipſius r multo minorem eſſe debere aſſumto. Atque ex latitudinibus concluditur iſte valor ipſius r diminui debere 835, ob longitudines autem diminui deberet 2763. Medium ergo ſumendo foret valor ipſius $r = 72700 - 1800 = 70900$ Hac itaque poſitione orbita cometæ multo magis a parabola ad figuram ellipticam reducetur, qua cognita hujus cometæ tempus periodicum definiri poterit. Quæ inveſtigatio cum operæ pretium ſit, tribuamus iterum ipſi r duos valores intra quos verus contineatur.

Sit ergo	$r =$	70000	72000
erit	$lr =$	4, 8450980	4, 8573325
add.	l sin $\eta =$	9, 6128990	9, 6128990
	l cos $\eta =$	9, 9600122	9, 9600122
	$lG\eta =$	4, 4579970	4, 4702315
	$lg\eta =$	4, 8051102	4, 8173447

$g\eta =$

$g\eta$ =	63842, 5	65666, 6
gm =	13539, 0	13539, 0
gn =	5875, 0	5875, 0
$m\eta$ =	50303, 5	52127, 6
$n\eta$ =	57967, 5	59791, 6
Sg =	98407, 0	98407, 0
$g\eta$ =	63842, 5	65666, 6
$Sg + g\eta$ =	162249, 5	164073, 6
$Sg - g\eta$ =	34564, 5	32740, 4
$l\,(Sg - g\eta)$ =	4, 5386302	4, 5150840
$l\,(Sg + g\eta)$ =	5, 2101833	5, 2150387
	9, 3284469	9, 3000453
l tang $(90 - \frac{1}{2} Sg\eta)$ =	10, 0897890	10, 0897890
l tang $\frac{1}{2}\,(g\eta S - gS\eta)$ =	9, 4182359	9, 3898343
$\frac{1}{2}(g\eta S - gS\eta)$ =	14°,40′,46″	13°,47′,12″
$\frac{1}{2}(g\eta S + gS\eta)$ =	50, 52, 52	50, 52, 52
$g\eta S$ =	65, 33, 38	64, 40, 4
$gS\eta$ =	36, 12, 6	37, 5, 40
A $l\,Sg$ ſin $Sg\eta$ =	14, 9838096	14, 9838096
ſubtr. l ſin $g\eta S$ =	9, 9592327	9, 9560926
$lS\eta$ =	5, 0245769	5, 0277170
a $lG\eta$ =	4, 4579970	4, 4702315
l tang $GS\eta$ =	9, 4334201	9, 4425145
$GS\eta$ =	15°,10′,41″	15°,29′,2″
A $lG\eta$ =	4, 4579970	4, 4702315
ſubtr. lſin $GS\eta$ =	9, 4180021	9, 4264582
lSG =	5, 0399949	5, 0437733
	12, 3790825	12, 3790825
ſubtr. 2 lSG =	10, 0799898	10, 0875466
lGO =	2, 2990927	2, 2915359
add l coſ $GS\eta$ =	9, 9845798	9, 9839443

$l\eta o$ =

$l\,\eta\,o$ =	2, 2836725	2, 2754802
Ergo $\eta\,o$ =	192, 164	188, 573
ab $S\eta$ =	105822, 22	106590, 12
$S\,o$ =	105630, 06	106401, 55
Ang. $g\eta S$ =	65°,33′,38″	64°,40′,4″
$\zeta\,m\,\eta$ =	9, 54, 8	9, 54, 8
$\zeta\,l\,o$ =	75, 27, 46	74, 34, 12
A $l m \eta$ =	4, 7015982	4, 7170677
subtr. l sin $\zeta l o$ =	9, 9858686	9, 9840573
	4, 7157296	4, 7330104
add l sin $\zeta m \eta$ =	9, 2354458	9, 2354458
l sin $g\eta S$ =	9, 9592327	9, 9560926
$l\,l\,\eta$ =	3, 9511754	3, 9684562
$l\,m\,l$ =	4, 6749623	4, 6891030
Ergo $l\eta$ =	8936, 67	9299, 43
subtr. $\eta\,o$ =	192, 16	188, 57
$l\,o$ =	8744, 51	9110, 86
$l\,l\,o$ =	3, 9417355	3, 9595593
add. $l\,\frac{\alpha+\beta}{\alpha}$ =	0, 2991128	0, 2991128
$l\,\lambda\,\theta$ =	4, 2408483	4, 2586721
Ab ang. $\zeta l o$ =	75°,27′,46″	74°,34′,12″
subtr. $\zeta k \theta$ =	17, 10, 24	17, 10, 24
$k\theta\lambda$ =	58, 17, 22	57, 23, 48
A $l\lambda\theta$ =	4, 2408483	4, 2586721
subtr. l sin $\zeta k \theta$ =	9, 4702096	9, 4702096
	4, 7706387	4, 7884625
add. l sin $\zeta l o$ =	9, 9858686	9, 9840573
l sin $k\theta\lambda$ =	9, 9297837	9, 9255293

$l\,k\theta$ =	4, 7565073	4, 7725198
$l\,k\lambda$ =	4, 7004224	4, 7139918
$m\,l$ =	47311, 02	48876, 81
add. km =	3285, 17	3285, 17
$k\,l$ =	50596, 19	52161, 98
subtr. $k\lambda$ =	50167, 50	51759, 70
$l\lambda$ =	428, 69	402, 28
$l\,l\lambda$ =	2, 6321433	2, 6045284
add. $l\,\frac{a}{e}$ =	0, 0038429	0, 0038429
$l\,l\zeta$ =	2, 6359862	2, 6083713
$k\,l$ =	50596, 19	52161, 98
$l\zeta$ =	432, 50	405, 85
$k\zeta$ =	51028, 69	52567, 83
$k\theta$ =	57082, 07	59227, 02
$k\theta + k\zeta$ =	108110, 76	111794, 85
$k\theta - k\zeta$ =	6053, 38	6659, 19
$l\,(k\theta - k\zeta)$ =	3, 7819979	3, 8234215
$l\,(k\theta + k\zeta)$ =	5, 0338690	5, 0484219
	8, 7481289	8, 7749996
l tang $(90 - \frac{1}{2}\zeta k\theta)$ =	10, 8210294	10, 8210294
	9, 5691583	9, 5960290
$\frac{1}{2}\,(k\zeta\theta - k\theta\zeta)$ =	20°,20′,44″	21°,31′,42″
$\frac{1}{2}\,(k\zeta\theta + k\theta\zeta)$ =	81, 24 48	81, 24, 48
$k\zeta\theta$ =	101, 45, 32	102, 56, 30
$k\theta\zeta$ =	61, 4, 4	59, 53, 6
$\zeta l o$ =	75°,27, 46	74, 34, 12
$k\zeta\theta + \zeta l o$ =	177, 13, 18	177, 30, 42
$S o \zeta$ =	2, 46, 42	2, 29, 18
A l sin $\zeta k\theta$ =	9, 4702096	9, 4702096
subtr. l sin $k\zeta\theta$ =	9, 9907889	9, 9888258

add. $lk\theta$

	9, 4794207	9, 4813838
add. $lk\theta$ =	4, 7565073	4, 7725198
$l\vartheta\zeta$ =	4, 2359280	4, 2539036
fm =	6672, 1	6672, 1
ml =	47311, 0	48876, 8
$l\zeta$ =	432, 5	405, 8
Erit $f\zeta$ =	54415, 6	55954, 8
bk =	17245, 1	17245, 1
$k\theta$ =	57082, 1	59227, 0
erit $b\theta$ =	74327, 2	76472, 1
$lf\zeta$ =	4, 7357234	4, 7478373
l tang ζ =	9, 6931129	9, 6931129
lFζ =	4, 4288363	4, 4409502
$lb\theta$ =	4, 8711478	4, 8835030
l tang θ =	9, 6127775	9, 6127775
lHθ =	4, 4839253	4, 4962805
Ergo Hθ =	30473, 7	31353, 1
Fζ =	26843, 3	27602, 6
Hθ — Fζ =	3630, 4	3750, 5
l (Hθ — Fζ) =	3, 5599545	3, 5740892
$l\zeta\theta$ =	4, 2359280	4, 2539036
l tang HNθ =	9, 3240265	9, 3201856
a lHθ =	4, 4839253	4, 4962805
lNθ =	5, 1598988	5, 1760949
Ang. HNθ =	11°,54′,28″	11°,48′,21″
Nθ =	144510, 3	150001, 3
A$l\zeta\vartheta$ =	4, 2359280	4, 2539036
subtr. $l\frac{a+e}{e}$ =	0, 3029557	0, 3029557
$l\vartheta o$ =	3, 9329723	3, 9509479
θo =	8569, 83	8931, 98

$N\,o$ =	135940, 5	141069, 3
$\frac{1}{2}\,S\,o\,\zeta$ =	1°,23′,21″	1°,14′,39″
$90 - \frac{1}{2}\,S\,o\,\zeta$ =	88, 36, 39	88, 45, 21
$,, S\,o$ =	105630, 06	106401, 55
$N\,o$ =	135940, 5	141069, 3
$N\,o + S\,o$ =	241570, 5	247470, 8
$N\,o - S\,o$ =	30310, 5	34667, 8
$l\,(N\,o - S\,o)$ =	4, 4815930	4, 5399263
$l\,(N\,o + S\,o)$ =	5, 3830439	5, 3935239
	9, 0985491	9, 1464024
l tang $(90 - \frac{1}{2}\,S\,o\,\zeta)$ =	11, 6152831	11, 6631758
l tang $\frac{1}{2}\,(o\,SN - SN\,o)$ =	10, 7138322	10, 8095782
$\frac{1}{2}\,(o\,SN - SN\,o)$ =	79°, 3′,40″	81°,11′,15″
$\frac{1}{2}\,(o\,SN + SN\,o)$ =	88, 36, 39	88, 45, 21
$o\,SN$ =	167, 40, 19	169, 56, 36
$SN\,o$ =	9, 32, 59	7, 34, 6
ab l ſin $S\,o\,\zeta$ =	8, 6854914	8, 6376495
ſubtr. l ſin $o\,SN$ =	9, 3294159	9, 2420989
	9, 3560755	9, 3955506
$l\,N\,o$ =	5, 1333489	5, 1494324
$l\,SN$ =	4, 4894244	4, 5449830
Ang. $g\,S\,\eta$ =	36, 12, 6	37, 5, 40
ſeu	1′,6°, 12′,6″	1′,7°, 5′,40″
$o\,SN$ =	5, 17,40,19	5, 19,56,36
	6, 23,52,25	6, 27, 2,16
$a\ 6' + g$ =	16, 0, 29, 2	16, 0, 29, 2
Long. Nodi aſcend.	9, 6, 36,37	9, 3, 26,46
l tang $HN\,\Upsilon$ =	9, 3240265	9, 3201856
ſubtr. l ſin $SN\,o$ =	9, 2198555	9, 1196138
	10, 1041710	10, 2005718

Inclinatio

Inclinatio Orb. ad Eclipt.	51°,48′,24″	57°,47′,2″
l cos SN☌ =	9, 9939394	9, 9962000
add. *l* cos HN☊ =	9, 9905525	9, 9907146
l cos SNH =	9, 9844919	9, 9869146
SNH =	15°,13′,15″	13°,59′,40″
☌ *l* F☋ =	4, 4288363	4, 4409502
l H☊ =	4, 4839253	4, 4962805
subtr. *l* sin HN☊ =	9, 3145790	9, 3109002
l FN =	5, 1142573	5, 1300500
l HN =	5, 1693463	5, 1853803
½ SNH =	7°,36′,37½″	6°,59′,50″
90 − ½ SNH =	82, 23, 22½	83, 0, 10″
SN =	30862, 02	35073, 82
NF =	130094, 03	134911, 87
NF + SN =	160956, 05	169985, 7
NF − SN =	99232, 01	99838, 05
l (NF − SN) =	4, 9966517	4, 9992961
l (NF + SN) =	5, 2067073	5, 2304124
	9, 7899444	9, 7688837
l tang (90 − ½ SNH) =	10, 8741495	10, 9110303
l tang ½ (NSF − NFS) =	10, 6640939	10, 6799140
½ (NSF − NFS) =	77°,46′,18½″	78°,11′,48″
½ (NSF + NFS) =	82, 23, 22½	83, 0, 10
NSF =	160, 9, 41	161, 11, 58
NFS =	4, 37, 4	4, 48, 22
l sin SNH =	9, 4191955	9, 3835062
subt. *l* sin NFS =	8, 9058402	8, 9231624
	0, 5133553	0, 4603438
l SN =	4, 4894244	4, 5449830
l SF =	5, 0027797	5, 0053268

NH =	147688, 39	153242, 89
SN =	30862, 02	35073, 82
NH+SN =	178550, 41	188316, 71
NH − SN =	116826, 37	118169, 07
a *l* (NH − SN) =	5, 0675410	5, 0725038
l (NH+SN) =	5, 2517608	5, 2748889
	9, 8157802	9, 7976149
l tang (90−½SNH) =	10, 8741495	10, 9110303
	10, 6899297	10, 7086452
½ (NSH − NHS) =	78°,27′,30⅔″	78°,55′,59¼
½ (NSH+NHS) =	82, 23, 22½	83, 0, 10
NSH =	160, 50, 53⅙	161, 56, 9 ¼
NSF =	160, 9, 41	161, 11, 58
FSH =	0, 41, 12⅙	0, 44, 11¼
NHS =	3, 55, 52	4, 4, 11
A *l* ſin SNH =	9, 4191955	9, 3835062
ſubtr. *l* ſin NHS =	8, 8360518	8, 8510771
	0, 5831437	0, 5324291
l SN =	4, 4894244	4, 5449830
l SH =	5, 0725681	5, 0774121
FS = *y* =	100642, 1	101234, 1
HS = *z* =	118186, 6	119512, 2
Φ =	0°, 41′,12⅙	0, 44′,11¼″
l ſin Φ =	8, 0786123	8, 1090132
l coſ Φ =	9, 9999688	9, 9999641
l cot Φ =	11, 9213565	11, 8909509
l y =	5, 0027797	5, 0053268
l z =	5, 0725681	5, 0774121
l yz =	10, 0753478	10, 0827389

l ηηzz =

$lyyzz =$	20, 1506956	20, 1654778
subtr.	13, 2823898	13, 2823898
	6, 8683058	6, 8830880
add $2\,l \sin \varphi =$	16, 1572246	16, 2180264
	3, 0255304	3, 1011144
Pars prior.	1060, 548	1262, 160
$l \sqrt{yz} =$	5, 0376739	5, 0413694
	0, 4771213	0, 4771213
	4, 5605526	4, 5642481
$2\,l \sin \varphi =$	16, 1572246	16, 2180264
	0, 7177772	0, 7822745
Pars poster. $=$	5, 221	6, 057
Ergo $b =$	1065, 769	1268, 217
$y =$	100642, 1	101234, 1
$z =$	118186, 6	119512, 2
$y - b =$	99576, 4	99965, 9
$z - b =$	117120, 9	118244, 0
A $l\,(z-b) =$	5, 0686344	5, 0727790
subtr. $l\,(y-b) =$	4, 9981564	4, 9998519
	0, 0704780	0, 0729271
add $l\,\frac{y}{z} =$	9, 9302116	9, 9279147
	10, 0006896	10, 0008418
subtr. $l \sin \varphi =$	8, 0786123	8, 1090132
	1, 9220773	1, 8918286
Pars subtr. $=$	83, 57518	77, 95224
a cot. $\varphi =$	83, 43658	77, 79487
— tang $v =$	0, 13860	0, 15737
Anom. vera loci F $= v =$	172°, 6′,32″	171°, 3′,24″
subtr. FSN $=$	160, 9, 41	161°,11, 58

Dist. Nodi

Dist. Nodi ☊ a Perihel.	11, 56, 51	9, 51, 26
Ad $l\,y$ =	5, 0027797	5, 0053268
add $l - \cos v$ =	9, 9958679	9, 9946878
$l - y \cos v$ =	4, 9986476	5, 0000146
add $l\,b$ =	3, 0276634	3, 1031935
l Num.	8, 0263110	8, 1032081
$- y \cos v$ =	99689, 10	100003, 36
$y - b$ =	99576, 4	99965, 9
Den.	199265, 5	199969, 2
l Denom.	5, 2994320	5, 3009631
$l\,a$ =	2, 7268790	2, 8022450
Dist. Perih. a Sole = a =	533, 1864	634, 2274
Ergo $2a$ =	1066, 3728	1268, 4548
b =	1065, 769	1268, 217
$\delta = 2a - b$ =	0, 603	0, 237
$l\delta$ =	9, 7803173	9, 3747483
$l\,b$ =	3, 0276634	3, 1031935
Char. 10 minuenda. ln =	6, 7526539	6, 2715548
$\frac{1}{2} v$ =	86°, 3′,16″	85°,31′,42″
$l\,t$ =	1, 1613272	1, 1067702
$l\,t^3$ =	3, 4839816	3, 3203106
$l\,t^5$ =	5, 8066360	5, 5338510
$l\,t^7$ =	8, 1292904	7, 7473914
$l\,nn$ =	13, 5053078	12, 5431096
$l\,n\,t^5$ =	2, 5592899	1, 8054058
$l\,n^2\,t^5$ =	9, 3119438	8, 0769606
$l\,n^2\,t^7$ =	1, 6345982	0, 2905010
$l\,n^3\,t^7$ =	8, 3872521	6, 5620558
$l\,n^3\,t^9$ =	9, 5485793	7, 6688260

t =

t =	14, 4986	12, 7870
$\frac{1}{3}t^3$ =	1015, 9220	696, 9303
$\frac{3}{5}n^2t^5$ =	0, 1231	71
$\frac{3}{7}n^2t^7$ =	18, 4766	8366
	1049, 0203	710, 5610
subtr. $\frac{2}{5}nt^5$ =	144, 9940	25, 5544
	904, 0263	685, 0066
subtr. $\frac{4}{7}n^3t^7$ =	139	2
$\frac{4}{9}n^3t^9$ =	1572	20
$t+\frac{1}{3}t^3+$&c.	903, 8552	685, 0044
$2\,la$ =	5, 4537580	5, 6044900
$l\sqrt{b}$ =	1, 5138317	1, 5515967
	3, 9399263	4, 0528933
lm =	5, 4345525	5, 4345525
	8, 5053738	8, 6183408
add. $l(t+\frac{1}{3}t^3+$&c.) =	2, 9560989	2, 8356934
	1, 4614727	1, 4540342
A Perih. ad F dies	28, 9383	28, 4468
seu consuetо more	$28^d,22^b,31',9''$	$28^d,10^b,43',23''$
Com. in F. A. 1680. M. Dec.	36, 6, 1′,38	36, 6, 1, 38
Cometa per Perihelium		
transiit A. 1680. M. Dec. =	$7^d,7^b,30',29''$	$7^d,19^b,18',15''$
Dist. Perihelii a Sole a =	533, 1864	634, 2274
semilatus rectum b =	1065, 769	1268, 217
Dist. Nodi ☊ a Perihelio =	11°,56′,51″	9°,51′,26″
Long. Nodi ☊ helioc.	9^s,6°,36′,37″	9^s,3°,26′,46″
Inclinatio ad Eclipticam	51°,48′,24″	57°,47′, 2″

Computetur nunc pari modo locus cometæ geocentricus.

ad A. 1680. M. Dec.	$12^d,4^b,46',0''$	$12^d,4^b,46',0''$
Tempus Perih. subtr.	7, 7, 30, 29	7,18, 19,15

$T =$	4, 21,15,30	4, 9,27,45
in diebus autem eſt $T =$	4, 8857	4, 3943
Ad Probl. VIII. $l\,(2a-b) =$	9, 7803173	9, 3747482
ſemiſs.	9, 8901586	9, 6873742
$\frac{3}{2}\,l\,(2a-b) =$	9, 6704759	9, 0621225
$l\,T =$	0, 6889268	0, 6428897
add.	11, 0500076	11, 0500076
	11, 4094103	10, 7550198
ſubtr. $3\,la =$	8, 1806370	8, 4067350
$lu =$	3, 2287733	2, 3482848
Ergo $u =$	1693,″4	223,″0
ſeu Anomalia media $u =$	0°,28′,13″	0°,3′,43″
$b-a =$	532, 583	633, 990
$l\,(b-a) =$	2, 7263872	2, 8020824
$la =$	2, 7268790	2, 8022450
$l\,\frac{b-a}{a} =$	9, 9995082	9, 9998374
ſit $\varrho =$	21°, 30′	10°, 30′
l ſin $\varrho =$	9, 5640754	9, 2606330
add.	5, 3139333	5, 3142625
$l\,\frac{(b-a)}{a}$ ſin $\varrho =$	4, 8780087	4, 5748955
$\frac{b-a}{a}$ ſin $\varrho =$	75510,″7	37574,″7
add. $u =$	1693, 4	223, 0
	77204, 1	37797, 7
$u + \frac{b-a}{a}$ ſin $\varrho =$	21°, 26′,44″	10°, 29′,57″
ſubtr. $\varrho =$	21°, 30′, 0″	10°, 30′, 0″

num. =

num. = —	— 3′, 16″	— 3 ″
l cos ϱ =	9, 9686779	9, 9926661
$l \frac{(b-a)}{a}$ =	9, 9995082	9, 9998374
	9, 9681861	9, 9925035
$1 - \frac{(b-a)}{a}$ =	0, 070634	0, 017112
erit z =	— 46′,15″	— 2′, 55″
Erit ω =	20°, 43′,5″	10°,27′, 5″
$\frac{1}{2}\omega$ =	10°, 21′,32½	5°, 13′,32½″
l tang $\frac{1}{2}\omega$ =	9, 2619649	8, 9612284
subtr. $lV \frac{2a-b}{b}$ =	8, 3763269	8, 1357774
l tang $\frac{1}{2} v$ =	10, 8856380	10, 8254510
Ergo $\frac{1}{2} v$ =	82°, 35′,9½″	81°,29′,56½″
Et anomalia vera v =	165, 10, 19	162,59′,53
l — cos v =	9, 9852909	9, 9805920
$l \frac{b-a}{a}$ =	9, 9995082	9, 9998374
	9, 9847991	9, 9804294
$-\frac{(b-a)}{a}$ cos v =	0, 965604	0, 955937
Den. =	0, 034395	0, 044062
$l\,b$ =	3, 0276634	3, 1031935
l Den. =	8, 5364953	8, 6440642
$l\,y$ =	4, 4911681	4, 4591293
Ab v =	165°,10′,10″	162°,59′,53″
Dist. ☊ a Perih.	11, 56,51	9, 51, 26
NC = Dist. Com. a ☊ =	153°, 13′,28″	153°, 8′,27″
CNP =	51°, 48′,24″	57, 47, 2

Fig. 6.

l sin NC =	9, 6536916	9, 6549454
l sin N =	9, 8953998	5, 9273925
l sin CP =	9, 5490914	9, 5823379
l cos N =	9, 7911844	9, 7268202
l—tang NC =	9, 7029480	9, 7045221
l—tang N P =	9, 4941324	9, 4313423
Lat. helioc. C P =	20°,44′,12″	22°,28′,21″
Ergo N P =	162, 40, 22	164, 53, 28
seu N P =	5′,12°, 40,22	5′, 14,53,28
Add. long. ☊ =	9, 6, 36,37	9, 3,26,46
Longitudo heliocentr.	2, 19,16,59	2′,18,20,14
Longitudo terræ	3, 1,51,23	3, 1,51,23
Ang. *c* S T =	12°,34,24″	13°,31′, 6″
C S *c* =	20, 44, 12	22, 28, 21
ly = *l* C S =	4, 4911681	4, 4591293
add. *l* sin C S *c* =	9, 5490914	9, 5823379
add. *l* cos C S *c* =	9, 9709127	9, 9657017
l C *c* =	4, 0402595	4, 0414672
l S *c* =	4, 4620808	4, 4248310
add. *l* sin *c* S T =	9, 3378364	9, 3687698
add. *l* cos *c* S T =	9, 9894579	9, 9877967
l c P =	3, 7999172	4, 7936208
l S P =	4, 4515387	4, 4126277
S P =	28283, 9	25859, 9
ab S T =	98275,	98275, 0
T P =	69991	72415,
a l c P =	3, 7999172	3, 7936208
subtr. *l* T P =	4, 8450422	4, 8598285
l tang S T *c* =	8, 9548750	8, 9337923
S T *c* =	5°,9′,1″	4°,54′,27″
Long. Solis	9′,1, 51, 23	9, 1, 51, 23

Long.

Long. Com. Geocentr.	9, 7, 0, 24	9, 6, 45, 50
a l T P =	4, 8450422	4, 8598285
ſubtr. l. cof S T c =	9, 9982431	9, 9984053
l c T =	4, 8467991	4, 8614232
a l C c =	4, 0402595	4, 0414672
l tang C T c =	9, 1934604	9, 1800440
Latitudo Geocentr. =	8°, 52′,24″	8°, 36′,27″

Hinc tam ex longitudinibus quam latitudinibus obſervatis liquet verum valorem ipſius r majorem eſſe quam 72000. Ex præcedente autem hypotheſi collegimus, r minorem eſſe quam 72700. Sunt autem omnes quatuor tam longitudines quam latitudines obſervatis majores, ex quo ſequitur, valores intra 72000 & 72700 contentos præbituros eſſe minores & longitudines & latitudines, ſicque veritati magis conſentaneas; ita ut intra hos limites minima longitudo & latitudo contineatur. Cum autem valores 72000 & 72700 pro r ſubſtituti æquales fere præbeant longitudines ac latitudines, minimum fere reſpondebit valori medio 72350; quem tanquam verum ipſius r valorem aſſumamus; cum eum propius definire vix liceat.

Comparemus ergo has duas hypotheſes inter ſe.

Hypotheſis r =	72000	72700
Cometa per perihelium tranſiit A. 1680 M Dec.	$7^d, 19^b, 18', 15''$	$7^d, 22^b, 17', 48''$
Diſt. Perih. a ſole — —	634, 227	678, 678
Semi latus rectum — —	1268, 217	1357, 313
Diſt. nodi ☊ a Perih. —	9°, 51′, 26	9°, 13′,17″
Long. nodi ☊ helioc. —	9^s, 3°, 26, 46	9^s, 2°,31′,32″
Inclin. Orbitæ ad Eclipt.	57°, 47′, 2″	59°, 32, 38″

Sumendo ergo inter hæc ſyſtemata medium, prodibit Cometæ hujus ſequens theoria quaſi vera

I. Cometa per perihelium tranſiit
A. 1680 M. Decembri — $7^d, 20^h, 48', 0''$
II. Diſtantia Perihelii a Sole = 656, 4525
III. Semi-latus rectum = 1312, 7650
IV. Diſtantia nodi ☊ a Perih. = $9°, 32', 21''$
V. Longitudo helioc. nodi ☊ = $9^s, 2°, 59', 9'$
VI. Inclinatio Orbitæ ad Eclipt. = $58°, 39', 50''$

Non multum discrepant hæ orbitæ Cometæ determinationes ab iis, quas Neutonus & Hallejus invenerunt, quarum ille conſtructione geometrica, hic vero calculo eſt uſus, ita tamen ut locum nodorum, & inclinationem & tempus, quo per perihelium tranſiit, eadem retinuerit, quæ Neutonus per conſtructionem inveniſſet: uterque autem orbitam cometæ perfectam eſſe parabolam aſſumſit. Quare cum conſtructio geometrica in hoc negotio admodum ſit lubrica, atque Hallejus præcipua capita hinc nata retinuerit, mirum non eſt, quendam diſſenſum inter hanc orbitæ determinationem & Neutonianam deprehendi, neque enim eſſet mirandum, ſi iſte diſſenſus major prodiiſſet. Statuit autem Neutonus I. hunc Cometam in perihelio eſſe verſatum A. 1680. M. Dec. $8^d, 0^h, 4'$; II. diſtantiam perihelii a ſole = 607, 5; III. ſemi-latus rectum = 1215. IV. Diſtantiam nodi a perihelio = $9°, 20'$: V. Long. nodi ☊ = $9^s, 1°, 53'$ & VI. inclinationem orbitæ ad Eclipt. $61°, 20', 20''$. Orbita autem hujus cometæ ſic proxime inventa poterit ſecundum

dum methodum, quam in ſuperiore diſſertatione de Cometa A. 1742. tradidi, ulterius corrigi, atque cum accuratiſſimæ obſervationes per ſatis longum temporis ſpatium ſupperant, fere ad eum perfectionis gradum perduci, ut axis transverſus ejus orbitæ definiri, atque adeo ejus tempus revolutionis aſſignari queat. Quem laborem aliis relinquens interim ex hac cometæ orbita inventa, tanquam eſſet vera, tempus periodicum inveſtigabo. Cum igitur ſit

Diſtantia perihelii a ſole a	=	656, 4525
erit $2a$	=	1312, 9050
ſubtrahatur b	=	1312, 7650
erit $2a - b$	=	0, 1400
At eſt la	=	2, 8172032
unde laa	=	5, 6344064
ſubtr. $l(2a-b)$	=	9, 1461280
l ſemi-axis transverſi	=	6, 4882784
addatur ſemiſſis	=	3, 2441392
		9, 7324176
ſubtrahatur $lcVc$	=	7, 5000000
		2, 2324176

Unde erit tempus periodicum = 170, 77 annorum. Reverteretur itaque iſte cometa ad perihelium poſt annos centenos & ſeptuaginta; & quamvis exiguum discrimen in valore $2a-b$ vehementer hoc tempus immutare poſſit, tamen non adeo a veritate aberrabit. Neque enim contra hanc reverſionem quicquam valet objectio, quod idem cometa annis 170 antea non ſit obſervatus, neque in Tabula Halleji unquam ante ullus ſit obſervatus, qui cum hoc conſentiret. Primum enim

ſtatus

ſtatus cometæ apparens plurimum a loco terræ in orbita ſua pendet, quæ ſi verſetur in iisdem ſignis, quibus cometa eſt proximus, cometa maxime fulgens conſpicietur, & caudæ longitudo apparens non ex ejus vera quantitate, ſed potiſſimum e ſitu relativo reſpectu noſtri æſtimatur. Utraque opportunitas locum habuit A. 1680, quo tempore non ſolum cometa ſatis prope ad locum terræ acceſſit, ſed etiam caudæ directio C*c* ita ratione terræ T erat diſpoſita, ut ejus magnitudo apparens ſeu angulus C T*c*, fuerit vehementer magnus; quanquam & hic cometa ob ſummam in perihelio vicinitatem cum ſole præ reliquis multo majori cauda inſtructus eſt putandus. Ex his autem intelligitur, ſi idem hic cometa vel in poſterum redeat, vel ante jam aliquoties ad perihelium acceſſerit, niſi terra eo tempore in iisdem fere orbitæ ſuæ locis ſit verſata, longe alia ſpecie hunc eundem cometam conſpici debuiſſe, ut ex terra viſus nullo modo pro eodem haberi potuerit. Tum vero ad quod maxime eſt attendendum, hic inſignis cometa ſæpius ad ſolem reverti poterit, incolis terræ prorſus inconſpicuus. In hoc enim Cometa idem, quod de cometa anni 1742 notavi, uſu venit, quod diſparuerit, fere antequam ejus diſtantia a terra diſtantiam ſolis ſuperaſſet. Quare cum terra eo tempore, quo iſte cometa ante redierit, in orbita ſua ita ſita eſſe poſſit, ut is perpetuo longius quam ſol a terra fuerit remotus, nequidem obſervari potuit; unde eo minus eſt mirandum, hunc cometam ante nunquam eſſe animadverſum, quantum quidem ex obſervationibus ſufficienti ſtudio inſtitutis colligere licet. Confir-

Fig. 8.

matur

matur itaque maxime illa conjectura, quam ante feci, nullum cometam nobis esse conspicuum, nisi terræ sit propior quam sol, sicque sine dubio complures cometæ ad solem in orbitis suis sæpius revertuntur, aspectum nostrum prorsus fugientes. Et hanc ob rem numerus cometarum systema solare exornantium multo erit major, quam suspicamur; utrum autem quandoque cometas, qui ad aliarum stellarum fixarum systemata pertineant, spectare nobis liceat; hoc nullo modo affirmari poterit, cum eorum distantia plus quam millies superare deberet eam, in qua cometæ nostri systematis se demum spectandos exhibeant.

Quoniam ceterum cometæ sunt corpora non admodum ingentia, & terram in perigæo celerrime præterire solent, effectus eorum ratione attractionis in perturbatione motus terræ non minimus esse nequit: nisi forte proxime ad terram accedant; quod quidem fieri non potest, nisi dum in alterutro nodo versantes per ipsam terræ semitam transeant, ibique terram offendant; unde non solum ob attractionem mutuam, sed etiam a mutuo conflictu effectus maxime funesti resultare deberent. Quod autem in majoribus distantiis motum terræ vix perturbare valeant, ratio est, quia vis solis, qua terra in orbita sua retinetur, incomparabiliter est major, quam illa vis, quæ unquam a cometa proficisci posset; ita ut vis cometæ a vi solis longissime superetur ac penitus absorbeatur. Hoc vero tantum est tenendum de viribus cometarum, quarum directiones in planum ecliptícæ incidunt; aliter enim comparata est ratio earum viri-

um, quarum directio ad planum eclipticæ est normalis. Cum enim hæ vires a vi solis non afficiantur, nihil impedit, quominus effectum suum producant; qui dum terram de plano eclipticæ vel boream vel austrum versus retrahere nituntur, actu orbitam terræ in aliud planum deducent; unde cum axis terræ non afficiatur, obliquitas eclipticæ atque positio punctorum æquinoctialium & solstitialium immutabitur, qui effectus eo magis erit sensibilis, quo propius cometa ad terram accesserit, simulque quo major eo tempore fuerit ejus latitudo. Hinc non dubitarim mutabilitatem obliquitatis eclipticæ, quæ nunc quidem extra dubium posita videtur, pariter ac variationem, quam in stellarum fixarum longitudine & latitudine deprehendunt, soli cometarum actioni tanquam veræ causæ adscribere; facile autem erit in posterum hanc conjecturam per observationes vel confirmare vel refellere, cum si hypothesis hæc esset vera, istæ mutationes subito post apparitionem cujusque cometæ contingere deberent. Quod quidem ad cometam anni 1742 attinet, ejus actione obliquitas eclipticæ aliquantum augeri debuisset, quamobrem Astronomi sunt rogandi, ut quam primum fieri licet, obliquitatem eclipticæ nunc quidem omni studio investigent, ut intelligi possit, utrum ea major reperiatur, quam ante hujus cometæ apparitionem est inventa, an secus. Generatim vero cometarum, qui in perigæo satis prope ad terram accedunt, simulque notabilem latitudinem habent, effectus ita erit comparatus; ut sequens tabella declarat:

Si

Si cometæ Latitudo fuerit borealis &

Locus ſolis ſit in ♈. Puncta æquinoctialia non afficientur, obliquitas eclipticæ autem augebitur.

Locus ſolis ſit in ♋. Puncta æquinoctialia promovebuntur, obliquitas eclipticæ non mutabitur.

Locus ſolis ſit in ♎. Puncta æquinoctialia non afficientur, obliquitas eclipticæ diminuetur.

Locus ſolis in ♑. Puncta æquinoctialia regredientur, obliquitas eclipticæ non afficietur.

Sin cometæ latitudo fuerit auſtralis, effectus iſti erunt contrarii. Probe autem iſta æquinoctiorum variatio diſtingui debet a præceſſione æquinoctiorum ſatis perſpecta, quæ non a mutabilitate eclipticæ, ſed a mutatione ipſius axis terræ proficiscitur, qui a cometis non variatur. Hinc autem recepta Aſtronomorum regula, qua ſtatuunt, puncta æquinoctialia quotannis 50″ regredi, non parum perturbabitur. Quod autem ab antiquiſſimis temporibus obliquitas eclipticæ ſatis ſenſibiliter ſit minuta, concludendum eſt, vel plures cometas cum latitudine boreali, dum ſol in ſignis borealibus verſabatur, vel cum latitudine auſtrali, dum ſol in ſignis auſtralibus verſabatur, ad terram acceſſiſſe; horumque effectum prævaluiſſe.