Military Inſtitutions

OF

VEGETIUS,

660
660

IN FIVE BOOKS,

Tranſlated from the Original LATIN.

With a Preface and Notes.

By LIEUTENANT JOHN CLARKE.

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M DCC LXVII.

1 7 6 7

have been thofe who made the Ancients their
Study, and formed themfelves on their Model.
The Works of Turenne, Montecuculli, Folard,
&c. evince the Efteem and Value thofe great
Men entertained for the military Writings of the
Ancients: and it is well known, that the Prince
of Orange, the Prince of Parma, and the Mar-
quis of Spinola, formed all their Sieges, where-
in they diftinguifhed themfelves fo much, after
Cæfar's Siege of Alefia. Many other fimilar
Inftances will occur on the leaft Reflection.
There are many ufeful Maxims in our Author's
fourth Book relative to Sieges, the Branch in
which the Invention of Fire-Arms feems to have
occafioned the greateft Alterations. The Long-
Bow, the Sling, and the various Kinds of
miffive Weapons, were perhaps not at all inferior
to our Small-Arms; and the Baliftæ, Catapultæ,
Onagri, and Scorpions, were as terrible and
deftructive as our Cannon.

That my Intentions may not be miftaken, I
think it proper to mention, that what I have faid
is in Order to fhew that Claffical Learning is as
neceffary in the Profeffion of Arms, as in any
other whatfoever; and that the Study of the an-
cient military Writers is effentially requifite.
The Affinity, to fay nothing more, of ancient
and modern Difcipline confirms this Obfervation:
and as our prefent Syftem is fo nearly copied from
Antiquity

Antiquity, there is all the Reafon imaginable to believe that many other important and ferviceable Inftitutions might ftill be introduced into the Service by a careful and judicious Examination of its valuable Remains. Xenophon, Polybius, Cæfar, and Vegetius, will always afford fufficient Employment for a military Man. I know not whether the military Science has not fuffered more by the Lofs of the greateft Part of the Works of Polybius, than it ever can retrieve by the other Authors now extant. His Differtations on the Roman Caftrametation, and on the Macedonian Phalanx, make us but too fenfible of the Lofs we have fuftained. His Abilities as an Hiftorian and a Statefman, are great; but when he fpeaks of military Affairs, he exceeds himfelf: nor can it be wondered at, as by his Precepts and Inftructions, he formed the greateft General of the Age, Scipio Africanus. Vegetius excepted, the ancient Writers, whofe Works are extant, have handled only particular Branches. Æneas treats only of the Defence of Places; Hyginus of Caftrametation; Frontinus and Polyænus of Stratagems; Arrian and Ælian of the Grecian Tactics. Thefe are all very valuable Works: there are fome others of later Ages, as the Treatifes of the Emperors Leo and Mauritius. We find the Names of Stratocles, Hermias, Cineas the Theffalian, Pyrrhus King of Epirus, Alexander his Son, Clearchus, Pau-

b 2 fanias

The larger thefe Engines are, the greater Dif-
tance they carry, and with the greater Force.
They are ufed not only to defend the Intrench-
ments of Camps, but are alfo placed in the Field
in the Rear of the heavy-armed Infantry; and
fuch is the Violence with which they throw the
Darts, that neither the Cuiraffes of the Horfe
nor Shields of the Foot can refift them. The
Number of thefe Engines in a Legion is fifty
five. Befides thefe, are ten Onagri, one for
each Cohort; they are drawn ready-armed on
Carriages by Oxen: in Cafe of an Attack they
defend the Works of the Camp, by throwing
Stones, as the Baliftæ do Darts. The Legion
carries with it a Number of fmall Boats, each
hollowed out of a fingle Piece of Timber, with
long Cables and fometimes Iron Chains, to faften
them together: thefe Boats, * joined and covered
with Planks, ferve as Bridges over unfordable
Rivers, on which both Cavalry and Infantry pafs
without Danger. It is provided with Iron
Hooks called Wolves, and Iron Scithes fixed to

what Vegetius exprefsly fays in the thirteenth Section of
this Book, that each Mefs confifted of ten Men, and the
Alteration fo flight, that I have admitted it without Scru-
ple. Befides, it is moft likely that a complete File, eom-
monly fuppofed to have confifted of ten Men, who lay in
the fame Tent, was allotted for the Service of the Engine.

* Thefe Boats.] Orig. Monoxyli; a Greek Word figni-
fying the fame Thing.

the

the Ends of long Poles; and with Forks, Spades, Shovels, Pickaxes, Wheelbarrows, and Baſkets, for digging and tranſporting Earth; together with Hatchets, Axes, and Saws, for cutting and ſawing Paliſades, and all Kinds of Wood. Beſides which, a Train of Workmen attend on it furniſhed with all Inſtruments neceſſary for the Conſtruction of Tortoiſes, Muſculi, Rams, Vines, moving Towers, and other Machines for the Attack of Places. As the Enumeration of all the Particulars of this Sort would be too tedious, I ſhall only obſerve that the Legion ſhould carry with it, wherever it moves, whatever is neceſſary for every Kind of Service, that the Encampments may have all the Strength and Conveniences of a fortified City.

END OF BOOK II.

the Bottom and floored with Planks: or on a
fudden Emergency, by faftening together a Number of empty Cafks, and covering them with
Boards. The Cavalry, throwing off their Accoutrements, make fmall Floats of dry Reeds or
Rufhes, on which they lay their Arms and Cuiraffes to preferve them from being wet: they
themfelves fwim their Horfes crofs the River,
and draw the Floats after them by a leathern
Thong. But the moft commodious Invention is
that of the fmall Boats, hollowed out of one
Piece of Timber, and very light both by their
Make and the Quality of the Wood: the Army
always has a Number of thefe Boats, upon Carriages, together with a fufficient Quantity of
Planks and Iron Nails; and thus, with the Help
of Cables to lafh the Boats together, a Bridge is
inftantly conftructed, which for the Time has
the Solidity of a Bridge of Stone. As the
Enemy generally endeavor to fall upon an Army
at the Paffage of a River either by Surprife or
Ambufcade, it is neceffary to fecure both Sides
thereof by ftrong Detachments, that the Troops
may not be attacked and defeated while feparated by the Channel of the River: but it is ftill
fafer to palifade both the Pofts, which will enable
you to fuftain any Attempt without much Lofs.
If the Bridge is wanted, not only for the prefent
Tranfportation of the Troops, but alfo for their
Return, and for Convoys, it will be proper to
throw

throw up Works with large Ditches to cover each Head of the Bridge, with a sufficient Number of Men to defend them as long as the Circumstances of Affairs require.

* Having thus explained the Order of Marches, we now come to the Description of the Camp. An Army on a Route cannot expect always to find walled Cities for Quarters, and it is very imprudent and dangerous to encamp in a stragling Manner without some Sort of Intrenchment: it being an easy Matter to surprise Troops while refreshing themselves, or dispersed in the different Occupations of the Service. The Darkness of Night, the Necessity of Sleep, and the Dispersion of the Horses at Pasture, afford Opportunities of Surprise. A good Situation for a Camp is not sufficient, we must chuse the very best that can be found, lest, having omitted to occupy a more advantageous Post, the Enemy should get Possession of it to our great Detriment. An Army should not encamp in Summer near bad Waters, or far from good ones : nor in Winter in a Situation without Plenty of Forage and Wood : the Camp should not be liable to sudden Inundations ; nor the Avenues too steep or too narrow, lest, if invested, the Troops

VIII. Rules for encamping an Army.

* This Section in the Original begins, Confequens videtur, Itineris Obfervatione defcripta, ad Caftrorum (in quibus manendum eft) venire Rationem. Non enim, &c.

should

left for the worsted Army. Every Plan, therefore, is to be considered, every Expedient tried, and every Method taken, before Matters are brought to this last Extremity. Good Officers decline general Engagements, where the Danger is common, and prefer the Employment of Stratagem and Finesse, to destroy the Enemy as much as possible in Detail, and intimidate them without exposing their own Forces. I shall insert some necessary Instructions on this Head collected from the ancients. It is the Duty and Interest of a General frequently to assemble the most prudent and experienced Officers of the different Corps in the Army, and consult with them on the State both of his own and the Enemy's Forces: all Adulation, as most pernicious in its Consequences, must be banished from the Deliberations: he must examine which has the Superiority in Number; whether his or the Adversary's Troops are best armed; which are in best Condition, best disciplined, and most resolute in Emergencies. The State of the Cavalry of both Armies must be enquired into, and more especially that of the Infantry, wherein consists the main Strength of an Army. With respect to the Cavalry, he must endeavor to find out in which are the greatest Number of Archers, or of Troopers armed with Lances; which has most Cuirassiers, and which the best Horses. Lastly, he must consider the
Field

Field of Battle, to judge whether the Ground is more advantageous for him or his Enemy. If ſtrongeſt in Cavalry, we ſhould prefer Plains and open Ground : if ſuperior in Infantry, we ſhould chuſe a Situation full of Incloſures, Ditches, Moraſſes and Woods, and ſometimes mountainous. Plenty or Scarcity in either Army are Conſiderations of no ſmall Importance : for Famine, according to the common Phraſe, is an internal Enemy that makes more Havoc than the Sword. But the moſt material Article is to determine whether it is moſt proper to temporiſe, or to bring the Affair to a ſpeedy Deciſion by Action. The Enemy ſometimes expect an Expedition will ſoon be over ; and if it is protracted to any Length, they are either conſumed by Want, induced to return home by the Deſire of ſeeing their Families, or having done nothing conſiderable in the Field, diſperſe themſelves from Deſpair of Succeſs. Thus, Numbers tired out with Fatigue, and diſguſted with the Service deſert, others betray them, and many ſurrender themſelves. Fidelity is ſeldom found in Troops diſheartened by Misfortunes ; and in ſuch Caſe, an Army numerous at taking the Field inſenſibly dwindles away to nothing. It is eſſential to know the Character of the Enemy, and of their principal Officers* ;

* Principal Officers.] Orig. Comites. There cannot be a ſtronger Proof of the Importance of this Maxim, than
the

ſerved the Diſtance between each Rank ſhould be ſix Feet, one Foot of which is taken up by the Men: thus if you form a Body of ten thouſand Men into ſix Ranks, they will occupy thirty ſix Feet in Depth*, and a thouſand Paces in Front. By this Calculation, it is eaſy to compute the Extent of Ground requiſite for twenty or thirty thouſand Men to form upon: nor can a General be miſtaken, when thus he knows the Proportion of Ground for any fixed Number of Men. But if the Field of Battle is not ſpacious enough, or your Troops are very numerous, you may form them into nine Ranks, or even more: for it is more advantageous to engage in cloſe Order, than to extend your Line too much. An Army that takes up too much Ground in Front, and too little in Depth, is quickly penetrated by the Enemy's firſt Onſet: after which there is no Remedy. As to the Poſts of the different Corps in the right or left Wing or in the Center, it is the general Rule to draw them up according to their reſpective Ranks, or to diſtribute them as Circumſtances or the Diſpoſitions of the Enemy may require.

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* Thirty-ſix Feet in Depth.] Orig. Quadraginta duos. The Calculation itſelf ſhews this to be a Miſtake. Six Ranks, at ſix Feet Diſtance from one another, make the Intervals but thirty Feet; to which we muſt add ſix Feet more, reckoning one Foot for the Ground taken up by each Rank in particular.

The

The Line of Infantry being formed, the Ca-
valry are drawn up in the Wings: the heavy
Horſe, that is, the Cuiraſſiers and Troopers
armed with Lances, ſhould join the Infantry;
for the light Cavalry, conſiſting of the Archers
and thoſe who have no Cuiraſſes, ſhould be placed at
a greater Diſtance: the beſt and heavieſt Horſe
are to cover the Flanks of the Foot, and the
light Horſe are poſted as abovementioned to
ſurround and diſorder the Enemy's Wings. A
General ſhould know what Part of his own Ca-
valry is moſt proper to oppoſe any particular
Squadrons or Troops* of the Enemy: for from
ſome Cauſes not to be accounted for, ſome par-
ticular Corps fight better againſt others, and
thoſe who have defeated ſuperior Enemies, are
often overcome by an inferior Force. If your
Cavalry is not equal to the Enemy's, it is proper,
after the ancient Cuſtom, to intermingle it with
light Infantry armed with ſmall Shields and train-
ed to this Kind of Service: they were formerly
called Velites†. By obſerving this Method,
tho'

* Squadrons or Troops.] Orig. Grumos, hoc eſt, Glo-
bos Hoſtium. Stewechius reads it Drungos. Drungus was
a military Term in the latter Ages of the Empire. It oc-
curs again in the 19th Section.

† Velites.] See Cæſar, Bell. Gall. I, 48. The Velites
ſeem to have ſerved ſometimes on Horſeback. See Sect.
24th of this Book. I ſhall here inſert a Paſſage from Va-
lerius

Sea, Marshes, or Rivers; by Art, when inclosed with Ramparts and Ditches. When a Place is to be built, the surest Way is to take every Advantage of Ground; for in a level and uniform Situation, nothing can be done but by mere Dint of Industry and Labor. We see, however, ancient Cities built in open Plains, which, notwithstanding the Disadvantage of Ground, have been rendered impregnable by Art and Labor.

II. The Walls of Cities.

The Ancients never built their Walls in strait Lines, that Disposition exposing them too much to the Violence of the Ram, but with saliant and reentering Angles with Towers at the Extremities. If an Enemy attempts to fix scaling Ladders, or advance Machines to a Wall of this Construction, he is seen in Front, in Flank, and almost in Rear, and is in a Manner surrounded by the Defences of the Place.

III. Ramparts.

A Rampart, to have sufficient Strength and Solidity, should be thus constructed. Two parallel Walls are built at the Distance of twenty Feet from each other; and the Earth, taken out of the Ditches, thrown into the intermediate Space, and well rammed down. The inner Wall should be lower than the outer, to allow an easy and gradual Ascent from the Level of the City to the Top of the Rampart. A Ram cannot destroy a Wall thus supported by Earth, and
in

in Cafe the Stone-Work fhould by Accident be
demolifhed, the Mafs of Earth within would re-
fift its Violence as effectually.

To fecure the Gates of a City from Fire, they
fhould be covered with raw Hides and Plates of
Iron.　But the ancient Invention is the beft for
this Purpofe; it is a Work thrown up before the
Gate, with a Portcullis* at the Entrance fufpen-
ded by Iron Rings and Ropes: if the Enemy en-
ter the Work, the Portcullis is let down, and
they lie at the Mercy of the Befieged.　The
Wall above the Gate fhould alfo be perforated
in feveral Places, that Water may be poured down
to extinguifh the Fire on Occafion. IV. Port-
cullis and
Gates.

The Ditches round a City fhould be very
broad and deep, that the Befiegers may not eafily
fill them up, and that an effectual Stop may be
put to the Mines by the Quantity of Water they
contain.　For the Depth of the Ditch and the
Water are the two principal Obftructions to
thefe Kinds of fubterranean Works. V. Ditches.

There is Reafon to apprehend the Showers of
Arrows may drive the Befieged from the Defen-
ces of the Place, whereby the Enemy gain an
Opportunity of fixing their Ladders and mount- VI. Me-
thods of co-
vering the
Garrifon a-
gainft the
Weapons of
the Befieg-
ers.

* Portcullis.] Orig. Cataracta, from καταρρίσσω vel κα-
ταρρέλτω, cum Impetu decido.

Quantities of Bitumen, Sulphur, liquid Pitch, and incendiary Oil *, muft be provided to burn the Machines of the Befiegers. The Magazines muft be ftored with Iron, Steel, and Coals, to make Arms, together with Wood proper for Spears and Arrows. The round Stones found in Rivers, as of the heavieft Kind, and moft proper for the Ufe of the Slingers, are to be carefully collected, and piled up in Heaps on the Ramparts and Towers. The fmalleft are thrown by the Sling, by the Fuftibalus, or by the Hand; thofe of the middle Size by the Onagri; and the heavieft and roundeft are difpofed along the Parapets, to be rolled down upon the Affailants, in Order to crufh them in Pieces, and demolifh their Machines. Large Wheels are likewife made of green Wood, or fmooth Cy-

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* Incendiary Oil.] Orig. Oleum quod incendiarium vocant. Ammianus, B. XXIII, thus defcribes it. " In hac Regione (Media) Oleum conficitur medicum, quo illitum Telum, fi emiffum lentius laxiore Arcu (nam Ictu extin-guitur rapido) hæferit unquam, tenaciter cremat; & fi Aqua voluerit abluere quifquam, Æftus excitat acriores Incendiorum, nec Remedio ullo, quam Jactu Pulveris, confopitur. Paratur autem hoc Modo: Oleum Ufus communis Herba quadam infectum condiunt harum Rerum periti, ad Diuturnitatem fervantes; & coalefcens durant, ex Materia Venæ naturalis, fimilis Oleo craffiori; quæ Species gignitur apud Perfas; quam, ut diximus, Naphtham Vocabulo appellavere gentili."

linders

linders * cut out of great Trees, to be rolled
along with greater Facility: when fuddenly
thrown down fteep Places, they deftroy Men,
Horfes, and every Thing in their Way, and
fpread univerfal Confternation. Beams, Planks,
and Iron Nails of all Sizes, are to be provided
for the Conftruction of Machines to oppofe
againft thofe of the Enemy: efpecially as it is
often neceffary to raife the Height of the Ram-
parts or Parapets, by expeditioufly adding new
Works, to prevent their being commanded by
the moving Towers of the Befiegers.

A fufficient Quantity of Cords of Sinews is to IX. Cords
be provided, as without them the Onagri, Balif- of the En-
tæ, and other Engines are of no Service. The
Hairs of the Manes and Tails of Horfes are alfo
fit for this Ufe: and we are taught by Experi-
ence of our Anceftors that Womens' Hair will
ferve equally for this Purpofe in Cafes of Ne-
ceffity. At the Siege of the Capitol, the En-
gines became unferviceable by continual Ufe,
and a Supply of Cords failing, the Roman
Women voluntarily cut off their Hair, and gave
it their Hufbands to repair the Engines, who
thereby repulfed the Enemy: thus, by giving up
the Ornament of their Hair, thefe virtuous La-

* Cylinders cut out of great Trees.] Orig. Cylindri,
quos Taleas vocant. Commentators are much divided
about the Word Taleæ.

dies

midated*. For the Affailants, by the formidable Difplay of their whole Force in Order of Battle, and their Shouts mixed with the Noife of Trumpets, endeavor to terrify the Enemy into a Surrender. If the Befieged are Strangers to Emergencies of this Kind, as Fear makes great Impreffion on Men unaccuftomed to Danger, they are thrown into Confufion by the firft Affault, and the Ladders are fixed, and the Place taken. But if the Affault is vigoroufly fuftained by refolute and experienced Troops, the Befieged immediately refume frefh Courage, the Influence of Fear is out of the Queftion, and each Party exerts all its Force and Skill, depending on them only for Victory.

XIII. Machines for attack. Machines ufed in the Attack of a Place are Tortoifes, Rams, Scithes, Vines, Mantlets, Mufculi, and Towers: I fhall defcribe their Conftruction feparately, and the Manner of employing or oppofing them.

XIV. The Ram, Scithe, and Tortoife. The Tortoife is compofed of Beams and Planks, covered with raw Hides, and Cloths of Hair or Wool, to fecure them from Fire. Within this Machine is a large Beam headed with a crooked Iron, to pull Stones out of Walls, which from

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* But the Befieged are ufually moft intimidated.] This is an Addition to the Original, which the Senfe feemed to require.

its

its Form is called a Scithe. When one End of
the Beam is armed with Iron, it is called a Ram,
either from the Hardnefs of its Head that beats
down the Walls, or from its recoiling, like that
Creature, to ftrike with greater Violence. The
Tortoife is named from its Similitude to that
Animal, that fometimes draws in and fometimes
puts out its Head: in the fame Manner this
Machine drives forward and backward the Beam
abovementioned, to give more Force to the
Stroke.

The Galleries, called by the Ancients Vines, **xv.** Vines,
are now known among the Soldiers by the barba- Mantlets,
and Cava-
rous Appellation Caufiæ. This Machine is made liers.
of flight Timbers, eight feet high, feven broad,
and fixteen long. The Roof is double and
compofed of Planks and Hurdles: the Sides are
likewife fo ftrongly defended by Ofier-Work as
to be impenetrable by Stones or Darts; and it is en-
tirely covered on the Outfide with frefh Hides, or
Cloths of Wool, to prevent its being fired.
Several of thefe are joined together, and afford
a fafe Shelter to the Befiegers who advance under
Cover to fap the Foundations of the Walls.
Mantlets are compofed of Ofiers, with an arched
Roof, and fecured by Hair-Cloths and Hides:
they move, like a Carriage, upon three little
Wheels, one of which is placed before in the
Middle, and the two others at the Corners behind.

A a 2   The

FLAVI VEGETI

RENATI, VIRI INL.

DE RE MILITARI

LIBRI QVATVOR;

Poſt omnes omnium editiones, ope
veterum librorum correcti,

A

GODESCALCO STEWECHIO, *Heusdano*:

Acceſſerunt SEX. IVLI FRONTINI Strategematôn
libri quatuor: ÆLIANVS De inſtruendis aciebus:
MODESTVS De vocabulis rei militaris: Caſtrame-
tatio Romanorum ex hiſtoriis POLYBII.

Acceſſit ſeorſum eiuſdem G. STEWECHI
in Fl. Vegetium COMMENTARIVS.

Adiuncta eiuſdem G. STEWECHI & FRANCISCI MODI,
in IVL-FRONTINVM Coniectanea, & Notæ.

CAP. XIX.
Ad portandum pondus exercendos tyrones.

PONDVS quoque baiulare vsque ad 60. libras,
iter facere gradu militari, frequentissimè cogen-
sunt iuniores, quibus in arduis expeditionibus necessit.
imminet annonam pariter & arma portandi. Nec h
credatur esse difficile, si vsus accesserit: nihil enim e
quod non assidua meditatio facillimum reddat. Qua
rem antiquos milites factitauisse, Vergilio ipso test.
cognoscitur; qui ait: *

> Non secus ac patriis acer-Romanus in armis
> Iniusto sub fasce viam cùm carpit, & hosti
> Ante expectatum positus stat in agmine castris.

Virgil. III. Georg.

CAP. XX.
Quo armorum genere vsi sint antiqui.

LOCVS exigit, vt quo armorum genere, vel in
struendi, vel muniendi sint tyrones, referre tente
mus. Sed in hac parte antiqua penitus consuetudo de
leta est: nam licet exemplo Gotthorum & Alanoru
Hunnorumque equitum arma profecerint, pedite
*[tamen] constat esse nudatos. Ab vrbe enim condit
vsque ad tempus D. Gratiani, & cataphractis & galei
muniebatur pedestris exercitus. Sed cùm campestr
exercitatio interueniente negligentia, desidiaque cessa
ret, grauia videri arma cœperunt, quæ raro vtique mili
tes induebant. Itaque ab imperatore postulant, prim
cataphractas, deinde *cassides deponere: sic detecti
pectoribus & capitibus, congressi contra Gotthos mili
tes nostri, multitudine sagittariorum sæpe deleti sunt
nec post tot clades, quæ vsque ad tantarum vrbium ex
cidia peruenerunt, cuiquam curæ fuit, vel cataphractas
ve

*Damnant li-
bri, locutione
non insolenti.*

*Alii, cassi-
des se debere
refundere: de
quo vide No-
tas meas.*

el galeas pedestribus reddere. Ita fit, vt non de pugna,
d de fuga cogitent, qui in acie nudi exponuntur ad
ulnera. Quid enim pedes sagittarius sine cataphracta,
ne galea, qui cum arcu scutum tenere non potest, fa-
iat? Quid ipsi draconarij, atque signiferi, qui sinistra
anu hastas gubernant, in proelio facient, quorum &
apita nuda esse constat, & pectora? Sed grauis pediti
rica videtur, & galea fortasse, * raró meditanti arma,
ró tractanti. Cæterùm quotidianus vsus non laborat,
iam si onerosa gestauerit. Sed illi qui laborem in
ortandis veteribus munimentis armorum, ferre non
ossunt, detectis corporibus & vulnera sustinere cogun-
ir & mortes: &, quod est grauius [& turpius] aut ca-
i, aut certè fuga rempublicam prodere. Sic dum exer-
itium laborémque declinant, cum maximo dedecore
ucidantur, vt pecudes. Vnde enim apud antiquos
Iurus dicebatur pedestris exercitus : nisi quòd pilatæ
egiones præter scuta etiam cataphractis galeis que ful-
ebant? vsque eò, vt sagittarij sinistra brachia manicis
unirentur. Pedites autem scutati, præter cataphractas
& galeas, etiam ferreas ocreas in dextris cruribus coge-
entur accipere. Sic erant muniti illi, qui in prima acie
ignantes Principes, in secunda Hastati, in tertia Triarij
ocabantur. Sed Triarij genibus positis solebant intra
uta subsidere, ne stantes vulnerarentur, venientibus te-
is: & cùm necessitas postulasset, tanquam requieti ve-
ementiùs inuaderent hostes, à quibus constat sæpe fa-
tam esse victoriam, cùm hastati illi, & qui priores ste-
erant, interiissent. Erant autem apud veteres inter pe-
ites, qui dicebantur leuis armaturæ funditores, & se-
entarij: qui præcipuè in cornibus locabantur, & à qui-
us pugnandi sumebatur exordium: sed hi & velocissi-
i & exercitatissimi legebantur. Nec erant admodum
ulti, qui cedentes (si proelij necessitas compulisset) in-

*Legendum
conicio, raró
meditanti,
raró arma
tractanti.

ter principia legionum recipi folebant, ita vt acies i
mota confifteret. Vfque ad præfentem propè ætat
confuetudo permanfit, vt omnes milites pileis, qu
Pannonicos vocabant, ex pellibus vterentur: quod pr
terea feruabatur, ne grauis galea videretur in prœlio
mini, qui geftabat aliquid femper in capite. Miff
autem, quibus vtebatur pedeftris exercitus, pila vo
bantur, ferro fubtili trigono præfixa, vnciarum nou
fiue pedali, quod in fcutum fixum non poffet abfc
di, & loricam, fcienter ac fortiter directum, facilè p
rumpit. cuius generis apud nos iam rara funt tela. B
bari autem fcutati pedites, his præcipuè vtuntur, qu
bebras vocant, & binas etiam ac ternas in prœliis p
tant. Sciendum præterea, cùm miffilibus agitur, fi
ftros pedes in antè milites habere debere: ita enim
brandis fpiculis vehementior ictus eft. Sed cùm ad
la (vt appellant) venitur, & manu ad manum glad
pugnatur, tunc dextros pedes in antè milites habere
bent: vt & latera eorum fubducantur ab hoftibus,
poffint vulnus accipere, & proximior dextra fit, qu
plagam poffit inferre. Inftruendos igitur ac protege
dos omni arte pugnandi, quocunque genere armoru
conftat effe tyrones. Neceffe eft enim, vt dimican
acriorem fumat audaciam, qui munito capite vel pect
re non timet vulnus.

CAP. XXI.
De munitione caftrorum.

CASTRORVM quoque munitionem debet ty
condifcere: nihil enim, neque tam falutare, n
que tam neceffarium inuenitur in bello: quippe fi rec
conftituta funt caftra, ita intra vallum fecuri milites d
noctesque peragunr, etiam fi hoftis quafi obfideat, m
ratam ciuitatem videantur fecum vbique portare. Se
hui

huius rei scientia prorsus intercidit: nemo enim iam
diu ductis fossis, præfixisque sudibus castra constituit.
Sic diurno vel nocturno superuentu equitum barbaro-
rum, multos exercitus scimus frequenter afflictos. Non
solùm autem * confidentes sine castris ista patiuntur, *Corrigo, confidentes, etsi non innuor libris.
sed cùm in acie casu aliquo cœperint cedere, muni-
menta castrorum, quò se recipiant, non habent, & more
animalium * multi cadunt. Nec prius moriendi finis *Lege meo periculo, in-ulu
est, quàm hostibus voluntas defuerit persequendi.

CAP. XXII.

In quibus locis constituenda sint castra.

CASTRA autem, præsertim hoste vicino, tuto sem-
per facienda sunt loco: vbi & lignorum & pabuli
& aquæ suppetat copia. Et si diutius commorandum
est, loci salubritas eligetur. Cauendum etiam ne mons
sit * vicinus altior, qui ab aduersariis captus, possit offi- *Malim, vicinior, aut altior,
cere. Considerandum [etiam]ne torrentibus inundari
consueuerit campus, & hoc casu vim patiatur exercitus.
Pro numero autem militum, vel impedimentorum
munienda sunt castra, ne maior multitudo constipetur
in paruis, néve paucitas in latioribus vltrà quàm opor-
tet cogatur extendi.

CAP. XXIII.

Quali specie delineanda sint castra.

INTERDVM autem quadrata, interdum trigona,
interdum semirotunda, prout loci qualitas aut ne-
cessitas postulauerit, castra facienda sunt. Porta autem,
quæ appellatur prætoria, aut Orientem spectare debet,
aut illum locum qui [ad] hostes respicit: aut si iter agi-
tur, illam partem debet attendere, ad quam est profe-
cturus exercitus, intra quam primæ centuriæ, hoc est,

B 2   cohor-

ceps autem primæ cohortis centuriam femis, hoc e
centum quinquaginta homines gubernabat. Ad que

*Rectius lege- prope omnia, quæ in legione * ordinata funt, pertine
ru ordinan- Item fecundus haftatus centuriam femis, id eft, ce
da tum quinquaginta homines regebat. Triarius pri
centum homines gubernabat: fic decem centuriæ o
hortis primæ, à quinque ordinariis regebantur: quib
magnæ vtilitates, & magnus honor eft à veteribus co
ftitutus: vt ceteri milites ex tota legione omni labore,
*Legendum, deuotione contenderent ad tanta præmia perueni
etiam Erant * enim centuriones, qui fingulas centurias cur
bant: qui nunc centenarij nominantur. Erant decan
denis militibus præpofiti: qui nunc caput contubern
vocantur. Secunda cohors habebat centuriones qui
que. Similiter tertia, & quarta, vfque ad decimam co
hortem: in tota autem legione erant centuriones qui
quaginta quinque.

CAP. IX.
De officio præfecti legionis.

*Rectius ex SED legati Imperatoris * ex confularibus ad exerc
confulibus   tus mittebantur, quibus legiones,& auxilia vniuer
obtemperabant in ordinatione pacis vel neceffitate bel
lorum, in quorum locum nunc illufttes viros conft
magiftros militum fubftitutos, à quibus non tantum
*numeri   binæ legiones, fed etiam plures * numero gubernantu
vera profitu- Proprius autem iudex erat præfectus legionis, habe
ta. comitiuam primi ordinis dignitatem, qui abfente lega
to, tanquam vicarius ipfius poteftatem maximam ret
nebat. Tribuni vel centuriones, ceteriq́ue milites, ciu
præcepta feruabant. Vigiliarum fiue profectionis te
fera ab eodem petebatur. Si miles crimen aliquod ad
mififfet,auctoritate præfecti legionis deputabatur à tri
buno ad pœnam. Arma omnium militum, item equi
veftes,

...tes, & annona, ad curam ipfius pertinebant. Difciplinæ ius, & feueritas : * exercitatio, non folùm pedi-...m, fed etiam equitum legionariorum, præcepto eius ...otidie curabatur. Ipfe autem cuftos diligens & fo-...tius, legionem fibi creditam affiduis operibus ad om-...em deuotionem , ad omnem formabat induftriam : ...iens ad præfecti laudem fubiectorum redundare vir-...tem.

Cap. x.
De officio præfecti caftrorum.

Rat etiam caftrorum præfectus, licet inferior dignitate, occupatus tamen non mediocribus confis : ...quem caftrorum pofitio, valli & foffæ * deftinario ...tinebat. Tabernacula vel cafæ militum, cùm impe-...mentis omnibus, nutu ipfius curabantur. Præterea ...gri contubernales & medici, à quibus curabantur, ex-...enfæ etiam ad eius induftriam pertinebant. Vehicula, ...fagittarij, necnon etiam ferramenta, quibus materies ...fecatur vel cæditur, quibus aperiuntur foffæ, * contexi-...u vallum aquæ ductus. Item ligna vel ftramina, arie-...es, onagri, baliftæ, ceteráque genera tormentorum , ne ...cellent aliquando, procurabat. Is poft longam pro-...ntamque militiam peritiffimus omnium legebatur : ...rectè doceret alios, quod ipfe cum laude feciffet.

*Melior lectio æftimatio

*Emendo, fagittarij, *Lege, ferra-tur *Quidfi fri-plerimus có-fepitur val-lum aqua eductur.

Cap. xi.
De officio præfecti fabrorum.

Habet præterea legio * fabros lignarios, inftructores, carpentarios, ferrarios, pictores, reliquosq. ...tifices ad hybernorum ædificia fabricanda ; ad ma-...hinas, turres ligneas, ceteráque, quibus vel expugnan-...ur aduerfariorum ciuitates , vel defenduntur propriæ, ...reparatos : qui arma, qui vehicula, ceteráque genera

*Rectè Mo-dius emenda-bat fabros, lignarios, ftructores.

C   tormen-

tormentorum, vel noua facerent, vel quaſſata repar
rent. Habebant etiam fabricas ſcutarias, loricarias, a
cuarias, in quibus ſagittæ, miſſilia, caſſides, omniaq
armorum genera formabantur. Hæc enim erat cu
præcipua, vt quicquid exercitui neceſſarium videbat
nunquam deeſſet in caſtris: vſque eò, vt etiam cunic
larios haberent, qui ad morem Beſſorum, ducto ſub t
ris cuniculo, murisque intra fundamenta perfoſſis, in
prouiſi emergerent ad vrbes hoſtium capiendas. H
rum iudex erat proprius præfectus fabrorum.

Cap. XII.
De officio tribuni militum.

DECEM cohortes habere legionem diximus:
prima erat miliaria, in qua cenſu, genere, lite
forma, virtute, pollentes milites mittebantur. Huic
bunus præerat, armorū ſcientia, virtute corporis, mor
honeſtate præcipuus. Reliquæ cohortes, prout princ
placuiſſet, à tribunis, vel à præpoſitis regebantur. Ta
autem ferumbatur exercendi milites cura, vt non ſol
tribuni, vel præpoſiti contubernales ſibi creditos,
oculis ſuis iuberent quotidie meditari, ſed etiam ipſi
morum arte perfecti, ceteros ad imitationem prop
cohortarentur exemplo. Tribuni autem ſolicitudo
hane laudatur induſtria: cùm miles veſte nitidus
mis benè munitus, ac fulgens, exercitij vſu, & di
plina eruditus *incedit.

*Recipiendum
ex VV. Tri-
buni lauda-
batur indu-
ſtria:
*Ex iiſdem le-
gamus ince-
debat.

Cap. XIII.
De centuriis atque vexillis peditum.

PRIMVM ſignum totius legionis eſt Aquila, qu
aquilifer portat. Dracones etiam per ſingulas
hortes à draconariis feruntur ad prœlium. Sed ann

*Liber V. &
Maleſtus, qui
*quia ſciebant in acie, commiſſo bello, celeriter ord
acie

ciesque turbari, atque confundi; ne hoc posset accide-
re, cohortes in centurias diuiserunt, & singulis centu-
riis singula vexilla constituerunt : ita vt ex qua cohorte,
vel quota esset centuria, in illo vexillo literis esset ascri-
ptum, quod intuentes, vel legentes milites, in quanto-
uis tumultu, à contubernalibus suis aberrare non pos-
sent. Centuriones insuper, qui nunc centenarij vocan-
tur, transuersis cassidum * cristis, vt faciliùs noscerentur, *Membrana
quos singulas iusserunt gubernare centurias : quatenus *inferunt cri-
nullus error existeret, cùm centeni milites sequerentur, *stis literas
non solùm vexillum suum, sed etiam centurionem, qui habebant,
signum habebat in galea. Rursus ipsæ centuriæ in con-
tubernia diuisæ sunt: vt decem militibus sub vno papi-
lione degentibus, vnus * [quasi] præesset decanus, qui *Fortasa
caput contubernij nominatur. Contubernium autem *quoque
manipulus vocabatur, ab eo quòd coniunctis manibus
pariter dimicabant.

CAP. XIIII.
De turmis equitum legionariorum.

QVEMADMODVM inter pedites centuria vel
manipulus appellatur, ita inter equites turma di-
tur. Et habet vna turma equites 32. Huic qui præst,
Decurio nominatur. * Vt enim centum pedites ab vno *Emendatā
centurione, sub vno vexillo gubernantur, similiter 32. *Vtenim cē-
equites ab vno decurione, sub vno vexillo reguntur. *tum & de-
Præterea sicut centurio eligendus est, qui sit magnis *cem pedites
uiribus & procera statura ; qui hastas vel missilia peritè
iaculetur & fortiter ; qui dimicare gladio, & scutum ro-
tare doctissimè nouerit; qui omnem artem didicerit ar-
maturæ, vigilans, sobrius, agilis, magis ad facienda, quæ
imperantur, quàm ad loquendum paratus: [qui] con-
ubernales suos ad disciplinam retineat; ad armorú ex-
ercitium cogat, vt bene vestiti, & calceati sint; vt arma

omnium defricentur ac fplendeant : fimiliter elegendu
eft decurio, qui turmæ equitum præponatur, imprimi
habili corpore, vt loricatus,& armis circundatus omn
bus, cum fumma admiratione equum poffit afcender
equitare fortiffimè ; conto fcienter vti ; fagittas docti
fimè mittere ; turmales fuos, id eft, fub cura fua equi
tes pofitos erudire ad omnia, quæ equeftris pugna de
pofcit : eofdem cogere loricas,vel cataphractas,contos
& caffides frequenter tergere, & curare. Plurimum
enim terroris hoftibus armorum fplendor importat
Quis credat militem bellicofum ; cuius diffimulatione
fitu, ac rubigine arma fœdantur? Non folùm autem
equites, fed etiam ipfos equos affiduo labore conuen
edomari. Itaque ad decurionem & fanitatis,& exercita
tionis tam hominum, quàm equorum pertinet cura.

C A P.   x v.
Quemadmodum legionum acies inftruantur.

N V N C qualiter inftruenda fit acies, fi pugna im
mineat,declaretur vnius legionis exemplo : quo
fi vfus exegerit, transferri poffit ad plures. Equites lo
cantur in cornibus. Acies peditum à prima cohorte in
cipit ordinari in cornu dextro. Huic cohors fecund
coniungitur. Tertia cohors in media acie collocatu
Huic annectitur quarta. Quinta verò [cohors] fini
ftrum fufcipit cornu. Sed ante figna,& * citra figna
nec non etiam in prima acie dimicantes, principes *vo
cantur, hoc eft, ordinarij, ceterique principales. Ha
erat grauis armatura, qui habebant caffides, cataphra
ctas, ocreas, fcuta, gladios maiores, quos fpathas vo
cant, & alios minores, quos femifpathas nominant
plumbatas quinas pofitas in fcutis, quas primo imper
iaciunt. Item bina miffilia,vnum maius, ferro trian
gulo,vnciarum nouem, * haftili pedum quinque * [&
femis

semis, quod pilum vocabant, nunc spiculum dicitur, ad cuius iactum exercebantur præcipuè milites, quod arte, & virtute directum, & scutatos pedites, & loricatos equites sæpè tranſuerberabat : aliud minus, ferro triangulo vnciarum quinque, * hastili trium pedum [&] semis, quod tunc verriculum, nunc verutum dicitur. Prima acies principum : Secunda haſtatorum, armis talibus docetur inſtructa. Poſt hos erant ferentarij & leuis armatura ; quos nunc * auxiliatores, & armaturas dicimus ; ſcutati qui plumbatis, gladiis, & miſſilibus accincti, ſicut nunc propè omnes milites videntur armati. Erant item ſagittarij cum caſſidibus ; cataphractis ; & gladiis ; ſagittis ; & arcubus. Erant funditores, qui ad fundas vel fuſtibalos lapides iaciebant. Erant tragularij, qui ad manubaliſtas, vel arcubaliſtas dirigebant ſagittas. Secunda acies ſimiliter armabatur : in qua conſiſtentes milites, haſtati vocabantur. Sed in ſecunda acie, dextro cornu, cohors ſexta ponebatur : cui iungebatur ſeptima. Octaua cohors mediam aciem tenebat, nona comitante. Decima cohors in ſecunda acie ſiniſtrum ſemper obtinebat cornu.

* Iterum lege haſtile

* Libri ſaniores habēt, exculcatores,

CAP. XVI.

Quemadmodum triarij, vel centuriones armentur.

POST omnes autem acies, triarij cum ſcutis, cataphractis & galeis ocreati cum gladiis, ſemiſpathis, plumbatis [&] binis miſſilibus locabantur, qui genu poſito ſubſidebant, vt, ſi prima acies vinceretur, ab his quaſi de integro reparata pugna poſſet * ſperari victoria. Omnes autem ſignarij vel ſigniferi, quamuis pedites, loricas minores accipiebant, & galeas ad terrorem hoſtium * vrſinis pellibus tectas. Centuriones verò habebant

* Membrana, reparati, fortean, felpirare

* In vna V. eſt hiſtutis

C 3   bebant

bebant cataphractas, scuta, & galeas ferreas : sed transuersis & argentatis cristis , vt *faciliùs agnoscerentur à suis.

* *Libri scripti malunt* celerius

CAP. XVII.
Commissa pugna grauem armaturam stare pro muro.

ILLVD autem sciendum est, & modis omnibus retinendum : quòd commisso bello , prima ac secunda acies stabat immota. Triarij quoque residebant. Ferentarij autem , *& leuis armatura scutatores , sagittarij funditores, aduersarios prouocabant ante aciem procedentes : si hostes fugare poterant , sequebantur : si eorum virtute,* ac multitudine premebantur,reuertebantur ad suos,& post eos stabant. Excipiebat autem proelium grauis armatura,quæ tanquã murus (vt ita dicam) ferreus stabat ; & non solùm missilibus, sed etiam gladiis cominus dimicabat. Et si hostes fugasset , non sequebatur grauis armatura,ne aciem suam * ordinemque turbaret , & ad dispersos recurrentes hostes,incompositos opprimerent : sed leuis armatura cum funditoribus,sagittariis,& equitibus,fugientes sequebatur inimicos. Hac dispositione , atque cautela sine periculo legio vincebat, aut superata seruabatur incolumis : quia ius legionis est, facilè nec fugere, nec sequi.

* *Restituo armaturæ, ex enlcatores, scutatores,sagittarij, funditores, hoc est leuis armatura.*
* *Malum, aut*
* *Vegetius scripsit ordinationemque*

CAP. XVIII.
Nomina militum, & gradus in scutis eorum aduersis scribenda.

SED ne milites [aliquando] in tumultu prælij à suis contubernalibus aberrarent, diuersis cohortibus diuersa in scutis signa pingebant : vt ipsi nominant διγμωτα, sicut etiam nunc moris est fieri. Præterea in aduerso

—

ditentur, vt & ars dirigendi, & dextræ virtus possit
adcrescere. Sagittarij verò, vel funditores, scopas, hoc
est, fruticum vel straminum fasces, pro signo ponebant;
ita vt sexcentos pedes remouerentur à signo, vt sagit-
tis, vel certè lapidibus ex fustibalo destinatis, signum
sæpius tangerent. Propterea sine trepidatione in acie
faciebant, quod ludentes in campo semper fecerant,
Assuescendum est etiam, vt semel tantùm funda circa
caput rotetur, cùm ex ea emittitur saxum. Sed & manu
sola omnes milites meditabantur libralia saxa iactare:
qui vsus paratior creditur, quia non desiderat fundam.
*Lego, iugi, Missilia quoque, vel plumbatas * iugiter perpetuóque
perpetuóque exercitio dirigere cogebantur, vsque adeò, vt tempore
*Malo, scin- hyemis de tegulis, vel *scandulis, quæ si deessent, certè
dulis. de cannis, vlua, vel culmo, & porticus tegerentur ad
equites, & quædam velut basilicæ ad pedites : in qui-
bus tempestate, vel ventis aëre turbato, sub tecto ar-
mis erudiebatur exercitus. Ceteris autem etiam hy-
bernis diebus, si niues tantùm, pluuiæque cessarent,
exerceri cogebantur in campo : ne intermissa consue-
tudo, & animos militum debilitaret, & corpora. Siluam
cædere, portare onera, transilire fossas, natare in mari,
siue fluminibus, gradu pleno ambulare, vel currere
etiam armatos cum sarcinis suis, frequentissimè conue-
nit : vt quotidiani laboris vsus in pace, difficilis non
videatur in bello. Siue ergo legio, siue auxilia fuerint,
exerceantur assiduè. Nam quemadmodum benè ex-
ercitatus miles prælium cupit, ita formidat indoctus.
Postremò sciendum est, in pugna vsum amplius pro-
desse, quàm vires. Nam si doctrina cesset armorum,
nihil paganus distat à milite.

C A P.

C A P. XXIIII.
Exempla adhortationum & exercitij militaris, de aliis artibus tracta.

ATHLETA, venator, auriga, propter exiguam mercedem, vel certè plebis fauorem, quotidiana meditatione* artes suas aut seruare, aut augere consue-scunt. Militem (cuius est manibus seruanda respublica) studiosiùs oportet scientiam dimicandi, vsumque rei bellicæ iugibus exercitiis custodire: cui contingit non tantùm gloriosa victoria, sed etiam amplior præda: quemque ad opes, ac dignitates ordo militiæ, & Impe-ratoris iudicium consueuit euehere. Artifices scænici ab exercitiis non recedunt pro laude vulgi. Miles sa-cramento lectus, ab exercitiis armorum, vel nouellus, vel iam vetustus cessare non debet, cui pugnandum est pro salute propria, & libertate communi: præsertim cùm antiqua sit prudensque sententia, Omnes artes in meditatione consistere.

C A P. XXV.
Enumeratio ferramentorum, vel ma-chinarum legionis.

LEGIO autem non tantùm militum numero, sed etiam genere ferramentorum vincere consueuit. Primùm omnium instituitur iaculis, quæ nullæ loricæ, nulla possunt scuta sufferre. Nam per singulas centu-rias singulas carrobalistas habere consueuit, quibus muli ad trahendum, & singula contubernia ad armandum vel dirigendum, hoc est, vndecim homines deputan-tur. Nam hæ quanto maiores fuerint, tanto longiùs ac fortiùs tela iaculantur. Non solùm autem castra defen-dunt, verùm etiam in campo post aciem grauis arma-turæ

turæ ponuntur. Ad quarum impetum, nec equites lo-
ricati, nec pedites scutati possunt obstare. In vna autem
legione quinquaginta quinque carrobalistæ esse solent.
Item decem onagri, hoc est, singuli per singulas cohor-
tes in carpentis *bobus [duobus] portantur armatis: vt
si fortè hostes ad oppugnandum venerint vallum, sagit-
tis & saxis possint castra defendi. Scaphas quoque de
singulis trabibus excauatas, cum longissimis funibus, &
interdum etiam ferreis cathenis, secum legio portat:
quatenus contextis eisdem (sicut dicunt) monoxylis,
supertectis etiam tabulatis, flumina quæ sine pontibus
vadari nequeunt, tam à peditibus, quàm ab equitatu
sine periculo transeantur. Habet ferreos harpagones,
quos lupos vocant, & falces ferreas confixas longissimis
contis. Item ad fossarum opera *facienda bidentes, li-
gones, *palos, rastra, alueos, cophinos, quibus portetur
terra. Habet quoque dolabras, secures, ascias, serras,
quibus materia ac pali dedolantur atque serrantur. Ha-
bet præterea artifices cum omnibus ferramentis, qui ad
oppugnandas hostium ciuitates, testudines, musculos,
arietes, vineas (vt appellant) turres etiam ambulatorias
faciant. Verùm ne singula enumerando plura dican-
tur, vniuersa quæ in quoque belli genere necessaria esse
creduntur, secum legio debet vbique portare, vt in quo-
uis loco fixerit castra, armatam faciat ciuitatem.

FLAVI VEGETI
RENATI
DE
RE MILITARI,
LIBRI TERTII

Prologus.

THENIENSES *& Lacedæmonios ante Macedonas rerum potitos, prisci *testantur annales. Verùm apud Athenienses, nõ solùm rei bellicæ, sed etiam diuersarum artium viguit industria: Lacedæmoniis autem præcipua fuit cura bellorum. Primi namque experimenta pugnarum de euentibus colligentes, artem præliorum scripsisse firmantur vsque eò, vt rem militarem, quæ virtute sola, vel certè felicitate creditur contineri, ad disciplinam peritiấ studia renocarint: ac magistros armorum (quos ταχτιχὰς appellauerunt) iuuentutem suam vsum, varietatémque pugnandi præceperint edoceri. O vtros summa admiratione laudandos, qui eam præcipuè artem edíscere voluerunt, sine qua aliæ artes esse non possunt! Horum sequentes instituta Romani, Martij operis præcepta, & vsu retinuerunt, & literis prodiderant. Quæ per diuersos autores librósque dispersa, Imperator inuícte, mediocritatem meam adbreuiare iussisti,

Probani libri V V. lequuntur.

Adriano Tutnebo lib. 12. Aduersariorum cap. 6. ad quem beniuolum Lectorem remitto.

Multitudine sagittariorum sæpe deleti sunt.] Fortean *sagittarum* scripserit Vegetius. Quod autem vsui venisse Romanis hic traditur, vt nudati pedites; cataphractis, galeisque depositis; infeliciter sæpe cum Gothis pugnârint; id inprimis euenisse scio illo prœlio, quo Valens A. superatus, & flamma hostili exustus est. Paulus Diaconus : *Ad primum Gothorum impetum perturbatæ sunt Romanorum equitum turmæ, nudatósque pedites defernére, qui mox equitatu hostium septi, ac sagittarum nubibus obruti* : lib. 12. Historiarum. Itidem Orosius, *Nubibus* (inquit) *sagitarum obrutæ.*

Dubitatum de Vegetij lectione. (margin)

Vel cataphractas, vel galeas pedestribus reddere.] Sed quærat nunc aliquis quid pro cataphractis, quid pro galeis milites Vegetij ætate, & deinceps gestârint ? Respondeo; pro lorica & cataphracta fuisse tunicam, quam Thoracomachum appellârunt. cuius vsum ad descriptionem meam mihi diligentia suppeditauit. Nam dum in eo sum, vt quæ ad bellica tormenta intelligenda, explicanda faciunt, conquiram; commodùm incido in librum, cui titulus Notitia vtriusque imperij, eíque coniunctum libellum de rebus bellicis. ex quo quæ de thorachomacho ibidem tradebantur, cum beniuolo Lectore, & studioso huiusmodi antiquitatum lubens communicabo : *Inter omnia,* inquit, *quæ aduersum bellicum pronida posteritatis cogitauit antiquitas, Thoracomachum quoque mira vtilitate ad lenamen corporis, armorum ponderi, & asperitati subiecit. hoc enim vestimenti genus, quod de coactili ad mensuram, & tutelam humani pectoris conficitur, de mollibus lanis timoris sollicitudo, solertia magistra, composuit : vt hoc inducto primùm, lorica vel cliVanus, aut his similia fragilitatem corporis, ponderis asperitate non læderent; membra quoque vestientis, inter armorum hiemisque discrimen tali solatio adiuta labori sufficiant. Sanè ne idem Thoracomachus pluuiis verberatus ingrauescente pondere adficiat vestientem, de Libycis bene confectis pellibus ad instar eiusdem Thoracomachi faciem conueniet superinducere. Hoc igitur vt diximus Thoracomacho induto, cui Græca appellatio, ex tuitione corporis nomen adsumpsit. focus etiam, hoc est calciamentis, & ferratis ocreis indutis, superposita galea, & scuto, vel gladio lateri aptato, arreptis lanceis in plenum, pedestrem subiturus pugnam, miles armabitur.* Quæ primùm inuenta vestis sustinendo aut leuando armorum ponderi, eadem postillà arma-

Romani prelorica thoracomachū induerunt. (margin)

Thoracomachus qualis fuerit. (margin)

Thoracomachus vñ de dictus. (margin)

turē

turæ loco fuit. Itidem puto pro galeis poftea pileos iftos *Thoracomachi*
Pannonicos fuiffe, de quibus Vegetius eodem hoc capite. *abufus.*
Quod ad Thoracomachum, non verba præmiffa, verùm *Pilei Pannoniti.*
etiam figura, quæ in eodem libello propofita eft, ita eueniffe indicat; & eft talis, qualem hìc propofitam vides. quam
bona fide, vt depictam iftic videram, exprimendam curaui.

Legionarius thoracomacho indutus.

nus l.10.ff.de adult. & Vlpianus l.2. ff. De his qui notantur infamia:& principalis constitutio in l.Imperialis, C.de nuptiis.& rubrica tota cod. Theodosiano, de scenicis. Primam horum spectaculorum in rempublicam Romanam inuectionem iamdudum, vt arbitror, à me desideras. eam habeto ex Liuio. is primùm initio libri septimi , ita scribit: *Ludi quoque scenici , noua res bellicoso populo (nam Circi modò spectaculum fuerat) inter alia cælestis iræ placamina instituti dicuntur*. Iterum lib. 33. *Ludos scenicos per quatriduum eo anno primùm factos ab curulibus ædilibus memoriæ proditur*. id quod Liuius postremo loco refert , factum Q Fabio Maximo, T. Sempronio Graccho iterum cols.

Ludi scenici quando Romam primùm inuecti.

AD CAPVT XXV.

PRIMVM omnium instruitur iaculis,quæ nullæ loricæ , nulla possunt scuta sufferre.] Varias agnouit antiquitas loricas. nam lineas,coriaceas, æneas, ac denique ferreas gestasse comperi. Lorica linea Alexandrū Magnum indui solitum,scribit in vita eius Plutarchus. Item & Græcorum heroës vsos , testis Homerus Iliad. β. Herodotus Polyhymnia . itidé de Hispanis memoriæ prodidit Liuius libro 31.Idem ille Samnites totam legioné linteatam habuisse scribit, libro nono extremo:& Festus in *legio*. Liuij hæc sunt verba : *Forma erat scuti: summum latus, quà pectus atque humeri teguntur,fastigio æquali ad imum cuneatior , mobilitatis causa: spongia pectori tegumentum,& sinistrum crus ocrea tectum . galeæ cristatæ,quæ speciem magnitudini corporum adderent,tunicæ auratis militibus versicolores; argentatis linteæ candidæ*. Certum genus militum Imperator Caracalla instituit, quos Alexandrinos appellauit:hos thorace ex triplici lino indutos fuisse,videbis apud Dionem,in Caracallā. Suetonius in Galba : *Loricam tamen*, inquit, *indnt lineam*. Lineam loricam, pro ænea militibus Athenienfibus dedit Iphicrates.testem do Diodorū lib. 13. & in eius vita Probum. Varro, *Lorica*,ait, *à loris, quòd de corio crudo pectoralia faciebant, poftea fuccuderunt Galli è ferro fub id vocabulum, ex annulis,ferream tunicam*.

Lorica antiquis variæ fuerunt, Linea lorica.

Legio linteata Samnitum.

Scuti perelegans descriptio.

Alexandrini milites.

Lorica linea.

Lorica coriacea.

Lorica ferrea.

Quibus muli ad trahendum.] Manuscriptus H. & quatuor Sufij legunt,*multi*. quod vereor,ne mentiantur.

Nam hæ quanto maiores fuerint , tanto longius tela iaculantur.] Augét verbo vnoC.S. M. & H.in quibus legitur,

gitur, *longius ac fortius*, vide, ne de suo hoc addiderint librarij.

Item decem onagri, hoc est singuli per singulas cohortes, in carpentis bobus duobus portantur armatis.] Alter Susianorum referebat, *bobus trahentibus portantur armatis.* Vox *duobus* nulla est in codice M. S. H. N. neque illi aliud quid eius loco substituunt. hoc amplius, pro *armatis*, omnes illi referunt, *armati*. quod non ad boues, sed ad ipsum Onagri machinamentum referendum est. Recte igitur emendamus, *bobus portantur armati*. Vegetius hoc eodem capite de carrobalistis loquens: *Singula*, inquit, *contubernia ad armandum vel dirigendum, hoc est vndecim homines deputantur.* Itidem in Notitiâ Imperij verba de balista sonant: *Quæ quanto minus ad armandum se virorum ministerium quærit, tanto est ingenij virtute præstantior.* Iumenta hæc, quæ machinis bellicis, ceterísque rebus trahendis in exercitu necessaria erant; siue muli, siue equi, siue boues erant, prouinciales præstare tenebantur. Ceterùm præstitis animalibus, prouinciales neque pabulis, neque pecunia danda grauari poterant: l. comperimus, C. de cursu publico, lib. 12. Porro vt hîc, in expeditione bellica, machinis, armis, ceterísque huc illuc transferendis boues, mulos vsui fuisse videmus: similiter & in cursu publico, bobus, mulis, asinis quoque antiquitus vsos, testatur Imperatorum constitutio, l. prima, Cod. Theodosiano, dicto titulo. Id autem à Iuliano sublatum, scribit Socrates lib. 5. cap. 1. Imò totum illum publicum cursum (cùm priuatorum onus antè fuisset) in se recepit Imperator Seuerus, teste Spartiano. Idem ille D. Hadrianum cursum fiscalem instituisse, alibi scriptum reliquit.

Quatenus contextis eisdem (sicut dicunt) monoxylis.] Eum locum explicabo lib. 5. cap. 7.

Item ad fossarum opera facienda.] Membranæ H. *faciendum* scribunt . Id, tanquam insolens, offendit aures eorum, qui hîc reposuerunt, *facienda*, existimantes benè mereri se de Vegetio, cùm meriti sint admodú malè. Gerundia enim veteres magis amasse vidétur quàm ea, quæ Gerundiua Grammatici vocát. Inde illi longè alio exéplo dixerunt: *Pullos subducendum, & consuefaciendum*, Varro. sic Lucretius,

Æternas quoniam pœnas in morte timendum.

Sed admonuerunt hæc Gellius: item in Spicilegiis suis noster Palmerius, & alij.

N n 4 Biden-

Emendatus Vegetius.

Vrbi Armandi uoua significatio.

Iumenta bellica vsui necessaria prouinciales suppeditasse. Iumenta autem qui præstabant, alere non tenebantur.

Boues, muli, asini quoque in cursu publico.

Cursum publicum ex priuato fiscalem seu D. Hadrianus.

Vegetius leuiter emendatur. Gerundiorum vsus apud veteres.

tibúfque ex prætoris figno. Igitur vnoquoq. manifeftè
agnofcente, in qua ftriga, & qua ftrigæ parte tendit, eò
quòd omnes femper eundem in caftris locum tenent, fit
fimile quippiam, quale cú in vrbem notam ac propriam
ingreditur exercitus. illic enim à portis declinantes mox
vnufquifque procedunt, perueniuntq. ad proprias ha-
bitationes abfque vllo errore: propterea quòd vniuerfi
ac finguli cognofcunt in qua ciuitatis parte fit ipforum
diuerforium. his fimile quippiam contingit etiã in Ro-
manis caftrametationibus, quibus videntur Romani fe-
quentes huiufmodi facilitatem, contrariam Græcis ince-
dere viam: quod ad partem etenim Græci caftrametan-
do præcipuum ducunt caftrorum munitiones, easque
fequuntur in primis, partim fodiendi labore declinan-
tes: partim exiftimantes non effe fimilia manufacta mu-
nimina, iis quæ ab ipfa locorum natura facta funt mu-
nimenta. ob id etiam in vninerfo caftrorum pofitu figu-
ras omnifariam mutare coguntur, fequentes locorum fi-
tus. vnde interdum effe contingit priuatum quoque &
particularem tabernaculi fingulorum locum. Romani
autem laborem fodiendi, aliáq. iis competentia tolerare
præoptant commoditatis gratia, atque vt notum vnum-
que femper habeant caftrorú fitum. Vniuerfales itaque
partes fpeculationis exercituum caftrametationífque in-
primis huiufmodi funt.

F I N I S.

GODESCALCI STEWECHII

COMMENTARIVS

AD

FLAVI VEGETI

RENATI,

DE

RE MILITARI

LIBROS.

Accesserunt eiusdem G. STEWECHII *&*
FRANCISCI MODII *Brugensis, in*
IVLIVM FRONTINVM
Coniectanea & Notæ.

adhibenda fit, aliis confiderandum relinquo. Vallos &
fudes pro iifdem effe, alibi docui ex Seruio; addam nunc

Vallum quid fit.
& Ifidori teftimonium: *Vallum*, inquit, *est quod mole terræ eri-*

Valli vnde di-
ctur.
gitur, vt custodia prætendatur. dictum autē vallum à vallis. nam valli

Quid inter-
ualla.
fustes funt quibus vallum munitur. Et valli sucti, quòd figantur & euel-
lantur, interualla. spacia funt inter capita vallorum, id est stipitum, qui-
bus vallum fit. lib. 15. cap. De munitionibus.

Lorica vrbes
circumdato:
Loricula vrbē effe circumdatam.] In membranis Hif-
torpianis, lorica vocabatur. Ammianus: *Terras præstringens,*
muros altius erigebat: hac lorica, diligentia celeri consummata, in tuto
locandam securitatem suam existimans: lib. 31. Etiam ad cœli
ambitum omnia fuo amplexu concludentem id tranftulit
Lucretius:

Denique qua circum cœli lorica coërcet.

Lorica illa vnde
dicta.
Dicebatur autem illa lorica Latinè ea notione, qua Græcè
θωράκιον, pró quo Vitruuius ferè reddidit *pluteum.* Loricam
autem hoc opus ab aliis quoque Hiftoriographis vocatam
obferuaui, non Loriculam, nifi in munitionibus leuiufcu-
lis & minoribus. Cæfar lib. 7. belli Gallici. *Post eas aggerem*
& vallum x 11. pedum extruxit, huic loricam pinnasq; adiecit. Ite-
rum lib. 5. *Turres cōtabulantur, pinnæ, loricæq; ex cratibus attexuntur.*
Hirtius octauo belli Gallici: *Turres crebras excitari in altitudi-*
nem trium tabulatorum, pontibus transiectis constratisq; coniungi: quo-
rum frontes viminea loricula muniuentur. Tacitus 4. Annal. *Obsi-*
dium cœpit per præsidia, quæ oportunè iam muniebat. dein fossam lo-
ricamq; contexens, quattuor millia passuum ambitu complexus est. Flo-
rus lib. 3. cap. 10. *Castellis ingenti quasi lorica circundatam primùm*
fame domuit.

AD CAPVT XXIX.

Dissentis à Tur-
nebo.
SED ex alto deftinata miffilia, fiue plumbatæ, fiue
lanceæ, veruta, vel fpicula.] Cogit me hic Vegetij lo-
cus diffentire à doctiffimo viro Adriano Turnebo, quod
illius manes mihi cupio ignofcere. Is lib. 24. Aduerf. c. 12.
plumbatas interpretatus glandes plumbeas, quas martio-
barbuli gerebant, vt à me relatū eft fuprà lib. 1. cap. 17. forte
inductus in eam opinionē, quòd eafdem putaret effe plum-
batas, quibus animaduertebatur olim in fontes: qua de re
ego memini fuprà libro fecundo. Et penè in eundem ille
errorem vir ille pertraxerat; nifi reprehendiffet Vegetius,
quemo

em vides has plumbatas inter miffilia enumerare. Iacu-
autem has plumbatas, non glandes fuiffe, probabo ex
certo auctore De rebus bellicis, cuius ego antè mentio-
n fæpiùs feci. Is bifariàs plumbatas proponit hac figura:

Plumbata Tribulata.

Plumbata Mamillata.

lteram plumbatam Tribolatam appellat, alteram Ma-
illatam. Expofitionem autem Tribolatæ talem adhibet:
oc, inquit, iaculi genus quod in modum fagittæ pennis videtur in-
ftum, non arcu neque baliftæ pulfu confuenit emitti, fed manus im-
ta & viribus elifum in hoftem cominus vadit, quod excipienti gemi-
ratione videtur afferre perniciem. Aut enim perimit infixum, aut fine
dnere dilapfum, & in terram pofitum, plantæ calcantis infgitur, eò
nàd in partem quamlibet fi fuerit connerfum ex latere, aculeo ex fe
minente inferat vulnus. Fit autem ex ligno in modum fagittæ facto,
i ferrum fubtiliter in formam venabuli aptatum infgitur, fiftula eiuf-
m ferri parumper extenfa, fupra quam modico interiecto fpatio, plum-
adhærentes iaculi velut tribuli emergunt. In fumma autem parte
ufdem iaculi affiguntur pennæ celeritatis cauf̃a, tanto videlicet fuper
fdem pennas relicto fpatio, quantum digiti potuerint tenentis amplecti.
lumbatæ Mamillatæ expofitionem talem habet idem au-
or: Bene extenfa (inquit) & directa virga, accipiet in extremitate
i rotundum & in acumen deductum ferrum fimilibus locis in tribula-
plumbo, & pennis adhærentibus, ut plumbi pondere, & pennarum
leritate adiuta rotunditas teli, facilè clypeos aduerfarij, & fimiliter
flamia valeat penetrare.

Balifitæ vero & Onagri, fi à peritis diligentiffimè

PETRI POSSINI E S. I.

OBSERVATIONUM

PACHYMERIANARUM

AD HISTORIAM ANDRONICI

LIBER III,

QUAE AD TEMPORA ET AD CHRONOLOGIAM PERTINENT TRACTANS.

CAPUT I.

De numero annorum, quos haec rerum Andronici historia complectitur. huius finis quantum absit ab initio historiae Cantacuzeni.

I.   Ante omnia operae pretium duco figere utrimque metas huic historiae, et ex quo limine procedens in quem excurrat limitem, definire metiendo.   scribit noster p. 12 v. 4 Andronicum Palaeologum capessentem solum extincto iam patre habenas imperii, *annos natum fuisse quatuor supra viginti*; ac c. 36 et ultimo libri 7, huius operis postremi, affirmat desinere hanc historiam in anno undequinquagesimo aetatis Andronici eiusdem.   unde infertur, res gestas annis sex et viginti huius secundi Pachymerianae historiae voluminis argumentum facere.   annos quippe sumimus expletos ad expeditiorem calculum; id quod citra magni detrimenti periculum posse nos facere, ex iis quae numero mox tertio de nato circa Iuliani anni principium Andronico dicemus apparebit.

II.   Restat explorandum quoti numerentur in aera vulgari Christiana duo hi anni, qui spatium temporis, in quo explicando haec historia versatur, utrimque terminant.   eorum prior quidem, unde principium ducitur, cum statim a Michaëlis Palaeologi Augusti morte inchoëtur, et haec, ut demonstratum est vol. I p. 747, die 2 Decembris anno Christi 1282 contigerit, fuit sine dubio annus idem aerae vulgaris 1282, sed postrema dumtaxat sui parte, diebus videlicet viginti.   huic anno si

25 solidos addamus, fiet annus Christi 1307, in cuius die un-
decima Decembris necesse sit metam defigere ultimam temporis
hac historia descripti. quia vero in collectione maiorum sum-
marum fere minutiae contemnuntur, haud magnopere repugna-
verim, si quis malit a kalendis Ianuariis anni Christi 1283 huius P 562
historiae initium ducere, ac finem eiusdem in kalendis iisdem
anni 1308 statuere, neglectis utrobique viginti diebus, qui supra
priorem epocham abundant, posteriori desunt ad perfectam ple-
nitudinem.

III. Et commodum ad istam putandi rationem satis apte
quadrant anni vitae Andronici, quos insigniendo principio spatii
narratarum a se hoc opere rerum noster adhibet historicus. nam
editum in lucem vel mense Ianuario vel Februarii principio An-
dronicum hunc imperatorem, dudum collegimus (vol. I p. 743)
ex illis Nicephori Gregorae verbis l. 10 p. 214, quibus in mo-
nodia de Andronici eiusdem obitu affirmat eum die duodecimo
Februarii morientem explevisse annum aetatis quartum supra
septuagesimum. τέταρτον μὲν ἤδη καὶ ἑβδομηκοστὸν ἔτος ἀπὸ
γενέσεως αὐτῷ τελευτῶντι ἠνύετο. quartus et septuagesimus an-
nus a nativitate ipsi morienti absolvebatur. cum autem eum
natum definiverimus ibidem anno Christi 1258, intelligimus
ipsum ingressum annum quartum et vicesimum aetatis primo
sesquimense anni Christi 1282 cuius anni mense ultimo patri de-
cedenti solus in imperio succedens extremos trahebat menses anni
suae vitae quarti et vicesimi, post non multos dies vigesimum
quintum initurus; ex quo tempore cum annos quinque supra
viginti evolvisset, quando ea gerebantur in quibus narrandis de-
sinit haec historia Pachymeris, quadragesimum nonum Andro-
nicus vitae annum prope absolverat, quinquagesimum proxime
inchoaturus.

IV. Atque hic declarandi locus est quod obiter dixi prae-
fatione ad universum hoc opus, quae in fronte partis prioris
proposita et ad hanc nihilominus extenditur. scripsi autem illic
per hanc nunc prodeuntem Pachymeris historiam expleri velut
quendam hiatum publicae memoriae a Niceta et Acropolita ad
Cantacuzenum. id quod non ὁλοσχερῶς accipi aut resecari ad
vivum volui, quasi ἀμέσως et protinus contigue initium Canta-
cuzenianae historiae fini Pachymerianae committatur. inchoat
Cantacuzenus narrationem suam a morte imperatoris Michaëlis
secundi Palaeologi, quem nepotem prioris Michaëlis Andronicus
senior Michaëlis primi filius, secundi pater, primogenitum suum
imperii collegam habuit. hunc Cantacuzenus primo statim libri
primi capite diem suum obiisse Thessalonicae scribit, τρίτον πρὸς
τεσσαράκοντα χρόνον ἄγοντα τῆς ἡλικίας, ἔτους ἐννάτου πρὸς τοῖς
εἴκοσι καὶ ὀκτακοσίοις καὶ ἑξακισχιλίοις, δωδεκάτῃ μηνὸς Ὀκτω-

ἀλλ᾽ οὐδὲ μεγάλα, ἀλλ᾽ ὅσον ἀκοντίζεσθαι ὅπου δεήσοι. sed vanum, opinor, sit quaerere originem vocabuli Francici in lingua Graeca.

ἀγρωτίδες p. 269 v. 7. casas rusticas ac tuguria aestiva messorum manipulos in areis terentium, opinor, intelligit; quas a fundamentis avulsas eluvie, et quod fere tabulis ac materia constarent, torrente abreptas significat innatantes aquis, quoad impactae moenibus urbis allisu dissiparentur. agi autem potissimum de temporariis tabernaculis circum areas frugibus plenas positis ad custodiam congestarum illic in moles frumenti spicarum, quas excuti et ex iis granum secerni, opera multorum continenter dierum laborem exigente, oportebat, suadet temporis articulus sub extremum Augustum et adiuncta mentio ἔργων αἰζηῶν ἀνδρῶν operum iuvenum virorum, hoc est valentium messorum. ἔργα enim universim opera rustica circa fruges vocantur, extenso etiam eius vocis significatu ad fructus ipsos istis laboribus paratos; quo sensu etiam Psalm. 127 2 labores manuum suarum manducare homines, nempe agricolae, dicuntur. corroborat autem coniecturam, quod mox Pachymeres in membro periodi respondente his verbis, αἰζηῶν ἀνδρῶν ἔργα, subiungit τὰ δ᾽ ἀφανίζεσθαι ταῖς προχώσεσι, disiecta et disperdita ista opera dicens cum molibus aut metis frumentariis, struibus videlicet aggestis manipulorum tritici ac frugum caeterarum, quae solent per aestatem in areis extare. favet his coniecturis epitome in hunc locum Vaticana, quam vide recitatam in hoc glossario infra verbo προχώσεις. quod huc pertinet, admoneo satis rarum videri vocabulum ἀγρώτιδες cum ω scriptum: nam vulgo ἀγρότης rusticus scribitur. sed fortasse noster ex usitato eadem notione verbo ἀγροιώτης, crasi quadam, hanc vocem formaverit; aut etiam in mente habuerit et scriptioni suae, ut interdum solet, inseruerit locum poëtae cuiusdam. certe haec cuncta, praesertim vero αἰζηῶν ἀνδρῶν ἔργα, poëtici styli saporem habent.

ἀδήριτον p. 152 v. 2. vocem ἀδήριτον hic usurpat auctor in notione ab Hesychio observata, dum ἀδηρίτῳ pro synonymis copulat ἄμαχον, ἀκαταμάχητον, invictum ineluctabile. quare verbum διέφερον, quod mox subditur, nullum eorum elegantium significatuum hic obtinet, quibus insignitur in plerisque disertorum operum libris, sed simpliciter sonat ferebant.

ἀλλαγαί p. 496 v. 2. τοῦτον βασιλεὺς μετ᾽ εὐμενείας δέχεται καὶ ἀλλαγαῖς ἀγάλλει. p. vero 498 v. 4 de Mpyrigerio sic scribit: καὶ ἐκυδνοῦτο ταῖς συχναῖς ἀλλαγαῖς. Hesychius ἀλλαγήν exponit ἀμοιβήν. sed eam generalem notionem his nostri locis haud quadrare nemo non videt. multo minus contentus quispiam esse possit ea quam Eustathius παρεκβολαῖς ad Iliad. ε p. 531 ed. Rom. annotat his verbis: αἱ δὲ ἱστορίαι σταθμοὺς οἴδασι λέγειν καὶ τὰς ὡρισμένας, εἴτ᾽ οὖν τεταγμένας, ἐνοδίους

ἀναπαύλας τοῖς εἴτε ἱππεῦσιν εἴτε πεζοδρόμοις, ἅς καὶ ἀλλαγὰς
ἔλεγόν τινες. in quam sententiam duo Meursius testimonia alle-
gat, alterum Basilicon Eclog. 58 ἐάν τις παρελάσῃ μίαν γοῦν ἀλ-
λαγήν, τὸ τετραπλάσιον τῆς τοῦ ζώου τιμῆς διδότω, alterum e
glossis veteribus, σταθμὸς ζῶον δρομικὸν (forte legendum σταθμὸς
ζώων δρομικῶν) ὃς λέγεται νῦν ἀλλαγή. verum nihil hinc elicio
quod declarationi duorum quae proposui locorum sufficiat. re-
perio ἀλλαγὰς praeterea vestes dici speciosiores, ornatus potius
in festo aut pompa quam necessitatis aut usus civilis gratia sumi
solitas. Codinus lib. de Offic. c. 10 n. 7: ἔπειτα ὁ πατριάρχης,
μᾶλλον δὲ οἱ πατριάρχαι εἰ παρόντες εἰσίν, ἐνδεδυμένοι τὰς ἀλλα-
γὰς αὐτῶν. agit de pompa diei Palmarum. vestes quoque im-
peratori eadem solemnitate usitatas n. 3 vocaverat ἀλλάγματα, uti
et n. 4 vestimenta τῶν ἀρχόντων principum aut praecipuorum
magistratuum, apparere cerimonia tali splendido habitu ex more
debentium, ἀλλάγματα pariter dixerat. videtur haec appellatio
derivata e sacris literis, ubi vestimenta quaedam insigniora com-
parata potius ad speciem quam ad vulgarem usum חליפות a verbo
חלף mutare dicuntur IV. Reg. v. 5 et 22. Isaiae vero 3 22 et
Zachariae item 3 4 vocantur כחלצות, ad quae omnia loca Hiero-
nymus mutatoria interpretatur. duobus vero prioribus locis se-
ptuaginta seniores ἀλλασσομένας στολάς pro חליפות reddunt: Ge-
nesis vero 45 22 (de quo loco mox agemus) ἐξαλλασσούσας στο-
λάς. haec nos movent ut initio propositis historici nostri locis
munera pretiosarum vestium ab Andronico honorandis hospitibus
impensa dici ἀλλαγὰς putemus. sane perantiquus mos principum
caros advenas donativo splendidarum vestium demerendi, iam
inde a Iosephi Aegypto praepositi temporibus est celeber. ille
quippe loco modo memorato Genes. 45 22, dum se agnoscendum
fratribus praebuit, *singulis eorum* (verba sunt S. Hieronymi vul-
gatae auctoris) *proferri iussit binas stolas. Beniamin vero* (uti-
que germano prae caeteris dilecto) *dedit trecentos argenteos cum
quinque stolis optimis.* in historia quoque Augusta Romanos
imperatores munerari solitos pretiosis vestibus quos vellent hono-
rare, de Alexandro Severo refertur a Lampridio, de Probo a Fla-
vio Vopisco. quem olim morem in aula Constantinopolitana
Orientalium Caesarum viguisse, praeterquam hi Pachymeris loci
indicant, etiam potest intelligi ex consuetudine Turcarum illic
hodie regnantium; quos in admissionibus legatorum insigniumve
personarum donativis talibus *vestarum*, ut vulgo vocant, passim
uti compertum est. et Andream igitur et Mpyrigerium Pachy-
meres, dum ἀλλαγαῖς ab Andronico honoratos scribit, significat
donis pretiosarum et speciosarum vestium non semel cultos. haec
hactenus scripseram, quando forte in locum incidi paraphrastis
Vaticani quo declaratur ipsum in eadem mecum de potestate vo-
cis ἀλλαγή sententia fuisse, siquidem is illa verba Pachymeris

βρίου, ἡμέρᾳ πρώτῃ τῆς ἑβδομάδος. *tertium et quadragesimum annum agentem aetatis, anni noni et vicesimi supra octingentesimum et sexies millesimum, duodecima mensis Octobris, feria prima hebdomadis.* ut anni aerae Graecorum ad aeram nostram vulgarem reducantur, perpetua methodo ex illis tollendi sunt anni solidi 5508. tali subtractione facta reperietur annus, quo est mortuus Michaël, Christi 1321. sed in his diligenter observare oportet discrepantias initii annorum. nam Graeci annos suos aerae mundi a Septembri, sicut et indictionem, inchoant, nos vero a kalendis Ianuarii. itaque quando per methodum modo indicatam comperimus annum Graecorum 6829 respondere anno Christi 1321, intelligendum id ex maiori dumtaxat parte, non autem ut alter alterum perfecte adaequet. concurrunt enim in octo dumtaxat mensibus, quorum primus Ianuarius sit. ab hoc enim ineunt Christi anni, quando iam a kalendis Septembris superioris annus aerae Graecorum, qui respondere tali Christi anno creditur, inchoaverat. id nisi quis animadverterit, in hoc ipso quod tractamus exemplo se lapsum sentiet. ecce enim ait Cantacuzenus diem duodecimum Octobris, quo est mortuus Michaël, illo anno aerae mundi 6829 fuisse dominicum. id vero anno Christi 1321 minime convenit. est enim hic in periodo Iuliana 6034, qui numerus per 28 divisus dat cyclum solis 14 ei Christi anno 1321 proprium. cyclo porro solis 14, cui litera dominicalis D competit, duodecimus Octobris dies lunae fuit. nimirum Octobri praecedentis Christi anni 1320 Michaël obierat. nam is annus cyclo solis 13 et litera dominicali gemina F E, quia bissextilis fuit, insignitus a mense Martio literam E feriae primae indicem habuit. haec autem litera duodecimum Octobris diem signat. unde charactere chronologico certa redditur epocha obitus imperatoris Michaëlis iunioris in Octobrem anni Christi 1320 exacte incidens. ex quo limine cum procedat historia Cantacuzeni, caput eius a fine Pachymerianae, desinentis, ut est dictum, sub exitum anni Christi 1307, distat spatio annorum tredecim, quod non impedit quo minus populari et minus scrupuloso numerandi more dici possit excipi Pachymerianam a Cantacuzeniana, et hanc illi continuari historiam, sicut Thucydideam Herodotianae succedere multi dixerunt, licet illa proprie ducat initium ab exordiis belli Peloponnesiaci, quae competunt anno periodi Iulianae 4283, haec in Plataeensi clade Persarum Mardonio duce et fine belli Medici deficiat, anno periodi Iulianae 4235, intervallo medio inter epocham utramque annorum 58.

CAPUT II.

*Ioannis Vecci eiectio e patriarchatu, exilium, carcer, obitus
suis annis assignantur; tempus definitur secundi patriarchatus
Gregorii Cyprii, denique prioris quoque patriarchatus
Athanasii.*

I. Iam demonstravi (vol. I p. 733) Ioannis electionem in
patriarchatum Constantinopolitanum contigisse die 25 mensis
Maii anno Christi 1275, inaugurationem vero eiusdem factam
dominica Pentecostes; quae incidit illo anno in diem secundam
Iunii. de huius e throno deiectione narrat noster hoc tomo se-
cundo p. 19 v. 11, Veccum animadversa mutatione rerum et
propensione novi principis ad restituendum schisma, cui obsi-
stere nequiret, ultro abire patriarchio paratum expectasse tamen
dum a satellitibus ab imperatore missis abduceretur; quos libens
secutus est anno ipso et mense quo erat mortuus Michaël, con-
cordiae cum Latinis auctor et usque ad obitum defensor. id ge-
stum postridie natalis domini tradit ibidem historicus. Decembris
igitur die 26 anno Christi 1282 desiit Veccus se pro patriarcha
gerere. quare septem solidis annis et totidem integris mensibus
in eius dignitatis possessione Veccus perstitit. sic igitur intelli-
genda sunt illa Gregorii Cyprii verba de Vecco ab Ill. Leone Al-
latio descripta col. 766 operis de Perp. Cons. πλὴν ὄγδοον μὲν
τῷ κακῷ τόδε σχεδὸν ἠνύετο ἔτος· ἐς τοσοῦτον δὴ κάκεῖνος τὸν
πατριαρχικὸν θρόνον τῆς οὐ καλῆς ἐπικαρπίας εἶχεν ἐνίδρυσιν: ut
non plane absolverit Veccus in patriarchatu octavum annum, sed
is in cursu fuerit et maiore ex parte transactus, cum est throno
deiectus.

II. Docet p. 19 v. 13 Pachymeres Iosephum die Decembris
tricesima, eodem anno, iterum in aedes patriarchales reporta-
tum. ostendi vol. I p. 732 Iosephum e patriarchio secessisse die
undecima Ianuarii anno Christi 1274. annis igitur octo, minus
duodecim diebus, extra palatium patriarchale cum privatam egis-
set vitam, in id est denuo relatus. ibi non totis duobus mensi-
bus patriarcham egit. nam affirmat noster p. 38 v. 16 mortuum **P 564**
fuisse illum ineunte Martio anni sine dubio 1283. dixerat autem
capite praecedenti eum morbo et senio gravatum paulo ante pa-
triarchatum abdicasse, cuius abdicationis scriptum rite forma-
tum prodierit. oportuit id factum mense Februario eiusdem anni.
quare brevior bimestri secundus Iosephi patriarchatus fuit, quem
vitae finis est secutus paucorum dierum intervallo.

III. Ad Veccum redeamus. is mense Ianuario anni 1283
variis schismaticorum exagitatus calumniis, et quod c. 10 narra-
tur, citatus ad synodum, brevi post ab imperatore Prusam rele-

gatur. docet id noster c. 11, tempus non exprimens: sed colligitur ex serie actorum id actum sub initium Februarii. revocatio Vecci e Prusa in urbem c. libri eiusdem primi 34 refertur. sed eius tempus divinandum est. si codex antiquus ex quo Sirmondus noster Acta pseudosynodi, qua est post colloquium capite huius libri 1 35 relatum damnatus Veccus, quorum Actorum apographa misit ad Henricum Spondanum et ad Odoricum Raynaldum continuatores Annalium Baronii, ut illorum uterque testatur, prior anno Christi 1283 n. 10, posterior an. seq. n. 48, — si codex, inquam, ille integer fuisset, haberemus ex eo tempus, hoc est diem et mensem, celebratae istius synodi, quae statim a Vecci revocatione Constantinopolim e Prusa est habita, unde intelligeremus quo mense talis in urbem Vecci reditus contigerit. sed ut observat Spondanus, titulus synodi, in quo tempus eius et locus verisimiliter notata fuerant, magna ex parte obliterata in eo codice fuere.

IV. Restat ergo via unica indagandi finis exilii, quod Veccus apud urbem Prusam pertulit, ex serie rerum quae inter eius abductionem illuc et postliminio retractionem intervenisse ab historico nostro memorantur. sunt eae mors Iosephi c. 13, evectio in patriarchatum Georgii sive Gregorii Cyprii c. 14 et 15, profectio imperatoris in Orientem c. 21, et conventiones Adramytii per ignem habitae sabbato ipso sancto pridie Paschae, ut p. 62 v. 17 expresse dicitur. fuit hic annus Christi 1283 in periodo Iuliana 5996. numeravit cyclum solis 4, lunae autem 11, qui Pascha assignant Aprilis 18. fuit ergo dies, qua Arsenianorum et Anti-Arsenianorum utrorumque ex aequo schismaticorum, scripta probationis gratia in ignem iniecta pariter arserunt, decima septima mensis Aprilis, quem et sabbatum fuisse oportuit, quoniam 4 cycli solaris annus literam dominicae indicem habet C, quae cernitur in kalendario notata ad diem sequentem octavam decimam eiusdem Aprilis. memorantur inde ostentum pluviae sanguineae mense Maio p. 54 v. 12, expeditio protovestiarii in Occiduos tractus c. 25, exercitus strages ex lue et ducis ipsius protovestiarii mors c. 27, consecrati panis in sacra pyxide deprehensa corruptio dominica Tyrine vocata c. 28, ubi p. 79 v. 4 diserte traditur eam particulam putrefactam fuisse illic depositam anno superiori feria quarta hebdomadae maioris. annus ille superior sine dubio fuit Christi 1283, quo cum, ut diximus, Pascha inciderit in diem 18 Aprilis, feria quarta maioris hebdomadae fuerit omnino 14 eiusdem mensis. annus post hunc sequens Christi 1284 cyclum solis numeravit 5 et aureum numerum 12. hae notae Pascha conferunt in diem nonum Aprilis. unde cum dominica Tyrine, eadem cum ea quam nos dominicam Quinquagesimae vocamus, illo anno bissextili in diem convenerit 19 Februarii, quo mense superioris anni relegatum Prusam Vec-

cum vidimus, liquet istud eius exilium annuo diuturnius fuisse, siquidem post illam consecrati panis corrupti reperti mentionem, quae ante narrationem revocationis Vecci, ordinem, ut apparet, gestarum rerum sequens, interserit historicus, aliquot facile mensium tempus expleverint, nempe debellatio Scytharum c. 29, conatus imperatoris ad factiones ecclesiae componendas c. 30, reportatio in urbem reliquiarum patriarchae Arsenii c. 31, clades P 565 Christianorum in Syria seu initium belli a Sultane Babylonis Latinis Antiochiam Tripolim et Ptolemaïdem tenentibus illati, cuius secuti posterius ultimi eventus a nostro per occupationem memorantur c. 32, denique secundum matrimonium Andronici imperatoris, de quo c. 33. his cunctis circumspectis, haud temere videbimur affirmare evocationem Vecci Prusa Byzantium anno Christi 1284 circa mensem Maium Iuniumve contigisse, ipsum vero synodo tunc habita damnatum, ab imperatore frustra diu conato eum ad partes trahere, in custodiam arcis a Sancto Gregorio nominatae traditum, quod sub finem c. 35 docet Pachymeres. haec faciunt ne assentiri possim Henrico Spondano, dum Vecci damnationem, sub quam mancipatus est carceri, anno Christi 1283 tribuit.

V. Perstitit quidem Veccus usque ad mortem in ea arcis San-Gregorianae custodia, sed conditione non semper eadem. nam initio durissime habitus est in summa inopia, sine ulla provisione necessariorum ad victum. eius incommodi laxamentum aliquod quando et quomodo acceperit, indicat obiter loco non suo Pachymeres, ad calcem modo memorati c. 35, cum ait a proficiscente in Orientem Athanasio iam creato patriarcha, et fretum ad Helenopolim traiiciente, missum ex itinere in arcem S. Gregorii magnum logothetam, qui Vecco centum aureos, Meliteniotae quinquaginta donaverit, Metochita sociorum Vecci altero iam antea propter morbum in domum propriam relato. investigemus, si qua possumus, istius gestae rei tempus. successit Gregorio Cyprio in Constantinopolitano patriarchatu Athanasius, nec statim ac nullo interregno medio successit. primum igitur videndum quamdiu Gregorius in sede perstiterit, tum quo inde intervallo suffectus ipsi fuerit Athanasius, postremo profectionis huius in Orientem tempus. primum quod attinet, Gregorius in abdicatione throni scripto expressa, quae recitatur p. 130 v. 20, ait se annos sex et quod excurrit in possessione patriarchatus perdurasse. creatio huius et inauguratio, capitibus libri prioris 14 et 15 narrata, contigit, ut illic innuitur, paulo post Iosephi mortem, quam superiori capite demonstravimus sub initium Martii anno Christi 1283 evenisse. initum porro a Gregorio patriarchatum ante medium Aprilis, cogit affirmare, quod historicus p. 48 v. 5 memorat, feria iam tum secunda maioris hebdomadae fuisse Cyprium in plena possessione patriarchalis

potestatis. fuit enim illo anno, ut capite superiori ostendimus,
Pascha die Aprilis 18; unde maioris hebdomadae feria secunda
diem Aprilis 12 insederit. quo anteriorem inaugurationem Gre-
gorii fateri necesse sit: ex qua si sex anni pleni et aliquid prae-
terea excurrentis temporis numerentur, reperiemus eius abdica-
tionem in annum Christi 1289 post medium Aprilem conferri
oportere. ponamus ergo licet abdicationem Cyprii et secessum
eius in monasterium Aristinae c. 10 l. 2 narratum, mense Maio
aut Iunio anni modo memorati a Christo nato 1289 accidisse.
hinc duo tresve menses fluxerint in altercationibus et disquisitio-
nibus a nostro historico relatis a capite 11 libri 2 ad 15, quo tan-
dem scribitur Athanasium iam antea electum patriarcham, die
14 mensis Octobris in templo rite fuisse ordinatum. procedit
ergo prior patriarchatus Athanasii a pridie Iduum Octobris anni
aerae Christi vulgaris 1289.

VI. Paulo ante memoratam Athanasii patriarchae transmis-
sionem freti ad Helenopolim et profectionem in Orientem com-
munem illi fuisse cum Andronico imperatore docet noster hoc
libro 2 c. 18, dum imperatorem se contulisse Nymphaeum nar-
rat, et eo itinere partes Bithyniae transgressum ibi obiter egisse
circa Veccum et eius socios, quae paulo ante (nimirum c. 35
l. 1) se memorasse ait. quibus verbis innuit Athanasii quidem
patriarchae nomine, imperatorem Andronicum comitantis, mis-
P 566 sum magnum logothetam ad Veccum: caeterum id totum esse
actum instinctu et iussu imperatoris. nec enim erat verisimile
patriarcham, austerum hominem ac ferum, sponte initurum co-
gitationem Vecci et sociorum eius, quos pessime oderat homo
schismati addictissimus, sublevandorum. unum hic quandam
male cohaerentis et secum ipsa collisae narrationis speciem habet,
siquidem illo priori loco p. 103 v. 11 affirmat historicus magnum
logothetam, qui ad Veccum ab Athanasio missus est, nondum
fuisse protovestiarium, p. autem 153 v. 6 diserte scribit Androni-
cum imperatorem, iis obiter cum Vecco transactis quae paulo
ante diximus, Nymphaeum pervenisse comite secum ducto Mu-
zalone, super antiquum honorem magni logothetae nova proto-
vestiarii dignitate decorato. sed haec facilem conciliationem ha-
bent, si dicatur statim, postquam a praescripta sibi profectione
ad Veccum Muzalo rediens imperatorio comitatui se iterum ad-
iunxit, ab Augusto in ipso itinere, prius quam Nymphaeum per-
veniret, fuisse protovestiarium declaratus. nihil ergo causae
est cur istud laxamentum aerumnarum Vecci non ad illud perti-
nere affirmemus tempus quo Andronicus ex urbe regia Nym-
phaeum se contulit, prout l. 2 c. 18 memoratur. explorandum
ergo nobis est quando contigerit ista profectio. narrat capite
superiori noster historicus mortem expatriarchae Cyprii et circa
eius sepulturae formam praescriptiones ab ipso Augusto ad fune-

ris curatores missas, quae satis indicant non abfuisse tunc illum
ab urbe: nam si iam tunc peregrinaretur, non tam cito perferri
ad eum nuntii mortis Cyprii potuissent, ut exiguo illo spatio,
quod ab obitu ad funus interest, per crebros subinde missos tam
distincte caveret ne modus excederetur sepulcralium privati ho-
minis honorum.   erat ergo Constantinopoli Andronicus, quando
mortuus et sepultus est Cyprius; et primus post istum notabilis
eventus fuerit discessus imperatoris eiusdem ex urbe, propterea
sequenti mox capite a Pachymere narratus.   cesserat patriarchio
Cyprius iuxta verisimiliter a nobis paulo superius statuta circa
mensem Iunium anni Christi 1289.   post tres aut paulo plus
menses, pridie Idus Octobris Athanasius in thronum evectus est.
Novembri, Decembri, Ianuario insequentibus verisimiliter acci-
derit, quod capite libri 2 c. 17 refertur, nempe Cyprium gloriae
avidum hominem, cum se tamdiu neglectum in secessu ac solitu-
dine doleret, ringi ac confici aegritudine coepisse; ex quo ei tae-
dio languor ille multorum dierum extiterit, quo consumptus de-
mum est circiter mensem, ut apparet, Martium.   Aprili mox
insequente, apta regiis expeditionibus tempestate, Andronicus
Augustus ex urbe movens, amoenae ac circumductae peregrina-
tionis metas Nymphaei denique defixerit, eo perveniens sub men-
sem Iunium.   circa Maium igitur anni Christi 1290 laxata custo-
dia Vecco fuerit, postquam egestatis cum captivitate iunctae in-
commoda tolerasset annis sex integris, a mense videlicet Maio
aut Iunio anni Christi 1284 iuxta prius definita n. 5 huius ca-
pitis.

VII.   Hac eadem in Orientales tractus peregrinatione An-
dronici contigisse praeterea oportuit accessum eius Dacibyzam,
ubi sub custodia tenebatur Ioannes Theodori Lascaris filius, quem
Michaël Andronici pater immani fraude circumscriptum imperio
deiecit et excoecavit.   huc profectum Andronicum narrat Pa-
chymeres l. 1 c. 36 petiisse a Ioanne coeco veniam iniuriae ipsi
a Michaële patre suo illatae, et multis benevolentiae significatio-
nibus ac donis eblanditum ab eo fuisse cessionem iuris ad impe-
rium sui.   ratio, quae cogit dicere tunc id actum, haec est.   no-
ster illo capite diserte asserit post conventum ab Andronico Ioan-
nem missum fuisse ab Athanasio iam patriarcha protovestiarium
ad Veccum; quod idem alibi factum affirmat eo itinere quo Nym-
phaeum se denique, illic diu commoraturus, imperator contulit.
igitur et haec eadem via per Dacibyzam Andronico ducta est.   non
enim bis patriarcha Athanasius protovestiarium ad Veccum misit. P 567
recte itaque admonet sub finem capitis historicus haec se in an-
tecessum hoc loco ex multo posteriori memoria praelibasse.   dicet
aliquis: quare igitur Pachymeres ipso initio istius capitis p. 103
v. 16 sic loquitur: *sed me praeterierat quod paulo prius conti-*
git, imperatorem videlicet ex urbe se contulisse Dacibyzam, etc.

respondeo: non haec referenda sunt ad colloquium Vecci cum
patriarcha Gregorio habitum, toto praecedenti capite 35 descri-
ptum, sed ad obiter adtextam ad calcem illius capitis mentionem
laxatae multo posterius Vecci custodiae, in quam post id collo-
quium est coniectus. id ergo tantum illa capitis 36 prima verba
significant, paulo ante quam in saepius memorata imperatoris
Andronici profectione in Orientem, per missum in arcem S. Gre-
gorii protovestiarium, Veccus in paulo tolerabiliorem conditio-
nem transferretur, aditum Dacibyzae ab Andronico Ioannem
Theodori Lascaris Augusti filium.

VIII. Mors inde Vecci narratur p. 270 v. 14. sed quo anno
contigerit disquirendum nobis historicus relinquit. experiamur
ergo ecquid, sequendis vestigiis rerum ab illo serie continua,
qua gestae sunt, narratarum, possimus certo deprehendere quan-
tum praecise spatii intercesserit a modo memorata relaxatione
acerbitatis in Vecci carcere ad perfectam eius, quae felici demum
obitu ei obtigit, liberationem ab aerumnis omnibus. primum
certum est Andronicum imperatorem Nymphaei perstitisse spatio
plus annuo. refert enim noster p. 154 v. 11 fuisse eum illic
undetrigesimo mensis Iunii die quo sanctorum apostolorum (Petri
nempe et Pauli) *festum celebratur, altero currente anno ex quo
imperator castra illic habebat:* διετείας τρεχούσης ἐστρατοπεδευ-
μένῳ τῷ βασιλεῖ. cum ergo numero superiori verisimiliter sta-
tuerimus Andronicum Augustum pervenisse Nymphaeum circa
initium Iunii anno Christi 1290, quod illo c. 9 Pachymeres me-
morat dissidium principum matronarum contractum occasione
panegyris apostolorum, contigerit 29 die Iunii anni Chr. 1291,
quando iam annum alterum suae apud Nymphaeum commoratio-
nis Andronicus inchoaverat. reditus eius inde in urbem notatur
p. 165 v. 3, et assignatur diei duodetrigesimae Iunii, anni vide-
licet statim sequentis aerae Christi vulgaris 1293, cum iam re-
parata fuissent damna incendii, quo biennio ante abdicationem
Athanasii, ut diserte traditur p. 178 v. 6, Forum magnum con-
flagraverat.

IX. Abdicationis porro modo memoratae Athanasii tempus
satis diserte Pachymeres exprimit, dum p. 177 v. 9 scribit ipsum
exacte quadriennium in patriarchatu explevisse, ita *ut initi re-
lictique regiminis ecclesiae eandem ferme numeraverit diem sex-
tam decimam Octobris.* alludunt haec ad prius scripta p. 146
v. 1, ubi dicitur quartam decimam Octobris diem primam Atha-
nasio patriarchatus initi fuisse. pertinet hoc, ut dixi num. 5,
ad annum Chr. 1289, ex quo anni vertentes quatuor in diem
14 Octob. an. 1293 desiere. biduo post throno cessit Athana-
sius, gesta patriarchali dignitate annis omnino quatuor et duo-
bus praeterea diebus. incendium ergo magni Fori anno 1291 sub
medium Novembrem evenit, cuius ruinae spatio mensium fere

octo adeo strenue a civibus reparatae sunt, ut rediens in urbem imperator extremo Iunio anni 1292 *gratularetur*, quod historicus ait p. 180 v. 8, *solo sibi aurium indicio constare notitiam incendii, nullo iam oculis superstite sui vestigio sensibilis.* ab hoc loco quae narrantur a nostro historico serie continua, res prout evenere declarante, usque ad c. 29 l. 8, quinque fere annorum explent spatium. unde quod scribitur p. 270 v. 16, mortuum esse Veccum sub finem Martii, ad annum sine dubio pertinet Christi 1298. octo igitur annis post laxatam aliquantulum custodiam, perstans nihilominus Ioannes Veccus in carcere, quoniam imperatori assentiri ad schisma revocanti constantissime semper renuit, ad suorum, ut sperare licet, praemia laborum a deo vocatus in coelum est. at Meliteniotes, alter eius sociorum, non prius quam post decem evolutos inde annos, pari laude com- P 563 mendatus invictae in fide Romana constantiae, decessit. tempus sic exprimit Pachymeres p. 636 v. 7 μηνὸς Βοηδρομιῶνος κατὰ τὴν καινὴν κυριακήν *mense Aprili circa novam dominicam.* inter dominicas Graecorum nullam in horum ecclesiasticis libris reperio quae proprio nomine καινή *nova* vocetur. puto sic dictam a Pachymere dominicam Paschalem, cuius hebdomas διακαινήσιμος illis dicitur: sic enim aliqui vocem illam scribunt. fuit ille annus, ut ex serie rerum in synopsi demonstro, Christi 1308, quo Pascha incidit in 14 Aprilis. circa illum ergo diem obierit Meliteniotes.

C A P U T   III.

Definitur tempus evectionis ad imperium Michaëlis Palaeologi Andronici filii, nec non huius coniugii cum Maria filia regis Armeniae.

I. Scribit Pachymeres l. 3 c. 1, cum videret Andronicus Michaëlem filium suum primogenitum iam ultra puberem provectum aetatem, et ea edentem specimina bonae indolis morumque proborum quae dignum eum Augusto fastigio monstrarent, adsciscendum ipsum sibi putasse in imperio collegam, ideoque solemnem eius inaugurationem in templo Sanctae Sophiae a patriarcha celebrari curasse; quam describit illo c. 1 l. 3. fuisse illum patriarcham Ioannem Cosmam ex rebus, quae ante ac post narrantur, manifestum redditur. unde cum is ecclesiae Constantinopolitanae praeesse coeperit, ut capite sequenti et in synopsi chronologica huius historiae demonstrabimus, kalendis Ianuarii anni Christi 1293, non videtur dubium quin statim post illic memorata Michaëlis coronatio, ministerio patriarchae facta die festo magni Constantini, ad illum quem dixi annum pertineat, et ad mensem eius Maium. nam ut diserte historicus memorat, et ex

usu etiam hodierno Graecorum ac ecclesiasticis eorum libris, quos
editos habemus, patet, anniversaria memoria magni Constantini
simulque matris eius S. Helenae die mensis Maii vicesima prima
recolitur in ecclesia Graeca. unde verisimile est traditione veteri
Constantinopoli acceptum tali die fato functum Constantinum;
quamvis Socrates l. 1 Hist. Eccl. c. 26 diserte scribat illum obiisse
22 Maii, ἐτελεύτησε inquiens τῇ δευτέρᾳ καὶ εἰκάδι τοῦ Μαΐου μηνός.

II.   Ex his sequi videtur imperium Michaëlis iunioris Palaeo-
logi a mense Maio anni Christi 1294 procedere. sed huic ob-
stat quod Pachymeres p. 561 v. 13 duodecimum Michaëlis huius
annum cum Andronici patris ipsius tertio supra vicesimum com-
parat. cum autem, ut c. harum Observationum primo demon-
stravimus, solus imperare Andronicus coeperit sub finem anni
Christi 1282, unde est consequens ut anno Christi 1294 duodeci-
mum is imperii annum egerit, sic manifestum est, si primus Mi-
chaëlis cum patris eius duodecimo concurreret, duodecimum Mi-
chaëlis eiusdem cum Andronici vicesimo quarto fuisse concursu-
rum. ergo ut duodecimus Michaëlis Andronici vicesimus tertius
sit, promovenda necessario est in annum praecedentem, Christi
1293, Andronici undecimum, epocha principatus Michaëlis; et fa-
tendum ante coronationem solemnem, quae anno Christi 1294 ce-
lebrata est, iam illum a patre adscitum fuisse in consortium Augu-
stae potestatis. nec illud prorsus Pachymeres tacuit: nam in ti-
tulo c. 4 l. 3 Michaëlem iam tum Augustum iuniorem vocat, cum
P 569 de eius matrimonio tractaretur longe ante adductam ex Armenia
Mariam, quam deinde duxit. credibile igitur est iam a principio
anni Christi 1293 Michaëlem ab Andronico patre fuisse collegam
assumptum.

III.   Et fit illud sane verisimile ex aetatis mentione qua obi-
ter indicat historicus invitatum Andronicum ad imperatoriae com-
municationem dignitatis filio abunde iam adulto non ultra differen-
dam. scribit illic videlicet Pachymeres ipso protinus ingressu l. 3
p. 195 v. 1, ἐπεὶ δ᾽ ἀντίπαις ἦν ὁ υἱός Μιχαὴλ ἤδη τῷ βασιλεῖ καὶ
τὸν ὑπὲρ τὸν ἔφηβον ἤλαυνεν. quoniam vero erat imperatori filius
iam ultra puberem adultus aetatem Michaël. ἀντίπαιδες Graecis
ἔφηβοι dicuntur adolescentes annum aetatis supergressi quartum
decimum. atqui sat longo intervallo provectum ulterius Michaë-
lem hoc tempore oportuit, cum eum aut anno Christi 1273 aut
non multo post natum fuisse sit verisimile. nam Andronicus eius
pater nuptias cum eius matre celebravit anno Christi 1272, iuxta
dudum a nobis constituta l. 3 priorum Observ. c. 8. ponamus Christi
1274 aut, quo vix recedi ulterius potest, 1275 ortum in lucem
Andronici primogenitum Michaëlem. iam ergo quando Androni-
cus imperii undecimum Christi anno 1293 numerabat, Michaël
saltem octavum decimum vitae annum attigerat. unde causa non
erat cur differret pater iampridem decretam eius assumptionem in

collegam principatus. apparet igitur iam tum illo anno Christi 1293 evectum a patre in consessum Augusti solii fuisse Michaë- lem: licet, forte propter nutantem illo anno patriarchae Athana- sii mox exauctorati dignitatem, differendam Andronicus putaverit imperantis secum ex tunc filii celebrem inaugurationem in illud tempus quo novus patriarcha Ioannes Cosmas in pleno ac pacifico aliquot iam mensibus perstitisset exercitio patriarchalic potestatis, et ad augustiorem istam ceremoniam reddendam expectatus esset dies Constantini Byzantini imperii fundatoris anniversaria celebri- tate insignis. nuptiae deinde eiusdem Michaëlis Augusti iunioris cum Maria filia regis Armeniae, l. 3 c. 5 et 6 a nostro historico relatae, ad diem 16 Ianuarii anni Christi 1296 pertinent, prout ex serie rerum in synopsi monstramus.

C A P U T   IV.

De Ioannis Cosmae patriarchatu, et restitutione Athanasii.

I. Inter Athanasii Constantinopolitani patriarchae deiectio- nem e throno et restitutionem in thronum Ioannis Cosmae patriar- chatus infinditur, multis vicissitudinibus varius, per quas tamen sat longo spatio duravit. eius qua ineuntis qua desinentis definire momenta, spatiaque totius durationis exacte dimetiri, cum est huius historiae callere chronologiam volenti necessarium, tum idem propter confusionem perplexe mistarum rerum historicique nostri ambiguam alicubi de his affirmationem haud sane obvium facile- que explicatu fore sperandum est, lectori praesertim primum ad haec advertenti et defungi, ut fere fit, obiter cupido. huius ego studio ut pro mei ratione officii serviam, cuncta hic eius generis quam brevissime et clarissime potero exponam.

II. Id agenti ante omnia considerandum occurrit, quod a Pachymere scriptum extat p. 368 v. 2, Athanasium expatriar- cham, quando eum die Ianuarii decima nona imperator Androni- cus cum episcopis et populo convenit, transegisse in illo monaste- rii secessu annos decem, minus novem mensibus. in eo asserto sibi egregie constat historicus: dixerat enim p. 177 v. 8 Athana- sium, renuntiato patriarchatu, monasterio Cosmidii fuisse inclu- P 570 sum die 16 Octobris, cum ante annos quatuor die quarta decima mensis eiusdem patriarchatus possessionem adiisset. erat ille an- nus, quo Athanasius in monasterium Cosmidii e patriarchio migra- vit, Christi aerae 1293, prout in Synopsi subiicimus oculis: alter autem annus, cuius Ianuarii 19 conventus illic idem ab Andronico Athanasius fuit, in eadem Christi aera sine dubio millesimus tre- centesimus quartus numerabatur. quia vero nonus annus priva- tae commorationis Athanasii apud monasterium Cosmidii evolutus fuerat die 16 Octobris anni praecedentis Christi millesimi trecen-

tesimi tertii, et si decimus a tali epocha fuisset explendus annus, perseverare idem clausus in isto loco debuisset usque ad 16 Octobris insequentis diem, a quo dies 19 Ianuarii novem fere solidis abest mensibus, apparet quam ad verum exacte definita Athanasii in Cosmidii monasterio secreta habitatio fuerit spatio praeciso decem annorum, minus novem mensibus.

III. Haec utcumque non inutiliter in rem nostram annotata sunt, non absolvunt tamen propositam de principio et fine patriarchatus Ioannis Cosmae quaestionem, siquidem is nec inchoavit statim a recessu Athanasii in monasterium Cosmidii, nec eo momento desiit quo Andronicus Athanasium eundem ibi convenit. sed de initio quidem clare tradit Pachymeres p. 186 v. 9, kalendis Ianuarii Ioannem Cosmam rite fuisse inauguratum patriarcham. nec dubium ex toto contextu rerum ante ac post ibi narratarum est, quin istae kalendae Ianuariae fuerint proxime secutae post discessum e patriarchio Athanasii et huius inclusionem in monasterium Cosmidii, quam 16 die Octobris anni Christi 1293 contigisse vidimus. maneat igitur pro certo Ioannem Cosmam a kalendis Ianuariis anni Christi 1294 praeesse patriarchali potestate Constantinopolitanae ecclesiae coepisse. quia vero quando, novem annis et octodecim diebus inde vertentibus, Andronicus imperator episcopos clerum et populum secum ducens Athanasium adiit, nondum manifeste Cosmas abiecerat possessionem patriarchalis honoris, quem nec ipse Athanasius utcumque tunc delatum admisit, et Cosmas postea, ipso fatente imperatore adhuc patriarcha verus, etiam ut talis anathemati subiecit quemcumque qui moliretur Athanasium in throno reponere, quaerendus alibi est verus et indubitatus finis patriarchatus Cosmae.

IV. Is porro non alibi reperietur quam p. 382 v. 18 sqq., ubi refert Pachymeres Andronicum abscindentem nodum quem solvere nequibat, dum episcopos in synodo sine modo aut spe conventionis de abdicatione Ioannis Cosmae et restitutione Athanasii altercantes videt, assumptis secum iis qui Athanasio favebant, eum iuris securum usu ac facto in patriarchatus possessione constituisse, multis episcoporum et ipso Ioanne Cosma nequidquam reclamantibus, et hoc quidem (etsi vi maiori cedens Sozopolim in patriam recessit) verum se adhuc patriarcham arbitrante. ex tunc tamen ab imperatore ac plerisque Ioannes Cosmas haberi pro patriarcha desiit; et Athanasius functiones eius potestatis (quo iure quave iniuria, deus scit) exercuit. habemus autem hanc epocham insignitam charactere chronologico, sed propter affectatam a Pachymere quandam in verbo ambiguitatem indigente declaratione non perfunctoria.

V. Ait nimirum noster historicus p. 383 v. 13 diem, quo est ab Andronico imperatore vi et manu throno impositus Athanasius, fuisse vicesimum tertium mensis Atheniensibus Maemacterionis dicti, cuius primus et vicesimus dies illo anno in parasceu-

en, hoc est, modo loquendi huic auctori usitato, in feriam hebdo-
madis sextam inciderit. Maemacterionem alibi Pachymeres con-
stanter, ut in priori observavimus Glossario, Iunium mensem vo-
cat. hic autem non uti eum hactenus consueta notione illud ipsum
subindicat, quod non ἁπλῶς et absolute, sed κατ᾽ Ἀθηναίους iuxta
Athenienses istum de quo agit mensem fuisse Maemacterionem as-
serit. sane is esse hoc loco Iunius non potest, quoniam, quo haec
gesta esse anno series narrationis fateri cogit, Christi millesimo tre- P 571
centesimo quarto, cum cyclus solis numeraretur 25, cui competit
pro mensibus Februarium sequentibus litera index dominicae D,
vicesimus primus Iunii dies dominica, non autem feria sexta fuit.
nec medetur huic incommodo, postquam illud animadvertisse vi-
sus est, paraphrastes Vaticanus, dum solitus semper alias Mae-
macterionem Pachymeris Ἰούνιον *Iunium* interpretari, hoc dum-
taxat loco Ἰούλιον *Iulium* reddidit: nam neque Iulii mensis dies
vicesimus primus affixam lateri literam B habet in vulgari kalen-
dario, prout oportuerat ut feria sexta censeri posset, sed literam
F, feriae tertiae indicem quando D feriam primam sive diem domini-
cam designat. omnino unus in toto anno est mensis Augustus, cuius
diei vicesimae primae litera B anno tali feriam sextam indicans ad
latus appicta cernitur. hoc igitur ipso mense contigisse oportuit
memoratam p. 384 v. 1 a Pachymere promotionem Athanasii. ac
sane suadet idem ille vehemens solis flagrantis aestus, quo exco-
ctum fuisse Andronicum dum hoc ageret Pachymeres innuit verbis
illis, ὑπ᾽ ἀέρι πῦρ πνέοντι καὶ καιρικῷ πνίγει, *sub aëre ignem spi-
rante*, ac prout tali tempestate solet fieri, paene suffocante tra-
hentes halitum. quae nemo non fatebitur Sextili sive Augusto
mensi, sub Leonis signo et Caniculae sidere longe omnium arden-
tissimo, eximie convenire.

VI. Idem adstruit ordo gestarum et a Pachymere memorata-
rum rerum, quae exacte totum spatium inter diem 19 Ianuarii et
mensis Augusti 21 complent, ut breviter demonstro. refert histo-
ricus l. 5 c. 2 statim a refrigerato primo illo ardore, quo in
Athanasii repositionem in sede die 19 Ianuarii passim omnes ab-
repti fuerant, non paucos antistitum adversa ei promotioni studia
monstrasse. qua contentione durante, addit Pachymeres mox p.
376 v. 2 Andronicum diebus Tyrophagiae, qui proxime quadra-
genarium ieiunium praecedunt, adiisse Ioannem Cosmam. fuit illo
anno feria quarta Cinerum dies undecima Februarii; unde illa pro-
fectio imperatoris ad Ioannem aliquo septem dierum undecimam
Februarii diem ἀμέσως praecedentium contigisse debuit. narrat
postea historicus perculsum Andronicum excommunicatione a Ioan-
ne, postquam illum ipse verum adhuc patriarcham agnoverat, in
eos intentata qui Athanasium reponere in sede molirentur, multum
remisisse de studio in eam restitutionem suo. supervenit his mor-
bus et mors Theodorae Augustae matris Andronici, rebus humanis

subtractae feria secunda secund.. ieiuniorum hebdomadae, hoc est
die Februarii decima sexta, ut p. 377 v. 20 refertur; significatur-
que ibidem curas universas imperatoris ad curandam, dum aegro-
tavit, et postquam fato functa est, magnifico ac regio funere ho-
norandam matrem esse conversas. post Paschales non magno
inde intervallo secutas ferias aliae urgentes domesticorum affe-
ctuum solicitudines Andronici animum a cogitando de Athanasio
averterunt, cura nimirum adornandae profectioins Irenes suae
coniugis Thessalonicam cogitantis, et nuptiarum Ioannis despotae
sui filii cum filia Chumni sui primarii ministri celebrandarum;
quae capite quinto memorantur, et facile dies a Pascha quindecim
expleverint. incidit autem illo anno Pascha in diem 29 Martii.
adulto igitur iam Aprile resumptum ecclesiae negotium est; et lon-
gae illae c. 6 indicatae institui ab episcopis deliberationes coe-
ptae circa excommunicationem a Ioanne Cosma coram in os An-
dronico Augusto intentatam; quibus absumptum Maium mensem
et Iunium non temere prudens aestimator ex historici verbis au-
tumaverit, donec mense Iulio, nihil ab iis sibi sperandum Andro-
nicus videns ad exemptionem scrupuli quem eius animo iniecerat
molestissimum inopinata illa Ioannis Cosmae comminatio excom-
municationis, se vertere statuit, et longo tempore per missos va-
rios eblandiri a Ioanne ipso conatus est revocationem anathematis
illius; cuius tandem voti compos est factus, in optatam ipsi sen-
P 572 tentiam edita declaratione remissionis ab eodem impetratae Ioanne
Cosma; quam scripturam imperator accepit feria illa sexta eadem-
que die vicesima prima mensis Augusti, supra memorata saepius.
unde triduo post, die mensis eiusdem vicesima tertia Athanasium
in sedis patriarchalis iteratam possessionem imperator induxit.
en ut successio et contextus actorum illius anni eumdem nos in
locum pedetentim ducit, quem procul quasi signaveramus indicio
alte se ostentantis characteris chronologici, hoc est coniunctionis
feriae sextae cum die Augusti 21; quae coniunctio cum annum
exigat cyclo solis 25 insignitum, qualis nullus isto temporum tra-
ctu alius est ab anno qui in aera Christiana numeratur quartus su-
pra trecentesimum et millesimum, restat demonstratum anno Chri-
sti 1304, die 23 Augusti, desiisse patriarchatum Ioannis Cosmae,
Athanasium autem Constantinopolitanae ecclesiae praesidere ite-
rum coepisse. unde consequitur Ioannem Cosmam a kalendis Ianua-
riis anni Christi 1294 ad diem 23 Augusti anni Christi 1304, an-
nis novem, septem mensibus et 22 praeterea diebus, patriarcha-
tum tenuisse.

    VII. Restat hic definiendus annus eventi notabilis a nostro
historico relati l. 3 c. 24, quod sine dubio ad patriarchatum Ioan-
nis Cosmae hic a nobis chronologica ratione definitum pertinet.
refert loco laudato Pachymeres pueros quosdam, dum mense Se-
ptembri nidos columbarum in Catechumeneis scrutarentur, testas

reperisse intra quas Athanasius patriarchio excessurus scripta quaedam incluserat, prout idem narraverat c. 22 et 23 l. 2. his sic
prolatis chartis turbatum vehementer Andronicum fuisse propter
memoratum illic anathema ab Athanasio intortum in adversantes
sibi. itaque allegasse certos homines ad Athanasium privatim in
monasterio degentem, qui ex eo rescirent an et quo animo ista
scripsisset. his eum tradidisse scriptum, quo imperatorem omni
exolvit scrupulo. scriptum autem istud fuisse consignatum nota
temporis ait, mensis Aprilis et indictionis 11 (p. 256 v. 18). igitur id contigerit anno Christi 1298, quo certissimum est indictionem 11 fuisse numeratam Graecis a Septembri anni praecedentis,
Latinis a kalendis Ianuariis. illud hic occurrit incommodum, quod
literae istae Athanasii declaratrices mentis eius mense demum Aprili
post inventionem chartarum absconditarum octavo consignentur,
cum tota narratio historici demonstret multo brevius spatium intercessisse inter scrupulum insertum et evulsum animo imperatoris. omnino credo mendum hic esse in duobus alioquin optimis
codicibus Pachymeris B et A diserte habentibus μηνὶ Ἀπριλλίῳ, et
apud unum Vaticanum veram huius loci extare lectionem. in eo
enim legitur μηνὶ Σεπτεμβρίῳ ἰνδικτιῶνος ιά, hoc est *mense Septembri indictionis* 11. Septembris igitur initio anni Chr. 1297,
quo iam Graeci indictionem 11 numerare suo more occupabant,
repertae chartae istae fuerint, post paucos vero dies eodem mense
literae Athanasii quas diximus conscriptae. fuit autem is annus
Cosmae patriarchatus quartus.

CAPUT V.

De lunae defectione totali Constantinopoli visa die 14 *Ianuarii
anno Christi* 1302, *quam describit Pachymeres l.* 4 *c.* 15.

I. Fuit Ioannis Cosmae patriarchatus alia quoque conspicuus
coelesti nota, eo hic a nobis pertractanda diligentius, quod eius
consideratio speretur redundatura in non vulgare stabilimentum
chronologicarum huiusce totius historiae rationum. loco modo P 573
indicato, nimirum p. 306 v. 3, scribit noster historicus eodem anno cuius post aequinoctium autumnale cometa praecedente
capite descriptus apparuerat, Ianuario currente, cum primus lunae a novilunio progressus simul cum illo mense incepisset, eum
planetam plenilunio in deliquium incidisse, prout imperatori praedixerant astronomicarum periti rationum, nempe ita ut obscurari
coeperit fere tertia noctis hora, a parte disci lunaris Orientali,
paulatimque per horae spatium caligine subintrante, prorsus intra
umbram luna tota absorpta, nigra perstiterit horae triente. post
quod resumens lento progressu, a limbo coeli parti Orientali obverso, perditum lumen, tota sensim hora tenebris emergens, pura

denique plenum os, ut antea, lucens ostendit. his fere verbis au-
ctor istud phaenomenum exprimit, quotus is annus ab orbe con-
dito, qua solet interdum uti aera, numeratus fuerit tacens. con-
sului ego super hoc domesticum oraculum doctissimi humanissimi
mihique amicissimi patris Ioannis Baptistae Riccioli societatis no-
strae, datis ad illum hinc Roma literis circa initium Aprilis anno
Christi 1667. ad eas mutuam eius epistolam hic describere operae
pretium duxi.

Epistola Ioannis Baptistae Riccioli soc. Iesu ad Petrum Possinum eiusdem societatis.

Reverende in Christo pater.

Pax Christi.

    Cum Pachymeres l. 4 c. 15 narret visam Constantinopoli ecli-
psim lunae totalem mense Ianuario, hora noctis 3, ita ut luna post
horam fere tota intra umbram telluris immersa fuerit et emergere
visa sit ab umbra post horae trientem tandemque post horae in-
tervallum tota emerserit, neque vero diem neque annum exprimat,
sed solum id accidisse tempore Andronici Palaeologi referat, iu-
bes me, pater doctissime et amantissime, inquirere ex mea Astro-
nomia Reformata quoto Christianae epochae anno talis eclipsis
contigerit; supponisque ex contextu rerum gestarum annum hu-
iusmodi consistere inter 1298 et 1310 dictae epochae. ut votis
tuis obsecundarem, examinavi plenilunia Ianuarii omnium praedi-
ctorum annorum; et respondeo distincte per tres conclusiones;
supponoque pro certo, ex mea tum Geographia tum Astronomia
Reformata, Constantinopoli altitudinem poli esse graduum 42 56,
eiusque meridianum orientaliorem esse Bononiensi (cui affixae sunt
meae tabulae) hora 1 min. 20 26.

I conclusio.

    Inter annos Christi 1298 et 1310 nullus fuit, in cuius Ianua-
rio fuerit plenilunium eclipticum, nisi anni 1301 1302 et 1303.

    Ratio est quia, ut lunae eclipsis sit naturaliter possibilis, lu-
nae distantia a propiore nodorum non debet excedere gradus 17
20, ut docui libro 5 Almagesti Novi. at in pleniluniis Ianuarii
omnium annorum ab anno 1298 ad 1310, demptis annis 1301
1302 1303, luna distitit a propiore nodo plus quam gradus 17 20,
ut ex prima tabella infra scripta liquet. ergo etc. et ad id dis-
cernendum sufficit adhibere plenilunia media.

TABELLA.

Anni vulgaris epochae Christi.	Menses.	Plenilunium medium Constantinopoli post meridiem.				Lunae locus verus tempore plenilunii.			Nodi ☊ Borei locus verus.			Distantia lunae a nodo propiore.	
Anni	Menses	Dies.	H.	ι.	ιι.	S.	Gr.	Min.	S.	Gr.	Min.	Gr.	Min.
1298	Ianuarius.	28	8	48	51	4	15	46	0	20	59	65	4
1299		17	17	37	29	4	9	35	11	22	13	42	38
1300		7	2	26	7	3	28	42	11	13	27	44	45
1301	Ianuarius.	24	23	58	48	4	16	6	10	23	8	8	2
1302		14	8	47	26	4	1	26	10	4	22	2	56
1303		3	17	36	4	3	16	53	9	5	36	11	17
1304	Ianuarius.	22	15	8	46	4	4	23	8	25	16	39	7
1305		11	0	57	24	3	25	7	8	6	30	48	37
1306		0	8	46	2	3	17	32	7	17	44	59	48
1307		18	6	18	33	3	28	0	6	27	28	89	28
1308	Ianuarius.	8	15	7	22	4	0	9	6	8	39	68	50
1309		26	12	40	3	3	18	50	5	18	19	59	28
1310		15	21	28	41	4	3	31	4	29	33	26	1

II conclusio.

Ex tribus pleniluniis eclipticis mensis Ianuarii annorum Christi 1301 1302 et 1303 solum plenilunium anni 1302 respondet
conditionibus a Pachymere relatis. plenilunia enim annorum 1301 et
1303 Ianuario facta neque totalem eclipsim cum mora notabili in
umbra terrae habuerunt; neque aut initium in iis aut medium
eclipsis fuit circa tertiam noctis horam, sed longe pluribus horis
post. at eclipsis anni 1302 Ianuarii die 14 fuit totalis, cum insigni mora lunae in tenebris; et eius initium fuit prorsus hora tertia noctis Constantinopoli, ut patebit ex calculo infra scripto; et
quoad hoc respondet exacte relationi Pachymeris.

III conclusio.

Recuperatio luminis post horae trientem asserta a Pachymere
non fuit vera recuperatio luminis radiorum solis directe lunam illuminantium, cum luna morata sit re vera in umbra terrae hora 1
42 24. sed ob radios solis refractos rubicunda coepit apparere,
licet intra umbram esset, ut plerumque evenit in eclipsibus totalibus, iuxta ea quae demonstravi in 5 libro Almagesti Novi, c. 5.

P 575   C A L C U L U S

eclipsis lunae totalis cum mora, visae Constantinopoli anno Christi MCCCII, Ianuarii die 14, *nocte sequenti.*

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altitudo poli Constantinopoli.   Grad. 42 56.
meridianus Constantinopolis orientalior Bononiensi hor. 1 20 26.

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tempus aequale plenilunii post merid.   hor. 10 37 32.
tempus apparens plenilunii post merid.   hor. 10 25 20.

	Signa	Grad.	min. 1.	min. 2.
Solis verus locus in Aquario post signa	10	2	33	18
apogei solaris locus.	3	2	29	38
anomalia solis aequata	6	29	55	58
lunae locus verus in Leone seu post signa	4	3	33	18
anomalia lunae coaequata	5	29	14	44
nodi ♌ borealis lunae locus medius	10	4	21	31
et nodi australis ♋	4	4	21	31
distantia lunae a nodo australi	0	1	18	13
verus igitur locus nodi ♋ australis	4	4	15	46
lunae latitudo maxima	0	4	58	30
argumentum latitudinis verae lunaris	5	28	17	32
latitudo ergo vera et borealis lunae in medio eclipsis, seu in momento plenilunii	0	0	8	52
semidiameter apparens lunae	0	0	16	12
et diameter	0	0	32	24
semidiameter umbrae correcta in loco transitus lunae	C	0	47	43
scrupula deficientia	0	0	55	3
digiti eclipsati 20 19 4				
horarius lunae motus a sole	0	0	35	30
scrupula incidentiae aut repletionis	0	0	53	21
scrupula semimorae in umbra.	0	0	30	13
	dies	horae	min. 1	min. 2
semidiurnum tempus Constantinopoli	0	5	43	20
initium eclipsis in horis post meridiem	14	8	43	30
in horis noctis sequentis	14	3	0	10
initium totalis immersionis post meridiem	14	9	34	28
in horis noctis sequentis	14	3	51	8
medium eclipsis seu plenilunium post meridiem	14	10	25	20
in horis noctis sequentis	14	4	42	0
initium verae recuperationis luminis post meridiem	14	11	16	32

	dies	horae	min. 1	min. 2
in horis noctis sequentis	14	5	33	12
finis eclipseos verus post meridiem	14	12	7	30
in horis noctis sequentis	14	6	24	10
tota mora lunae in umbra terrae	0	1	42	24
tota duratio eclipsis	0	3	24	20

Bononiae 16 Aprilis 1667.

R. V. Servus in Christo
Ioannes Baptista Ricciolus.

Hactenus epistola R. P. Riccioli, cui ad notitiam perfectam P 576 deliquii lunaris a Pachymere memorati nihil addi potest nisi forte typus eclipseos eiusdem, quem a summo amico talium peritissimo meo rogatu delineatum, hic, cum bona R. P. Riccioli venia, ne quid lector e solitis tali occasione praestari desideret, apponam.

Typus eclipseos lunaris visae Constantinopoli die 14 *Ianuarii anni MCCCII.*

A centrum umbrae.
B centrum lunae.
A B latitudo lunae borealis 8 52.
A C et A D summa semidiame-
trum, umbrae 47 43 et lunae
16 12.
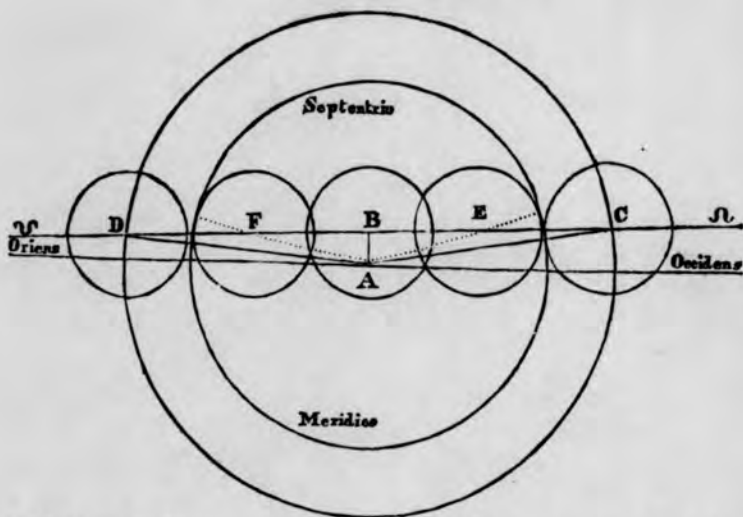
C B media duratio hor. 1 42 10.
B D idem.
C D integra duratio hor. 3 24 20.
E B media mora 51 12.
B F idem.
integra mora hor. 1 42 24.

III. Primus usus huius deliquii lunaris est certa indicatio anni, quo memoratus cupite praecedenti cometa comparuit. ait Pachymeres eodem anno quo post aequinoctium autumnale visus

cometes fuerat, mense Ianuario conspectam eclipsim lunae. scri-
bit et numerat more Graecorum. hi enim mundi annos, qua aera
vulgo utebantur, a Septembri mense inchoabant. unde non est
dubium quin per autumnum anni Christi 1301 nova illa crinita
stella conspecta in coelo fuerit; quin a vernis mensibus eiusdem
anni ad finem Septembris prodigiosa illa, quam describit histori-
cus extremo c. 14, exarserit coeli ariditas, prata et segetes plan-
tasque omnis generis adurens, puteos quoque perennes et vivas
uberrimorum fontium scaturigines exsiccans. denique quod *inter
haec*, hoc est circa hoc tempus, contractum historicus memorat
p. 304 v. 3, Michaëlis despotae cum Terteris filia a crale Serbiae
repudiata connubium, ad hunc quoque ipsum 1301 Christi annum
haud dubie pertinere putandum est. et confirmatur idem chara-
ctere chronologico, quo anterius narrata superiori anno Christi
trecentesimo supra millesimum vindicantur, refert siquidem Pa-
chymeres p. 302 v. 8 patriarcham Ioannem Cosmam se contulisse ad
Andronicum imperatorem, et cum eo simul ad Palaeologorum mo-
nasterium ivisse die 25 Octobris, quae tunc numerata fuerit feria
hebdomadis tertia. nempe anno Christi 1300 bissextili cyclus so-
P 577 lis 21 literas dominicales habet duas, C et B, quarum posterior
cum insigniens 23 Octobris diem ostendat eam illo anno domini-
cam fuisse, demonstrat pariter 25 eiusdem mensis fuisse feriam
tertiam. ac quia caetera eventa tum ante tum post istam eclipsim
ea fere qua gesta sunt serie in hac historia referuntur, eorum ferme
omnium verum tempus ex hac coelesti nota designari posset; quod
facili experimento demonstrarem, si tanti esset in iis immorari
diutius. sufficiat quod in eo genere ad lectoris solatium conati
sumus capite ultimo huius Observationum libri tertii, ubi plera-
que libris septem Pachymerianae de rebus Andronici historiae de-
scripta sub unum velut aspectum in annos digesta coniecimus. est
tamen ex istis eventis unum paulo intricatius implicatione casuum
et ambiguis affirmationibus auctoris, quam ut relinqui a nobis,
evolvere perplexitates chronologicas hoc loco professis, intactum
debeat. esto igitur id argumentum capitis sequentis.

C A P U T   VI.

*Intricatae rationes temporum circa Rontzerii ac Catelanorum
res et acta explicantur.*

I. Quae tribus ultimis libris huius historiae de Rontzerio,
Pharenda Tzime, Mpyrigerio Tentza et quibusdam aliis Latinis du-
cibus, tum de militibus quibus praeerant, Catelanis et Amogaba-
ris, primum auxiliaribus infidis, deinde feris hostibus Andronici
et Romanorum, referuntur, haud satis dilucide ordinata sunt ab
historico, vel sub finem longi et laboriosi operis fesso, vel ob in-

dignationem in Catelanos et duces eorum, propter atrocissimas in suam gentem iniurias, numquam fere sine indicio perturbationis ex vehementi odio eorum recordante, ideoque imperfecte defungente distinctione et explicatione necessaria. huic ut pro virili medeamur incommodo, in gratiam lectoris studiosi confusam istam congeriem hic evolvere, et chronologica methodo suis acta eiusmodi et eventa singula alligare epochis aggredimur, initio a prima Rontzerii et Catelanorum e Sicilia in terras Orientalis imperii evocatione ducto.

II.   Narrat l. 5 c. 12 Pachymeres : imperatorem parum praesidii adversus Persarum irruptiones in Orientales imperii regiones in Romana militia reperientem, ideoque respicere coactum externa auxilia, primum Pharendam Tzimem cum manu militum, quos e sibi subditis armaverat, suppetias ultro venientem grate excepisse; ac praeterea offerentem se ad idem per literas Rontzerium amplis conditionibus invitasse, quibus ille permotus postea cum magno navali exercitu venerit Constantinopolim. istius Andronicum inter et Rontzerium per literas invicem scriptas initae stipulataeque conventionis tempus non diserte notatum a nostro historico, ex causa, qua inductum ad eam tractationem Rontzerium ait, divinandum est. scribit autem ille Rontzerium ex milite templi post captam ab Aethiopibus (hoc est Saracenis duce Sultane Aegypti Melec Seraf dicto) Ptolemaidem, ditissimam et munitissimam urbem Phoeniciae (quod anno Christi 1291 die 18 vel, ut alii, 19 Maii contigisse accurate Spondanus illo anno docet ex scriptoribus illorum temporum) manu collecta sibi obnoxiorum, quaestuosam aliquandiu per illa maria piraticam fecisse, partisque magnis opibus ducem iam classis validae Friderico Siciliam obtinenti (Theuderichum hunc perperam vocat Pachymeres) militarem longo tempore certi pactione stipendii operam navasse, P 573 bello quod ille adversus ecclesiam rebellis contra Carolum gerebat Apuliae regem. caeterum hoc tandem bello nuptialibus conditionibus dirempto, quibus Ecaterina regis Caroli filia regis Siculi fratri collocata sit, Rontzerium haerere amplius in Sicilia non valentem, quod eum Romanus pontifex dedi sibi puniendum a rege Siculo poscebat, pactum de quo diximus iniisse cum Andronico.

III.   Ita ibi Pachymeres, in rebus quae de alienis terris aut gentibus obiter memorat, suo more balbutiens. voluit enim sine dubio illic indicare pacem factam anno Christi 1302 inter Carolum regem Neapolis et Fridericum in Sicilia dominantem, qua non Ecaterina sed Eleonora regis Caroli filia, non fratri regis Siculi sed ipsi Friderico desponsa coniux est, prout Fridericus ipse attestatur in instrumento conventionis istius publice per ipsum edito ad Castrum Novum die 19 mensis Augusti anno Christi 1302, indictione 15, quod totum recitat Odoricus Rainaldus eo Annali, unde manifestum est ab illo iam tempore institui coeptum esse

tractatum inter absentes, hinc Rontzerium inde Andronicum im-
peratorem, de auxiliari classe ab illo ad hunc adducenda. sane
praesens status rerum impellere vehementer Andronicum ad ad-
mittendum oblatum auxilium debuit: eo quippe anno Michaël Au-
gustus iunior eius filius omnes secum imperii copias ductans ter-
gum inhoneste Persis verterat, fugaque praecipiti se incluserat
Magnesiae, ubi et descrebatur a militibus et omnium rerum extre-
ma laborabat inopia, cui subvenire Andronicus pater cummaxime
cuperet, obstaculis ineluctabilibus prohibebatur, prout prius narra-
verat ipse Pachymeres l. 4 c. 18, consequenter inde referens mi-
serrimam desolationem omnium imperii regionum per illos Orien-
tales tractus ex his secutam, praesertim post novam et luculen-
tam cladem Romanorum duce Muzalone hetaeriarcha, die 27 Iulii
circa Bapheum prope Nicomediam a Persis duce Atmane illatam,
quae l. 4 c. 25 describitur. extremis ergo mensibus an. 1302 et
primis anni sequentis 1303 fuit conventio ista commeantibus ul-
tro citroque nuntiis conclusa; rursusque aliquot inde mensibus in
classis apparatu impensis, tandem ea mense Septembri Constan-
tinopolim appulit.

IV. Mense inquam Septembri anni Christi 1303, diserte si-
quidem attestatur Pachymeres p. 393 v. 6, insecuto mox Septem-
bri, post mensem Augustum cuius die octavo terrae motus incepit
quo subversa est Rhodus, appulisse Rontzerium Constantinopolim
cum classe auxiliari, indictione secunda. verba eius sunt: κατὰ
τὸν ἐπὶ τούτῳ Γαμηλιῶνα δευτέρας ἐπινεμήσεως εἶδεν ἡ Κωνσταν-
τίνου καὶ τὸν Λατῖνον Ῥοντζέριον. Gamelion, hoc est usu perpe-
tuo Pachymeris September, indictionis secundae, est sine ullo du-
bio September a quo incepit more Graecorum numerari Indictio
secunda. indictiones autem, quas Latini a kalendis Ianuariis nu-
merare incipimus, Graeci semper a quarto retro mense inchoant,
unde et initium ducunt annorum aerae suae a mundi principio iuxta
calculos ipsorum. unde cum viderimus superius n. 3 Fridericum
literas publicas, quibus pacem a se cum Carolo rege Neapolis initam
promulgavit, consignasse anno Christi 1302, die 19 Augusti, indi-
ctione 15, intelligere debemus fuisse illum annum ultimum cycli
indictionis complectentis annos quindecim, ita ut Septembri post
illum Augustum mox secuto Graeci numerare primam indictio-
nem coeperint, Latini vero id facere distulerint usque ad primum
diem Ianuarii sequentis, quo Christi annus 1303 calculo ipsorum
est initus. rursus huius anni Christi 1303 mense Septembri Graeci
secundam indictionem numerarunt, dum Latinis indictio adhuc
prima per spatium quadrimestre curreret. nec alius ab hoc Se-
ptember indictione secunda Graecis insignis reperiri hoc tractu
temporum potest, nisi quis retrocedat annis quindecim ad annum
P 579 Christi 1288, aut progrediatur pari spatio consequentis temporis
usque ad annum aerae Christianae 1318, quorum item annorum

duorum mense Septembri apud Graecos δευτέρα ἐπινέμησις secun-
da indictio numerari coepta est. quam vero est manifestum ad
neutrum illorum annorum pertinere potuisse appulsum Rontzeria-
nae classis Constantinopolim, tam certum haberi debet illum esse
assignandum mensi Septembri anni Christi 1303.

V.   At ecce hoc assertum tam diserta Pachymeris affirma-
tione constitutum contrario eiusdem testimonio evertitur.   scribit
ille in hunc modum p. 561 v. 13.   *ambobus iam imperatoribus,
seniori quidem tertium et vicesimum, iuniori autem duodecimum
annum imperii evolvi contigit*, *quando* etc.   eventa varia me-
morat, quae in illum inciderunt articulum temporis, quo Andro-
nici annus imperii 23, Michaëlis autem eius filii 12 evoluti erant, hoc
est, expleti numerabantur, sequentibus iam inchoatis.   inter alia
vero istius generis eventa paulo post recenset inclusionem Michaë-
lis Augusti iunioris intra Didymotichum, munitam arcem, in qua
se necessario continebat, quod milites Romani, quibus praeerat,
fracti animis ob acceptas clades, inde progredi et os hostibus ob-
vertere non auderent.   hostes hic non alios intelligere historicus
quam Catelanos potest.   et ipse statim clare de iis se loqui demon-
strat, dum continue subiungit Andronicum experimentis evidenti-
bus persuasum, vinci non posse Marte aperto suorum armis Cate-
lanos, alias eorum debilitandorum aut alliciendorum ad conven-
tiones pacis rationes iniisse.   clades igitur, quarum Pachymeres
hic meminit Romanis militibus exercitus, cui Michaël iunior Au-
gustus in Occiduo tractu praeerat, a Catelanis illatarum, non aliae
fuerint quam quas idem retulit l. 6 c. 30 et libri eiusdem c. 32,
quorum in priori narrat progressum contra Catelanos aliquanto
post necem Rontzerii Caesaris, Adrianopoli Pamphylum usque,
Michaëlem Augustum iuniorem, cum toto Romano exercitu, par-
tem huius sub tribus ducibus, Duca Umpertopulo et Bossila, con-
tra Calliopolim misisse, ubi Catelani et Amogabari suas copias ha-
bebant : sed hi obiecta Romanis armentorum praeda, cum sic eo-
rum ordines solvissent, immisso in discursantes inordinate equi-
tatu fuderunt eos fugaruntque, ducentis interfectis, vulneratis
ipsis ducibus.   posteriori autem loco, nempe l. 6 c. 32, idem
historicus fuse describit commissum postea a Michaële Augusto,
digestis in aciem universis Romanis copiis, adversus Catelanos
praelium, eo successu ut Romanus quidem exercitus fugatus, ipse
vero Michaël fortiter pugnans periclitatus de vita fuerit, et vix de-
nique fuga ipse quoque servatus Pamphylum primum se receperit;
paulo vero post, iuxta ea quae deinde c. 1 l. 7 noster idem auctor
tradit, Didymotichum se transtulerit, ubi examinatas metu ex cla-
dibus acceptis Romanas copias intra muros munitae arcis conti-
nere cogebatur.   id porro si contigit quando evolvebatur aut po-
tius evolutus iam erat annus imperii Andronici vicesimus tertius
Michaëlis duodecimus, oportuit sine dubio contingere anno Christi

1806: tunc enim Andronicus, cui primus a patris morte imperii
annus fuit 1283, vicesimum tertium principatus annum absolverat
et vicesimum quartum inchoaverat, Michaël vero, cuius primus
annus imperii cum patris undecimo Christi 1293 concurrit, prin-
cipatus duodecimum annum evolverat, decimum tertium iniverat.

VI. Atqui cum hoc quidem constare nequit quod Pachyme-
res ex publicae memoriae conscientia, tamquam certissimum et a
se visum, asseverat, Rontzerium mense Septembri secundae indi-
ctionis appulisse Constantinopolim. hoc nunc demonstratur ex
serie ac nexu rerum intervallisque temporum diserte memoratis a
Pachymere. Rontzerius Septembri/secundae indictionis, hoc est
an. Chr. 1303, in urbem appulsus ab Andronico magnifice excipi-
tur, magnus dux creatur, uxorem ducit imperatoris neptem, Cyzi-
cum in hiberna missus in digressu ab urbe a Genuensibus oppu-
P 580 gnatur. haec narrata l. 5 c. 14 facile reliquum anni 1303 exple-
verint. igitur circa initium anni Christi 1304 excepti a Cyzicenis
Catelani uberi et copioso hospitio, nihil minus cogitarunt quam
cuius causa missi erant, Persas ulterioribus imperii provinciis in-
festos oppugnatum ire. itaque perstiterunt *a vere* illic *ad Arctu-
rum*, ut scribit Pachymeres, hoc est ab Aprile ad Septembrem,
quo mense oritur Arcturus stella *undecim diebus ante aequino-
ctium autumni.* verba sunt Plinii l. 2 c. 47. iis verbis significat
historicus universam eos tempestatem aptam expeditionibus in sta-
tivis consumpsisse, non tam desidendo, quod ipsum esset flagitio-
sum, quam depraedationibus ebrietatibus extorsionibus stupris et
nullo non iniuriarum maxime intolerabilium genere miserrimos ho-
spites vexando. / quae scelera non ferens Pharenda Tzimes unus e
Latinis ducibus, pars militiae istius, sed non subiectus Rontzerio,
at sibi proprie auctoratos milites ductans, una cum iis recessit pa-
triam repetens, ut tradit Pachymeres l. 5 c. 14. ea aestate per
totam passim Orientalem imperii ditionem licentissime Persae bar-
bari agebant ferebantque cuncta; quod fuse describitur a nostro
l. 5 c. 21. quare solicitati Rontzeriani, ut suppetias oppressis ac-
currerent, cum ab aliis tum a Marule imperatorio duce, qui cum
aliquibus Romanis copiis admixtus Catelanis Cyzici degebat, variis
semper praetextibus profectionem differebant. et cum ipse Maru-
les cum suis, frustra invitato Rontzerio, adversus provectos in
viciniam hostes movens prospere pugnasset, praeda quam de Per-
sis ipse et eius milites tulerant, redeunti a Catelanis est extorta.
cum propter haec et multa talia in aula nuntiata gravi Rontzeriani
infamia apud imperatorem laborarent, profectus in urbem sub
anni finem, ut videtur, Rontzerius facile omnia credulo et sibi
addicto Andronico purgavit; grandemque ab eo pecuniam accepit
in stipendia, ut aiebat, Alanorum, quos etiam admixtos suis Cy-
zici habebat, expendendam; et promissa ingentis alterius summae
ex collatione tributorum intra quadragesimum inde diem nume-

randae, prout ex fide factum est. sicque onustus thesauris Ron-
tzerius ad suos rediit circa initium veris an. 1305, ut apparet,
mox videlicet, uti sperabat imperator, eos contra Persas ducturus.
verum interim non pauci e Catelanis, convasata in naves praeda
quam Cyzici et locis circumvicinis Romanos diripiendo corrase-
rant, domos proprias iniussu repetierunt. inde secuta stipendio-
rum per Rontzerium iniqua divisio est, Italis large donatis, Ala-
nis maligne aspersis imperatoria pecunia. hinc inter hos et illos
ortae simultates diu suspicionibus odiisque rixisque inter ipsos
mutuis exercitae sunt. per haec detrectata variis elusionibus in
huius quoque anni aestatem expeditio in Persas est, Catelanis sta-
tiva commoda relinquere nolentibus, quantumvis urgente impera-
tore; quem maxime premebat obsideri coepta, Alisyrae Persae sa-
trapae validis copiis, Philadelphia; quod sub autumnum an. 1305
evenisse crediderim.

VII. Iniit annus Christi 1306, quando solicitus imperator
pro Philadelphia iam acri fame laborante, frustra per missos et li-
teras expertus duobus primis mensibus emoliri Cyzico Rontzerium,
mense tertio socrum eius Irenen, Asanis viduam, sororem suam,
ad eum allegavit nave celeri, quod factum ait Pachymeres p. 421
v. 21 *coepta iam hebdomada maiore sub finem Martii* τῆς μεγάλης
ἑβδομάδος καταλαβούσης, Κρονίου μηνὸς λήγοντος. haec charac-
cterem certum habent huius anni Christi 1306, quo Pascha inci-
dit in diem 3 Aprilis; nec convenire superiori possunt, qui Pascha
habuit die Aprilis decima quarta, unde finis Martii hebdomadam
maiorem nequivit attingere. nihil omisit artis et industriae Irene
ad persuadendum Rontzerio ut contra Persas tenderet. sed Cate-
lani praetextus quaerebant haerendi loco sibi grato; interimque
superbissime insultantes Alanis, in ipsos per iurgia minatos, gras-
satione nocturna irruunt; unde atroci commissa pugna vincuntur
Alani, filio ducis ipsorum Georgi occiso. sed postridie, quae fuit
dies Aprilis nona, vicissim insurgentes Alani circiter trecentos e
Catelanis peremerunt. placatis utcumque Alanis, mense tandem P 531
Maio procedere coepit Rontzerianus exercitus e Romanis Catelanis
Alanis constans. haec ex Pachymere constant l. 4 c. 21. c. vero
23 idem memorat solutam Rontzerii adventu Philadelphiae obsi-
dionem, commisso ad Aulacem praelio, ex quo vulneratus dux
Persarum et Carmanorum Alisyras matura sibi fuga consuluit,
Amurii suarum partium ducis castris se admovens. ex hoc suc-
cessu late inclytus Rontzerius avarissime pecunias a Romanis ex-
torquet, l. 5 c. 26, partem praedae deponens apud fidam sibi, ut
putabat, Magnesiam, cuius occupatorem Attaleotam imperatori
reconciliaverat. sed hoc ipso auctore Magnesienses in Rontze-
rium rebellant, et ab eo totis viribus nequidquam oppugnantur.
Alani ex eius castris fugiunt, l. 5 c. 31. Andronicus multis mis-
sis et literis frustra diu conatus Rontzerium a Magnesiae oppu-

gnatione avellere, tandem ei persuadet traiectum in Occiduum tra-
ctum, ut ibi copias cum prius eo profecto Michaële Augusto iu-
niore coniungeret. ergo ille cunctis Romanis regionibus qua-
qua transiit vastatis, copias denique traducit partim Mitylene
partim Lampsaco Madytum et in alia continentis Occiduae
loca, ubi Romanos hostiliter Catelani depraedati sunt.   narrat
haec Pachymeres l. 6 c. 3.   quae sine dubio pertinent ad
Octobrem aut Novembrem anni Chr. 1306, quando nondum An-
dronicus 24, Michaël 13 imperii annum expleverant.   unde ulti-
mum id tempus est quo verum esse potuit illud quod scribit no-
ster in fronte libri septimi: *ambobus iam imperatoribus, seniori
quidem tertium et vicesimum, iuniori autem duodecimum an-
num imperii evolvi contigit.*   progressi enim uterque multum
erant in anno ille 24, hic 13, sed neuter illum absolverat: desi-
nunt enim anni aeque amborum extremo Decembri.   usus ergo
repetitione quadam est dum ista scripsit Pachymeres, et retro ex
ea quam tum tractabat memoria resiliit, insignire, ut opinor, vo-
lens verum initium belli Catelanici, quod si quis recte consideret,
ex hoc tempore processit.   etsi enim adhuc Rontzerius et eius mi-
lites se stipendiarios imperii ferebant, tamen non dubie apertam
defectionem machinabantur, cuius certa indicia Genuenses degen-
tes Galatae Andronico detulerunt, ut noster refert l. 6 c. 6 et 9.
et sane res id ipsae loquebantur: nam ex hoc praesertim tempore
relictae oppugnationis Magnesiae nihil minus contumaciae in im-
peratorem, saevitiae in Romanos omnes Catelani monstrarunt
quam ipsi hostes Persae barbari.   ac quamquam eos Andronicus
tractare adhuc ut socios pergebat, ignavo constrictus metu, tamen
alter imperator Michaël pro veris eos, quales erant, palam habuit
hostibus, adiungere illos sibi renuens iubente licet patre, et irruere
in ipsos se paratum ferens, ut docet noster l. 6 c. 3 et 13.

    VIII.   Verum quidem est geri coeptum a Catelanis in Roma-
nos multo apertius et immanius bellum post necem Rontzerii, quae
anno sequenti contigit.   sed inde aliud non conficitur nisi duo
quasi fuisse initia Catelanici belli, quorum alterum ad autumnum
anni Christi 1306, alterum ad ver anni 1307 pertinet.   unde cre-
dimus Pachymerem cum secundo referendo se accingeret, in ipso
limine libri 7 prioris epocham ex retro actis retraxisse, eique men-
tione coniunxisse eventa multa, quorum quaedam posterioris erant
memoriae, et non ad annum Andronici 23 expletum, 24 curren-
tem, Michaëlis 12 expletum, 13 currentem, qui fuit Christi 1306,
pertinebant, sed ad sequentem Chr. 1307, quo Andronicus 25,
Michaël 14 iniverant.   haec igitur solutio est obiectionis superius
n. 5 propositae.   concedo secuturum, quod opponitur, incommo-
dum submotionis adventus in urbem Rontzerii retro in indictio-
nem primam, si Michaëlis Augusti duplex a Catelanis clades et
inde secuta eius intra Didymotichum inclusio in annum Andronici

23 expletum, 24 inchoatum, Michaëlis 12 evolutum, 13 initum
conveniret. nego autem id ita esse, et aio commemorari tempus
illud ex transacta memoria per anacephalaeosim; et ex multis P 582
eventis, quae simul ibi conglobantur, pleraque non illius esse anni,
qui fuit, ut saepe dictum est, Christi 1306, sed sequentis 1307.
nunc caetera quae ad Rontzerium pertinent reddamus.

IX. Satis diligens noster fuit in huius et promotione in Cae-
saream dignitatem et caede non multo post secuta referendis, ad-
iunctis etiam notis temporis, sed quarum aliqua subobscura est.
tradit Pachymeres p. 522 v. 4 Rontzerium ad se missa ab Andro-
nico Caesareae dignitatis insignia induisse ac rite acclamatum Cae-
sarem fuisse *die qua Lazari resurrectio celebrabatur.* hic dies in
kalendario Graecorum est sabbatum contigue praecedens domini-
cam palmarum. porro cum illo anno Chr. 1307 cyclum solis 28,
lunae 15 numerante, dominica resurrectionis septiduo serior do-
minica palmarum inciderit in 26 Martii, sabbatum Lazari pri-
dianum dominicae palmarum omnino fuerit 18 Martii dies. ad-
iungit his noster historicus c. sequenti, hoc est p. 524 v. 12, no-
vum Caesarem Rontzerium adeundum sibi putasse Michaëlem Au-
gustum iuniorem, qui apud Adrianopolim castra habebat; prae-
misisseque ideo ad illum Asanem uxoris'suae fratrem, a quo ait
primum indicium venturi Rontzerii perlatum ad Michaëlem *die
octava supra vicesimam Boëdromionis. Βοηδρομιῶνος τοιγαροῦν
ὀγδόῃ λήγοντος ἦν.* Boëdromion alibi semper a Pachymere dicitur
Aprilis mensis. sed ne hic ita intelligatur, prohibet quod p. 525 v. 2
addit, *quarta feria post hebdomadam Thomae admissum fuisse
ab Augusto Caesarem.* hebdomas Thomae est apud Graecos sine
ullo dubio ea quae sequitur octavam Paschae, a nobis dictam *in
albis* aut *quasi modo;* in qua dominica post Pascha prima Graeci
item ut Latini, inter sacra recitant comma evangelii ex c. 20 Ioan-
nis, quo narratur dubitatio Thomae apostoli de resurrectione
Christi convicta curataque tactu sacrorum eius vulnerum, unde
nomen hebdomadis Thomae contiguis isti dominicae diebus usu
Graecorum adhaesit. manifestum porro est hebdomadam Tho-
mae illo anno, qui, ut ostendimus, Pascha 26 Martii habuit, se-
qui non potuisse diem 28 Aprilis. sed neque sequenti anno Chri-
sti 1308: nam hoc Pascha in Aprilis 14 incidit. igitur aliud quam
Aprilem nomine Boëdromionis hoc loco expressit Pachymeres. nec
est novum illum variare in appellationibus mensium, utpote quem
certo deprehenderimus Ianuarium, quem solet vocare *Hecatom-
baeonem,* aliquando *Lenaeonem* appellasse, et Augustum, cui con-
suevit Posideonis nomenclationem adaptare, semel designasse vo-
cabulo *Maemacterionis,* quo alibi est solitus Iunium exprimere.
itaque necessario intelligendum *Boëdromionem* nunc Pachymeri
Martium dici. cuius die 28, tertia post Pascha feria, monitus de
Rontzerii adventu Michaël, ubi eum se benevole excepturum de-

clarasset, dedit se hic in viam, et nono ab hoc die, feria quarta
hebdomadae Thomae, primae post Paschalem, admissus est.
fuit ea dies Aprilis quinta. sexta insequenti Caesar Rontzerius
una cum Augusto Michaële in urbem Adrianopolim solemni oc-
cursu invehuntur. sed paulo post idem Caesar in limine cubiculi
Augustae, quam salutatum ibat, ab Alanis necem filii Georgi
Cyzici a Catelanis patratam ulciscentibus interfectus est, prout
l. 6 c. 24 distinctius narratur.

CAPUT VII.

*Quae Pachymeres in utraque parte huius historiae sparsim
tradit de rebus et principibus Muguliorum, ex monumentis
Arabicis illustrata, ordine temporum digeruntur.*

I. Muguliorum imperii late per Asiam ab anno Christi cir-
citer ducentesimo supra millesimum ad millesimum trecentesi-
mum quadragesimum clari, sed quod iure nonnulli questi sunt,
Graecis Latinisque scriptoribus nimis perfunctorie memorati, non
facile quisquam alius horum temporum nota per Europam lin-
gua usus historicus crebriorem distinctioremque suis scriptis
mentionem inseruit quam Pachymeres hic noster. cui propterea
illustrando addictam dudum habens operam, fugere salvo officio
non potui, quin illigare certa ratione chronologica conarer quae
varie ille ac confuse indicans passim de Muguliis plurima conge-
rit; ad quod parum utique subsidii in Graecis Latinisque histori-
cis reperiens consulere sum Arabas coactus. ex his Gregorius
Abulpharagius, Christianus auctor accurati Chronici, nuper ex
Arabico Latinitate donati atque utroque coniunctim idiomate
Londini editi ab Eduardo Pocockio, in hoc de re literaria opti-
me merito, me, quod grate fateor, iuvit insigniter. vixit et
scripsit is chronographus, prout colligitur e variis eius operis lo-
cis, incipiente dominari Constantinopoli domo Palaeologa, sub
primis eius nominis imperatoribus Michaële et Andronico seniore,
quorum acta duorum Pachymerianae huius historiae voluminum
argumentum sunt: scripsit autem et ad rerum vere gestarum exa-
ctam indicationem et ad temporum ordinationem, quantum ex
collatione cum optimis quibusque explorare potui, fidelissime.
quare accuratione quam praestat in iis quae possunt alieno testi-
monio coargui, dignus videtur cui fides secure habeatur in his
quae affirmat solus.

II. Hic igitur sui Chronici in Arabico quidem contextu
p. 427, in Latina vero interpretatione p. 280, ait anno Hegirae
599, cuius initium fuit dies 20 Septembris in anno aerae nostrae
Christi vulgaris 1202, coepisse imperium Mogulensium, desiisse
autem imperium Praesteiannis sive Presbyteri Ioannis. Ioannes
erat commune nomen principum latissime quondam dominan-

tium super Scythas Asiaticos, ad montem Imaum, adeo ut qui-
dam scribant duos et septuaginta reges ipsis aliquando fuisse ve-
ctigales. Christianam autem religionem, sed iuxta Nestorii hae-
resim, colebant, crucemque in bellis prae se duplicem ferebant,
alteram auream alteram gemmeam. huic imperio qui ultimus
praefuit, ut docet Abulpharagius, praeter commune Ioannis no-
men proprie *Ung Chan* vocatus, cum quendam Tamuiinum no-
mine, quo fuerat usus diu, in bellis praesertim, strenuo et feli-
cissimo ministro, calumniis aemulorum invisum sibi factum com-
prehendere aggrederetur, ab eo fortissime repugnante victus ipse
occisusque est. quo tempore quidam inter Mogulenses magnae
auctoritatis, apparuisse sibi deum affirmans, et declarasse ele-
ctum a se Tamuiinum in quem orbis terrarum imperium atque
in eius posteros transferre decrevisset, universam illi conciliavit
Muguliorum gentem; cuius consensu creatus imperator, a deo
ipso, ut ille quem dixi fanaticus aiebat, impositum ipsi acce- P 584
pit *Gingizchanis* nomen. hactenus Abulpharagius, cui satis
consentanee noster Pachymeres priore tomo c. 4 l. 5 legislatorem
Tocharorum, qui se ipsi Mugulios nominant, nomen habuisse
Tzinciscanis asserit, addens eum ex fabro ferrario ad imperium
evectum. tum eorum instituta mores et acta fuse memorat, se-
dem etiam novi huius imperii indicans, Portas Caspias, qui lo-
cus in Mediae ac Parthiae confiniis situs est.

    III. Pergit Abulpharagius, referens anno Hegirae 600
captam a Latinis Constantinopolim. est annus Hegirae 600 in
aera Christi 1203, sed a die dumtaxat decima mensis Septembris
Iuliani, quam in diem neomenia Muharram primi Arabum men-
sis incidit. cum autem nos demonstraverimus tomo superiore
occupatam a Latinis Constantinopolim fuisse die 12 Aprilis anni
Christi 1203, eam epocham retro trahere aliquot mensibus cogi-
mur, et ad quadrimestre ultimum anni Hegirae 599 conferre, ut
magnae illae conversiones duae, imperii a Praesteiannensibus ad
Mugulios translati et redactae in Latinorum potestatem metropo-
lis imperii Graecorum, in unum eundemque aerae Arabicae,
quam *Hegirae* vocant, annum undesexcentesimum convenerint.
anno inde 606 Hegirae, qui iniit 6 Iulii anni Chr. 1209, Gingiz-
chanes imperio suo subiunxit regiones Caracathaiae, quae viden-
tur Tartarorum Sinensi regno confinium. anno Heg. 610, cuius
est initium a Maii 23 anni Christi 1213, Gingizchanes bello in-
dicto Sultani Mohamedi, in ultionem iniustae necis quorumdam
mercatorum, urbem maximam Otraram post quinque mensium
obsidionem vi cepit cum infinita hominum caede, ut et anno 617,
cuius kalendae in 8 Martii incidunt, Bocharam et Samarkan-
dam urbes longe amplissimas, quarum huic praesidio fuisse im-
posita a Sultane Mohamede centum viginti equitum millia tradit
Abulpharagius. sed his praelio cruentissimo profligatis dedita

et direpta Samarkanda est, triginta hominum millibus occisis, totidem in servitutem abductis.

IV. Anno Heg. 618, ineunte a Februarii 25 anni Christi 1221, Balkam Talakanum et Albamiyanum, reliquas e Chorazani ditione civitates opulentissimas et munitissimas, expugnavit Gingizchanes, et ad Sendiam amnem acie Ialalodinum vicit, huius tamen admirans praedicansque fortitudinem, quod cum illum vivum ad se perduci iussisset, is e strage circa se suorum intelligens quare sibi hostes parcerent, eques fluvium tranavit, et ex eo medio natans conversus sagittam est eiaculatus in Mogulenses. contigisse hoc ait Abulpharagius mense Raiebo, qui in anno Arabico mensis septimus est, ex hoc miro successu fortitudinis Ialalodini natum asserens proverbium Arabicum, quo dici solet *vive ad Raiebum, et videbis mira*. ex occasione hic ponam experimentum consensionis Abulpharagii cum nostris chronographis a me cum voluptate observatum. ait hoc eodem anno Heg. 618 Sultanem Aegypti Damiatam de Francis recuperasse die Mercurii, Raiebi 19, postquam in ea substitissent Franci annum integrum et undecim menses. vix alius eventus est cuius plures et certiores e nostris spectatae fidei scriptoribus habeamus auctores. Ioannes de Vitriaco, Sanutus, S. Antoninus, Nauclerus, Blondus, Aemilius et alii summa concordia memorant anno Christi 1219, nonis Novembris, post menses octodecim obsidionis captam fuisse Damiatam ab exercitu cruce signatorum; eandem autem Sultani redditam anno 1221, die natali B. virginis Mariae octavo Septembris. vides quam exacte tempus detentae a Latinis Damiatae definiat Abulpharagius anno uno et undecim mensibus. nunc inquirendum an pari fide feriam quartam et 19 mensis Raiebi diem isti restitutioni assignet. hic 618 Hegirae annus Muharrami primi sui mensis kalendas, ut dixi, habuit eodem die anni Iuliani aerae Christi 1221 qui vicesimus quintus Februarii numeratus est. hinc patet kalendas Raiebi, septimi, ut monuimus, P 585 Arabum mensis, in diem Augusti vicesimum primum illo anno incidisse. ex die Aug. 21 si novemdecim dies numeres, pervenies ad octavum Septembris. de quo si velis scire quota feria fuerit, quaere quotus isto anno numeratus fuerit cyclus solis. fuit annus Christi 1221 periodi Iulianae 5934. divisus hic numerus per 28 reliquos facit 26, qui fuit cyclus solis huius anni. cyclo autem solis 26 competit litera dominicalis C. quae cum in Iuliano kalendario respondeat diei quintae Septembris, ostendit illam eo anno fuisse primam feriam, ac consequenter diem octavam eiusdem mensis diem Mercurii, ut Abulpharagius notat, sive feriam quartam, necessario esse debuisse.

V. Anno Hegirae 624, cuius Muharram incepit a die 22 Decembris anni Christi 1226, mortuus est Gingizchanes primus imperator Mogulensium die 4 mensis Ramadani, noni ordine in

anno Arabico. incidit ea mors in autumnum anni Christi 1227.
addit Abulpharagius imperasse illum circiter viginti quinque an-
nis; quod verum est, cum, ut vidimus, imperare coeperit anno
Christi 1202, Hegirae 599. anno inde Hegirae 626, cuius Mu-
harram incepit a die 30 Novembris anni Christi 1228, congrega-
tis comitiis universae gentis Mugulicae ex testamento Giugizcha-
nis creatus est imperator Oglaï tertius eius filius, qui prae mo-
destia per dies quadraginta recusans, quod suos patruos aut fra-
tres natu maiores praeferendos sibi diceret, tandem consensu
victus, ab Utacino patruo et Iogtaï fratre maiore collocari se in
throno passus cognomen ab iisdem impositum *Kaan* accepit. anno
Hegirae 627, cuius kalendae Muharrami occupant diem vicesimum
Novembris Iuliani anno aerae Christi 1229, expeditionem susce-
pit novus imperator Mogulensium Kaan in regem Cathaiae. Ca-
thaia porro quid fuerit, qui ex hoc discere auctore idoneo malet
quam e nugacibus fabellis institorum illudentium credulitati vul-
gi, non dubitabit amplius quin Sinense regnum, hodie in Europa
notissimum navigationibus Lusitanorum, id ipsum re vera sit
cum eo quod Aiton Armenus, Paulus Venetus, et si qui alii
scriptores rerum interioris et maxime Orientalis Asiae, nomine
Chataï significarunt. docet enim hic Abulpharagius *Altun Chan*
ea tempestate Cathaiae regem in urbe sua primaria *Nam Cinc*,
sive ut vulgo alii scribunt, *Namquin*, expectasse successum
irruptionis huius Tartaricae, misso ad arcendos finibus Mogulen-
ses centum millium fortissimorum militum exercitu. sed has co-
pias a Kaane, numerosissimas per se ductante Mogulensium le-
giones, cruentissimo fuisse praelio deletas, alia longe sperans,
inopinatissime Altun Chan audivit, inde adeo consternatus ut
filios et uxores in suo secum palatio incenderit, ne vivus in Mo-
gulensium manus veniret; qui paulo post venientes et Namqui-
num et caeteras maximas Cathaiae urbes sibi subiecerunt. notis-
simum porro est Namquinum nomen esse alterius urbis regiae
imperii Sinarum, quam tum fuisse captam a Tartaris videri in-
credibile non debet, cum hac nostra aetate similem irruptionem
Tartaricam in Sinense regnum contigisse certissimis nuntiis co-
gnoverimus; qua etiam haec eadem Namquinensis civitas capta
et vastata fuisse disertissime traditur, itemque altera Pequinum,
ubi deprehensus Sinensium rex non minus tragico quam tunc
Altun Chan exitu desperationem ostendit. nam ne victoribus
ludibrio esset, nubili prius filia obtruncata, sese ipse ex arbore
suspendit, anno Christi 1644, ut legitur in historia Martini Mar-
tinii nostri testis paene oculati hac de re edita, quae et eadem ex
eius ore et P. Michaëlis Boymi item nostri, hic Romae dum visa
referrent audivimus. sed et Cathaiam non aliud esse quam Si-
nam, missus Goa an. Christi 1603 16 Ianuarii Benedictus Goëz
noster ad hoc ipsum explorandum, trienni peregrinatione cla-

rissime deprehendit, in urbem Sinensis regni Suceum sub finem anni Christi 1605 perveniens. denique id ipsum diserte Abulpharagius alibi testatur, nempe p. 351 huius ipsius sui Chronici.

VI. Hic caetera breviter secundi Mogulensium imperatoris P 586 acta reddemus, eo libentius quod quae horum proxime occurrunt, illustrandae huic nostrae Pachymerianae historiae non parum accommodata deprehenduntur. reversum e Sinensi expeditione Kaanem Abulpharagius memorat *Batu* sive Batuo, Tusbi fratris sui natu maximi nuper mortui filio, numerosas et validas dedisse copias, cum mandato expeditionem suscipiendi in tractus septentrionales et subiugandi Sclavoniam, Alaniam, Russiam, Bulgariam. hisce obtemperans mandatis Batuus ingentes mortalium strages edidit: nam, ut ibi ait Abulpharagius, cum Kaan proficiscentibus ad hoc bellum militibus edixisset ut hominum quos quisque occideret aurem dexteram, ad indicium numeri, recisam e cadavere secum auferret, qui ferali huic censui habendo praefecti erant, ducenta septuaginta hominum millia totidem exhibitarum dextrarum auricularum argumento compererunt neci tradita fuisse. addit Arabs chronologus, re bene in Sclavonia gesta, decrevisse Batuum adoriri Constantinopolim, et eo animo in Bulgariam movisse. sed illic habuisse obvios Francorum reges, hoc est duces Latinorum qui tunc Constantinopolim tenebant, qui frequentibus praeliis victos Mogulenses *terga dare coëgerunt* (verba sunt Abulpharagii) *adeo ut ab his incursionibus reversi Mogulenses haud iterum ad hunc usque diem Graecorum Francorumve regiones aggressi fuerint.* tali narratione multorum annorum bella et incursiones in varias imperii Romani Orientalis partes, diverso successu a Mogulensibus tentatas, innui satis apparet; unde non vana coniectura sit hunc circumminantem Romanis provinciis Tocharicum tumultum, ab anno circiter Hegirae 628 ad 638, hoc est ab anno Christi 1230 ad 1240, inquietasse, partim Nicaeae dominantes Graecis Lascarim, aut Batatzam, partim imperantem Constantinopoli Balduinum eius nominis secundum. fortius porro ac felicius restitisse Tocharis Latinos quam Graecos eo bello, quod forte parum candide Pachymeres dissimulavit, diserte hic affirmat Abulpharagius, ex quo etiam discimus debuisse Graecos fortitudini Latinorum, victoriis in Bulgaria de Mogulensibus relatis probatae, recessum Tocharorum ab ipsorum finibus; a quibus bello tentandis nisi terrore Latinorum cohibiti temperassent, quantum profecturi forent, consternatio Graecorum ad solam mentionem belli Tocharici saepe ac fuse a Pachymere memorata satis augurandum praebet. huc enim sine dubio pertinent quae ille vol. I p. 133 v. 10 narrat de terrore imperatorum Nicaeensium, quoties rumor Tocharorum increbuerat; tum quae p. 149 v. 6 refert de consternatione Panica Nicaeae urbis ad ortum ex vano murmur irruptio-

nis horum. videntur autem repulsi metu a Romanis tunc pro-
vinciis Mogulenses incubuisse in Persidem; ubi navasse ipsos ope-
ram, Calypha illic dominante victo et oppresso, narrat ibidem
fuse Pachymeres p. 133, adiungens hos in Perside belligerantes
Tocharos vulgo *Atarios* vocatos. quod nomen forte haud temere
auspicetur quispiam e nomine ducis ipsorum detortum, ut qui se
ipsi *Batuarios* a *Batuo* dicerent, quod huius auspiciis milita-
bant, populari corruptione vexatarum ab ipsis linguae diversae
gentium *Atarii* nominarentur.

VII. Interim quae alii Mogulensium duces alibi agerent exe-
quens Abulpharagius, tradit anno Hegirae 633, cuius est initium
a die 16 Septemb. anni Christi 1235, captam fuisse a Mogulensi-
bus Carmalisam urbem maximam in regione Arbelae, et anno se-
quenti ipsam Arbelan. post quadraginta dierum obsidionem, magna
pecunia taxatam. anno Hegirae 635, Christi 1237, ab Augusti
mensis die 24, Mogulenses in Bagdadi fines procurrentes primum
acie victi sunt, sed postea cum novis copiis redeuntes, ad lo—
cum Canekinium vocatum, Bagdadensium exercitum cruento
praelio profligarunt. anno 639 Hegirae, Christi 1241, a die 12
Iulii, Mogulenses duce Iarmaguno urbem Arzen Rumam vi cepe-
runt. anno Heg. 640, Christi 1242, a kalendis Iulii, Mogulenses
Sultanem Giattodinum acie vicerunt, eius urbes Sivasam et Cae-
saream et Azenganum ceperunt, et his malis fracto Sultani tri-   P 587
butum imposuerunt. anno Hegirae 643, Christi 1245 a Maii 29,
Kaan secundus imperator Mogulensium vivere desiit, designato
prius successore et accersito ad hoc, dum adhuc viveret, Cayuco
suo filio; qui in itinere nuntium accepit de patris morte. mater
Cayuci, dicta *Turacina*, quae *Chatun*, hoc est *domina* sive uxor
primaria, Kaanis fuerat, imperium administravit, donec comitia
gentis universae convenirent. anno Heg. 644, Christi 1246 a
Maii 19, celebratus est magnus conventus principum et ducum
Mogulensium *tempore verno*, ait Abulpharagius, hoc est, ut opi-
nor, mense Aprili anni Christi 1247, adhuc currente 644 Hegi-
rae. his comitiis Cayucus filiorum Kaanis natu maximus, non
sola aetatis praerogativa aut patris iudicio sed et praestantium
virtutum ac dotium merito praelatus Cubano et Siramuno minori-
bus fratribus, imperator declaratur; titulusque ipsi additus est
Cayuc-Chanis. hic duos praecipuos ministros Christianos ha-
buit, quorum alteri *Kadabo*, alteri *Ginkai* nomen fuit; qua-
rum favore episcopi et monachi a Cayuc-Chane matre ipsius uni-
versaque regia familia impense honorabantur. unde contigit adeo
illic crescere Christianam religionem, quantum his verbis Abul-
pharagius ostendit, *factumque est* inquiens *imperium Christia-
num, et magni habitae sunt gentes quae huic religioni nomen
dederunt, e Francis, Russis, Syris et Armenis. ac eo redacti
sunt tam melioris notae quam e plebe Mogulenses aliique iis*

*permixti, ut inter salutandum dicerent b a r e c h m o r, quod ver-
bum est compositum Syriacum, sonans b e n e d i c d o m i n e.* ad
huius ego Mogulensis imperatoris Cayuc-Chanis tempora referen-
dum puto quod Pachymeres narrat, tomo priore c. 3 et 4 l. 5,
de Noga uno e ducibus exercitus quem a Kaane secundo impera-
tore Mogulensium missum diximus in septentrionales tractus ad
eos subiugandos, praeposito cunctis Batuo fratris sui filio, a
quibus Sclavoniam et Russiam fuisse occupatas superius n. 6 hu-
ius c. ex Abulpharagio indicavimus. sed improspere a Mogulen-
sibus tentato Constantinopolitano imperio propter acres in ipsos
impetus victoriasque Latinorum Byzantii dominantium, Batuus
non ab iis solum sed et a Graecis lacessendis abstinens, cum
praecipua parte copiarum videtur in Persidem primum, deinde
ad suos in Orientis interiora recessisse, proxime ad Cayuc–Cha-
nis sui propinqui comitatum, relicto in Sclavonia et Russia, qui
parta illic tueretur, Noga. hic autem, ut refert Pachymeres,
cum auctis ex indigenarum iuventute in suos mores traducta
copiis satis se instructum putaret ad defendendas suis auspiciis
uberes eas fertilesque regiones, ex praefecto se principem supre-
mum declaravit, obedientia deinceps Mogulensibus imperatoribus
negata. quam contumaciam diu impune tulit, aut negligentibus
eam rem illis, aut non sufficientes rebelli domando copias contra
Nogam mittentibus; unde illum in principatu perfidia quaesito
corroborari contigerit florereque potentia; qua motus Michaël
Palaeologus recuperata Constantinopoli totum Orientale imperium
obtinens, eius amicitiam et affinitatem ultro ambierit, data No-
gae in uxorem propria filia Euphrosyne, prout fuse narrat noster
c. 4 l. 5 partis prioris, ubi possessione diuturna et crebra pro-
speritate successuum, partim in eludendis arte ac dolo, partim in
vi repellendis conatibus dominorum veterum fugitivum repeten-
tium, sensim fuisse confirmatam Nogae dynastiam Pachymeres
insinuat. unde non incongrue suspicari licet, ab anno maxime
Christi 1250, quo Batuus, ut mox dicemus, negotiis maioribus
reipublicae Mogulicae a cura septentrionalis limitis avocatus in
longum tempus est, coepisse Nogam res illic suas agere; perse-
verasseque crescendo semper, quousque duodecim post annis,
anno scilicet Christi circiter 1262, eum talem imperator Michaël
iudicaverit cuius affinitas intima, qua tunc eum sibi generum fa-
ciens admovit, et honori et praesidio rebus suis futura videretur.

P 588   VIII.   Anno Hegirae 647, cuius primus dies fuit sextus deci-
mus Aprilis Iuliani anno Christi 1249, mortua primum Turacina
matre dilectissima Cayuc-Chanis, ipse prae dolore locum mu-
tans in itinere versus partes Orientales fato functus est, nono
die Rabiae prioris, tertii mensis in anno Arabico, hoc est die
quinquagesimo septimo a kalendis Muharrami, quae nota numeri
diem Iunii undecimum designat. turbatis eo inopinato casu Mo-

gulensium rebus, tota cura imperii ad Batuum e stirpe Gingiz-
chanis natu maximum devoluta est. is per interregnum regimine
in manus sumpto dabat operam congregandis de more gentis co-
mitiis; quae res ob distantiam locorum, principumque ac ducum
occupationes in provinciis, longiores nunc solito moras habuit.
in hunc eumdem annum recte ac consentanee nostratibus chrono-
logis confert Abulpharagius priorem in Syriam et Aegyptum ex-
peditionem Sancti Ludovici, quem sono vocis fama iactata in li-
teras Arabicas coniecto *Redefrans* appellat. ab hoc refert captam
Damiatam; tum caetera de illo eadem plane parique ordine ac
nostri exequitur historici. quae obiter, ad specimen veracitatis
huius Chronici, tanti fuit indicasse. anno dehinc Hegirae 648,
cuius kalendae Muharrami a die Aprilis quinta procedunt in anno
aerae vulgaris Christianae 1250, evoluto iam biennio a morte
Cayuc-Chanis, cernens Batuus frustra se hactenus laborasse in
accersendis e longinquo cogendisque in legitima comitia Mogulen-
sium principibus, de consilio praesentium, et assensu absentium
per missos et literas declarato, Munkakaum e Gingizchanis stirpe
magnis dotibus insignem rite imperatorem declaravit, adiuncto ei
Kaanis titulo. neque hic tamen prius quam verno tempore anni
sequentis, Hegirae 649, in solio solemnibus ceremoniis collocatus
est. incepit is annus Arabicus a die 26 Martii Iuliani in anno
Christi 1251. unde intelligimus auspicia imperii Munkakai Kaa-
nis, diei nono Rabiae prioris, ut diserte asserit Abulpharagius,
affixa, exacte procedere a kalendis Iunii Iuliani anno Christi me-
morato 1251. videtur hic Munkakaus Kaan aliquid, quod ob-
servare nostra interest, primus innovasse in regimine imperii.
adscivit enim sibi veluti collegas e suis fratribus septem duos natu
maximos *Kobla* et *Hulacu*; quorum priorem in ultimos Orientis
fines, Cathaiam videlicet et Sinenses provincias misit tuendo illic
Mogulensis imperii limiti, alterum *Hulacu* moderandis Occiduis
tractibus imperii eiusdem, hoc est regionibus Persidis Babyloniae
et aliis Romano imperio confinibus, praefecit suprema potestate,
quam multis annis illic exercuit; unde a Pachymere vol. I p. 174
v. 5 Χαλαοῦ *Chalaü* (nam ita *Hulacu* vocabulum deformat)
ἄρχων Τοχάρων *princeps Tocharorum* absolute dicitur; et apud
Abulpharagium p. 337 consiliarii Caliphae Bagdadi, de modo
resistendi copiis ingentibus quas *Hulacu* ductabat deliberantes,
eum *regem praepotentem* vocant. videtur ad id consilium par-
tiendi cum fratribus imperii Munkakaus Kaan descendisse, do-
ctus experientia quam esset difficile tot tam late patentes provin-
cias unum regere. anno quippe secundo sui imperii, Hegirae
650, cuius kalendae Muharrami processerunt a die 14 Martii Iu-
liani in anno Christi 1252, is vix salvus effugerat coniurationem
adversum se validam principum suae gentis, post quam oppres-
sam statim refert Abulpharagius destinatos ab eo *Koblam* fratrum

maximum in partes Cathaiae et *Hulacu* secundum ab hoc, in Occiduum Mogulensis imperii limitem.

IX.   Anno Hegirae 651, cuius primus dies in anno Iuliano aerae Christi 1253 est tertius mensis Martii, capessivit *Hulacu* sive *Chalaii* commissam sibi anno superiore praefecturam provinciarum Occiduarum Mogulensis imperii, ad quas profectus est ducens exercitum numerosissimum atque lectissimum: nam e singulis decadibus militum duos elegit. suppeditavit etiam ei Munkakaus Kaan ingentem apparatum armorum et machinarum cum fabris earum. duxit quoque secum *Hulacu* filium suum natu maximum (*Abakam*, inquit Abulpharagius: est is sine dubio quem Pachymeres *Apagam* vocat) et primariam uxorem Christianam *Dukusam* nomine. quae cuncta iuvat memorare, quoniam iis quae de *Chalaii* Pachymeres tradit fidem adstruunt. annis Heg. 653 et 654 recenset Abulpharagius quaedam acta *Hulacu* satis conspicua, sed parum ad nos pertinentia. unde ad annum Heg. 655 promovemus gradum: in eo quippe nimis etiam multa ad nos spectantia Abulpharagius memorat. incepit is annus Arabicus a die 19 Ianuarii anni Chr. 1257, unde totus fere cum hoc commensuratur. eo scribit Abulpharagius p. 334 et deinceps *aegrotasse Theodorum imperatorem Graecorum in urbe Nicia; interimque vexasse patricium quendam e suo comitatu Michaëlem cognomento Palaeologum, quod e quibusdam vaticiniis quae ferebantur suspectaret regnaturum; iussisse illum in territorii Thessalonicensis castro quodam comprehendi, ducique in carcerem a quodam Gadino, qui tamen ei praedixerit imperium, exequendo nihilominus iussum imperatoris Theodori. hunc addit adducti ad se Michaëlis misericordia motum eum liberasse, et tutorem parvo, quem relinquebat, filio Calo-Ioanni vocato praefecisse. ac paulo post mortuum in monasterio Magnesiae fuisse sepultum.* addit Muzalonis caedem, Michaëlis Palaeologi promotionem ad imperium, circumscriptionem pueri Calo-Ioannis, eiectionem Arsenii patriarchae in exilium iussu Michaëlis, quod is ipsum de pupilli oppressione reprehendisset; denique accumulat super omnia recuperationem urbis Constantinopolitanae et eiectionem ex ea Latinorum, modum rei gestae referens, in quo, ut et superius memoratis, quaedam non adeo magni momenti discrepantiae a Pachymeriana narratione facile cum deprehendi tum corrigi poterunt ex collatione cum l. 1 partis prioris huius nostrae historiae. unum necessario hic emendamus, quod ait spatium temporis, quo urbs Constantinopolis tunc Graecis reddita permansit in potestate Latinorum, fuisse *annorum circiter quinquaginta trium.* verius quippe Georgius Acropolita, quem descripsimus et recte numerasse demonstravimus priorum Observationum l. 3 c. 4 n. 3, detentam a Latinis Constantinopolim per annos octo supra quinquaginta affirmavit,

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cum ab iis expugnata fuerit anno Christi **1203** die **12** Aprilis, et Graecis reddita anno Christi **1261** die **25** mensis Iulii. fraudi nimirum Abulpharagio fuit, quod haec cuncta, prout simul audierat, uno fasce in annum sui Chronici unicum congessit; quae si distinxisset, perducturus fuerat ad annum Hegirae **659**, cuius kalendae Muharrami cum inierint a die sexta Decembris anni Christi **1260**, maiori sui parte annus ille Arabicus cum Iuliano in aera nostra vulgari **1261** concurrit.

X. Ignoscamus autem, censeo, Abulpharagio culpam istam qualemcumque confusorum in unum annorum quatuor, quam excusat in homine Arabe peregre degente vix evitabilis ignorantia rerum Graecarum haud per se magnopere insignium et locis a commercio abruptis transactarum, cum praesertim eodem tempore mentes ad se omnium per interiorem Asiam raperent prodigiosi Mogulensis imperii sub auspiciis *Hulacu* sive *Chalaü* progressus, nec iis spatium alia longe minora distinctius observandi relinquerent. nam statim post annum illum Hegirae **655**, quo aegrotasse Theodorum Graecorum imperatorem tradit Abulpharagius, non male ad nostram chronologiam tomo priori c. ultimo l. 3 Observationum expansam. etsi enim illic nos anno Christi **1258**, respondente anno Hegirae **656**, primam morbi Theodori mentionem posuerimus, quod tunc ingravescere magis coeperit, superius tamen inolevisse non negamus: immo id historiae series indicat. statim, inquam, post, nempe anno Hegirae **656**, cuius fuit initium dies Ianuarii octavus in anno Christi modo memorato **1258**, Hulacu mense ipso anni primo Muharramo oppugnavit expugnavitque vi summa urbem longe maximam Bagdadum, olim Babylonem dictam, metropolim regni Caliphae. quo in ordinem redacto, ditioneque eius in imperii Mogulici provinciam conversa, finitimum dynastam Mausclae dominum mi- P 590 nis territum sibi tributarium fecit; et Astraphum dynastam, arcis munitissimae fiducia iugum subire detrectantem, in ipsa illa sua urbe Mihapharekino, licet inexpugnabili, fame domandum obsideri iussit a suis. duravit obsidio plus biennio. tandem anno Hegirae **658** Astraphus plerisque suorum fame absumptis dedens sese ad Hulacu perducitur, et iussu eius interficitur. eodem autem anno Hegirae **658**, qui cum inceperit a **18** Decembris anni Christi **1259** usque in Decembrem anni Christi **1260** excurrit, Hulacu ponte Euphrati imposito traiecit in Syriam, ducens secum formidabiles copias millium quadringentorum, quibus Damascum obiter cepit, Halebum post dierum paucorum oppugnationem cum caede innumerabilium illic repertorum expugnavit. Al Naser Halebi dominus cum uxoribus et liberis iam ante profugus, captus deinde et occisus est. sub hac a recedente e Syria Hulacu relictus ab eo illic qui provinciae praeesset Cetbuga cum decem millibus equitum, praelio victus et interfectus est a Kutuzo

Turcomanno praefecto Aegypti. eodem anno Munkakaus Kaan supremus imperator Mogulensium praelio adversum regem Sinarum rebellantem commisso sagitta ictus occubuit. de huius successione inter duos eius fratres per annos inde octodecim certatum est, succumbente denique et cedere coacto Arigbuga natu minore, et Kublaï praeter aetatis praerogativam praestantibus quoque commendato dotibus, armis etiam praevalente. quo civili tam longi temporis discidio tanto videlicet certius confirmatus est Hulacu in absoluto tractuum Occiduorum, quibus praeerat, imperio.

XI. Ergo is ut amissam clade Cetbugae Syriam recuperaret, anno Hegirae 659, qui coepit a die 6 Decembris anni Christi 1260, et consequenter excessit in partem maximam anni Christi 1261, ingentem suorum exercitum eo misit duce quodam *Gugalcio*, qui cuncta primo adventu facile subegit Halebum usque, plurimis passim obsistentium occisis. sed cum praepropere ad suos revertisset, supervenientes Aegyptiorum magnae copiae Mogulensibus denuo Syriam eripuerunt. interest nostra hic observare cuius auspiciis haec tam felix Aegyptiorum expeditio sit suscepta: de hoc enim non perfunctorie agit noster Pachymeres l. 3 c. 3 4 et 5 tomi prioris, res exequens a Michaële Palaeologo gestas statim a solemni sua coronatione, quam accepit ministerio patriarchae Arsenii, prout narratur ibidem c. 2. demonstramus autem, l. 3 Observationum nostrarum ad eum tomum c. 4 et 10, eam coronationem celebratam fuisse anno Christi 1261, hoc est illo ipso in quo nunc versatur Abulpharagius, eum numerans Hegirae 659. scribit igitur loco modo indicato Pachymeres solicitum Michaëlem de sibi stabiliendo recens parto imperio, quos maxime potentes circa se principes videbat, sibi conciliare studuisse. ac facile videntem eminere tunc opibus inter finitimos dynastas Chalaü principem Tocharorum, hoc est *Hulacu*, cuius crebro meminit Abulpharagius, et Sultanem Aethiopum, utriusque gratiam ambire officiis legationibusque affectasse. ea occasione de Sultane Aethiopum memorat, fuisse illum genere Comanum, quae regio est prope Pontum Euxinum; hinc olim venditum in servitutem Aegyptio domino, sua illic industria serviles catenas in regium diadema commutasse. eundem addit in primis prudentem habitum; et quod in Aegypto natos parum habiles bellicis laboribus videret, emisse pueros magno numero e Scythia et aliis regionibus trans Pontum, quibus apud se nutritis fortibus deinde militibus utebatur, permittente id commercium, magno rei Christianae detrimento, imperatore Michaële: hinc enim auctum opibus Aegypti Sultanem Latinos Palaestinam occupantes illinc expulisse. haec Pachymeres; quae multum illustrantur comparatione cum iis quae Abulpharagius hoc loco scribit. ait enim, postquam Kutuzus Turcomannus Aegypti domi-

nus Cetbugam Mogulensium in Syria praefectum acie victum oc-
cidisset, quod ait contigisse die 27 mensis Ramadani anno Hegi- P 591
rae 658, hoc est die 3 Septembris anni Christi 1260, satis gnarum
illum haud quieturos Mogulenses ab ultione cladis istius repo-
scenda, properasse in Aegyptum, ut copias illic pararet, quibus
ipsis obsisteret: sed eo itinere prope Gazam progressum a quodam
Baibars vocato fuisse interfectum. addit hunc *Baibars*, con-
ciliatis et adiunctis sibi copiis quae Kutuzo militaverant, cum iis
ingressum Aegyptum eam occupasse. tradit ibidem istum *Bai-
bars* servum antea fuisse magni cuiusdam in Aegypto ducis, cui
Bundokdar nomen fuerat; unde initio *Bundokdar minorem* no-
minatum. at postquam Sultan Aegypti factus est, cognominatum
a suis fuisse *Rucnodinum Al Malec Al Dhaher.* eum tamen
pergit in sequentibus Abulpharagius vocare Bundokdarem, suc-
cessus eius maximos recensens contra Christianos Latinos Antio-
chiam et Syriae maritima obtinentes, quos illinc expulit, ut
etiam deplorat Pachymeres tomo 1 l. 3 c. 5, culpam earum cla-
dium ex parte imputans imprudenti avaritiae Michaëlis Palaeo-
logi, qui propter quaestum modicum permittebat e Ponto expor-
tari in Aegyptum Scythica mancipia tenerae aetatis, quae deinde
illic in robustos et Christianis rebus exitiales bellatores adolesce-
rent. quem igitur Pachymeres e servo apud Comanos nato fa-
ctum Aethiopum Sultanem expulisse Syria Latinos Christianos
ait, is sine dubio fuit quem patrio vocabulo *Baibars* dictum, do-
mini cui servierat nomine *Bundokdarem* nuncupatum Abulpha-
ragius docet.

XII. Referamus nos iam ad res intermissas *Hulacu* sive
Chalaü et subiectorum ipsi Mogulensium cum deinceps narratis
a Pachymere utiliter comparandas. tradit Abulpharagius eodem
hoc modo indicato anno Hegirae 659, cuius fuit initium dies sex-
tus Decembris anni Christi 1260, missum in Syriam ab Hulacu
Mogulensium exercitum, duce Samdagu Christianis favente, ob-
sidione cinxisse Mauselam urbem incluso in ea Al Saleho Syriae
principe, et copiis e Syria obsessis suppetias venientibus per
longe illis occurrentes Mogulenses circumventis et occidione de-
letis Mauselam cepisse, plurimis in ea repertis occisis, aliis ser-
vitum abductis, ipso principe Al Saleho ad Hulacu pertracto
huiusque iussu interfecto. hae tantae Chalaü victoriae moverunt
Michaëlem Palaeologum Augustum ad omni ope satagendum in
paranda sibi benevolentia tam potentis et paene finitimi principis.
igitur, quod narrat Pachymeres l. 3 c. 3 partis prioris, legatos
ad eum misit, qui ipsum a se salutarent et eius amicitiam posce-
rent, oblata in sponsam propria filia Maria. indicat Pachymeres
venisse a Chalaü ad Michaëlem mutuam legationem, qua is signi-
ficaret placere sibi conditionem oblatam. idem vero distinctius
expressum in Abulpharagii Chronico legitur p. 355, ubi narrata

Hulacu morte, de qua mox dicetur, scribit eum iam antea mi-
sisse legatos Constantinopolim, qui filiam illic imperantis in
uxorem sibi poscerent. has mutuas Michaëlis et Hulacu legatio-
nes obitas apparet ab anno 661 Heg. ad 663, quorum annorum
prior incipit a die 15 Novembris anni Christi 1262, posterior a
24 aut 25 Octobris anni Christi 1264. perspecta porro Michaël
Hulacu voluntate, filiam suam Mariam apparatu magnifico dedu-
cendam ad eum streaue curavit per archimandritam monasterii
Pantocratoris nomine Principem, ex illustri familia Peloponne-
siensium dynastarum, quem ait loco proxime laudato Pachyme-
res in eo itinere nuntium accepisse mortis Chalaü . nec tamen re ·
infecta rediisse, sed perduxisse sponsam illi destinatam ad filium
eius et successorem Apagam, qui eam sibi iunxerit uxorem. haec
eadem distinctius etiam exprimit Abulpharagius, memorans le-
gatos imperatoris Constantinopolitani, qui huius filiam Hulacu
desponsam comitarentur, ubi Caesaream pervenissent, accepisse
nuntios de Hulacu obitu, nec tamen ideo retrocedendi consilium
inivisse, sed puellam perduxisse ad *Abakam* in patris *Hulacu*
iam solio regio locatum, qui eam sibi rite coniugem sociavit.
hoc sine dubio pertinet ad annum Hegirae 664, cuius kalendae
P 592 Muharrami diem insederunt tertium decimum Octobris anni Christi
1265. et quia quae multa et molis magnae ab Abulpharagio in
hunc annum congeruntur, nempe mors *Hulacu* et aliquo inter-
vallo secuta mors etiam Dukusae Christianae coniugis ipsius, tum
post hanc comitia Mogulensium principum, qui *Abakam* ob per-
spectam ipsis, ut ait Abulpharagius, eius *prudentiam sufficien-
tiam eruditionem* etc. liberis suffragiis in supremum suae gentis
imperatorem elegerunt et subinde ritu ipsorum coronarunt, non
videntur posse in primum anni Arabici trimestre facile compingi,
verisimilius differimus auspicia imperii Abakae huiusque cum
Maria nuptias in annum Christi 1266. observandum hic est
Abakam, sive ut Pachymeres vocat *Apagam*, titulum supremi
Mogulensium Kanis rite delatum accepisse, cum eius pater tale
imperium exercere satis habens vocabulo eius abstinuerit. hoc
eo videri potest mirabilius, quod satis constabat vivere adhuc
Kublaï, qui Munkakao Kaani occumbenti successerat in imperio,
anno ab hinc retro quinto aut sexto, Hegirae 659, ut paulo su-
perius n. 10 retulimus. verum quia, ut ibidem dictum est,
Arigbuga fratre minore Kublaï successionem sibi imperii vindi-
cante bellum inter eos civile conflatum est, quod annos ipsos
octodecim tenuit ac consequenter ad duodecim aut tredecim ab-
hinc annos propagatum est, totum instar imperii Mogulici ex
Orientalibus fraterna dissensione turbatis tractibus in Occiduis et
fundata dudum illic Hulacu (qui et ipse Munkakai Kaanis frater
fuerat) domo et potentia constitit; successioque Mogulensium
principum hinc deinceps a chronologis Arabibus est deducta,

neglecto Kublai, quem tandem praevaluisse Arigbugae Abulpha-
ragius tradit, et in quadam specie absoluti imperii aliquamdiu
pacifice indicat vixisse; et si qui post in extremo illo limite Mo-
gulensium Kaanum titulum sumpserunt. quos ne mentione qui-
dem dignandos putaverunt aut noster hic Abulpharagius, aut e
quibus supplementum concinnatur huius Chronici, Al Iannabius,
Abulfeda et Ebn Yusephus, Arabes et ipsi chronologi. unde
Munkakao Kaani *ἀμέσως* continuare possumus Abakam, nume-
rando eum quartum a Gingizchane et absolute quintum imperato-
rem Mogulensium.

XIII. Abakas-Chan (sic enim illum nominat Abulpharagius
ex quo est inauguratus imperator) misit ad recuperandam Syriam
exercitum, cui ducem praefecit fratrem suum natu minorem, vo-
catum *Kungortai*, *Bundokdaro* Aegypti et Syriae Sultane paulo
ante victo et mortuo. Mogulenses ductore Kungortai cuncta
statim illic subegerunt, facile progressi Halebum usque, et illa
ipsa urbe subiugata: verum, ut alias fecerant, nimis cito reces-
serunt, ideo mox coacti eo redire duce Munga Timuro, corro-
borato copiis regis Armeniae, prout consequenter illic exponitur
distinctius. sed ego harum rerum, prout in Chronico digerun-
tur, seriem attentius explorans conturbatas paululum deprehen-
do Abulpharagii rationes; quod equidem, propter in aliis proba-
tam huius fidem ac diligentiam, errori librariorum in numerorum
notas irrepenti libentius imputaverim. scriptum videlicet legitur
p. 360 huius Chronici anno Hegirae 679 missum in Syriam Kun-
gortai. kalendae Muharrami anni Arabici istius cadunt in diem
tertiam Maii Iuliani in anno Christi 1280. statim post additur
hunc exercitum duce Kungortai rem in Syria gessisse hieme anni
Hegirae 680, quem inchoasse certum est ea die quae Aprilis vice-
sima secunda in anno Christi 1281 numerata est. hic illud pri-
mum inopinatissimum occurrit, quod mora solidi fere biennii
interiicitur inter initium expeditionis e propinquo susceptae et
rem per eam gestam. addit Abulpharagius Kungortai cuncta
peragrata Syria et usque ad Halebum facile subacta recessisse:
verum rebellantibus denuo videlicet illic gentibus missum eodem
ab Abaka alium exercitum quinquaginta millium anno Hegirae
681, praeposito illi ductore Munga Timuro fratre suo natu mini-
mo; cui comitem se adiunxit rex Armeniae cum propriis copiis. P 593
hi duo simul iuncti exercitus obvios inter Hamam et Hemesem
habuerunt Syros simul et Aegyptios praevalidis copiis instructos,
cum quibus statim acri et cruento praelio commisso, nec plane
victores Mogulenses et Armenii, nec tamen prorsus victi fuerunt.
post illum dubium eventum Munga exercitu in Mesopotamiam
reducto, in itinere versus Nisibin veneno extinctus est. his con-
tinue Abulpharagius attexit eodem anno, nempe Hegirae 681,
Abakam, postquam Hamdani festum Paschae cum Christianis ce-

lebrasset, postridie, die lunae, convivio exceptum a quodam
Persa nomine *Banham*, mistum ab hoc cibis venenum hausisse,
ex quo die Martis statim sequente graviter aegrotare coeperit, die
Mercurii contiguo mortuus sit. hunc porro diem Mercurii ait
fuisse vicesimum mensis Dhul-Haiae, hic est mensis ultimus in
anno Arabum. habemus in his characteres duos, Paschae Chri-
stianorum et feriae quartae concurrentis in diem 20 Dhul-Haiae,
quorum neuter anno Hegirae 681 competit, prout clarissime de-
monstro. annus aerae Christianae vulgaris 1283, in cuius men-
sem saltem ultra tertium necessario excurrit annus Hegirae 681
Aprilis undecimo die anni praecedentis 1282 inchoatus, cum fue-
rit periodi Iulianae 5996, cyclum numeravit solis 4 cum litera
dominicali C, cyclum vero lunae 11. haec signa Pascha Chri-
stianorum indigitant in die 18 mensis Aprilis, qui dies necessa-
rio extra Hegirae anni 681 fines excessit. hoc infitiari non po-
terit qui sciet, quod certum est, annum Arabum Iuliano esse
minorem diebus saltem decem. unde manifestum est, si annus
Arabicus 681 die 22 Aprilis anni Chr. 1282 iniit, desinere illum
debuisse ante 18 Aprilis anni Chr. 1283, quoniam a 22 Aprilis die
ad diem eiusdem mensis 18 non intercedunt dies decem. en ostensum evidenter Pascha Christianorum anni Hegirae 681 in mensem Dhul-Haiam ultimum anni Arabici non potuisse convenire.
deinceps pari evidentia demonstro vicesimam Dhul-Haiae diem
eodem illo anno Hegirae 681 feriam quartam non fuisse. fuit
ille annus Arabicus embolimaeus ac consequenter 355 dierum, et
Dhul-Haia mensis eius ultimus in annis ordinariis cavus, in eo
plenus fuit, dies numerans triginta. tollantur 355, qui est nu-
merus dierum anni Heg. 681, de 365 a die 22 Aprilis anni Christi
1282 incipientibus: ultimus residuorum cadet in undecimum
Aprilis anni Christi 1283. hic est tricesimus Dhul-Haiae; a quo
si retro decem diebus promoveas, invenies vicesimum eiusdem
Dhul-Haiae primum Martii, qui dies Iovis et quinta feria, eo
anno literam dominicalem C habente, fuit, non autem, ut ait
Abulpharagius, dies Mercurii sive quarta feria.

XIV. His lector adactus ad fatendum characteres istos duos
chronologicos, Paschae incidentis in mensem Dhul-Haiam et fe-
riae quartae insignientis vicesimum Dhul-Haiae diem, minime
convenire in annum Hegirae 681, quaeret forte num in alium
conveniant. non longe abibitur: aio aptissime ambos quadrare
in annum ἀμέσως praecedentem, videlicet Hegirae 680. hic an-
nus initium duxit a die 22 Aprilis Iuliani anno Christi 1281, de-
siit autem die decima eiusdem Aprilis anno Christi sequenti 1282.
fuit annus Christi 1282 periodi Iulianae 5995. cyclum solis ha-
buit 3 cum litera dominicali D, cyclum vero lunae 10. ex his
patet Pascha eius anni occupasse diem 29 mensis Iuliani Martii.
haec dies deesse non potuit quin ambitu mensis Arabici Dhul-

Haiae in anno Hegirae 680 clauderetur, quoniam is annus a 22
Aprilis anni Chr. 1281 inchoatus usque ad 10 Aprilis anni Chr.
1282 protenditur: Dhul-Haia vero ultimus mensis anni Arabici
viginti novem postremos eius anni dies continet, qui cum retro
numerati a 10 Aprilis ad 13 Martii perveniant, ibi defigunt neo-
meniam Dhul-Haiae. prior igitur character manifeste competit
anno Hegirae 680. nec minus evidenter posterior eidem adapta-
tur. nam vicesimus nonus dies Martii, quem fuisse diem Paschae
ostendimus in anno Christi 1282, fuit necessario decimus septimus
Dhul-Haiae mensis Arabici, siquidem is incepit, ut est dictum, P 594
a die 13 Martii. porro ad diem 29 Martii, quae Paschae domi-
nica fuit, si tres ferias adiungas, secundam tertiam et quartam,
hanc profecto ultimam residere deprehendes in kalendis Aprilis
Iuliani, in quas incidit vicesimus dies Arabici Dhul-Haiae. ergo
vicesimus Dhul-Haiae anno Hegirae 680 fuit dies Mercurii sive
quarta feria; qui erat secundus chronologicus character annum,
quo est Abaka mortuus, insigniens. quare hunc imperatorem
Mogulensium non anno Hegirae 681, ut perperam in Abulphara-
gii Chronico scribitur, sed praecedenti Hegirae 680 vivere ac
regnare desiisse tenendum pro certo est. unde quae proxime
antecessisse illic dicuntur eius obitum expeditiones Mogulensium
in Syriam duae, sic verisimiliter ordinandae sunt, ut prior duce
Kungortai coepta verno tempore anni Hegirae 679 hieme anni
eiusdem terminetur. postea vere anni sequentis Hegirae 680, nun-
tiata nova Syrorum defectione, eo Munga Timurus minimus Abakae
frater cum exercitu Mogulensium quinquaginta millium moverit,
habens praeterea secum sociales Armenorum copias, rege ipso
Armeniae ductante. hi simul omnes cum Syris et Aegyptiis du-
bio Marte inter Hamam et Hemesam conflixerunt. inde Munga
Timurus se ad Abakam recipiens cum in Mesopotamiam perve-
nisset, ibi ex veneno per fraudem propinato in itinere versus
Nisibin extinctus est, eorumdem videlicet insidiis qui non multo
post Abakam ipsum pari scelere ac dolo peremerunt: nam effe-
ctus tam gemini recte uni et eidem imputentur causae, odio quo-
rumdam coniuratorum in Abakae domum. at de his pro insti-
tuto plus satis.

XV. Abakae mortuo successit eius insidiator Ahmedes et
ipse filius Hulacu, sed alia matre natus, ex qua praeterquam
novercalem in Abakam animum trahere potuit, etiam instinctus
videtur ad eundem Abakam perdendum odio Christianae religio-
nis, cuius cultorem fuisse Abakam clare affirmat Abulpharagius,
dum eum celebrasse festum Paschae una cum Christianis scribit.
huius Ahmedis acta principatus omnia rediguntur in unam pro-
lixam epistolam in commendationem Alcorani et superstitionis
Mahometicae ad Sultanem Aegypti scriptam, quam Abulphara-
gius recitat, continuo referens indulgentem Ahmedem dudum

concepto in Abakae familiam furori, dum Argunem Abakae filium
studet opprimere, ab eo et ei studentibus fuisse comprehensum
et custodiae mancipatum die Mercurii Iomadi prioris undecimo,
anni Hegirae 683, qui incepit a die 20 Martii anno Christi 1284.
est Iomadi prior quintus ordine mensis in anno Arabico; cuius
kalendae a 20 Martii numeratae incidunt in decimum sextum
Iulii eius Christi anni 1284 bissextilis; cuius cyclus solis fuit 5
et litera dominicalis B A, unde patet undecimum Iomadi prioris
re vera fuisse diem Mercurii: talis enim fuit feria 26 dies Iulii,
cum undecimo die Iomadi prioris coincidens. iam tum a clauso
in carcere Ahmede coepit Mogulensium consensu imperare Argun
titulo Chanis assumpto: nam deinceps *Argun-Chan* est dictus.
meminit huius Pachymeres p. 327 v. 22 Arganen Kanin vocans.
censuerunt autem principes Ahmedem, ut caedis Abakae-Chanis
reum, iure posse interfici; idque auctores ipsi iubendi erant.
verum ille recusavit, satis habens Ahmedem matri Kungortai et
huius filiis dedere, qui eum occiderunt in ultionem paternae cae-
dis die 2 Iomadi posterioris, quae dies in feriam item quartam
incidit, ut ait Abulpharagius et verum cernitur, siquidem Io-
madi posterioris, sexti mensis Arabum, dies secundus in diem
eo anno Christi 1284 cedit sextum decimum mensis Augusti, cui
diei ad marginem adiacet in Romano kalendario litera D, nota
quartae feriae, quando, ut tunc, litera feriae primae sive domi-
nicae index est A. hic desinit Chronicon Abulpharagii; cui La-
tinus interpres perutiliter supplementum attexuit ex Al Iannabio,
Abulfeda, Ebn Yusepho et aliis chronologis Arabibus expressum,
unde hic Mogulensis imperii extrema tempora, quantum ad rem
nostram conferet, reddemus.

P 595   XVI. Argun-Chan anno Heg. 690, qui a die 4 Ianuarii
anni Christi 1291 duxit initium, finem imperandi et vivendi fe-
cit, veneno, ut est creditum, sublatus a Iudaeis, mense Rabia
priori: hic tertius est in anno Arabico, et tunc maiori ex parte
Martio Iuliano respondit. huic successit *Caichtu* vel, ut alii
scribunt, *Ganiatu*, cui communis cum Argun-Chane pater fuit
Abaka. hunc morum improbitate suis exosum factum Mogulen-
sium plerique facta coniuratione, cuius dux fuit *Baidu* filius
Targihi fratris Abakae, fugientem assecuti trucidarunt, anno
Hegirae 694, cuius kalendae Muharrami diem occuparunt 21
Novembris in anno Christi 1294; unde mensis Rabia posterior,
quo *Caichtu* dicitur occisus, extremam Iuliani Februarii et prio-
rem Martii partem insedit in anno Christi 1295. puto extremo
Argun-Chanis principatu cogitatum ab eo de recuperandis septen-
trionalibus Europae provinciis ultra Bulgariam; quas, ut est
superius dictum n. 6. auspiciis Kaanis secundi Mogulensium im-
peratoris a Batuo subiugatas Noga, eis tuendis a Batuo Persidem
versus recedente praefectus, progressu temporis suas fecerat, ob-

sequium imperatori Mogulio recusans; diuque prout multis locis Pachymeres significat, istam rebellionem impune tulit, in ea etiam Michaëlis primi Palaeologi Augusti affinitate firmatus, ducta ipsius filia Euphrosyne. talis ab Argun-Chane suscepti consilii vestigium in fine Abulpharagiani Chronici reperio, ubi scriptum legitur: *Argun-Chanem imperio sibi stabilito unicuique filio-rum praefecturam alicuius regni sui exercituum commisisse.* filii Argun-Chanis fuerunt Cazanes, Carmpantas, Tuctaïs. ex his Cazanes videtur exercitui et provinciae loco ubi degebat imperator propinquae praepositus. nam occupato postmodum, ut mox dicetur, a Baidu imperio, primus qui obsisteret, viciniae, prout apparet, beneficio, extitit. alii duo Cazanis fratres longius a patre leguntur amandati, siquidem Carmpantanem Pachymeres p. 459 v. 5 partis posterioris ait exercitum in India ductasse: Tuctainem idem refert partis eiusdem l. 3 c. 26 et 27, longum difficile atque anceps cum Noga gessisse bellum, quoad eum iam senem acie postrema victum occidit funditusque profligavit factionem eius, restitutis imperio Mogulensium praetentis Euxino ex parte Europae regionibus, quas inde Nogae rebellio alienaverat, et iis ipse patris Argun-Chanis primum, deinde fratris Cazanis auctoritate regendis praesentem impendens operam. cuius tam potentis vicini Andronicus imperator, patris Michaëlis imitatione, gratiam sibi firmare affinitate studuit, filiam ei Mariam volenti despondendo, quod narrat noster c. 27 l. 3. haec longa Tuctainis bella videntur tenuisse ab anno circiter Chr. 1290 ad 1296.

XVII. Sublato e medio Caichlu successore Argun-Chanis, Baidu, qui eum oppresserat, in eius se solium intrusit. sed ei obstitit Cazanes Argun-Chanis filiorum, ut videtur, natu maximus, avitum paternumque imperium sibi armis vindicans. commisso itaque inter regni candidatos praelio, Baidu proditione suorum victus et occisus liberum aemulo Cazani reliquit imperium, postquam illud per octo circiter menses occupavit. contigit mors Baidu mense Dhul-Haia eiusdem anni Heg. 694, hoc est circa finem Octobris aut initium Novembris anni Chr. 1296. hinc procedit imperium Cazanis, cuius dotes praeclaras, instituta laudabilia, acta illustria effuse laudans memorat Pachymeres c. 1 l. 6. res gestae sic summatim perstringuntur in supplemento Chronici Abulpharagii. anno Heg. 697, qui coepit a die 19 Octobris anni Chr. 1297, occiso *Niruzo*, cuius proditione Baidu fuerat oppressus, *Atabegi* dignitatem (erat id nomen illustris in imperio Mogulensi magistratus) qua Niruzus functus fuerat, transtulit in *Kotlu Sahum*; quem eundem esse suspicor cum *Chutluchaimo* nominato a Pachymere sub finem modo laudati c. 1 l. 6, ubi p. 459 v. 12 vocat Χουτλουχάϊμ κατὰ τὸν Εὔξεινον ἄρχοντα praetorem provinciarum imperii Mogulici ad Euxinum sitarum. fuerat

P 596 ista, uti diximus, praefectura Tuctainis. quare hinc licet intel-
ligere, circa quartum aut quintum principatus Cazanis annum
Tuctainem ad fratris imperantis comitatum se transtulisse, for-
sitan eo vocante, ut mores eius observaret, statueretque an di-
gnus is foret quem imperii successorem designaret. quae proba-
tio parum e Tuctainis voto succedens hunc exclusit imperio.
scribit enim Pachymeres, saepe indicato c. 1 l. 6 Cazanem in
dubia sua valetudine successioni regni consulentem, cum mores
Tuctainis, quem in propinquo haberet, fratris suis dissimiles
notasset, Carmpantanem alium fratrem ex India, ubi exercitui
praeerat, evocasse, eumque ad id accurata institutione praepa-
ratum imperii haeredem designasse. igitur decedenti ex partibus
Euxino vicinis Tuctaini suffectum in istarum provinciarum regi-
mine Chutluchaimum arbitror, quem illic tali officio fuisse fun-
ctum quando est mortuus Cazanes, affirmat Pachymeres.

　　XVIII. Pergit continuator Abulpharagiani Chronici acta
Cazanis exequi, scribens anno 699 moventem cum exercitu in
Syriam Cazanem cum occurrente sibi Sultane Aegypti, qui voca-
batur Al Malec Al Naser Mohammedes, conflixisse praelio, eum-
que fusum in fugam vertisse, dein Damasco potitum; quibus
gestis, relicto in Syria praefecto *Kapiak* vocato, in regiones
Orientales rediisse. habuit annus Hegirae 699 initium a die 28
Septembris anni Christi 1299. quia vero dies, quo acie victus
est Sultan Aegypti dicitur illic fuisse vicesimus septimus Rabiae
prioris, indicat nota illa diem vicesimum secundum mensis De-
cembris eiusdem Christi anni 1299. quod autem addit continua-
tor Abulpharagii diem illum fuisse Mercurii, haud usquequaque
quadrat, siquidem illo Christi anno cyclus solis 20 literam attu-
lit feriae primae indicem D, quae 22 Decembris diem feriam fuisse
tertiam demonstrat. crediderim mendum irrepsisse in numeros,
et pro 27 Rabiae prioris scribi oportere 28, qui dies fuit 23 De-
cembris feria 4. fundamentum mihi sic opinandi est testimonium
oculatum scriptoris illorum temporum Aythoni. extat huius
opus titulo Historiae Orientalis, cuius c. 41 affirmat se fuisse co-
mitem expeditionis quam *Cassanus* (sic enim vocat) *rex Tarta-
rorum* Christianus, una cum regibus Armeniae et Georgiae pari-
ter Christianis, suscepit in Syriam contra Melechnaserum Sulta-
nem Aegypti Syriae dominantem, quem et habuit obvium prope
Hamam, antiquis Emesam dictam. ducebat Sultan secum equi-
tum centum millia cum infinita peditum multitudine, Cassanus
autem exercitum ducentorum millium, magnam partem equitum
habebat. commissum fuisse praelium inter hos exercitus Aytho-
nus, qui praesens interfuit, asserit *die Mercurii ante festum na-
tivitatis*. cadit aptissime nota haec in diem 23 Decembris, quae
illo anno, ut est dictum, feria quarta fuit. addit Aythonus
praelio victum et fugere compulsum fuisse Sultanem, tum die

post victoriam 45 deditam Cassano fuisse urbem Damascum, in qua Cassanus praefectum pro se Syriae cum parte exercitus reliquit quemdam ducem Saracenum ad se a Sultane transfugam, nomine Capcakum; cui dedit in mandatis ut si Christiani ab Occidente venirent, eis Syriam traderet. sed cum Europae principes ire illuc aut exercitus mittere neglexissent, Capcakus rebus suis consulens, impetrata a Sultane transfugii venia, Syriam illi rursus expulsis Tartaris subiecit. haec Aythonus de hac expeditione; quae quam sint consentanea traditis a continuatore Abulpharagii ex collatione patet. etenim apud hunc legitur Aegyptios audito Cazanis abitu reversos in Syriam fuisse, et Capcako in partes eorum transeunte, Tartaros qui erant in Syria ea relicta in Orientem contendisse, et Damascum iterum in Aegyptiorum potestatem rediisse.

XIX. Anno Hegirae 700, cuius initium fuit dies sextus decimus Septembris in anno aerae Christi vulgaris 1300, Cazanes secundam expeditionem duxit in Syriam, ait continuator Abulpharagii: sed cum tribus circiter mensibus in Halebi ditionibus P 597 substitisset, re infecta iterum se subduxit. ita ille. ad hoc tempus equidem retulerim quod scribit Pachymeres loco saepe memorato de Cazane his verbis: *vastans quin etiam Aegyptum clamdesque illic Arabibus non leves inferens, longe pluribus et gravioribus sine dubio damnis illos affecturus, nisi ei, ne penetraret interius, locorum arenis inviis et aquae inopibus late squallentium insuperabilis difficultas obstitisset.* hactenus Pachymeres; unde licet suspicari vel ipsum Cazanem vel partem eius exercitus, ipso apud Halebum interim morante, Aegyptum tentasse, at ob impedimentum memoratum coepto abstitisse. refero etiam ad hanc secundam expeditionem illa quae paulo superius idem Pachymeres dixerat, nempe *Cazanem Hierosolymis hostiliter admotum parum abfuisse ab urbe illa tanta, cui Sultan Christianis ereptae dominabatur, expugnanda.* ita ille, longe verisimilius quam quidam Latini scriptores citati ab Henrico Spondano in continuatione Annalium Baronii anni Christi 1300 n. 1, qui aiunt tunc a Cassano *Hierosolymam fuisse captam, et sacris locis magna veneratione visitatis restauratis et dotatis, habitandam concessam Christianis Armenis Georgianis caeterisque ex Cypro et latebris convolantibus.* nam id, si vere contigisset, non videtur aut ignorare potuisse Aythonus tunc vivens, aut in historia de his scripta silere voluisse; in qua tamen nihil tale reperitur. anno dehinc Hegirae 702 (pergit supplementum Abulpharagii) Cazanes copias in Syriam misit duce Kotlu Sabo, sive ut Pachymeres vocat, Chutluchaimo; primus dies istius anni Hegirae 702 fuit vicesimus sextus mensis Augusti in anno aerae nostrae vulgaris 1302. ex his quae refert de morbo Cazanis diuturno Pachymeres, necesse est dicere iam tum illum aegrotasse,

atque adeo morbo impeditum a per se obeunda expeditione ne-
cessaria hominem cui maxime fideret vice sua misisse Chutluchai-
mum, sive illum evocavit e partibus septentrionalibus circa
Euxinum, quibus eum, in locum Tuctais sive Tuctainis, fuisse
iam antea praefectum paulo superius suspicabamur, sive illum
adhuc in officio Atabegi circa se habuit, et tantum post ipsius
reditum e Syria ad istum septentrionalem limitem destinavit, ne
occasione secuturae brevi (quod praesentiebat) mortis suae Tuctais,
quem exclusum imperio volebat ex istis sibi dudum obnoxiis
provinciis opes ducere posset ad negotium Carmpantani, sibi in
successione praelato, facessendum. utcumque sit, utrumque
idoneis auctoribus discimus, et bellum in Syria pro Cazane ges-
sisse illo iam aegrotante Chutluchaimum, et Cazane non multo
post mortuo eundem regionibus circa Euxinum prius a Tuctai
possessis praefuisse.

XX. De successu porro Syriacae huius expeditionis Chut-
luchaimi sic breviter collector supplementi Abulpharagii tradit.
primum equites decies mille exercitus Mogulici a ducibus copia-
rum Aegyptiarum, inter quos fuit Abulfeda, prout ipse testatur
in historia de his scripta, fuisse profligatos, deinde universum
exercitum fractum fugatum et pessumdatum. unde credibile est
Chutluchaimum cum reliquiis copiarum revertisse quamprimum
ad Cazanem, a quo ingravescere languorem suum sentiente pro-
pter causam supra indicatam missus ad Arctoum limitem fuerit.
eodem anno, Hegirae 702, die 13 mensis Shavalis, ut ait Ianna-
bius, Cazanes est mortuus. est Shaval decimus Arabum men-
sis, cuius diem tertium decimum incurrisse oportuit in diem 31
mensis Maii anno Chr. 1303, siquidem, ut est dictum, kalen-
dae Muharrami sextum vicesimum Augusti mensis anni superioris
insederant. hinc definire certo possumus controversiam, quae
inter quosdam mox referendos auctores de numero annorum im-
perii Cazanis agitatur. si enim, quod superius n. 17 statuimus,
coepit Cazanes imperare circa initium Novembris anno Christi
1296, moriens in fine Maii anni Christi 1303 utique sex in im-
perio annos explevit, et menses insuper septem. plus ergo iusto
spatii Cazanis principatui tribuit Arabs chronologus Iannabius,
dum eum regnasse dicit *annos octo et menses circiter decem.*
P 598 Ioannes Villanius l. 8 c. 15, Sanutus l. 3 p. 13 c. 8 et Aythonus
Hist. Orientalis c. 45, etsi diserte spatium regni Cazanis non ex-
primunt, quaedam tamen affirmant unde ultra praescriptos a no-
bis limites illud haud paulum excessisse sit consequens. nempe
duo priores aiunt coepisse illum imperare anno Christi 1294, et
Aythonus obitum eiusdem confert in annum Christi 1304, ex qui-
bus inferendum esset eum ultra novem plenos annos Mogulense
imperium rexisse. sed de vera sede epocharum initi a Cazane
principatus et mortis obitae tutius, opinor, creditur Arabibus

chronographis quam aut Aythono Armeno aut Villanio et Sanuto Europaeis scriptoribus, praesertim cum ad Arabum chronologiam se accommodet nostri Pachymeris assertio mortuum Cazanem affirmantis *cum ad sex annos imperasset*; quod, si de annis expletis agitur, exactissime scriptum est. eius qui Cazani successit nomen sic effert Iannabius: *Giyathoddin Chodabandah Mohammed*, *filius Argunis filii Abagae.* Abulfeda et Ahmed Ebn Yuseph, propius ad Pachymeris *Carmpantan*, *Chorbandam* hunc principem appellant. is post fratris decessoris funus die 23 Dhul-Haiae solemnibus ceremoniis inauguratus, pro *Chanis* titulo maioribus usitato *Aliaitu* se dici voluit, quae vox teste Iannabio *magnum imperatorem* significat. vereor ne mendum sit apud Iannabium, ubi coronationem Carmpantanis die 23 Dhul-Haiae celebratam confert in annum Hegirae 703, hoc est in mensem fere quintum decimum a decessoris obitu, quod parum est verisimile, praesertim cum, ut Pachymeres videtur significare, non solum designatus a Cazane adhuc vivente fuerit unicus haeres imperii, sed et iam tum in possessionem regni missus. id me invitat ad credendum eodem quo est Cazanes mortuus anno, sed altero fere post mense, nempe die 23 Dhul-Haiae, coronatum Carmpantanem. cum autem dies 13 Shavalis, ultimus vitae Cazanis, fuerit in anno Iuliano 31 Maii, oportuit diem 23 Dhul-Haiae anni eiusdem concurrere cum 29 Iulii anni Christi 1303. vitam et principatum produxit Carmpantan usque ad annum Hegirae 716, quo vivere simul et imperare desiit mensis Ramadanis die 27. coepit annus Hegirae 716 a die 26 Martii anni Christi 1216. unde Ramadanis mensis Arabum noni dies 27 coincidit cum die 13 Decembris eiusdem anni Christi 1316. Carmpantani suffectus est *Bahadur-Chan*, puer undecim annorum; quo imperante quisque praefectorum provinciis eas sibi iure supremo coeperunt usurpare. unde hoc moriente (quod contigit anno Hegirae 736, qui coepit ab Augusti 21 anni Christi 1335) Bahadur-Chane, inquam, decedente nullus deinceps est creatus imperator Mogulensium, tanta illa dynastia in partes minutas fracta et penitus dissipata.

Hactenus brevem synopsim dedimus imperii Mogulici, quod ab anno Christi 1202 ad annum Christi 1335, per annos 133, sub imperatoribus undecim, Gingizchane, Kaane, Cayuc-Chane, Munkakao, Abaka, Ahmede, Argun-Chane, Caichtu, Cazane, Carmpantane, Bahadur-Chane, magnis per Asiam rebus gestis inclaruit.

CAPUT VIII.

Origines imperii Ottomanici a Pachymere indicatae
distinctius explicantur.

I. Ut regum quibus in interiore Asia commune nomen pre-
sbyteri Ioannis fuit, vastum et diu florens imperium Mogulici ex-
ortu deletum est, ita ipsum Mogulicum magna ex parte in Otto-
manicum defecit, rebellione primi huius fundatoris Ottomani,
P 599 quem noster Pachymeres Atmanem nominat, contra Cazanem et
Carmpantanem primum impunita remanente, inde sensim invale-
scente in iustum instar regni proprii, auctibus postea stupendis
usque ad extinctionem imperii Romani Orientalis et regni Mama-
lucorum in Aegypto profecturi in terrorem Europae, cui mina-
tur, hodieque universae. huius novae dynastiae quasi cunabula,
obiter a Pachymere perstricta, nesciente scilicet in quantam ex
his illa molem foret immaniter crescendo surrectura, operae pre-
tium duxi considerare hic paulo attentius, et epochas originum
istarum in principiis parum notabiles, ex inopinato deinde suc-
cessu momentum et aestimationis meritum nactas, suis exacte lo-
cis figere.

II. Othmanis sive Ottomani genus historici Arabes dedu-
cunt e quodam *Soliman Shaho*, quem aiunt circa annum Hegirae
611, cuius fuit initium Maii dies 13 in Christi anno 1214, prae-
fuisse provinciae Persis subiectae, quae vocabatur *Mahan*. hic
cum a Mogulensium potentia, tunc sub primo illorum imperatore
Gingizchane irruptionibus in omnem partem vehementibus fines
dilatante, tueri suam praefecturam desperaret posse, convasatis
quae potuit auferre, assumptisque secum qua e principibus qua
e populo, qui novas alibi quaerere sedes mallent quam in patria
servire, in Asiam minorem iter intendit. sed dum incerto vado
Euphratem traiicit, aquis hausto Soliman Shaho, e tribus qui
eius fugam comitabantur filiis duo priores, Sankur Zengi et Cun
Tugdi, redierunt in Persidem, tertius Ortogrules ibidem ad ripas
Euphratis domicilium fixit, illicque diu moratus tres educavit
filios, Condozum Sarubanum et Othmanem. verum cum anguste
incommodeque habitarent, Sarubano filio ad Aladinum Iconii sa-
trapam legato misso supplex petiit ab eo assignari sibi locum ubi
cum liberis degeret in terris ipsius ditionis. annuit satrapa, et
Ortogruli permisit ut cum suis migraret in regionem sitam inter
montes Tumalagii et Armeniae. Karaiaptag ei loco nomen fuit,
quem insedit Ortogrules tanto numero suorum ut quadringenta
tentoria illic fixa explerent. rem ibi strenue multis annis, limi-
tem tutans et auspiciis Aladini principis Iconiensis feliciter mili-
tans, Ortogrules gessit, magni ob hoc ab illo habitus et deside-

ratus cum fato functus est, quod contigit anno Hegirae 687, qui
coepit a die 6 Februarii anno Christi 1288. haeres Ortogrulis
Othman fuit, cui ut in Karaiaptagi principatu patri succederet
prono favore Aladinus indulsit, et eum, quoad ipse perstitit in
potentia, beneficiis fovit. verum Aladino et annis iam fracto et
opibus diminuto, ut iam amplius armis Mogulensium sub Chalaü
et Apaga in istis partibus praevalentium ac cuncta subiugantium
par sustinendis haud foret, res sibi suas agere Othmanes coepit,
et propriis auspiciis in Romani imperii provincias irrumpere,
non praedis solum inde abigendis intentus, sed et arcibus atque
urbibus ibidem occupandis. quod coeptum cum ei ex voto suc-
cessisset, expugnatis et praesidio suorum insessis validis quibus-
dam munitionibus, unde regionum illis adiacentium facile domi-
nium sibi perpetuum assereret, Sultanis tum demum Othman,
hoc est supremi principis, titulum palam usurpavit, anno He-
girae 699, cuius kalendae Muharrami inciderunt in diem 28 Sep-
tembris anni Christi 1299.

III. Hactenus relata de Othmanis primordiis tradunt Ara-
bes scriptores; cum quibus comparare sparsim de his asserta a
Pachymere, ac quam haec iis apte congruant ostendere, labor
deinceps meus sit. principio repeto quae in ipso sui operis li-
mine noster historicus partis 1 l. 1 a c. 3 ad 6 fuse disserit de
arcibus limitis Orientalis Romanae ditionis contra Persidem deque
illarum momento ad tutelam imperii; tum de cura, qua eas am-
plexi dominantes Nicaeae post amissam Constantinopolim impe-
ratores Graeci optime consuluerint reipublicae numerosis viro-
rum fortium praesidiis in eo limite auctorandis, cum largorum
stipendiorum fida solutione ad diem, tum assignatione agrorum P 600
in illa vicinia et concessione praedae omnis quam ex hostili agro
infestis incursionibus possent corradere. innuitque ad id adhibi-
tos a Byzantinis Augustis exteros probatae virtutis et experientiae
bellicarum rerum; quorum multos illic, qua spoliis ex hoste ra-
ptis, qua pensionibus cum fide numeratis, qua fructibus dato-
rum ipsis agrorum, magnas adeptos divitias ait, unde tanto ter-
ribiliores hostibus fierent, ac fortius propugnarent Romanas pro-
vincias, barbaris procul intra ipsorum terras vel terrore conti-
nendis, vel vi armisque, si erumpere conarentur, retrudendis.
non videtur dubium quin par in contrarium cura fuerit infesto-
rum Romano nomini et Christianae religioni Saracenorum princi-
pum, aut Persidem aut vicinas ei limiti provincias sub sua di-
tione habentium; inter quos Aladinus fuit dynasta sedem imperii
habens Iconii, quae est urbs Lycaoniae primaria. quare cum
apud Arabas historicos legimus evocatum ab hoc ex Transeuphra-
tensi regione Ortogrulem cum familia et inter montes Tumulagii
et Armeniae, in loco cuius ipsi toparchiam concesserit, colloca-
tum, intelligere debemus illam *Karaiaptagam*, regionem attri-

butam Ortogruli ab Aladino, fuisse confinem Romanis illis modo
memoratis arcibus; et militiae illic dudum constitutae lateque
formidandae stipendiariorum exterorum Romanis Augustis mili-
tantium, oppositam a Sultane Aladino istam cohortem sequen-
tium fortunam Ortogrulis peregre appulsi Turcorum, qui qua-
dringenta illic tabernacula complerent. quodsi tempus indage-
mus quo migrasse Karaiaptagam e ripa Euphratis ulteriore Orto-
grulis familiam Arabes indicant, reperiemus fere convenire in
principatum Ioannis Batatzae, qui Nicaeae Graecis imperavit ab
anno 1228 ad 1255, quo moriens successorem habuit Theodo-
rum filium. per illa tempora et inde ad receptam e Latinis Con-
stantinopolim vigentibus et numero atque alacritate praevalenti-
bus praesidiariis limitanearum arcium imperii Romani contra Per-
sidem, facile ab illis sustinebatur impetus barbarorum in quoti-
dianis velitationibus plerumque inferiorum; quoad pessimo con-
silio suggesto a Chadeno, Michaël Palaeologus postquam in im-
perium invasit circumscripto pupillo Ioanne Theodori Lascaris
filio, ubi se potitum Constantinopoli Latinis erepta vidit, isti
praesidiarii Romani limitis vexari fiscalibus calumniis et ad ino-
piam redigi, minuique inde cum animis tum viribus et numero
coeperunt, ut observat Pachymeres ibidem. quando potissimum
contigisse credibile est, quod Arabes indicant, ut Ortogrules cum
suis prospere in Romanos pugnando laudem ab Aladino, cuius
auspiciis militabat, mereretur.

IV. Nec vero istam Ortogrulis et filiorum eius adversus
praesidiarios Romanarum arcium comparatam operam, et quae-
sitam in vicinia ex parte adversae Persidis stationem Pachymeres
ipse dissimulat. en eius verba vol. I p. 18 v. 20: *post haec viris
fortibus inter Persas, quibus omnis vivendi spes et conditio in
armis erat, caeteris inclinatis ad Tocharos, qui nuper impe-
rium Persarum occuparant, rebellantibus visum opportunum est
refugere ad claustra castellaque montium, et inde vicina incur-
sando rapto ac praedis victum quaerere.* haec ille, quae quin
Ortogrulis familiae conveniant Karaiaptagae prope arces Romanas
in finibus Persidis collocatae, negare nemo poterit, qui praeser-
tim attenderit ad hic indicatam eius aversionem a Tocharis in-
vasoribus Persidis, quibus ne parere cogeretur Soliman-Shahus
Ortogrulis pater, inde relicta provincia fugerat. addit statim
Pachymeres praesidiarios Romanarum arcium utcumque agris
multatos et praedae parte spoliatos imprudenti avaritia Michaëlis
primi e Palaeologis imperatoris, abstinuisse quidem ab incursando
fines hostium, quod antea utilissime fecerant, tamen arces ipsis
commissas fide constanti tenuisse, quamdiu annuae pensiones ad
victum necessariae praebitae ipsis e fisco sunt: has vero ipsis
suppeditari desiisse post mortem Michaëlis, solo iam Andronico
P 601 imperante, diserte noster asserit vol. II p. 208 v. 18, ubi *alterum*

fontem enervationis imperii fuisse scribit *parsimoniam plene sol-*
vendarum ex fide pensionum, quae praesidiariis arcium in li-
mite sitarum olim statutae fuerant in mercedem operae milita-
ris, adeo illic ad communem tutelam necessariae. hae maligne
nunc suppeditabantur, avaritia praefectorum erogationi pecu-
niae publicae, quorum apponebatur lucris quod per astutas fru-
strationum artes diffundenda praetextibus vafris solutionis die
miseris militibus subtrahebatur, pretium sudoris et sanguinis.
ita ille ibi; qui et multis inferius locis significat non iam solum
per fiscalium calumniosas fraudes, sed edicto ipso ac iussu di-
serto Andronici Augusti pensiones et auctoramenta istiusmodi
fuisse interversa. unde necessario contigit arcium custodiam ne-
gligi, ac quasdam ipsarum in militum ex parte Persidis contra-
rias Romano limiti stationes obtinentium venire potestatem. su-
stinuit quodam tempore labem illam ac ruinam felix Alexii Phi-
lanthropeni per illos tractus militia, circiter annum Christi 1295, ⁱ
Andronici 13, eo missi cum valido exercitu, prout fuse narrat
Pachymeres l. 3 vol. II c. 9. sed postquam is rebellans a Libadario
est oppressus, et Persae, qui sub eo militaverant, male multati
reversi domum, et causa cladis ulciscendae et fiducia nullius
satis validae occursurae Romanae potentiae, Philanthropeno
quem unum timuerant amoto, arcibus iam cunctis potiti licen-
tissime in subiectas imperio regiones passim inundarunt. hoc
memorat Pachymeres l. 3 vol. II c. 14, et coepisse videtur ab anno
Chr. 1297, imperii Andronici 15. durasse vero sine intermis-
sione, immo cum atrocioribus subinde malorum augmentis, us-
que ad finem huius historiae, intelligitur ex frequentissimis ea
de re nostri historici querelis ac lamentationibus per cunctos fere
consequentes huius operis libros sparsis.

    V. Ex his patet quam consentanee ad nostrae huius histo-
riae memoriam Arabum annales referant quod superius exscri-
psimus, Ortogrulem Othmanis patrem obiisse anno Hegirae 687,
qui ex parte coincidit cum anno Christi 1288, inclytum bellicis
successibus, de Romana videlicet Persici limitis militia relatis,
quippe quae iam tum a recepta de Latinis Constantinopoli, hoc
est ab annis retro sedecim, debilitari valde coeperat. quare suc-
cedens Ortogruli Othman filius aliquot iam tum habuit loca de
Romanis manu parta, quibus plura maioraque postquam anno-
rum plurium continua felicitate ad paternam Karaiaptegae adie-
cisset ditionem, Sultanis denique, hoc est supremi principis, no-
men haud dubitavit usurpare, tueri se illud posse sperans. huius
primae ac quasi fundamentalis epochae Ottomanici imperii sedem
ex vero in ordine temporum statuere nostrum est, quod efficere
conabimur comparatis Arabum chronologorum et nostri Pachy-
meris testimoniis. refert Pachymeres, p. 327 v. 6, Atmanem in-
valuisse opibus adiuncta sibi manu fortissima bellatorum acerri-

morum e Paphlagonia, et obsistere sibi conatum Muzalonem Ro-
manum ducem acie vicisse prope Nicomediam Bithyniae metro-
polim, quam inde urbem velut obsessam campi dominus tenuerit.
haec contigisse circa Bapheum prope Nicomediam die vicesima
septima mensis Iulii diserte Pachymeres tradit: annum ex serie
rerum verisimiliter affirmamus in Synopsi hunc fuisse Christi
1299. sequenti 1300 putarim evenisse quod noster narrat p. 415
v. 1, videlicet quasdam Romanas copias duce quodam Siuro, ab
imperatore ad eam tuendam provinciam misso, collectas ab At-
mane occidione fuisse deletas; *unde victor Atman progrediens
Belocomam* (verba sunt Pachymeris) *insiliens vi capit, et ibi
repertos interficit. ipse autem immensis opibus ea clausis muni-
tione potitus praedives inde est habitus. arcis quippe illius mu-
nimentis situ et arte validis ad quaesitae pecuniae custodiam
usus, magnos sibi thesauros, unde belli ac principatus expedi-
ret sumptus, secure conditos ad manum habuit. harum magna
pars calamitatum in Prusam redundavit, sic nudatam posses-
sione agri sui et intra murorum ambitum redactam* etc. haec
P 602 Pachymeres; quae satis clare indicant mutationem hoc tempore
in Atmane factam, quasi e privato in principalem statum. au-
diamus iam Arabas. hi magno consensu affirmant Othmanem e
toparcha Karaiaptagae et simplici satrapa Sultanis seu supremi
domini nomen adscivisse anno Hegirae 699. huius anni cum ka-
lendae Muharrami insederint diem 28 Septembris Iuliani in anno
Christi 1299, et quam memoravimus e Pachymere Belocomae
expugnatio ad menses aestivos pertinuisse videatur, intelligen-
dum relinquitur regnare Atmanem, sine ulla iam dissimulatione
vocabulum imperii palam usurpando, coepisse anno Christi 1300,
idque in Bithynia ad urbem Prusam, quam paulo post ei fuisse
subiectam tributariae pacis nomine, re vera deditione ac subie-
ctione plena, innuit Pachymeres, dum sic scribit p. 597 v. 14:
*Prusa ipsa calamitatibus subacta ingentibus emere a Persis nu-
merato immani pretio umbram pacis, pro vera, quam menda-
cibus promissis ostentarunt, pace.* ita ille.

VI. Haec tamen non eo traho ut existimem Prusam Atmani
iam tum regni principio plene possessam, cum eam quidam Ara-
bum sub finem tantum vitae Atmanis, quidam nonnisi post eius
obitum a filio eius et successore Urchane penitus subiugatam tra-
dant. verum cum eam urbem arcibus undecumque a se possessis
cinctam et vectigalem ad libitum haberet, aequo interim animo
ferebat eius se ingressu exclusum, quem sibi ac suis aliquando,
ut res tum se habebant, libere pandendum certa praesumebat spe.
in hoc igitur incumbebat, ut agri ac provinciae illius, nempe Bi-
thyniae universae, sibi dominium assereret, quod consequebatur
arcibus primariis, et unde urbium magnarum salus et securitas

penderet, occupandis et validissimo praesidio tenendis, sicut modo eum vidimus in Belocoma fecisse, in qua claves Prusae reperit; uti et Nicaeam sibi subiugasse visus est capta et suis firmissimis copiis insessa Tricoccia. qua de re iuvat nostrum hic Pachymerem audire p. 637 v. 13 scribentem in hunc modum: *circa Nicaeam malo sane loco res erant, Atmane cuncta illic agente ferenteque.* ac paulo post: *itaque infestum exercitum — venientibus, Atman credidit.* hactenus Pachymeres, ex cuius triplici modo memorata narratione rerum ab Atmane, ad Nicomediam victo Muzalone, ad Prusam capta Belocoma, ad Nicaeam expugnata Tricoccia gestarum, manifestum est habuisse illum in potestate universam Bithyniam, tribus illis primariis eius provinciae urbibus, etsi non plene possessis, saltem undique circumdatis, et lenta sic obsidione cum interim pro libito macerandis et pecunia multandis, tum denique certissime trahendis sub absolutum integrumque dominium. id quod non ipsi quidem obtigit Atmani. verum illius haeres et filius Urchanes, quem Cantacuzenus l. 3 c. 9, statum in quo eum pater moriens reliquerat, exprimens *satrapam* Orientalis Bithyniae appellat, brevi se Bithyniae totius principem ostendit Prusa Nicomedia et Nicaea plane domitis, postquam huic ultimae periclitanti suppetias Andronicus iunior accurrens repulsus et vulneratus in femore recessit. cuius pugnae ac vulneris meminit Cantacuzenus P 603 l. 2 c. 7, inde secutam tamen Nicaeae deditionem parum candide dissimulans, quam ingenue fatentur Gregoras l. 9 et Phrantzes c. 11 l. 1, ut omittam idem diserte affirmantes Arabas scriptores, inter quos omnes convenit *Iznicmid* et *Iznik* (sic illi Nicomediam et Nicaeam nominant) ab Urchane Othmanis filio post patris mortem captas fuisse. Brusiam vero (ita Prusam appellant) quidam illorum Othmani adhuc viventi, alii eo mortuo Urchani deditam aiunt. fato vero functum Othmanem omnes ii magno consensu tradunt anno Hegirae 726, cuius fuit initium dies 8 Decembris anni Christi 1325, adeo ut mors Othmanis in annum Christi 1326 videatur differenda.

VII. Hactenus dictis liceat mihi per benignum lectorem mantissae loco apponere considerationem duorum veterum oraculorum, quae per haec fuisse patrata eventis non immerito credi potest; id quod eo minus alienum ab hoc loco forte fuerit, quod eorum alterum est implicatum cum rationibus chronologicis quibusdam, numeros a nobis hic subductos recto positos calculo adstruentibus. recitat antiquus scriptor Zosimus, historiarum l. 2, Erythraeae vel Epiroticae Sibyllae hoc vaticinium:

δὴ τότε Βιθυνῶν γαῖαν λύκοι οἰκήσουσι
Ζηνὸς ἐπιφροσύναισι· ταχὺ δ' ἐπιβήσεται ἀρχὴ
ἀνδράσιν, οἳ Βύζαντος ἕδος καταναιετάωσι.

tunc Bithynorum terram lupi habitabunt
divino consilio; celeriter autem superveniet (horum) *prin-*
cipatus
viris qui Byzantis solum incolunt.

huius eventum prophetiae conatur Zosimus adaptare aetati Con-
stantini et restauratioui atque amplificationi per eum factae By-
zantii.   quam recte, ipse viderit: non enim satis apparet quid
ista mentio *luporum Bithyniam habitantium* cum exornatione
Byzantinae urbis commune habeat.   dicamus nos licet accommo-
datius ad speciem veri, per Sibyllam divino afflatam spiritu,
tanto ante his fuisse praenuntiatum verbis exortum Ottomanici
imperii a praedonibus avidis et lupina voracitate ac crudelitate
praeditis in Bithynia fundati, cui non multo post tempore suc-
cumbere deberet Byzantinae urbis imperantis potentia et splen-
dor, barbaricae deinceps servitutis iugum gravissimum et pro-
brosissimum laturae.   Graeci Byzantini in poenam impii et per-
tinacis ab ecclesia Romana omnium matre inde usque a Photii
temporibus continuati schismatis, duram a Latinis Constantino-
polim per annos octo supra quinquaginta obtinentibus servitutem
passi fuerant; ex qua profecisse visi sunt, dum ea liberati Ro-
mani papae primatum agnoverunt.   at ubi Michaële istius con-
cordiae auctore mortuo, filius eius Andronicus pessimo consilio,
quae pater saluberrime statuerat rescindens, se suosque iterum a
sede Petri contumaciter abrupit, statim dei ultoris providentia
praeparari coepit et sensim in Bithynia concrescere Ottomanica
tyrannis, a qua diris continenter cladibus flagellati Byzantini,
cum minime resipiscerent sed magis magisque in haeresi ac schi-
smate obfirmarentur, vi tandem saeva subacti ab uno ex Atmanis
successoribus Mahomete secundo, anno Chr. 1453, captivitatem
Babylonica Iudaeorum eo tristiorem, quod Cyrum nullum qui
eam solvat expectant, ducentis iam et quod excurrit annis infe-
licissimi tolerant, fidem ingenti suo luctu sancientes Sibyllini,
quod retulimus, oraculi.

VIII.   Aliud de his habemus suspicioni fictionis minime ob-
noxium vaticinium, quippe quod in sacro et canonico libro cla-
rissime legatur, Apocalypsi S. Ioannis.   in ea Novi Testamenti
prophetia, eventa complectente praecipua rerum quae a Christi
resurrectione et prima fundatione ecclesiae ad hanc usque diem
dei regnum attinentes contigerunt, postquam persecutiones im-
peratorum adumbratae sunt a c. 12 ad 20, in hoc iam per sym-
bolum alligationis Satanae tempus illud describitur quo Constan-
tinus, victo et occiso Licinio imperii Romani plene potens, libe-
ralissimis et quasi triumphalibus edictis religionem Christianam
studuit ornare. ista edicta recitantur ab Eusebio l. 2 de vita Con-
stantini, a c. 25 ad 60. in horum uno (tria enim sunt), nempe

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in Rescripto ad Eusebium c. 45 descripto, quo imperatur ut ec-
clesiae Christianorum ubique sumptu publico aedificentur, fit di-
stincta mentio draconis, quem hic Ioannes ligatum memorat. sic
enim illic Constantinus loquitur: νυνὶ δὲ τῆς ἐλευθερίας ἀποδο-
θείσης, καὶ τοῦ δράκοντος ἐκείνου ἀπὸ τῆς τῶν κοινῶν διοική-
σεως τοῦ θεοῦ τοῦ μεγίστου προνοίᾳ, ἡμετέρᾳ δ' ὑπηρεσίᾳ ἐκ-
διωχθέντος, *nunc autem libertate reddita, et dracone illo*
(Licinium innuit idololatriae promotorem) *ab administratione
rerum dei maximi providentia et nostro ministerio deiecto.* con-
tigerunt ista circa Christi annum 320. inde per mille annos in
plena possessione liberae pacis intra imperium Romanum Chri-
stiana religio permansit, nempe usque ad annum Christi 1320,
quo tempore, ut vidimus, Othmanes exitiale Christi religioni
fundavit imperium, foedissimam Mahumetis superstitionem orbe
ferme toto propagaturum, ex qua non minus fere dei regno de-
trimentum quam ex invalescente ac subnixa olim regum opibus
idololatria illatum est. accessit circa idem tempus emergens
Wiclefi haeresis, in Ioannem deinde Hus, Lutherum, Calvinum
aliosque propagata. denique circa idem tempus semina sunt iacta
longi schismatis post obitum Gregorii XI per annos supra sexa-
ginta Romanae sedis auctoritatem, qua eatenus ecclesiasticae
monarchiae salus steterat, perniciosissime labefactaturi. haec
simul tria mala millesimo vertente post pacem a Constantino da-
tam anno exorientia, solutione prius ligati Satanae a sancto vate
designantur. id vero, quod ad nostram proprie rem attinet,
adstruitur ex eo quod Turci Ottomanici ab omnibus habentur
originis Scythicae. Scythae autem ex Magog secundo filio Iapheti
memorato Gen. 10 4 propagati haud dubie creduntur. idem porro
Magog Gog quoque dictus per apocopen, occupata coloniis Lydia,
Gyges Graecorum literis appellatus fuerit. hinc Plinius l. 5 c. 23
Hierapolim Syriae dictam a Syris *Magog* testatur, nimirum
quoniam ea civitas, ut docet Lucianus libro de dea Syria, a
Deucalione Promethei sive Magogi aut Gogi filio, Scytharum au-
ctore, sit condita. quae his adiungit Ioannes de actis Gog et
Magog magnam habent cum narratis de gestis Ottomanicorum
principum similitudinem. primum ait *congregandos in praelium,
quorum numerus sicut arenae maris*, morem istorum innuens
numerosissimos armandi exercitus. addit *et ascenderunt super
latitudinem terrae.* Europa originis Graecae nomen est ex εὖρος
latitudo et ὄψ ὀπός *terra:* nam hoc vocabulo designatam Cybe-
len, quae eadem *Tellus* et mater magna, apud veteres videmus.
unde *inopes* defunctos insepultos, qui terra carent, Virgilius in
6 Aen. vocat illo versu

    haec omnis quam cernis inops inhumataque turba est.
et Ausonius in Mosella de ossibus insepultorum in campi super-
ficie iacentium

infletaeque iacent inopes super arva catervae.
igitur transitus Ottomanidarum in Europam his verbis innuitur.
is primum contigisse ab Arabibus traditur anno Hegirae 758,
qui paene totus coincidit cum anno Christi 1357, quippe cum
coeperit a die 25 Decembris anni Christi 1356. tunc enim iussu
Urchanis filius huius Solimanes *connexis trabibus copias in Grae-
ciam traiecit, et anno sequenti cepit urbem Callipolim.* verba
sunt continuatoris Abulpharagiani Chronici. quod autem ex Asia
in Europam, nempe septentrionalem, ad Callipolim *ascendi* di-
citur, recte quadrat ad naturalem situm: nam vere Maro scripsit
　　　*mundus ut ad Scythiam Ripaeasque arduus arces
　　　consurgit* etc.

P 605 pergit sacer vates adiungens de Gog et Magog, hoc est Turcis
Ottomanicis: *et circuieram castra sanctorum.* voci *castra* in
originibus Graecis respondet παρεμβολή locum singularem desi-
gnans. ego per *castra sanctorum* terram sanctam et Hierosoly-
mam intelligo, tot Christianorum sacris expeditionibus et bellicis
facinoribus quaesitam et diu possessam. hanc Ottomanica po-
tentia circumiit ἐκύκλωσεν illinc Aegypto, hinc Asia maiori, inde
Phoenice Cyproque occupatis, ut iam ne adiri quidem a privatis
causa religionis, nisi empto ab ipsis transitu, possit. ultimum
Ottomanidarum facinus S. Ioannes his verbis exprimit: *et ca-
pient civitatem dilectam.* quaenam haec intelligi possit alia quam
Constantinopolis, a Muhamete secundo an. Chr. 1453 expugnata,
et ab eius successoribus hactenus pro imperii Ottomanici prima-
ria sede habita? *dilectam* vocat, quia eam fundator Constanti-
nus non ut patriam in qua esset natus amaverit, sed naturali situ
et praestantibus eius coeli ac soli dotibus prae cunctis delegerit
et dilexerit, sedem in ea Romani collocans imperii et veteris Ro-
mae splendorem cum novae Romae nomine in eam transferens.
ita utraque tam Sibyllae quam S. Ioannis prophetia excidium urbi
Constantinopoli a domo Ottomanica denuntiat: haec vero id illa
plus facit, ut tempus invalescentis Ottomanidarum potentiae di-
stincte prodat, millesimum scilicet annum a pace per Constan-
tinum ecclesiis data.

　　Deinceps nihil, opinor, chronologicae operae circa Pachy-
meris historiam superest aliud, nisi ut res hac secunda parte in
ea memoratas, sicut in priori fecimus, suis annis assignatas et
expansas in tabulam lectori proponamus; cui rei caput sequens
operis ultimum impendimus.

C A P U T   IX.

*Synopsis chronologica praecipuarum rerum hoc
secundo historiae Pachymeris tomo memoratarum, eas
assignans annis suis.*

Anni Chr.	Romanorum Pontificum. Martini IV	Impp. Roman. Andronici	
			Andronicus Michaëli imperatori 11 Decemb. mortuo succedens solus imperare incipit. l. 1 c. 1.
1282	2	1	Tocharos a patre evocatos in Triballos immittit. ibid. sponte propendens in abrogationem concordiae ecclesiarum Latinae ac Graecae Michaëlis eius patris studio initae, consiliis praeterea Eulogiae amitae et Theodori Muzalonis magni logothetae ad idem impulsus, veniam petit quod in eam consenserit. l. 1 c. 2. Ioanni Vecco e patriarchatu deiecto Iosephum dudum exauctoratum substituit. l. 1 c. 3 4 et 5.
1283	3	1	Ecclesiastici et laici, qui ecclesiarum concordiae assenserant, multis et piaculis subiecti vix tandem in communionem recipiuntur. c. 6 et 7. Veccus et alii concordiae auctores in synodo accusantur. c. 8. Veccus condemnatus relegatur Prusam. c. 10 et 11. Arseniana factio revalescit. c. 12. Iosephus moritur mense Martio. c. 13. P 606 Georgius Cyprius, nomine in monachatu sumpto Gregorius vocatus, creatur patriarcha circa initium Aprilis. c. 15 et huius Observ. l. 3 c. 2 n. 5. Mense Aprili stella Saturni per diem apparet. c. 16. Antistites qui paci ecclesiarum consenserant, condemnantur et gradu deiiciuntur. c. 17. Mense Maio sanguis de coelo cadit. c. 18. Augusta Theodora renuntiare cogitur obedientiae papae. c. 19.

Anni Chr.	Romanorum Pontificum. Martini IV	Impp. Roman. Andronici
1283	3	1
1284	4	2

Ab Athanasio patriarcha Alexandrino exigitur damnatio actorum in causa concordiae ecclesiarum. ibid.

Foedus imperatoris Andronici cum Tertere, quem pro legitimo rege Bulgariae agnoscit. c. 20.

Sectas Iosephitarum et Arsenianorum imperator conciliare studet. c. 21.

Inito inter hos tali conventionis pacto, ut utrique chartas iura ipsorum complectentes in ignem iniicerent, et ii superiores agnoscerentur quorum scripta non arsissent, utrorumque libelli pariter consumpti flamma sunt. contigit id sabbato sancto pridie Paschae 23 Martii, praesente imperatore. c. 22 et huius Observ. l. 3 c. 2 n. 4.

Perculsi eo successu Arseniani, cum se patriarchae Gregorio obedituros promisissent, statim a pactis resiliunt. ibid.

Andronicus olim episcopus Sardensis, ex multum gratioso apud imperatorem reus laesae maiestatis peractus, ignominiosissime eiicitur. c. 23.

Cotanitza monachus ex latrone factus Prusa fugit. c. 24.

Tarchaniota protovestiarius mittitur ab imperatore cum exercitu in Occiduos tractus. c. 25.

Classis Romana negligitur pessimo consilio, et sensim aboletur. c. 26.

Panis consecratus in sacra pyxide corruptus et plane putrefactus reperitur in magna ecclesia Constantinopoli, dominica Graecis *Tyrine*, Latinis *Quinquagesimae* dicta, die 23 Februarii. l. 1 c. 28 et huius Observ. l. 3 c. 2 n. 4.

Imago deiparae picta in pariete domus privatae Constantinopoli multis diebus lacrimas fundit. c. 30.

In aedibus Charsiae apud eandem Constantinopolim ex effigie S. martyris Georgii sanguis copiose manavit. ibid.

Anni Chr.	Romanorum Pontificum. Martini IV	Impp. Roman. Andronici
1284	4	2
1285	Honorii IV 1	3

Arsenii patriarchae dudum mortui reliquiae in urbem solemni pompa reportantur. c. 31.

Sultan Babylonis Christianos Syriam obtinentes bello vexat. c. 32.　　P 607

Andronicus imperator viduus secundam ducit coniugem Irenen filiam marchionis Montisferrati. c. 33.

Veccus Prusa evocatus congreditur cum schismaticis in Alexiaco triclinio, et rationem reddit fidei suae et actorum. tamen ab infestis condemnatus deportatur cum sociis duobus archidiaconis in arcem S. Gregorii, ubi nulla victus provisione, durissima custodia detinentur sex annis integris. c. 34 et 35. vide praeterea c. 2 huius libri Observ. 3 n. 6.

Ex neglectu et debilitate Romanae classis licentia piratarum increbescente, littorum accolae migrare in mediterranea iubentur. c. 37.

Scythis Danubii accolis incursionem in Thraciam et Macedoniam minantibus, cadaver Michaëlis imperatoris, ne ab illis ablatum redimendum foret postea, ex Allage Selybriam transfertur. ibid.

Blachi ne se Scythis adiungerent, ex Occidua continente in Orientalem transfretare coguntur. ibid. p. 66 edit. Possin.

Martinus IV sum. pont. Perusii moritur 4 kalend. Apr. hoc est 29 Martii. huic suffectus est Iacobus diaconus Card. e familia Sabella, qui coronatus est Romae 17 kal. Maii, dictus Honorius IV.

Curopalates Umpertopulus Scythae Danubii accolas acie vincit et fugat, in eius rei bene gestae praemium magnus papias creatus. c. 29.

Disceptatur inter ecclesiasticos de allegatis patrum testimoniis a Vecco, dum in colloquio synodali auditus est; quibus multi non bene satisfactum mussitabant. l. 2 c. 1 p. 73 et 74.

Anni Chr.	Romano- rum Pon- tificum. Honorii IV	Impp. Ro- man. Andronici	
1286	2	4	Plurimi e Blachis altero abhinc anno ex Occidua continente in Orientalem transire compulsi, cum et parvuli et gre- ges ipsorum ei coelo non assuescerent, quod crebrae utriusque generis mortes te- stabantur, reditum in priores sedes ab imperatore pecunia redimunt; l. 1 c. ult. p. 66.
1287	3	5	Ad sedandos circa Vecci allegationes multorum scrupulos negotium datur tomi scribendi Gregorio patriarchae. l. 2 c. 1 p. 74.
	Sedes va- cat		Honorius IV moritur Romae die coenae domini, quae fuit 3 Aprilis, ut Sponda- nus et Rainaldus recte observant. illo enim anno, qui cyclum solis numeravit 8, lunae autem 15, et lit. Dom. habuit E, Pascha incidit in Apr. 6. vacavit sedes a coena domini huius anni usque ad 22 Fe- bruarii anni sequentis, per menses fere undecim.
1288	Nicolai IV 1	6	Die cathedrae S. Petri, 22 Februarii, creatur Romae pontifex F. Hieronymus Ord. S. Francisci, Card. Praenestinus, dictus Nicolaus eius nominis IV.
			Tomus anno superiori a Gregorio pa- triarcha conscribi coeptus editur, et pu- blice legitur in ecclesia. l. 2 c. 1 p. 74.
			Multi e clericis ei subscribere recusant. p. 75 lit. B et C.
			Propter hoc varie vexantur. ibid., et p. 76.
			Athanasius patriarcha Alexandrinus de- gens Constantinopoli vehementer, sed fru- stra, urgetur ad subscribendum tomo Gre- gorii. l. 2 c. 5 p. 81.
			Arsenius patriarcha Antiochenus Con- stantinopoli damnatur et e sacris dipty- chis eraditur, quod auditus esset consen- sisse in negotio ecclesiae cum rege Arme- niae. ibid.

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Anni Chr.	Romanorum Pontificum Nicolai IV	Impp. Roman. Andronici	
1288	1	6	Veccus in carcere scribit contra tomum Gregorii; et eius liber Constantinopoli lectus multorum animis scrupulum iniicit, vitia tomi detegens. l. 2 c. 2 p. 76 et 77. Tomus accusatur a quinqueeclesiensi et exchartophylace Moschampare; insurgunt in eundem alii quoque, c. 3 p. 77 et 78.
1289	2	7	Exardescit antistitum scandalum in Gregorium occasione commentarii a Marco eius discipulo editi, ipso probante. c. 4 p. 79. Imperatore tomum corrigi oportere iudicante, Gregorius id facere recusat. p. 80. Gregorius invidiae ferendae se imparem sentiens patriarchio recedit. c. 6 p. 82. Tandem patriarchatum abdicat circa mensem Iunium, post transactos in ea dignitate sex annos et paulo plus. c. 9 p. 87 et 88. l. 3 Observationum, c. 2. Corrigitur tomus Gregorii sublata ex eo expositione sententiae S. Ioannis Damasceni. c. 11 p. 90. Athanasius monachus e monte Gano eligitur et inauguratur patriarcha die 14 Octobris. c. 15 p. 97 et 98.
1290	3	8	Gregorius expatriarcha moritur. c. 17 p. 102. Imperator Andronicus ex urbe se confert in arcem Nicetiatarum Dacibyzam, ubi custodiebatur Ioannes Theodori Augusti filius et haeres, olim excoecatus a Michaële patre Andronici, ab eoque officiose salutato et liberaliter munerato eblanditur cessionem iuris ad imperium. l. 1 c. 36 p. 64. Inde idem Andronicus per Athanasium patriarcham, quem comitem ducebat, mitti curat ad Veccum et socios in arce S. Gregorii custoditos Theodorum Muzalonem, qui eorum sublevavit egestatem. l. 1 c. 35 p. 63 et c. 36 p. 64. praeterea l. 2 c. 17 p. 102.

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Anni Chr.	Romano-rum Pon-tificum. Nicolai IV	Impp.Ro-man. Andronici
1290	3	8
1291	4	9

Andronicus Veccum et socios carcere eductos humaniter admittit, comitate illa praeparare illos studens ad amplectendum schisma. quem in finem iterum quoque Lopadii eos allocutus est. l. 1 c. 36 p. 64 et 65. sed tractatu non succedente relinquuntur in carcere, ut intelligitur ex c. 29 l. 3.

Imperator collata Theodoro Muzaloni magno logothetae protovestiarii dignitate, Nymphaeum pervenit sub finem Maii. l. 2 c. 18. ibique spatio plus annuo moratur, ut intelligitur ex cap. sequenti. vide et c. 2 l. huius Observ. 3 n. 7.

Constantinus Porphyrogenitus imperatoris frater Nymphaei Augusti gratia excidit, et dure ac contemptim ab eo tractatur. l. 2 c. 19 p. 105 et seq.

Constantinus Porphyrogenitus affectati imperii delatus mense Martio huius anni custodiae traditur una cum Strategopulo. l. 2 c. 19 p. 108.

Constantinopoli circa medium Novembrem forum magnum casu exorto incendio conflagrat. l. 2 c. 25.

In restaurandas eius incendii ruinas cives strenue incumbunt. ibid.

Athanasius patriarcha Alexandrinus iniurias ipsi ab Athanasio Constantinopolitano illatas non ferens Rhodum secedit. l. 3 c. 5.

Circa hoc tempus Melec Masur Azatini Sultanis filius, post patris mortem, au-, xilio Arganis Tocharorum Kanis, Thymaenae ultra Pontum Euxinum et locis circumsitis dominatus, magnis deinde cladibus ab Amurio satrapa Tocharorum validis copiis adiuto affectus, supplex ad Andronicum imperatorem cum uxore ec liberis confugit. sed eo Constantinopoli non reperto, dum uxore in urbe relicta Nymphaeum ad eum, accitu ipsius, a prothieracario imperatoris Abrampace ducitur, offensus in itinere observari se a

Anni Chr.	Romanorum Pontificum. Nicolai IV	Impp. Roman. Andronici	
1291	4	9	deductore curiosius quam suae dignitati conveniret, Atramytii noctu a comitatu se abiungens fugit ad Persas, et horum auxilio Amurium oppugnat. l. 4 c. 25. Filia eius in urbe obses retenta illic educatur. l. 7 c. 22.
1292	5	10	Hoc anno Andronicus imperator natam P 610 sibi filiam, metuens ne non vitalis esset, quod erat aliquoties expertus infelicem in feminis uxoris partum, superstitiosa cerimonia praemunire studuit ab eiusmodi periculo, Simonidem eam vocans ex occasione eventi narrati. l. 3 c. 32.
	Sedes vacat		Nicolaus IV Romanus pontifex Romae moritur circa festum Paschae, quod incidit illo anno bissextili, cycli solis 13, lunae 1, in sextum Aprilis, cum inchoasset annum pontificatus quintum a 22 Februarii, circiter per sesquimensem. vacavit sedes longo tempore.

Andronicus imperator Constantinopolim redit, fratrem Constantinum in lectica clathrata secum ducens, et sic urbem ingreditur die 28 Iunii. l. 2 c. 20.

Magna exardescente in Athanasium patriarcham invidia ob ferum eius rigorem et immanium eius ministrorum saevas in quosvis grassationes, ecclesiasticis ea causa se ab illo abscindentibus graviter succenset. ibid.

Theodoro Muzaloni longo morbo decumbenti substituere imperator incipit in cura primaria principalium negotiorum Nicephorum Chumnum. ibid.

Imperator filiam Muzalonis fratri suo Theodoro despondet; et iis sponsalibus solutis ob deprehensum in puella ex incestu praegnante vitium eandem nihilominus Constantino proprio filio sponsam destinat. l. 2 c. 26.

Idem Sophoniam hieromonachum in Apuliam mittens ad ibi tractandum filii sui Michaëlis matrimonium cum nepte Balduini olim imperatoris, nata ex filia

Anni Chr.	Romano-rum Pon-tificum. Sedes va-cat	Impp. Ro-man. Andronici
1292		10
1293		11
		Mich. Au-gusti iu-nioris 1

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Caroli regis Apuliae, dare illi noluit lite-ras ad papam, ne illum *patrem sanctis-simum* in his appellare cogeretur. l. 3 c. 5.

Tamen ipse Andronicus postea scribens ad Sultanem Babyloniae fratrem illum vocare non dubitat, auctoribus episco-pis, praesertim Philadelphiensi Theole-pto, qui etiam daemones malos fratres ecclesiae in Cantico Canticorum dici ex quodam Gregorii Nysseni testimonio affir-mavit, eo nomine acriter reprehensus a Dyrrhachiensi Niceta, sed excusatus et defensus ab imperatore concione super eo proprie argumento habita. l. 3 c. 5 et c. 23.

Circa hoc tempus Tuctaïs Nogam prae-lio victum occidit; ac mox desponsam sibi prius Andronici imperatoris filiam notham uxorem accipit. l. 3 c. 28.

Episcopi et ipsi a Saba et aliis Athana-sii patriarchae ministris vexati, clericis ab imperatore, quod ab Athanasio se ab-scinderent, inclementer habitis se palam adiungunt; et primum patriarcham de suorum excessibus admonent, deinde a negligentis satisfacere communione se ab-iungunt. denique per missos ad impera-torem duos eum graviter monent ne actis inconvenientissimis favorem praebeat. l. 2 c. 21.

Ab hoc anno Pachymeres imperium Mi-chaëlis iunioris Augusti inchoat, compa-rans 12 huius annum cum 23 illius. l. 7 c. 1. unde oportet Michaëlem collegam hoc anno fuisse declaratum, etsi tantum sequenti die 21 Maii a novo patriarcha coronatus fuerit. Athanasius, scripto data patriarchatus cessione, in monaste-rium recedit die 16 Octobris, annis qua-tuor et duobus insuper diebus patriar-chali dignitate possessa. l. 2 a c. 22 ad 25.

Melec Masur auxiliis Persarum contra veterem hostem Amurium praevalens,

Anni Chr.	Romanorum Pontificum. Sedes vacat	Impp. Roman.	
		Andronici 11	eum ad se supplicem venientem coram ipsius filio Ale crudeliter trucidat. l. 4 c. 25.
1293		Mich. Augusti iun. 1	Athanasius patriarcha Alexandrinus Rhodo Constantinopolim redit. l. 3 c. 5.
			Nicephorus Angelus despota, Occiduorum tractuum dynasta, moritur. l. 3 c. 4.
1294		Andron. 12 Michaël. 2	Kalendis Ianuariis prima huius anni die Cosmas, qui et Ioannes alio nomine vocabatur, rite antea electus, consecratur patriarcha Constantinopolitanus. l. 2 c. 28.
			Tzaca Nogae filius Bulgariae regnum invadit, fugiente Tertere. l. 3 c. 26.
			Imperator sub initium Martii conventum in Alexiaco triclinio celebrat, in quo causas damnati a se Constantini despotae fratris sui et cum eo Strategopuli exponit, et plerisque approbat. c. 29.
			Quidam Lachanae dudum a Noga occisi nomen usurpans ab imperatore coniicitur in vincula. c. 30.
			Theodorus Muzalo protovestiarius moritur. c. 31.
			Ei sufficitur in cura primaria principalium negotiorum Nicephorus Chumnus canicleo praefectus. c. 32.
	Celestinus V		Die 5 mensis Iulii eligitur in Rom. pontificem a Cardinalibus Perusii congregatis Petrus de Murrhone, qui aegre honorem admittens Aquilae in Vestinis coronatus 4 kal. Septembris Celestini V nomen accepit.
			Sed mox pridie Idus aut Idibus Decembris idem Neapoli in publico consessu Cardinalium pontificatum abdicavit, recitata cessionis ex scripto formula. in cuius locum ibidem electus est Benedictus Cardinalis Caietanus, qui Bonifacii nomen assumpsit.

Anni Chr.	Romano- rum Pon- tificum. Bonifacii VIII	Impp. Ro- man. Andronici
1295	1	13 Michaël. 2
1296	2	Andron. 14 Michaël. 3

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Bonifacius papa coronatur Romae in basilica S. Petri 17 kal. Februarias.

Andronicus Michaëlem filium, iam anno superiori in collegam imperii assumptum, 21 die Maii coronari solemniter curat in templo S. Sophiae, opera Ioannis patriarchae. L. 3 c. 1.

Ales, Amurius ex patre cognominatus, Melecum patris interfectorem singulari certamine victum occidit. l. 4 c. 25.

Ioannes Andronici imperatoris ex Irene secunda coniuge primogenitus filius, creatur a patre et fratre Michaële novo Augusto despota l. 3 c. 2.

Cum patriarcha et episcopi Augustis petentibus negassent expeditionem constitutionis ecclesiasticae, qua diris et anathemati subiicerentur qui obedientiam negassent Michaëli iuniori Augusto, in ultionem eius repulsae Andronicus imperator Novellam promulgavit, qua distributiones sportularum ab episcopo, dum consecrabatur, suffragatoribus et ordinatoribus suis fieri solitas ut Simoniacas damnavit et in posterum prohibuit. l. 3 c. 3.

Matrimonium Michaëlis Augusti cum Ithamare filia defuncti Nicephori Angeli despotae, ambitum ab Anna puellae matre, licet imperio utile, ob sextum inter destinatos coniuges consanguinitatis gradum reiicitur. l. 3 c. 4.

Veneti et Genuenses Constantinopoli se mutuo infestant, implacabilibus commissi odiis. l. 3 c. 15.

Michaël Augustus iunior die 16 Ianuarii apparatu splendido nuptias celebrat cum Maria regis Armeniae filia, paulo ante Constantinopolim appulsa. l. 3 c. 5 et 6.

Novus imperatoris conatus in reconciliandis ecclesiae Arsenianis irritus. l. 3 c. 7.

Anni Chr.	Romanorum Pontificum. Bonifacii VIII	Impp. Romman. Andronici
1296	2	14 Michaël. 3

Desperata Cretae insulae adversus Latinos eam acriter oppugnantes defensione, copiae inde evocatae Persis Asiam incursantibus opponuntur. l. 3 c. 8.

Alexius Philanthropenus dux Asiae minoris ab imperatoribus declaratus, illic aliquandiu contra Persas limitem Romanum irrumpentes rem bene ac prospere gerit. l. 3 c. 9.

Osphentisthlabus Terteris regno Bulgariae pulsi filius, paulatim invalescens, Tzacam dolo captum interficit, Ioachimum Bulgarorum patriarcham praecipitio necat. l. 3 c. 26.

Radosthlabus sebastocrator Bulgariae eiectus inde ab Osphentisthlabo ad imperatorem confugit. ibid.

Ales Amurius ex paternae caedis ultione clarus factus, collectis copiis, primum bello palam non indicto latrociniis infestat Romanum limitem; deinde cum repentino casu, Martio mense, Sangaris fluvius alveum mutans arcium illic Romanarum praesidiarios, munimento amnis invadabilis obiecti hostibus nudatos, fugere inde compulisset, transgressus in me- P 613 diterranea minori iam verecundia Romanos hostiliter infestat, instinctus ad hoc aemulatione Atmanis, alterius satrapae loca Nicaeae vicina prospere incursantis. l. 4 c. 25.

Muzalo dux Romanorum capitur ab Atmane, sed mox liberatur. ibid.

Kalendis Iunii terrae motus ingens et exitiosissimus Constantinopolim et eius tractus provincias concussit. duravit vario tenore usque ad desinentem Iulium. damna eius memorantur. l. 3 c. 15.

Ea occasione Andronicus imperator deo propitiando supplex cum populo procedit, et prolixam habet concionem. moxque corruptelas iudiciorum constitutione bulla aurea munita de iis edita emendare nititur. ibid. c. 16 et 17.

Veneti cum 75 longis navibus infesti Constantinopolim adversus Genuenses illic

Anni Chr.	Romano-rum Pon-tificum. Bonifacii VIII	Impp.Ro-man. Andronici
1296	2	14 Michaël. 3
1297	3	Andron. 15 Michaël. 4

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degentes appellant, die dominica 22 Iulii ingressi Galatam, non repertis illic Genuensibus, domos eorum incenderunt urbemque ipsam variis locis oppugnarunt. et comperto pugnare pro Genuensibus Romanos, Galatam reversi aedes insuper illic sitas Romanorum flammis absumpserunt. c. 18.

Imperator Nicephorum episcopum Cretensem, qui de his expostularet, Venetias mittit. interimque Venetis urbis inquilinis in reparationem damni per ipsorum cives illati multam nummorum octoginta millium indicit, oppigneratis in eam summam omnium illorum bonis. l. 3 c. 19.

Mense Decembri Genuenses Venetos Constantinopoli degentes, initio a baiulo facto, trucidant: primores Venetorum urbis inquilinorum omnes ea carnificina interempti. vilior ipsorum plebs et mechanicarum professores artium, nece primo latebris vitata, deinde clam Venetias recedunt. l. 3 c. 20.

Ob haec Andronicus imperator monachum Maximum Planudem et praefectum orphanotrophii Leonem Aquileiam misit, sui apud senatum Venetum purgandi gratia.

Alexius Philanthropenus rebellat, et paulo post captus excoecatur a Libadario protovestiarite, sub finem Decembris. l. 3 c. 10 et 11.

Eius successus fama strenue in urbem perlata extremis anni diebus, imperator deo et deiparae solemniter gratias agit. l. 3 c. 13.

Andronicus imperator nactus clam iactum famosum libellum, in quo de multis accusabatur, ad episcopos clerum monachos et populum convocatos longam orationem habuit, qua se purgare ab omnibus obiects solicite contendit. l. 3 c. 22.

Hoc anno mense Septembri, quando iam more Graecorum incipiebat indictio undecima, quam Latini tantum inchoa-

Anni Chr.	Romanorum Pontificum. Bonifacii VIII	Impp. Roman. Andronici
1297	3	15 Michaël. 4
1298	4	Andron. 16 Michaël. 5

bant a kal. Ian. anni sequentis Christi 1298, reperta sunt scripta ab Athanasio, antequam patriarchatu cederet, composita et recondita, quibus anathema intorquebat in sibi adversantes. horum lectione turbatis patriarcha et imperatore, conventus ipse expatriarcha Athanasius novum scriptum dedit, quo illa priora emendabat aut revocabat. l. 3 c. 24.

Ioannes Tarchaniota mittitur cum exercitu ad limitem imperii firmandum adversus minas et incursiones Tocharorum Triballorum Serborum et Persarum; quo in negotio prudenter et strenue versatur. l. 3 c. 25.

Michaël Constantini olim regis Bulgariae et Mariae Andronici consobrinae filius ab hoc mittitur ad recuperandum paternum regnum: sed factione illic Osphentisthlabi praevalente, exclusus Ternobo circum errat. l. 3 c. 26.

Diluvium perniciose inundans ex imbre vehementi et longo, die 29 Augusti cadente, videtur hoc anno contigisse, narratum l. 3 c. 27.

Ioannes Lazorum princeps moritur, succedente illi filio Alexio. l. 3 c. 29.

Matrem huius Eudociam a viri morte ad fratrem Andronicum imperatorem profectam hic collocare crali Serbiae cogitat. l. 3 c. 30.

Ioannes Veccus olim patriarcha moritur in carcere apud arcem S. Gregorii, sub finem Martii. l. 3 c. 29.

Eudocia in viduitate perstare certa connubium cralis Serbiae recusat. l. 3 c. 30.

Ea spe deiectus Andronicus imperator, cum necessarium putaret devincire sibi cralem affinitate intima, propriam filiam Simonidem, non multum sexenni maiorem, ipsi offert in sponsam. l. 3 c. 31.

Theophano soror Mariae coniugis Michaëlis Augusti iunioris, Theodora nominata in memoriam matris Andronici sic

Anni Chr.	Romanorum Pontificum. Bonifacii VIII.	Impp. Roman. Andronici
1298	4	16 Michaël. 5
1299	5	Andron. 17 Michaël. 6

dictae, despondetur Ioannis sebastocratoris filio, item Ioanni dicto. l. 3 c. 6.

Sed ante nuptias moritur. l. 4 c. 3.

Persae irritati caede suorum qui Philanthropeno rebelli adhaeserant, universus Orientales regiones saevis excursionibus desolant. l. 3 c. 14.

Maxima et rigidissima omnium quas homines meminissent hiems primis huius anni mensibus desaeviit. unde contigit destinatam imperatori profectionem Thessalonicam necessario differri. l. 3 c. 33.

Tandem ineunte Februario die parasceues, hoc est feria sexta, quam incidisse oportuit illo anno, cyclum solis 20 et literam dominicae indicem D habente, die sexta mensis eius, sub vesperam Andronicus imperator urbe exiens Dripeam se confert, unde reliquam profectionem adornavit, nonnulla illic mora. l. 4 c. 1.

Ioannes patriarcha dissuadere Andronico volens coniugium Simonidis cum crale Dripeam tendit: sed a gnaro quorsum veniret imperatore, praecedere Selybriam per missos obviam rogatur. ibid.

Selybriae elusus ab Andronico Ioannes, nec permissus quae volebat de Simonidis coniugio disserere, ibi perstare decernit imperatore abeunte, nec redire in urbem, donec ille Thessalonica rediisset. l. 4 c. 2.

Thessalonica imperatoris Andronicus Radosthlabum cum Romanis copiis in Bulgariam remittit, unde is pulsus ab Osphentisthlabo fuerat. l. 3 c. 26.

Eltimeres pro Osphentisthlabo pugnans Radosthlabum praelio victum capit, et excoecatum ad uxorem remittit. ibid.

Osphentisthlabus Terteren patrem ab Andronico imperatore custodia detentum permutatione Romanorum ducum ab Eltimere captorum redimit; nec tamen ei regnum Bulgariae reddit, sed civitatem attribuit, ubi liber privatus vivat. ibid.

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Anni Chr.	Romanorum Pontificum. Bonifacii VIII.	Impp. Roman. Andronici
1299	5	17 Michaël. 6

Imperator Thessalonicae, tractatu affinitatis cum crale Serbiae concluso, ab eo Cotanitzam transfugam et priorem cralis coniugem filiam Terteris accipit, vicissimque crali propriam filiam Simonidem sponsam consignat, puellulam vix octennem viro prope quinquagenario et plurium iam uxorum marito, custodiendam videlicet intactam usque ad puberem aetatem (quem tamen Gregoras l. 7 scribit festinanda per intemperantem expectandi impatientiam defloratione virgunculae inhabilem illam gignendis postea liberis reddidisse.) l. 4 c. 4 et 5.

Venetorum legatio Andronicum imperatorem Thessalonicae convenit, petens remitti multam Venetis urbis Constantinopolitanae inquilinis indictam, et relaxari oppignerationem bonorum iam dudum factam propter incendium Galatae: sed nihil impetravit. l. 4 c. 6.

Imperator Andronicus frustra conatur conciliare matrimonium Alexii principis Lazorum, sui ex sorore nepotis, et pupilli testamento patris, cum filia praefecti canicleo, et irritare iure tutorio prius coniugium ab eodem Alexio sine auctoribus matre aut avunculo contractum cum quadam unius e primoribus Iberorum filia. l. 4 c. 7.

Hinc deiectus nequidquam tentat eandem praefecti canicleo filiam collocare filio suo Ioanni despotae, matre iuvenis Augusta Irene repugnante. ibid.

Die 22 Novembris Andronicus imperator e Thessalia redux in urbem Constantinopolim solemni occursu invectus est. l. 4 c. 8. P 616

Atman Persarum satrapa, aliis Ottomanes dictus, auctor domus hodie regnantis apud Turcos, invalescit opibus, adiunctis sibi numerosis copiis ferocium e Paphlagonia latronum. l. 4 c. 25.

Anni Chr.	Romano- rum Pon- tificum. Bonifacii VIII.	Impp. Ro- man. Andronici	
1300	6	18 Michaël. 7	Ioannes patriarcha dolore initae ab Andronico sine suo consilio noxiae ac turpis, ut putabat, affinitatis cum crale Serbiae, in Pammacaristi monasterio quasi privatus degit. l. 4 c. 8.

Ioannes patriarcha dolore initae ab Andronico sine suo consilio noxiae ac turpis, ut putabat, affinitatis cum crale Serbiae, in Pammacaristi monasterio quasi privatus degit. l. 4 c. 8.

Imperator postquam eum placare per multos a se missos frustra tentasset, denique kalendis Februarii multa nocte illum ipse convenit; et ei circa tria querelarum de se capita plene satisfacit, persuadetque ut in patriarchales remigrans aedes regimini ecclesiae se reddat. l. 4 c. 9.

Post Paschales ferias imperator Andronicus palam revocavit latam a se in Ioannem Ephesinum sententiam, eumque declaravit innocentem criminis ob quod falso impactum throno deiectus et datus in custodiam fuerat. l. 4 c. 10.

Tamen Ioannes patriarcha cum episcopis Philadelphiensi et Smyrnensi Ioannis Ephesini restitutioni obsistunt. ibid.

Iurgiis inde exortis offensus Ioannes patriarcha iterum e patriarchio in Pammacaristi monasterium recedit. ibid.

Contra illum antistites libellum querelarum plenum imperatori offerunt. l. 4. c. 11.

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Ioannes patriarcha ultro imperatorem adiens 25 Octobris feria tertia, illo anno cycl. sol. 21 numerante cum litera dom. C B, ex eius voto functionibus patriarchatus se reddit, quod sibi per angelum imperatum aiebat. l. 4 c. 12.

| 1301 | 7 | Andron. 19 Michaël. 8 | Michaël despota repudiatam a crale Serbiae Terteris filiam uxorem ducit. l. 4 c. 13. |

Michaël despota repudiatam a crale Serbiae Terteris filiam uxorem ducit. l. 4 c. 13.

Hoc anno sub aequinoctium autumni, sole in Virginem ingresso, apparet Constantinopoli cometa, descriptus a Pachymere. l. 4 c. 14.

Praecesserat exortum cometae siccitas insolita, ex qua fontes perennes exaruerunt; unde terrae fructus et segetes perire funditus contigit, ventis etiam cre-

Anni Chr.	Romanorum Pontificum. Bonifacii VIII.	Impp. Rom. Andronici
1301	7	19 Michaël. 8
1302	8	Andron. 20 Michaël. 9

bris aridis et procellosis aërem vix spirabilem reddentibus. ibid.

Alani qui sub Noga militaverant, numero sedecim millium, in partes imperatoris transeunt. l. 4 c. 16.

Missi in Asiam Romanos vexant et spoliant; tamen iuncti copiis imperatoriis ad P 617 locum Chenam dictum hostes imperii egregie vincunt, praeda inde non modica ditati. ibid.

Circa hoc tempus Atman sive Ottomanes regium nomen sumpsit, et occupata postea Prusa regni sedem illic posuit. is moriens deinde anno Hegirae, ut tradit Al Iannabius chronologus Arabs, 726, hoc est anno Christi circiter 1327, Urchanem filium regni in urbe Prusa recens capta inchoati reliquit haeredem. Prusae obsidionem innuit Pachymeres l. 5 c. 21 p. 296, expugnationem autem l. 7 c. 27.

Die 14 Ianuarii visa est Constantinopoli eclipsis lunae horribilis. l. 4 c. 15.

Michaël Augustus iunior primo vere circa Paschales ferias cum valido exercitu in Orientem movet, et magnam consternationem sui fama Persis iniicit. l. 4 c. 17.

Persae tandem eliciuntur ad certamen: sed in procinctu praelii imperator persuasus a ducibus Romanis ignave pugnam detrectat. unde in contemptum hostibus venit; a quibus universae mox illorum tractuum Romanae regiones saevis et avaris incursionibus desolatae sunt. l. 4 c. 18 et 21.

Muzalo hetaeriarcha dux copiarum Romanarum in Bithynia, dum Atmani cuncta vastanti se adversum ferens obsistere nititur, militum Romanorum, taedio livore ac desperatione ignave pugnantium, degeneri languore vincitur; et vix Alanorum forti opera reliquias fusi exercitus secum intra Nicomediam recondit. contigit haec clades die 27 mensis Iulii circa Bapheum prope Nicomediam. l. 4 c. 25.

Anni Chr.	Romano- rum Pon- tificum. Bonifacii VIII.	Impp Ro- man. Andronici
1302	8	20 Michaël. 9

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Tredecim Venetae triremes cum septem piraticis navibus meridie Constantinopolim infestae invehuntur, portum *Ceras* dictum ineunt, e regione imperialis palatii statione fixa hostiliter grassantur, igne ac telis in obvia immissis. sicque imperatorem cogunt concedere quod legatis Venetis Thessalonicae negaverat, nempe remissionem multae et expignerationem bonorum occupatorum. l. 4 c. 23.

Eodem tempore piratae insula Principum occupata cogunt imperatorem ad redimendos praesenti pecunia captivos plurimos, quos illic fecerant. l. 4 c. 24.

Clauso Magnesiae Michaële Augusto iuniore, Alani qui sub eo militabant, missionem petunt. aegre tandem blanditiis verborum trimestre morae spatium ab iis impetratur. monitus de his Andronicus subministrare filio ea quibus egeret, cum maxime vellet, nequit. l. 4 c. 19.

Quae impedierunt Andronicum a providendis quae necessaria erant exercitui Augusti Michaëlis, fuerunt, praeter modo memoratum bellum Venetum, turbae tunc coortae ecclesiasticorum in urbe, quae narrantur l. 4 a c. 27 fere ad finem libri.

Hoc anno inter Carolum regem Neapolitanum et Fridericum dominantem in Sicilia post bellum diuturnum pax coaluit, Eleonora Caroli filia Friderico in uxorem data. filiam hanc Caroli Pachymeres Ecatherinam perperam vocat; cuius erroris occasionem in notis refero. pontifex Bonifacius eas nuptias et pacem approbat, licet in conditionibus mutari aliquid voluerit. vide accuratissimum Odoricum Raynaldum hoc anno a numero 1 ad 8.

Rogerius Lauria, quem Pachymeres Rontzerium nominat, qui bello praecedente Friderico utiliter militaverat, ab Andronico imperatore, cui se suppetias venturum obtulerat, cupide acceptus et diplomate aurea bulla munito ad spes amplas invitatus, classem et copias parat ad eo proficiscendum. l. 5 c. 12.

Anni Chr.	Romanorum Pontificum. Bonifac. VIII	Impp. Roman. Andronici
1303	9	21 Michaël. 10

Alani trimestri, quod cum imp. Michaële pepigerant, spatio elapso missionem armatis precibus extorquent. l. 4 c. 20.

Imp. Michaël, nullo a patre subsidio interim accepto, barbaris satrapis Ale Amurio, Laminse, Atmanc ac plurimis aliis ipsum Magnesiae clausum circum undique oppugnantibus, noctu inde perturbatione ac confusione maxima aufugit Pergamum. ibid.

Inde omnes Orientales imperii regiones in praedam barbaris cedunt. c. 21.

Alani e ditione imperii iniussu abeuntes retinere conantem in traiectu ad Calliopolim magnum domesticum Raülem Alexium interficiunt. c. 22.

Post hoc excusantes factum Alani iterum ab Andronico in gratiam recipiuntur. ibid.

Patriarcha Ioannes Cosmas variis episcoporum Ioanni Ephesio faventium machinationibus clam palam oppugnatus, prout fuse narratur capitibus libri quarti 27 28 29, ad extremum die quinta Iulii eademque feria sexta (quae nota est huius anni cyclum sol. 24, cui convenit litera dominicae index F, numerantis) e synodo indignatus excedens, patriarchio in monasterium Pammacaristi migrat; unde postridie scriptam patriarchatus abdicationem ad imperatorem mittit.

Imperator trepidis simul undecumque nuntiis turbatus, non unius alteriusve urbis aut provinciae barbaris succumbentis, sed universi ubique imperii uno tempore oppressi, utique cum Persae universae Orientalis continentis sine controversia domini, mare classibus piraticis ingressi, Tenedo occupata, inde Chium Samum Carpathum Rhodum subitis exscensionibus depraedarentur, causam patriarchae, et deliberationem ecquid valida esset eius abdicatio, episcoporum suffragiis permittit. ibid. P 619

Ipse interim procuranda clam affinitate inter Cuximpaxim Tocharum sibi fidum,

Anni Chr.	Romanorum Pontificum. Bonifac. VIII	Impp. Romau. Andronici
1303	9	21 Michaël. 10

et Solymampaxim ducem exercitus barbarorum Nicomediae minantis, servare illam urbem satagit, et minuere aliquantulum belli atrocis mala; qua in re non multum proficit. l. 4 c. 30.

Post synodicas deliberationes circa Ioannis Cosmae patriarchae cessionem, et varias utrimque ista occasione tricas c. 31 32 memoratas, re adhuc indecisa imperator, spe attrahendorum Arsenianorum in suas partes ostendit se non abhorrere a promotione episcopi Marmaritziensis, ab iis ad hoc nominati, in patriarcham. l. 4 c.33.

Michaël Augustus iunior vehementissimis insultibus Persarum resistendo impar, Pergamo Cyzicum recedit; ac ne illic quidem se tutum sentiens, Pegas, quae erat urbs maritima munitissima, se recipit. l. 5 c. 10.

Bonifacius VIII summus pontifex moritur Romae 5 idus Octobris, cum sedisset annos 8, menses 9, dies 18. eligitur ei successor 11 kal. Nov. Fr. Nicolaus Bocasinus Ord. Praedicatorum, Cardinalis episcopus Ostiensis, qui dominica sequenti 6 kal. Nov., vigilia Apost. Simonis et Iudae, coronatus apud S. Petrum Benedicti nomen assumpsit. hunc IX inter Romanos pontifices sic appellatos Spondanus numerat, etsi plerique XI censeant.

Septembri huius anni, coepta iam numerari more Graecorum indictione 2, Rontzerius cum exercitu auxiliari Constantinopolim appellit. creatur ab imperatore dux magnus; et filiam Asanis ex Augusti sorore natam uxorem accipit. mittitur Cyzicum. in digressu oppugnatur a Genuensibus. drungarius Muzalo missus ab imperatore ad rixam dirimendam interficitur. l. 5 c. 14.

| 1304 | Benedict. IX | Andron. 22 Michaël. 11 |

Menas monachus cognomento Scoleces, discipulus Athanasii expatriarchae, die 25 Ianuarii sub solis occasum Andronicum imperatorem adiens, aegre tandem au-

Anni Chr.	Romano- rum Pon- tificum. Benedict. IX	Impp Ro- man. Andronici
1304		22 Michaël. 11

dientia impetrata denuntiat ei dixisse
Athanasium se praesente iram dei urbi ac
populo imminere proximam, et cupere se
ut statim Augustus iuberet per omnia ur-
bis monasteria orari et pervigilari a cun-
ctis toto triduo. arripiente consilium Au-
gusto statim ipsa nocte mandatae preces
indicuntur. postridie mane animadvertit
imperator lenem terrae motum, idque esse
initium mali ab Athanasio praenuntiati cen-
suit. die mox septima decima Ianuarii
terrae motus extitit vehementior, non ta- P 620
men qui usque ad aedificiorum subversio-
nem invalesceret. tunc non dubitavit quin
revelatum Athanasio fuisset ingruens urbi
periculum, et quin supplicationibus ab eo
praescriptis noxia vis terrae motus debili-
tata fuisset. unde ipsum tamquam homi-
nem deo carum suspexit et in throno re-
ponere decrevit. die 18 Ianuarii convo-
catis imperator episcopis ecclesiasticis et
monachis disseruit de consilio sibi sugge-
sto et secuto post hoc eventu, nomen Atha-
nasii reticens. inde die 19 eiusdem men-
sis ad cunctos non solum ecclesiasticos et
monachos, sed et cives convenire iussos,
concionem in eandem sententiam habuit,
commendans innominatum adhuc illum
vaticinii et consilii salutaris auctorem.
tum ex ipsa concione, professus adire se
protinus velle prophetam beneficum, ut se
sequerentur invitavit universos; sicque
fere cunctis comitantibus se confert ad
Athanasium, quem primo visu episcopo-
rum plerique patriarcham acclamaverunt,
ad regimen ecclesiae resumendum hortan-
tes. ipso ficta modestia recusante, et tan-
tum petente impetranteque statim ab im-
peratore auctoritatem sublevandi oppres-
sos. unde contigit omnium paene in urbe
rerum supremam potestatem ipsi deferri,
cunctis ad illum ex quocumque iudicio
provocantibus. narrantur haec fusius tri-
bus ultimis capitibus l. 4 et 1 l. 5.

Dissensio exardescit inter episco-
pos circa Athanasium, an rite is

Anni Chr.	Romanorum Pontificum. Benedict. IX	Impp. Roman. Andronici
1304		22 Michaël. 11

et prudenter in throno reponi posset. l. 5 c. 2.

Andronicus imperator resistentium Athanasii promotioni antistitum eluctari auctoritatem studens assensu Ioannis Cosmae in eam impetrando, eum adit diebus Tyrophagiae, qui sunt 7 feriam 4 Cinerum praecedentes (fuit haec illo anno 11 Februarii), et ab illo interrogatus ecquid se putaret patriarchalem adhuc obtinere potestatem, obnoxie assentiens audivit: *atqui, siquidem patriarcha ego vere sum, mea nondum abdicatione vel probata vel accepta, perseveranteque adhuc in magna ecclesia et monasteriis commemoratione mei nominis, auctoritate sanctae trinitatis excommunicationi maiori subiicio eum qui volet dominum Athanasium in patriarchali rursus sede constituere.* l. 5 c. 3.

Theodora Augusta imperatoris Andronici mater moritur feria 2 secundae ieiuniorum hebdomadae, Februarii decima sexta; et ab eo magnifice sepelitur. l. 5 c. 4.

Post Pascha, quod illo anno incidit in 29 Martii, nuptiae Ioannis despotae cum filia praefecti canicleo celebrantur. l. 5 c. 5.

Irene Augusta uxor imperatoris Andronici ex urbe Thessalonicam proficiscitur. ibid.

Melitas ambitiosus clericus, solvendo impar aeri alieno quod immane contraxerat, laqueo se suspendit Constantinopoli hoc anno die 30. Iulii. l. 5 c. 8.

Die 8 Augusti terrae motus incipit, quo Rhodus, Alexandria, Peloponnesi pars magna et Cretae insulae misere deformatae sunt. l. 5 c. 11.

Andronicus imperator de excommunicatione, qua ipsum Ioannes Cosmas Athanasii repositionem in throno meditantem obligaverat, solicitus, disquiri curat inter episcopos ecquid valida illa necne censenda foret. sed illis sine fine aut spe concordiae dissidentibus, per multos ad ipsum Ioannem Cosmam deprecatores missos tandem imperator eblanditur revocationem

P 621

Anni Chr.	Romano-rum Pontificum. Benedict. IX	Impp. Romaa. Andronici
1304		22 Michaël. 11

anathematis illius scripto expressam; quod scriptum accipit feria sexta, incidente in diem vigesimam primam mensis Augusti. l. 5 c. 6 et 7.

Andronicus verbo admonitos episcopos de relaxatis a Ioanne excommunicationis vinculis in eos intentatis qui Athanasium restituere in patriarchatum vellent, de illius promotione deliberare iubet congregatos in templo SS. Apostolorum. id illi fecerunt infinite altercando toto sabbato sequente et antemeridianis horis dominicae, quae fuit dies 23 mensis eiusdem Augusti, cuius ipso meridie Andronicus, intellecto per suos, quos id explorare iusserat, antistites in factiones scissos numquam conventuros unanimiter videri in restitutionem Athanasii, profectus ad synodum inde secum arripit episcopos qui Athanasio favebant, et cum illis ad Athanasium procedens hunc pontificaliter ornatum ipse pedes sub flagrantissimo sole ad ecclesiam perducit et in patriarchatus possessionem inducit. l. 5 c. 7.

Michaël Augustus iunior apud Pegas, quo se receperat, ex diro morbo periclitatus ope deiparae convalescit. l. 5 c. 10.

Rontzerius cum suis ingressi Cyzicum diram ibi tyrannidem exercent. l. 5 c. 14.

Ioannes Batatza olim imperator apparet custodiens Magnesiam, et qui eum videt, antea mutus loquendi facultatem recipit. l. 5 c. 16.

Cazanem Tocharorum Orientalium Kanin Andronicus imperator sibi conciliare studet oblatis filiae nuptiis; qua ille conditione grate accepta, edicto iubet duces barbaros Romanum imperium infestantes ab iniuriis cessare, comminans, ni pareant, se illos armis repressurum. l. 5 c. 16.

Caeteris satrapis parum istas minas curantibus, unus Alaïs iis motus indutias quasdam paciscitur cum praesidiariis urbis Sardium; a quibus adiuvante Romano duce primicerio aulae Alaïdis copiae circumventae, internecione sunt deletae. ibid.

Anni Chr.	Romano- rum Pon- tificum. Sedes va- cat.	Impp. Ro- man.	
P 622 1304		Andronici 22 Michaël. 11	Benedictus IX Rom. pontifex moritur Perusii die 6 vel 7 Iulii. dissidentibus circa successoris electionem Cardinalibus, plus decem mensibus sedes vacat.

Rontzeriani a vere ad autumnum flagitiosissime Cyzici desident, socios vexantes, movere in hostem detrectantes. multi eorum praeda e civibus rapta in naves imposita fugiunt; quarum rerum excusandarum causa extremis huius anni mensibus Rontzerius Andronicum adit. ei quae vult persuadet; magna insuper pecunia donatur. l. 5 c. 21.

Hoc anno contigit mors Cazanis Kanis Tocharorum, memorata c. 1 l. 6. vide notas nostras ad illud caput, et c. 7 l. 3 nostrarum Observationum. paulum eam praecesserat Carmpantanis Cazani fratri succedentis coronatio.

1305	Sed. vac.	Andron. 23 Michaël. 12	Michaël Augustus iunior ex Orientali expeditione redux die 24 Ianuarii, solemni patris et urbis occursu, Constantinopolim ingreditur. l. 5 c. 17.

Die 13 Martii Michaël despota perduellionis damnatus perpetuo carceri addicitur. l. 5 c. 19.

Sphentisthlabo Bulgaro bellum imperio indicente, Andronicus imperator praesidiis illum limitem firmat, Eltimerem Sphentisthlabi patruum donis praeoccupando continere in fide satagit. denique Michaëlem Augustum iuniorem eo destinat, attributis ei possessionibus Michaelis despotae. l. 5 c. 18 et 19.

Mense Martio instanter urgens Andronicus imperator abscissos ab Athanasio antistites, ab iis impetrat ut ei reconciliari velint. unde mox proximo Palmarum festo, quod incidit in 7 Aprilis, convenientes in templum, Athanasium ut patriarcham agnoverunt, cum eo communicantes. l. 5 c. 20.

Solus Athanasius Alexandrinus communicare Athanasio Constantinopolitano inflexibiliter respuit. ibid.

Anni Chr.	Romanorum Pontificum.	Impp. Roman.
1305	Sedes vacat.	Andronici 23 Michaël. 12

Ex universa Orientali continente impune a Persis direpta concurritur in urbem Constantinopolim, inde gravatam numero immenso egentium advenarum. l. 5 c. 21.

Nicaea Nicomedia et aliae magnae urbes, circumsitis arcibus et suburbanis pagis in barbarorum potestatem redactis, obsessae vix durant. ibid.

Atman in Catoeciae partibus copias Romanas sub Siuro stratopedarcha internecione delet. inde arcem Belocoma dictam, munitissimam et omni apparatu instructissimam, occupat; qua praeda ditissimus evadit. ibid.

Persae a Marule duce Romano ad turrim Gulielmi dictam caeduntur: sed parta ex his spolia Catelani victoribus Romanis eripiunt. ibid.

Horrenda exempla crudelitatis avaritiae libidinis a Catelanis edita Cyzici. ibid.

Vigilia Pentecostes, Nonis sive quinto die Iunii creatur Perusii pontifex Bertrandus de Agutis archiepiscopus Burdegalensis, qui sumpsit nomen Clementis V.   P 623

Rontzerius sciens se et suos gravi infamia in aula laborare, quod Cyzici otiose et flagitiose desiderent, interim dum hostes impune per imperii provincias eius tractus volitantes etiam Philadelphiam castris circum positis commeatu exclusam fame ad deditionem compellere conarentur, Constantinopolim sub finem huius anni proficiscitur, et ibi Augusto allegat recusasse milites in hostem tendere propter stipendia non soluta. hoc intelligitur ex c. 21 l. 5.

| 1306 | 2 | Andron. 24 Michaël. 13 |

(Clementis V 1 — in left column at *qui sumpsit nomen Clementis V* row)

Rontzerius huius anni primo vel secundo mense, facile purgatis apud credulum et sibi addictum imperatorem criminationibus sui ac suorum, grandem etiam ab eo impetravit pecuniam (cuius partem praesens accepit, alterius vero certa pro-

Anni Chr.	Romano-rum Pontificum. Clementis V	Impp. Romaa. Andronici
1306	2	24 Michaël. 13

missa intra diem quadragesimum Cyzici numerandae, prout factum est) qua non solum suis Catelanis, sed Alanis etiam stipendia plene solveret. l. 5 c. 21.

Cyzici Rontzerius dum pecuniam imperatoriam suis large, Alanis maligne dividit, causam querelarum et simultatum inter ambas nationes praebet. ibid.

Irritati Catelani Alanos contemptim tractant, nec vim abstinentes. unde ad pugnam venitur, vincentibus primo Catelanis occiso Georgi Alanorum primoris filio: sed postea Catelani trecenti ab Alanis perimuntur die 9 Aprilis. ibid.

Alisyras cum exercitu Carmanorum Philadelphiam arta obsidione cinctam in extremam famem adigit. ibid.

Andronicus pro Philadelphia solicitus Rontzerium urget, ut cum iis quas Cyzici habebat suis et Alanorum copiis eo suppetias accurrat. ibid.

Sed iis moras adhuc nectentibus, adulto iam Martio, Andronicus germanam suam Irenem Asanis viduam, Rontzerii socrum, coepta iam hebdomada maiore sub finem Martii (Pascha enim illo anno fuit 3 Aprilis) Cyzicum proficisci iubet, et illic apud generum instare ne tam necessariam expeditionem ultra differat. ibid.

Tandem mense Maii, reconciliatis utcumque Alanis, Rontzerius universum exercitum Achiraüm promovet, indeque Germae admovet, quam arcem fuga Persarum desertam capit. Romani res suas in praeda Persica agnitas recipientes male a Rontzerio multantur. ea occasione Chranisthlabus magnus tzaüsius periclitatur de suspendio. l. 5 c. 21 et 23.

Constantinus Porphyrogenitus Andronici imperatoris frater in carcere moritur die quinta mensis Maii. l. 5 c. 22.

Rontzerius ad Aulacem praelio vincit Alisyram, quo vulnerato fugiente Philadelphia liberatur. l. 5 c. 23.

Antea Tripolis ad Maeandrum strategemate capta per noctem a Persis. l. 5 c. 25.

Anni Chr.	Romanorum Pontificum. Clementis V	Impp. Romam. Andronici
1306	2	24 Michaël. 13

Magnus dux Attaleotam occupatorem Magnesiae, imperatoris, cui suspectus erat, gratiae restitutum suae intimae fiduciae admovet. l. 5 c. 24.

Nostongus magnus hetaeriarcha, praefectus illi provinciae, iniuriis ducis magni cogitur iniussu imperatoris redire Constantinopolim, ubi a praeoccupato in favorem Rontzerii principe male accipitur et dignitatibus privatur. ibid.

Dux magnus ingentes a Romanis pecunias crudeliter extorquet. l. 5 c. 26.

Magnesia duce et suasore Attaleota deficiens a magno duce ab eo summa vi, sed frustra, oppugnatur. ibid.

Arx, Cenchreae dicta, quo multi Romanorum confugerant, diu a barbaris obsessa et auxilio a Choerobosco illato ad breve tempus recreata, siti ad extremum compellitur ad deditionem. l. 5 c. 27.

Michaël Augustus iunior cum exercitu in tractus Occiduos profectus regionem iugo exteriori subiectam, quae Bulgaris hostibus parebat, die mensis Augusti vicesima tertia hostiliter ingressus late vastat. l. 5 c. 28.

Alexius princeps Lazorum Trapezunte prospere contra Genuenses pugnat. l. 5 c. 29.

Anna regina in Occiduis tractibus a genero Philippo, cui dotales terras dare iuxta pacta differebat, bello impetitur. l. 5 c. 30.

Mutus linguae usum subito recuperat intercessione Sanctae Theodosiae martyris. l. 5 c. 32.

Alani e castris magni ducis fuga elapsi prope Pegas Persas nongentos ipsi multo pauciores internecione delent. l. 5 c. 31.

Andronicus imperator ducem magnum ab oppugnatione Magnesiae iteratis saepe iussis necquidquam conatur avellere. ibid.

Tandem is in Occiduum, ut iubebatur, tractum, cuncta in itinere vastans, copias traducit. l. 6 c. 3.

Anni Chr.	Romanorum Pontificum. Clementis V	Impp. Roman. Andronici
1306	2	24 Michaël. 13

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Cazanes Tocharorum Kanis, Romanorum amicus, moritur, successore sibi prius designato Carmpantane fratre, quem ad hoc ex India accersiverat. l. 6 c. 1.

Amurius cum Andronico imperatore de pace tractat. ibid.

Die 29 Septembris imperator longam concionem ad Arsenianos pertinaci dudum schismate a caeteris discissos habet, reducere illos ad consensionem in cassum studens. l. 6 c. 2.

Traiecti in Occiduam continentem Amogabari crudelissime Romanos diripiunt, praetextu non solutorum ipsis stipendiorum, et victoriam a se apud Philadelphiam de Carmanis partam sine fine praedicantes. l. 6 c. 3 c. 13 c. 14 et l. 7 c. 1.

Hunc enim puto esse locum epochae libri 7 initio descriptae. nam re vera hoc tempore contigerat evolvi 12 Michaëlis, 23 Andronici annum. etsi enim titulus huius anni in hoc nostro indice Mich. 13, And. 24 habet, nihil obstat, quoniam nos in titulo inchoatos annos ponimus, Pachymeres vero de absolutis manifeste loquitur. utcumque igitur annus 13 Mich., And. 24 in cursu esset, expletos quidem annos numerare non poterant nisi ille 12, hic 23. voluit autem, opinor, historicus illa insolita sibi diligentia annorum, quibus principes imperaverant, exprimendorum insignire principium belli Catelanici. vide dicta superius huius libri chronologici c. 6 n. 8.

Genuenses Galatae degentes imperatorem Andronicum admonent parari a Catelanis contra Romanos bellum, expectarique ad hoc auxilia e Sicilia. sed imperatore fidem indicio non tribuente, ipsi ad bellum illud propulsandum se comparant. l. 6 c. 6 et c. 9.

Mpyrigerius Tentza Catelanus cum novem longis navibus ad Madyti portum appellit, accitus a magno duce, quem is ut conciliaret Andronico et auctorari honoribus stipendiisque suaderet, ad eum ac-

Anni Chr.	Romano- rum Pon- tificum. Clementis V	Impp. Ro- man. Andronici
1306	2	24 Michaël. 13

cessit sub finem Octobris, et suis quidem
militibus trecenta nummorum millia in
stipendiorum debitorum solutionem po-
poscit, Tentzae deinde suffragatus hono-
rari eum petiit. imperator tantae pecu-
niae flagitatione perculsus primo assentiri
negat; postea tamen iterum adeunt illum
Rontzerio ac stipendiorum petitionem in
summam moderatiorem contrahenti utrum-
que indulget. l. 6 a c. 4 ad 8.

Andreas pirata imperatori militarem
operam cum duabus armatis navibus offe-
rens admittitur. sed ab infensis Andreae
Venetis altera eius navium comburitur,
ipso cum altera fugiente. l. 6 c. 10.

Mpyrigerius Tentza circa medium De-
cembrem Constantinopolim accitu impera-
toris appellit, exscensurum se e navi ne-
gans, nisi obsides darentur. tandem per-
suasus ad festum Christi natalis exscen-
dere creatur dux magnus, et fidem impe-
ratori, sed cum exceptione, iurat. l. 6
c. 11 et 12.

Adhibitus inde ad consilium super peti-
tionibus Catelanorum, ubi audivit ab im-
peratore quantum ipse iam dedisset Cate-
lanis et quantum adhuc dare paratus es-
set, queri coepit avare secum agi, cui tam
pauca caeterorum comparatione donaren-
tur. indeque defectionem ab imperatore
cogitavit. l. 6 c. 14 et 15.

1307	3	Andron. 25 Michaël. 14

Mpyrigerius invitatus ab imperatore ad P 626
comparendum secum simul in festo lumi-
num, hoc est Epiphaniae, celebrando 6
Ianuarii, proterve recusat ire, irridens
etiam contemptim concessa sibi ab Augu-
sto insignia honorum; ac tertio post die
vela fecit Calliopolim ad Catelanorum ca-
stra, insalutato Augusto, qui eum satis
compertum parare defectionem invadi de-
tinerique a suis vetuit. l. 6 c. 15.

Imperator videns Catelanos plane cer-
tos belli palam Romanis inferendi, quod
Genuensibus dudum et recentius Michaëli

Anni Chr.	Romanorum Pontificum. Clementis V	Impp. Romau. Andronici
1307	3	25 Michaël. 14

Augusto indicantibus credere noluerat, ut id quoquomodo impediret, Caesaream dignitatem per legatos offert Rontzerio, qui eam certis aegre tandem conditionibus admittit. l. 6 c. 16.

Theodorus Chumnus portans ab imperatore ad Rontzerium insignia Caesareae dignitatis cum diplomatibus auro bullatis et triginta nummorum millibus, audiens in itinere Catelanos non exequi pacta, et vim ab iis metuens, re infecta redit. l. 6 c. 17.

Insula Chios a Persis capta direpta vastata est, plerisque incolarum barbarica immanitate trucidatis. ibid.

Rontzerius apud Calliopolim iniuriosam imperatori et superbe minacem concionem habet. l. 6 c. 18.

Post decem inde dies literis ad Andronicum datis Rontzerius, poenitentiam a se contra illum actorum et dictorum simulans, et necessitatem ex vi a suis in seditionem concitatis excusans, veniam petit. l. 6 c. 18.

Die nono Martii ad legationem a Catelanis missam Andronicus, magno coetu congregato, orationem habet, qua eos officii admonitos etiam minis deterrere a contumacia tentat. c. 19.

Andronicus imperator filium Constantini Porphyrogeniti, fratris sui, panhypersebastum creat. l. 6 c. 20.

Athanasium patriarcham ob immanem in omnes saevitiam cunctis exosum et ideo clam sparsis libellis famosis proscissum, adversus invidiam munire studens imperator, concionem habet de eius laudibus, addens exemplum cuiusdam Armeni, qui postquam Athanasio maledixisset, casu crus fregerat, quod ipse poenam esse divinitus illatam persuadere conabatur. l. 6 c. 21.

Inter haec die qua Lazari excitati per Christum e mortuis evangelium inter sacra recitatur in ecclesia Graeca, quod certum est fieri sabbato contiguo dominicae

Anni Chr.	Romanorum Pontificum. Clementis V	Impp. Roman. Andronici
1307	3	25 Michaël. 14

Palmarum, sive pridie eius festi, quod illo anno Pascha habente 26 Martii omnino incidit in 19 eiusdem mensis, ac consequenter praecedens sabbatum 19 Martii diem insedit, Rontzerius Caesaris insignia ab Andronico imperatore ad se missa, cum tribus et triginta nummorum aureorum millibus, solemniter induit. l. 6 c. 22. **P 627**

Rontzerius iam Caesar cum 150 lectis e suorum numero Adrianopolim se confert, salutaturus illic Michaëlem iuniorem Augustum, a quo magnifice excipitur. l. 6 c. 23.

Rontzerius Caesar ab Alanis interficitur Adrianopoli in ipso aditu cubiculi Augustae, ad quam salutandam admittebatur. l. 6 c. 24.

Eius comites in custodiam tunc dati, postea fuga evadere conantes, obsessi, oppugnati, igne absumpti sunt. l. 6 c. 33.

Catelani Callipoli, ubi dominabantur Romanis ibi crudeliter interfectis, obsidentur ab exercitu Romano, duce magno primicerio: sed obsidione, fraude impetratis indutiis, laxata arcem illam commeatibus, et praesidiis muniunt. tum aucti copiis regiones Romanas incursant. Perinthum die 28 Maii vi capiunt, puberibus ibi repertis occisis. et eadem die traiecto freto ignem tectis rusticis per campos iniiciunt, obvios quoque obtruncantes, et terrorem urbis ipsius portis admovent, confugientium in tutum vix capientibus turbam l. 6 c. 25.

Cuiusdam Catelani ad imperatorem transfugae, quem is Amiralem creaverat, proditio detegitur. l. 6 c. 26.

Inde seditione in urbe concitata, plebs quaerendorum Catelanorum latentium praetextu aedes civium diripit et inflammat. ibid.

Frerii, hoc est monachi Latini, domo et templo, quae consensu imperatoris intra urbem habebant, per Athanasium patriarcham expelluntur. exarchus Pisanus, qui ei executioni praefuerat, per sub-

Georgius Pachymeres II.

Anni Chr.	Romano- rum Pon- tificum. Clementis V	Impp. Re- man. Andronici
1307	3	25 Michaël. 14

missos a Galatinis Genuensibus sicarios vulneratur. eam ob rem Andronicus Galatenses urbis ingressu arcet. l. 6 c. 28.

Andronicus reconciliatur Genuensibus, et appellentes in urbem longas eorum naves sedecim contra classem Catelanam duce Mpyrigerio urbi minantem pugnare persuadet. omnes, praeter unam, Catelanorum naves in Genuensium potestatem veniunt. dux ipse Mpyrigerius capitur. l. 6 c. 29.

Duo Romani duces, a Michaële iuniore Augusto cum parte exercitus contra Catelanos missi, ab iis in insidias pertracti vincuntur. l. 6 c. 30.

Plebem in urbe tumultuantem imperator Andronicus concione habita minis et monitis coërcet. l. 6 c. 31.

Iunior imperator Michaël universum exercitum contra Catelanos acie instructum ipse ductans vincitur, et de vita periclitatus aegre fugit. l. 6 c. 32.

P 628

Maturae segetes in campis, collectae fruges in areis et villis a rusticis undique in urbem fugientibus relictae, in praedam Catelanorum cedunt. ibid.

Duae naves bellicae Genuensium magna mercede in bimestrem militiam ab Andronico imperatore conducuntur. ibid.

Andreas Muriscus pro imperatore Tenedum obsidens, procurata per Genuenses deditione, arce illa potitur. l. 6 c. 34.

Manuël Zacharias Phocaeae imperitans insulas illi obiacentes custodiae suae immunes permitti ab Andronico impetrat. ibid.

Mpyrigerius a Genuensibus captivus in Italiam abducitur. l. 7 c. 7.

| 1308 | 4 | Andron. 26 Michaël. 15 |

Incluso Didymotichi Michaële Augusto iuniore p st pugnam adversam, et hinc Osphentisthlabo Bulgaro Romanum limitem vexante, inde Catelanis cuncta infestantibus, Andronicus imperator de pace cum Catelanis per legatos Callipoli tractat,

Anni Chr.	Romanorum Pontificum. Clementis V	Impp. Roman. Andronici
1308	4	26 Michaël. 15

sed frustra, illis conditiones intolerabiles exigentibus. l. 7 c. 1 et 2.

Persae qui Catelanis militabant, dum iis offensi, se ad suos in Asiam recipientes, traiiciunt fretum, ab Andrea Murisco imperatoris navarcho intercepti perimuntur. l. 7 c. 3.

Inde Muriscus in praemium operae creatur Ameralis. ibid.

Alani et Turcopuli ab imperatore deficientes Romanos impugnant. l. 7 c. 4.

Attaleota in Oriente contra imperatorem rebellat. ibid.

Catelani late omnes Romanas regiones populantur. l. 7 c. 3.

Madyto longa obsidione Catelanorum fame laboranti Andreas Muriscus frumentum importat. l. 7 c. 11.

Paulo post ab Augusto deficit. ibid.

Madytus tandem ad deditionem compulsa capitur a Catelanis duce Pharenda Tzime. l. 7 c. 6 et 11.

Athanasio patriarcha Constantinopolitano cunctis exoso, litanias deo in tot malis propitiando quotidianas celebrante, ferale incendium casu aut dei nutu preces illas se aversari declarantis sub vesperam exortum, a porta Cynegorum ad monasterium Prodromi, frequentissime habitatum et ditissimum urbis tractum in cinerem redigit inaestimabili iactura. l. 7 c. 10.

Athanasius Alexandrinus patriarcha irrevocabiliter infensus Athanasio Constantinopolitano, ab Andronico imperatore frustra saepius conato hunc illi reconciliare in suam ecclesiam redire iussus, solvens Cretam versus defertur in Euboeam, ubi graviter periclitatus a Latinis illic dominantibus, Thebis deinde coniectus in carcerem, tandem liber emittitur l. 7 c. 8 et 16. P 629

Mense Aprili, dominica quae *nova* vocatur, Meliteniota constans in fide Romanae ecclesiae moritur. l. 7 c. 31.

Anni Chr.	Romanorum Pontificum. Clementis V	Impp. Roman. Andronici
1308	4	26 Michaël. 15

Cubuclea arx Mysiae in Olympo sita per Amogabaros Persis perfidiosissime ac crudelissime proditur: ipsi Lampsacum salvi deducuntur. l. 7 c. 9.

Turci arcem Examilii occupant, duce Romoforto Latino, cuius in imperatorem adornata proditio detegitur. l. 7 c. 12.

Arx Thyraeorum per longam obsidionem famis necessitate cogitur se dedere, et post illam Ephesus a Persarcha Sasane capitur; ubi templum S. Ioannis evangelistae, opulentissimum sacrae supellectilis, tali occasione diripi contigit. l. 7 c. 13.

Viginti millia militum a Charmpantane Kani Tocharorum in auxilium imperatori missa Iconium pervenisse nuntiantur. ibid.

Catelani Turcopulis adiuncti Thraciam universam desolant. l. 7 c. 14.

Imperator Andronicus auxilium a Genuensibus, legatis ad eos missis, implorat. ibid.

Monachus Hilarion manu et armis adversus Persas feliciter rem gerit, ideo vexatus a patriarcha, protectus ab imperatore. l. 7 c. 16.

Prusa tributum pendere Persis cogitur. ibid.

Primo vere naves longae circiter novemdecim Genua Constantinopolim appellunt. l. 7 c. 18.

Iis uti contra Catelanos negligit Andronicus, spe conveniendi cum illis de pace; quam ad rem legatos Callipolim frustra mittit. ibid.

Turcopuli iuncti Amogabaris Alanos praelio vincunt in finibus Bulgariae, et multam iis praedam ereptam praemium victoriae inter se partiuntur. l. 7 c. 19.

Amogabari ab Orestiade diu necquidquam oppugnata recedere coguntur, multis suorum amissis. ibid.

Pars Amogabarici exercitus e Persis maxime conflata, Gani montis faucibus et arce occupatis, subiectam regionem va-

Anni Chr.	Romanorum Pontificum. Clementis V	Impp. Roman. Andronici
1308	4	26 Michaël. 15

stat segetibus maturis demetendis, mense Iulio. l. 7 c. 20.

Alias arces eius tractus Romofortus cum Latinis capit. l. 7 c. 26.

Isaacius Melecus Persa, Persarum, qui Amogabaris militabant, ab iis abducendorum data imperatori fide, hoc vicissim ei promittente nuptias filiae alterius Meleci, neptis Sultanis Azatinis, deprehensus dum quod erat pollicitus tentat, obtruncatur. l. 7 c. 15. 22 et 29.

Magnus primicerius Cassianus contra P 630 imperatorem rebellans, proditus a Chellensibus, ducitur Constantinopolim, carceri mancipatur. l. 7 c. 24.

Societas cum Iberis ab imperatore successu irrito tentatur. l. 7 c. 25.

Arx Rhaedesti dedere se Romoforto cogitur. l. 7 c. 26.

Imperator, legatis suis cum Genuensibus ad Catelanos missis, impetrare ab iis pacem nequidquam tentat. l. 7 c. 27.

Romani ad Bizyam ab Amogabaris caeduntur. post eam cladem, ne arx Bizyae caperetur, mulieres pro viris ostentatae prohibent. l. 7 c. 28.

Gravissimae oppressiones omnium, praesertim ecclesiasticorum, ab Athanasii patriarchae immanitate describuntur. l. 7 c. 22. 28 et 35.

Pharendae Tzimis in imperatorem proditio, specie transfugii adornata, deprehenditur. l. 7 c. 30.

Maria soror imperatoris, sponsa Charmpantani Kani Tocharorum destinata, Nicaeae degens, impetratis a sponso armatorum triginta millibus, ut fama ferebat, adventantibus, frustra conatur deterrere Atmanem a Romanis arcibus tractuum illorum oppugnandis. nam ille eo ipso tempore Tricocciam, munitissimum Nicaeae propugnaculum, vi expugnat. l. 7 c. 33.

Thasi arcem a Manuële Genuensi, Zachariae fratris aut sororis filio, occupatam, missis summa aestate decem navi-

Anni Chr.	Romano-rum Pon-tificum. Clementis V	Impp. Ro-man. Andronici
1308	4	26 Michaël. 15

bus, praefecto Marule, recuperare impe-rator nititur.   ibid.

Aenus arx Romana frustra oppugnatur a Latinis, duce Tzime.   ibid.

Duces Catelanorum inter se dissidentes ne a misso quidem a rege Siciliae proprio filio conciliari queunt. l. 7 c. 34.

Tandem ad Cassandream Catelanorum duces inter se pugnant. Mpyrigerio in-terfecto, Pharenda Tzime fugato, solus Romofortus rerum potitus universas Ca-telanicas copias in Thessaliam ducit. l. 7 c. 36.

Finis huius historiae in anno vitae Andronici undequinquagesimo desinentis. ibid.

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ABRAHAM AND THE LAND OF HIS NATIVITY.

By Hormuzd Rassam.

Read, 1st June, 1897.

There have been from time to time conflicting opinions and theories, both ancient and modern, regarding the historical site of "Ur of the Chaldees," the supposed birth-place of Abraham, especially since the discovery of some cuneiform inscriptions in the ruins of Moggayir, at the extreme end of Southern Mesopotomia, wherein, it is alleged, the name of *Ur* occurs, and which a number of Assyrian scholars construed into that celebrated ancient site, mentioned in the eleventh chapter of Genesis, that I have taken upon myself the task of contesting its existence anywhere in that region. The world knows nothing of Abraham except what can be gathered of his history from the Bible, and it is therefore necessary to go to that Book for any authentic information about him and his fatherland.

In quoting different passages from Holy Writ in support of my argument, I beg to point out, in the first place, that I do not do so on religious ground, as my purpose is simply to show the historical aspect of the question in dispute, and not to prove my contention from a theological standpoint. Secondly, as I am not an Assyrian scholar, and incompetent, therefore, to decide how certain signs and figures in the arrow-headed writing ought to be read and pronounced, I must not touch upon their interpretation, as I might fall into a woeful dilemma, and incur the odium of being too inquisitive. But I want to touch briefly upon the danger of trusting to theories regarding the meaning of Semitic words in use even at the present day among the Arabs, Chaldeans, and Syrians.

There are perhaps more than five hundred millions of Christians, Moslems, and Jews, who only know of the existence of Abraham from the Bible, and we ought therefore to be guided by what is recorded therein of him and the land of his nativity, and let that history speak for itself.

In Genesis (xi, 31), where we first learn of Abraham's country, it is said: "And Terah took Abram his son, and Lot the son of Haran his son's son, and Sarai his daughter-in-law, his son Abram's wife; and they went forth with them from Ur of the Chaldees, to go into the land of Canaan; and they came unto Haran, and dwelt there." In the first verse of the following chapter it is related: "Now the Lord had said unto Abram, Get thee out of thy country, and from thy kindred, and from thy father's house, unto a land that I will shew thee." We must assume, therefore, that Haran was the country of Abraham, the same as any Englishman, being destined to change his abode to France from London and moves in the first place to Dover, could safely assert that the latter place was part and parcel of his country. In the fifth verse it is recorded that: "Abram took Sarai his wife, and Lot his brother's son, and all their substance that they had gathered, and the souls that they had gotten in Haran; and they went forth to go into the land of Canaan; and into the land of Canaan they came." Then in the ninth verse of the same chapter it is said: "And Abram journeyed, going on still toward the south." Now no one can doubt that Haran is situated in Northern Mesopotamia, about 450 miles above Babylon, and not less than 600 from Moggayir. How is it then when Abraham was commanded to go to Canaan, which is about 550 miles to the west, that Terah, with all his great retinue, should go nearly 400 miles out of his way for Abraham to reach the promised land, which was to the south-west? It has been urged by different writers upon the subject of Abraham's emigration that the route was chosen for convenience; but those who advocate this theory are not aware that to take that course from the situation of Moggayir is anything but the right one, if they had examined the country properly between the latter place and the Holy Land. Abraham could have easily marched straight to Palestine from Moggayir through a country which has neither hills nor rivers to impede his passage, the same as the nomad Arabs move from place to place at the present day with all their substance. I have no doubt that the four confederate kings who invaded Sodom and carried Lot captive, whom Abraham afterwards rescued, had followed the same track from Southern Mesopotamia. Those who dispute the position of Padan-aram as being the native country of Abraham, ought, I think, to show in the first instance a good reason for the object of Terah going such a distance out of his way to

sojourn at Haran, if it had not been a city with which he had a previous acquaintance from its proximity to Ur of the Chaldees. Moreover, I do not know why Terah should choose Haran as his future home from such a distance as Moggayir, where he would be looked upon as a stranger. But as I believe that Terah went from a place which must have been somewhere at or near the present city of Orfa, in Northern Mesopotamia, known to the Hebrews as Aram-Naharaim, it was not extraordinary that Abraham should call Haran his country when he sent his servant Eliezer thither to fetch a wife for his son Isaac. All references made in the Bible about Abraham point to his country as being in Aram-Naharaim, and this name must not be confounded with the Greek appellation of *Mesopotamia*, as the former applies only, according to the Hebrew geographical positions, to that part of Northern Mesopotamia which embraces the province of Orfa, the ancient Eddesa; whereas the latter is a Greek word which takes in the whole valley of the Euphrates and Tigris from Diarbekir to the junction of the two rivers, two hundred miles below Babylon. The mistake began by the authors of the Septuagint, as the first mention of Aram-Naharaim was in the 24th chapter of Genesis, when, as I said before, Abraham sent Eliezer thither on an errand to his relatives at Haran, and said to him : "But thou shalt go unto my country, and to my kindred, and take a wife unto my son Isaac." Aram-Naharaim was also the country of Balaam ; * and we find that it had a king in those days named Chushanrishathaim, mentioned in Judges.† Surely no one can ever imagine that this Aram-Naharaim was in Southern Babylonia, near the Persian Gulf ? We find also that Joshua in speaking to the tribes of Israel,‡ he told them that their forefathers " dwelt on the other side of the flood in old time, even Terah, the father of Abraham, and the father of Nachor." This allusion also points to that part of the Euphrates in the northern part of Mesopotamia, which is verified by what Moses said in Deuteronomy of Jacob's nationality as an Aramee.§ This in my opinion proves more than anything else that Abraham's family came from the neighbourhood of Haran, at the upper part of the Euphrates, and not the lower ; and it is remarkable that both Balaam ‖ and Hosea ¶ mention that part of Mesopotamia merely as

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* Numbers xxiii, 7 ; see also Deut. xxiii, 4.
† Judges iii, 8.   ‡ Joshua xxiv, 2.   § Chapter xxvi, 5.
‖ Numbers xxiii, 7.   ¶ Hosea xii, 12.

אָרָם Aram, though in the authorized English version of the Old Testament the former is rendered *Aram*, and the latter *Syria* ; but in the revised version both are called *Aram*. Why the Greeks corrupted the Semitic word Aram into Syria, and Aramaic into Syriac is a mystery.

There were formerly no less than five Arams existing on the east and west of the Euphrates, namely, Aram of Damascus (kingdom of the so-called Syria); Aram-Naharaim (Northern Mesopotamia, between the Euphrates and the Khaboor, or Chebar river); Aram-padan (which means arable land, where Terah and his family lived); Aram-Zobah (Province of Aleppo); and Aram-Rehob, the district of Hamath, bordering on the Mediterranean as far as Latakia. It may be that as the Greeks corrupted the word *Assyrian* into Syrian, thus confounding different nationalities with this misnomer, which has no connexion whatever with the original, either in sound or etymology. It is a pity the revisers of the Old Testament did not correct all the words into Aram which were erroneously translated formerly into Syria, as they did in some cases already alluded to above.

Orfa, where the dreadful massacres took place among the Armenians some time ago, is believed by all learned Jews, Mohammedans, and Christians of that country to have been the "Ur of the Chaldees" mentioned in Scripture. Being so near Haran, and commanding an important position in that part of Mesopotamia, it was most probably, in olden times, as it is now, the capital of Padan-Aram. It might have been called then Oor, as it is in the original Hebrew and Aramaic. It is very striking that in the ancient Padan-Aram we have at the present day three positions near each other in Aram-Naharaim that are called by three biblical names, which are Orfa, Haran, and Serug, styled in Arabic Serooj, the hard *g* having changed into *j*, as there is no letter as the former in Arabic. The difficulty has arisen from the supposed non-existence of such a country as Chaldea in Northern Mesopotamia ; as it had been taken for granted that such a realm was only in a small part in Southern Mesopotamia, between Babylon and the Persian Gulf ! But if we refer to Grecian history we shall find that the Chaldeans were mentioned inhabiting different parts of the range of mountains between the Mediterranean and Persia. Moreover, *Ur of the Chaldees* does not necessarily mean Ur in Chaldea, but it may signify the Ur of the Chaldeans, like we may now style

Algeria as of France, though it is in Africa and not in Europe, or Aden of the English though it is in Arabia and not in England. The words "Ur of the Chaldees" show, however, that there were other Urs existing at the time in Biblical lands, like Bethlehem of Judah, and Bethlehem of Zebalon ; and Cush * (Ethopia) of Asia Minor, and Cush † of Africa. It is very interesting to note that in the Chaldee or Aramaic language Jerusalem is called ܐܘܪܫܠܡ,

Oor-Shalem, that is to say, Oor of Selim, like ܐܘܪܕܟܠܕܝܐ, Oor, d'Chaldaye, or Oor of the Chaldees. We find also that that northern part of Mesopotamia called by the Hebrews Aram-Naharaim, is styled by the Prophet Ezekiel as the land of the Chaldeans,‡ as the river Chebar (in Arabic Khaboor) is one of the rivers which surround Padan-Aram mentioned above. St. Stephen also mentions, in Acts vii, 4, that Abraham came out of the "land of the Chaldeans" when he was in *Aram-Naharaim*. There could have been no better word applied to that country as the *Arable* Aram, from the richness of its soil and extent of its cereal production. Its annual export of corn to Europe, even now, when a small part of the land is cultivated, is very great. As for the position of the town of Orfa, it is one of the most picturesque in Mesopotamia ; and had it a better and more energetic Government, its province might have vied in beauty and importance with the most flourishing regions in the world. The town is situated on an eminence, with a large number of rivulets running in all directions, and commanding extensive fertile plains stretching far and wide. Its produce of fruit and cereals might prove a source of incalculable riches, especially if railway communication could be established between the Mediterranean and the Persian Gulf, through the Euphrates and Tigris Valley. A large extent of land in front of the town is studded with private and public gardens ; and within the city itself there are a large number of well to do families, who have their houses surrounded with arbours and orchards.

I think it will not be uninteresting to quote some passages from different writers, both ancient and modern, regarding the Ur of the Chaldees mentioned in Scripture, and leave it to painstaking critics to draw their conclusion therefrom. I must begin first with the ancient historians, who are supposed to claim a better authority

* Genesis ii, 13.   † 2 Kings xix, 9.   ‡ Ezekiel i, 3.

than modern scholars and travellers, they having lived nearer the time of Biblical sages.

Eupolemus says, that in the "tenth generation [after the Flood], in the city of Babylonia, called Camarina (which, by some, is called the city Urie, and which signifies a city of the Chaldeans), there lived, the thirteenth in descent (a man named), Abraham, a man of a noble race and superior to all others in wisdom. Of him they relate that he was the inventor of astrology and the Chaldean magic, and that on account of his eminent piety he was esteemed by God. It is further said that, under the directions of God, he removed and lived in Phœnicia, and there taught the Phœnicians the motions of the sun and moon, and all other things ; for which reason he was held in great reverence by their king." *

Nicolas of Damascus says thus of Abraham : "Abram was king of Damascus, and came thither as a stranger, with an army, from that part of the country which is situated above Babylon of the Chaldeans. But after a short time he again emigrated from this region with his people, and transferred his dwelling to the land which was at that time called Canaaea, but is now called Judea ; together with all the multitude which had increased with him, of whose history I shall give an account in another book. The name of Abram is well known even to this day in Damascus, and a village is pointed out which is still called the House of Abraham." †

This writer makes the emigration of Abraham to have been from *above* Babylon, and not from *below* it, where Moggayir is situated ; but Justin, on the authority of Trogus Pompeius, makes a more startling statement in regard to the Jews' origin by fixing it at Damascus in Syria, and he goes so far as to allege that even the Assyrian kings and Semiramis had sprung from that Syrian region ! ‡

Jacob Bryant in his "Ancient Mythology" advocates Southern Babylonia as the land of Abraham's nativity ; and as he gives an interesting account of the different historical theories regarding the whereabouts of the Ur of the Chaldees, I cannot do better than quote what he adduces for and against his contention. He says : "Before I proceed, it may not be improper to obviate an objection, which may be made to the place, and region, where I have supposed Abraham to have been first conversant ; as there are writers who

* Abimelech, king of Gerar. CORY's *Ancient Fragments*, p. 77.
† CORY's *Ancient Fragments*, p. 78.
‡ *Ibid.*, p. 78.

have imagined Ur of Chaldea to have been in another part of the
world. The region in question is by Strabo plainly defined as a
province of Babylonia : and Arrian, Ptolemy, Dionysius, Pliny, and
Marcellinus all determine its situation so clearly, thought no doubt
could have arisen. It appears, however, that Bochart, Grotius,
Le Clerc, Cellarius, with some others, are dissatisfied with the
common opinion, and cannot be persuaded that Abraham came
from this country. Bochart accordingly tells us that the Ur of the
Scriptures was near Nisibis, in the upper regions of Assyria, and
bordered upon Armenia. . . . . This is surely too lightly
determined. All that we learn from Marcellinus is, that they passed
by a castle called Ur. Not a word is there mentioned about a
region called Chaldea, nor of a people styled Chaldeans, which was
necessary to be found. Yet the learned writer says, res patet, *we
may be assured* that here was the birth of the Patriarch : and the
original place of his residence was near Nisibis. In another part
of his work he mentions a place called Ur, near Syria, upon the
Euphrates, of which notice is taken by Pliny, and he seems to think
it not improbable that here might have been the first abode of
Abraham. From hence we may perceive that he was not very
determinate in his opinion. Edessa is said to have been called
Ur and Urhoë, on which account some have been induced to place
the birth and residence of the Patriarch here. But who ever heard
of Chaldeans in these parts, or of a region named Chaldea ?

"If there be anything certain in geography, we may be assured,
from a number of the best writers, that the country of which we are
treating was in a different part of the world. Chaldea lay to the
south of Babylonia, and was originally bounded to the east and
west by the Tigris and Euphrates, so that it was an interamnian
region. Hence Joshua tells the children of Israel, in speaking of
the first residence of their ancestors, that their *fathers dwelt on the
other side of the flood,* or river, *in old time, even Terah, the father of
Abraham.* And St. Stephen, speaking of the call of this Patriarch,
says : *The God of glory appeared unto our father Abraham, when he
was in Mesopotamia, before he dwelt in Charran.* The land of
Chaldea was in those times a portion of the great region called
Mesopotamia, and, as I before said, it was bounded to the west by
the Euphrates, which in its latter course ran nearly parallel with the
Tigris, and emptied itself into the sea below. . . . . In this
province was the Ur of the Scriptures, called Ur of the Chaldeans,

which was so styled in order to distinguish it from every other
place of the same name. It was also expressed Our, Ourhoë,
Ourchoë, and the people were called Ourchani. It was sometimes
compounded Camour, and rendered Camurine, and it is thus men-
tioned by Eupolemus. The description of Chaldea given by Strabo
is very precise. He speaks much in favour of the natives, and
says that they inhabited a portion of Babylonia which bordered
upon Arabia and the Persic Sea. He describes them as being
devoted to philosophy, especially the Borsippeni and the Orcheni.
These last we may suppose to have been particularly the inhabitants
of the city concerning which we are treating. For here, in the true
land of Chaldea, we must look for Ur of the Chaldees. We
accordingly find that there was such a place called Urchoë by
Ptolemy, by Josephus, Ura, or Ure. By Eusebius it is rendered
Ur, and it was undoubtedly the capital city of the province. Add
to this the account given by Eupolemus, who points out plainly the
place of the Patriarch's birth and abode.*

"As the history is so plain, why do we go so wide of the mark
as to suppose this city to have been upon the confines of Syria ? or,
what is more extraordinary, to make it, as some do, an Assyrian
city, and to place it high in the north, at the foot of Mount Taurus,
upon the borders of Media and Armenia, where the name of
Chaldeans is not to be found ? Yet to these parts does Grotius,
as well as Bochart, refer it, and mentioning Ur of the Chaldees, he
adds, *the name remained to the time of Marcellinus.* But this learned
man is surely wrong in determining so hastily and with such a
latitude, for there was no Ur of the Chaldees, nor any Chaldea in
these parts. Lucian was born at Samosata, and Marcellinus was
thoroughly acquainted with this country, yet neither from them nor
from Pliny, Ptolemy, Mela, Solinus, nor from any writer, is there
the least hint of any Chaldeans being here. . . . . . The place
mentioned above was an obscure castle of little consequence, as we
may infer, from its never having been taken notice of by any other
writer. Grotius says *mansit loco nomen,* from whence one might be
led to imagine that it had existed in the days of Abraham. But
there is not the least reason to suppose any such thing. . . . .

"There is another question to be asked. As the rout (*sic*)
supposed to be taken from Babylonia and the south towards Haran
is objected to, I should be glad to know which way the Patriarch

* See page 6.

should have directed his steps.   It is answered, *that he ought to have gone to Canaan directly westward, through Arabia, which would have been nearly in a strait* (sic) *line if he had gone from the lower regions of Babylonia, but as he proceeded in a circuit, that could not be the place of his departure.* Now, from the best accounts, we may be assured that the rout (sic), which we suppose him to have taken was the true and only way—there was no other by which people could proceed. . . . .   The very best accounts prove that this was the rout (sic) ever taken by people who went from Babylonia and its provinces to Palæstina and Egypt, for the direct way, as Grotius terms it, and which Bochart recommends, could not be pursued.   From Babylonia and Chaldea westward was a desert of great extent, which reached to Canaan, and still further to the Nile. Nor is there, I believe, upon record above one instance of its having ever been traversed.* All armies and all caravans of merchants were obliged to go to the north of the Euphrates when they came from Babylonia to Egypt, or the reverse when they went from Egypt to Babylonia.   Herodotus, when he is speaking of the march of Cambyses to Egypt, says that the only way into that country was downward from the Euphrates, by Syro-Phenicia and Palæstine.† *There is no other apparent passage into Egypt but this.* And the reason is plain, for the Arabian desert rendered it impracticable to proceed in a strait (sic) line. People were obliged to go round by Carchemish upon the Euphrates, and the kings of Babylonia and Egypt fortified that place alternately to secure the passage of the river. When Pharaoh Necho and the king of Babylon wanted to meet in battle, they were obliged to come this way to the encounter.   The army of Cambyses, and all the armies of the Greeks and Romans, those who served under Cyrus the younger, the army of Alexander, Antiochus, Antonius, Trajan, Gordian, Julian, went to the north by the Euphrates. Some of these princes set out from Egypt, yet were obliged to take this circuit. It is remarkable that Crassus, in his rout (sic) towards Babylonia, went by Charræ, or Harran, which was the very spot where Abraham, in his way from Chaldea to Canaan, resided. At this place the Roman general was met by Surena and slain. Alexander the great went nearly in the same track ; for though this was round about,

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* It is said by Berosus that Nebuchadnezzar, hearing of his father's death, made his way in great haste over this desert.

† Herodotus, L. iii, c. 5.

yet it was by many esteemed the best road to Babylonia. The Emperor Julian also took his rout (sic) by Haran, but from thence went the lower way by Cercusium and the Euphrates. For there were two roads through Mesopotamia to Babylon and Persia, and they both commenced at Charræ, or Haran. All these circumstances afford great light to the Mosaic history, and abundantly witness its truth and precision, even in the most minute particulars. It is therefore a great pity that men of learning are not sufficiently considerate in their determinations. We, from this instance, see that they would set aside a plain and accepted interpretation, on account of a seeming difficulty, to the prejudice of Scripture, which interpretation, upon inquiry, affords a wonderful evidence in its favour, for it appears, upon the strictest examination, that things must have happened as they are represented."*

It is not difficult to infer that Bryant was fully convinced that the homestead of the family of Terah was in Southern Babylonia, and he tries to prove his argument by quotations from different historians, as if their information were infallible, quite forgetting the main point of Abraham's connexion with Aram-Naharaim in Northern Mesopotamia, which he never alludes to. Most of his arguments are flimsy, especially, as he asserts that there were no Chaldeans beyond Southern Mesopotamia, though he has a note in vol. iii, p. 287, on the word " Casdim " or " Chaldæi," in which he admits that " there was a *Chaldea* upon the Pontus Euxinus to the east of Sinope, in the country of the Chalybes ;" but he adds, " *nobody will suppose that Abraham came from hence.*" Had the writer examined a proper map of Asia Minor, the ancient Cappadocia, he would have found that Aram-Naharaim bordered on that country, and its south eastern limit is within a few miles of the district of Serooj, (the ancient Serug, named after the great grandfather of Abraham), or Padan-Aram. Then with regard to his references to the routes followed in times past by armies and travellers, he makes a woeful mistake by saying that there was no other way from Mesopotamia to Syria and the Holy Land except by Haran, and he goes so far as to ask, " which way the Patriarch should have directed his steps ? " He could not have known that there were, and are, two ways to go from Irack or Babylonia to Palestine : one by Aana, and the other by Dair, both being important towns on the western side of the

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* JACOB BRYANT, *Ancient Mythology*, Vol. III, p. 277.

Euphrates; and in the time of Palmyra's prosperous days there was a flourishing trade between the East and the West through the kingdom of Zenobia to Syria. If I were asked by anyone which way to choose to go to Damascus from Mesopotamia, I should say it all depended upon where I was, as that interamnian region is more than one thousand miles in length. In going from Mossul or any part of Northern Mesopotamia I should proceed either by Orfa or Dair; but if I were at Baghdad, or in any locality in Southern Babylonia, the route taken would be on the western side of the Euphrates, and enter Syria either *via* Aana or Dair; but I should certainly never think of going three hundred miles out of my way to reach Damascus or Aleppo by way of Haran. The very fact of his quoting Herodotus (L. iii, c. 5) about the passage of Cambyses through the Syrian desert, shows that there was a way through that country which Phanes the Halicarnassian recommended. Moreover, modern travellers have frequented that route *via* Palmyra, though since the destruction of that kingdom the country has been deserted.

In 1837 the well known General Francis Rawdon Chesney, the commandant of the "Euphrates Expedition," took the direct desert route from the Persian Gulf to Damascus, without even following the valley of the Euphrates; and now I hear that Colonel Edward Mockler, lately Political Resident at Baghdad, has taken the Palmyra route *via* Damascus and Beyroot on his way home.

With reference to the allusion Bryant makes about Joshua's words to the children of Israel regarding the origin of their forefathers having dwelt "on the other side of the flood in old time," for the purpose of proving that he had meant the lowest part of the Euphrates, is contrary to reason, because all allusions made in the Old Testament to a "flood," or "great river," are directed to that part which borders on Aram-Naharaim and Padan-Aram, and with the history of Eliezer's mission to Northern Mesopotamia, and Jacob's matrimonial visit to Haran.

I think I cannot do better than quote the short notices made by three distinguished and experienced travellers and savans, who visited in person the lands I have been referring to,—I mean General F. R. Chesney, Mr. William Ainsworth the famous geologist, and Mr. J. S. Buckingham, as will be seen from their writings, that they considered Orfa (Eddesa) to have been the identical position of the "Ur of the Chaldees." General Chesney says thus: "To this place I had looked forward with much interest. Its history as

a royal city, its much earlier connection with Job and Abraham, and its present as well as future importance with regard to trade (of which its position has at all times made it an emporium), naturally gave it great consequence in my eyes. Its appearance, as the traveller approaches, is most picturesque. It occupies the intervening valley, as well as the slopes of two hills, which jut out from the range of neighbouring mountains. On their southern side is the castle, which, as well as the town itself, is defended by high walls flanked by square towers. The city contains 900 Turkish, 800 Armenian, and 200 Syrian houses, all well built: also numerous baths, and about twenty mosques, one of which is a remarkably handsome building, with two large ponds attached to it full of sacred fish.

"The extensive excavations in the vicinity of the town are supposed to be the remains of ancient Riha or Edessa, and on the adjoining hill are the scattered ruins of a building attributed to Nimrūd."[*]

Under the head of *Ur of the Chaldees*, Mr. Ainsworth writes: "The city of Ur, which was in Ur of the Chaldees, and the seat of the nativity of Abraham and of the death of Haran, is, to the present day, denominated by the Syrians Urhoi, by the Arabs corrupted into 'Urfáh, or 'Orfáh. It is at the foot of the mountains of Osroene, and at the head of the same great and fertile plain, which contains the seats of the patriarchs of the family of Shem; Haran, and Seruj. Tradition has consecrated 'Urfáh as the birth-place of the father of Isaac, and the Birket el Ibrahím el Khalíl is still supposed to contain the descendants of the fish loved by the Prophet. 'Urfáh is also celebrated as the residence of Akbár, commonly called Agbarus, by Herodotus Αυγαρος, who is said to have written a letter to our Saviour.

"Ur was not only 'Ur of the Chaldees' (Gen. xi, 28, Aben Ezra in Gen., Bochart, lib. i, Phaleg, x, and Hugo Grotius in Gen.), but is more particularly described as in the land of the Chaldæans (Josephus, lib. i; *Antiq.*, vii), and by Eusebius as 'Ur oppidum regni Chaldæorum,' that is, of the kingdom founded by Chesed; the same author also says, 'In urbe Camarina, seu Urie, quæ Græcis dicta Chaldæopolis.' Oriental historians conduct the patriarch Abraham, in his migration to the land of Canaan, from Haran to

[*] CHESNEY'S *Narrative of the Euphrates Expedition*, p. 139.

Berza, or Beroe, the modern Aleppo; and 'Ahméd Ibn Yusúf, and Abu Mohamméd Mustáfah, identify Ur with Roha, the modern Urfah. From the records of the Holy Writ we gather (Gen. xi, 31)' that Terah and Abraham, with others of the family, went out of Ur to go into the land of Canaan, and they came into Haran, and dwelt there. It is evident, that, had the Ur of the Chaldees been identical with the Ur of Babylonian Chaldæa, the Orchoe of Ptolemy and Pliny, that the way of the patriarchs did not lie through Haran in Mesopotamia; but even the direction of the journey is preserved in the amplitude of the sacred text, for we are expressly informed (Gen. xii, 9), that the Patriarch 'journeyed, going on still towards the south.'

"Ur, in the progress of corruption, became Urhoi, Roha, 'Orfah or 'Urfáh, and, with change of masters, Chaldæopolis, Antiochea, Callirhoe, and Edessa. Mr. Buckingham has apparently mistaken what Benjamin of Tudela says of Dakia, or Rakkah, as belonging to 'Urfáh, and hence he makes Haran two days' journey from that city, from which it is in reality visible at almost all times, and a ride of only eight hours, or about twenty miles in direct distance."*

The geographer Buckingham, alludes to Orfa, or Ur of the Chaldees, as follows :—

"Orfah is conceived, by all the learned Jews and Mohammedans, as well as by the most eminent scholars among the Christians, to have been Ur of the Chaldees, from whence Abraham went forth to dwell in Haran, previous to his being called from thence, by God, to go into Canaan, the land promised to himself and to his seed for ever. The Jews say that this place is called in Scripture Ourcasdin, that is, the Fire of Chaldea, out of which, say they, God brought Abraham; and on this account the Talmudists affirm that Abraham was here cast into the fire and was miraculously delivered.

"This capital of the country between the Euphrates and the Tigris, the Padan-Aram and Aram-Naharaim of the Hebrews, the Mesopotamia of the Greeks, and the Paradise of the poets, received from its Macedonian conquerors the name of Edessa; and an abundant fountain which the city enclosed, and called, in Greek, Callirhoe, communicated this name to the city itself. In later times it was called Roha, or, with the article of the Arabs, Or-rhoa, and by abbreviation, Orha.

* AINSWORTH'S *Assyria, Babylonia, and Chaldea*, p. 152.

"D'Anvilie thinks that this last name may be derived from the Greek term signifying a fountain; or, according to another opinion, it may refer to the founder of this city, whose name is said to have been Orrhoi, now retained, with some little corruption, in Orfah or Urfah."*

There is no doubt that both Job and Balaam were natives of Aram-Naharaim, and were of the same stock as the Hebrews in the Aramean sense of the word; and so also a large majority of the Arabs. In the Book of Job it is related that bands of Chaldeans and Sabeans had plundered that Patriarch's camels and cattle; it is therefore not unreasonable to suppose that both those nationalities inhabited the northern part of Mesopotamia, as we know that Haran was at one time a Sabean settlement, and the Chaldeans occupied one part of Cappodocia to the north. Diodorus Siculous mentions (Tom. i; T. ii, p. 142–145) the temple of the moon at Haran, whereto the Sabeans went for pilgrimages; but now that sect, which is commonly called Christians of St. John, are only found in Southern Babylonia and in Khuzistan in Southern Persia. It is very remarkable that those interesting people, of whom there are now no more than, at the most, about one hundred thousand souls existing, speak almost the same language as that of the Chaldeans in Assyria and Mesopotamia, called by them "Chaldee" or Chaldean, erroneously styled in Europe as *Syriac;* but as I intend to touch briefly hereafter upon the nationality and language of the latter, I will confine myself, for the present, to the subject under consideration.

The origin of the Chaldeans and their ruling power have been from time inmemorial a puzzle, and I suppose the controversy will continue as it has been to the end of the chapter, especially as up to the present time scholars have not agreed as to the etymology of the word ארפכשד, Arphaxad, from which all the Semitic nations believe this nationality of the Chaldeans and Hebrews sprang.† Why the authors of the Septuagint translated the word בשריא, Chasdia, into Chaldean is not easily to be understood, unless, indeed, they adopted the word from the Chaldeans themselves, as we know from Josephus, alluded to above, that they were called by that name in his time. We learn, however, from the history of Dieæarchus, a disciple of Aristotle, and a philosopher of great

* BUCKINGHAM'S *Travels in Mesopotamia*, Vol. I, p. 121.
† Josephus, I, vi, 4.

repute, the Chaldeans were first called *Cephenes* from *Cepheus*, and afterwards *Chaldæans* from *Chaldæus*, an Assyrian king, fourteenth in succession from Ninus. This Chaldæus built Babylon near the Euphrates, and placed the Chaldaens in it.* This confirms in a remarkable manner the passage in Isaiah, which has given rise to the question as to the origin of the Chaldaens :—" Behold the land of the Chaldeans ; this people was not till the Assyrian founded it for them that dwelt in the wilderness : they set up the towers thereof, they raised up the palaces thereof."†

The use of the word *Chaldean*, like that of Assyrian, was very vague. It appears to have been applied sometimes to the entire country bordering on the Tigris and Euphrates south of the mountainous regions of Asia Minor and Armenia, to only a part of it, to a race, and ultimately to a class of the priesthood. There is a remarkable passage in Judith (chap. v, 6, 7), in which the Jews are spoken of as descendants of the Chaldeans, a belief which is prevalent amongst all the Hebrews in Biblical lands at the present day.

As to the extent of the Chaldean kingdom after the destruction of the Assyrian monarchy, there is no doubt that it must have included, in the time of the Medo-Persian Monarchy, all the provinces which were subject to Nebuchadnezzar, and called the *realm of the Chaldeans* in Daniel (ix, 1). It is thus related there : " In the first year of Darius the son of Ahasuerus, of the seed of the Medes, which was made king over the realm of the Chaldeans."
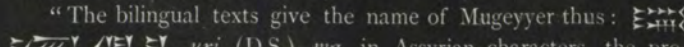
Now, I must say a few words concerning the expression of *Ur*, which is said to have been found amongst the arrow-headed inscriptions in the Mound of Moggayir in Southern Babylonia. As I said before, it is not my business to enter into a minute detail about the etymology of the cuneiform inscriptions, inasmuch as I do not claim to be an Assyrian scholar, but I wish to try and give a commonsense view of the reading of Semitic languages. In the first place the word Ur which is said to have been found in the cuneiform inscriptions is not written with regular letters of the alphabet ; and if it were, it does not prove that that was Ur of the Chaldees mentioned in the 11th chapter of Genesis, as the very fact of its being called Ur of the Chaldees shows that there were other Urs in Biblical lands in those days, as the Or of Salem (or Jerusalem).

* STEPHANUS, *Dict. Hist. Geog.*   † Isaiah, xxiii, 13.

Moreover, the word Ur is not pronounced thus in the original Semitic languages, and even if it were, how is it to be assumed that that was really pronounced as Ur, when we know that Or of Salem in Aramaic is spelt and pronounced differently, as ירו Yeroo in Hebrew. It is very difficult for any person not quite conversant even with modern Semitic languages to understand not only the pronunciation but the real meaning of certain words, unless he has lived in the country since childhood and become acquainted with the idioms and phraseology understood by the natives. Very often a traveller finds that what he learnt in one country where Arabic is spoken is not to be comprehended in another. I think one example will suffice, and that is the word من min (which means *from*), consisting of two letters, م meem M, and ن noon N. When it is pronounced differently it is turned into who? defective, being benevolent, conferring a benefit, manna, and a measure of two pounds. The most wonderful of all the changes that take place in an Arabic word is عجوز Ajooz, which means an old woman. There are no less than one hundred meanings to that word when it is pronounced according to its application and context. The oddest of all the combinations in the list of words under the head of Ajooz are, a young woman of delicate constitution ; an old man ; a king ; a kettle ; a pot ; butter ; wine ; a lion ; a horse ; a bull ; a cow ; a dog ; and a she-camel ! If these variable meanings of four Arabic letters constituting an old woman are not enough to puzzle even an Assyrian scholar, I do not know what would be.

In writing to my friend, Mr. Theophilus Pinches, the learned Assyrian scholar, for his opinion about the word Ur found at Moggayir, he was good enough to send me the following answer, which will explain his idea upon the subject whether that Ur was really the Ur of the Chaldees mentioned in Genesis as being the birthplace of Abraham. He says :—

" The bilingual texts give the name of Mugeyyer thus : 𒀖 𒀖 𒈤 𒈨, *uri* - (D.S.) - *ma*, in Assyrian characters, the pronunciation *in Assyrian* being Uru, genitive Uri, as in *bêl Uri*, " lord of Uru," a title of Nannar or Sin, the moon-god, who was patron-god of the city.

" You will notice that after the D.S. ('determinative suffix,' showing that what precedes is the name of a place), there is the character *ma* (or wa), indicating that the full form of the word in Akkadian was Urima, or Uriwa. There is no trace of this extra

syllable in the Assyrian form, but it certainly ought to be in the Hebrew, if Mugeyyer be Ur of the Chaldees. In my opinion, the extra letter or syllable at the end would have been represented by ו, or וא (אוֹרוֹ, or אוּרוֹא). That the Assyrian has *u* (Uru) and not *o* (Oru) is no argument against the identification, as the same vowel had to do duty for both *u* and *o* in that language. Except the likeness of the name, I do not know why scholars have identified Ur-Kasdim with Uru (Mugeyyer). They regard the latter as being in the land of the Chaldees."

Through the blundering of the Greeks there has been no end of confusion in like manner as regards the word אָרָם Aram in Hebrew, which was corrupted into Syria, and אֲרָמִי Aramee into Syriac; and so it happened in regard to the ancient name of *Assyrians*, as Herodotus mentions in his Polymnia (Book VII. chap. 63), that the Greeks called them *Syrians*. Professor George Rawlinson, the present Canon of Cantérbary, however, has tried to contradict in his learned work,* entitled "Rawlinson's Herodotus," the father of history, by alleging that "Syrian" is nothing but a variant of Tyrian," and that Syrian and Assyrian are two entirely different words. That the Greeks when they first became acquainted with the country between Asia Minor and Egypt, found the people of Tyre (Tzur) predominant there, and from them called the country in which they dwelt Syria (for Tsyria, which was beyond their powers of articulation). Afterwards, when they heard of the Assyrians, they supposed the name to be the same, though it had really a very different sound and origin. Then he goes on to say: "The difference between the two words will be seen most plainly by reference to the original languages. The root of 'Syrian' is in Hebrew צוּר (Tzur), the root of 'Assyrian' is אַשּׁוּר (Asshur). A still greater distinction is found in the Assyrian inscriptions, where Assyria is called Assur, but the Tyrians are styled Tsur-ra-ya, the characters used being entirely different. With respect to original meaning, Tzur seems to be rightly explained, as so called from the rock (צוּר) on which the town was built; Asshur is perhaps to be connected with אַשֵׁר 'happiness,' at any rate it can have no connection with tzur."

It is difficult to understand how Professor Rawlinson manages to prove his argument by asserting that the word Syrian was a

* Vol. IV, p. 52.   (Note.)

corruption of the Greek Tyrian, or the Hebrew Tzur! In the Semitic languages Tyre is rendered צוּר Ssoor with the hard *s*, or ssadee), and in the Greek and other European languages it has been called Tyre, or Tyrus. In the Septuagint version of the Old Testament there is a great distinction between the words Tyre and Syrian. The former is written Τυρου, Tyrian, or Τυριον, but the latter is mentioned as Συριαν, Syrian, which is a corrupt rendering of Aram. Moreover there is no such word as Syria in Hebrew or Aramaic, but the proper word is אָרָם Aram. This proves that when the Old Testament was translated into Greek, the term Tyre was understood to have no connexion with the foreign appellation Syria, they being two distinct nomenclatures. Even the late Sir Henry Rawlinson, the brother of the Professor, considered that the word Syria was a corruption of Assyria, as it will be seen from his remark upon his brother's note in "Herodotus," Book I, chap. 6, in which he says, "[the only true word is Assyria, from Asshur. Syria is a Greek corruption of the genuine term.—H. C. R.]."

Even in the present day people are puzzling their heads whether the Chaldeans of Assyria and Mesopotamia, of which nationality I am, are entitled to that ancient name, as if those people had no origin, but had fallen from the sky! Indeed, the members of the Archbishop's Mission to the Assyrian Christians have taken the liberty of giving them a new name by calling them "East Syrians," an appellation which is quite foreign to them, as they never had any connexion with Syria, and their country lies on the eastern side of the Tigris, known as Assyria, and not to the west of the Euphrates! Being ignorant of the habits and customs, and historical changes in Biblical lands, they have drawn their conclusions from the word "Soorayé," by which, as they allege, the Nestorians, who inhabit the highlands of Assyria, call themselves. This is a mere religious term which means *Christian*, like the sect of the *Nazarenes*.* "Soorayé" is a corruption of the word *athoorayé* (Assyrian), the same as Othman is corrupted by the Turks into Osman, and turned into English as *Ottoman*. The *th* as in three is turned into *s*, as it is now pronounced by different Biblical nationalities, such as the Yezeedees, Coords, and Persians.

The Chaldeans, both as a nation and a sect, have been mentioned by different writers from time to time, namely—Herodotus,

* Acts xxiv, 5.

Xenephon, Josephus, Bar Hebræus, Assemani, and the modern geographers; and the Arab historians, in particular, allude to Assyria as *Athoor*, on the eastern side of the Tigris, where Nineveh is situated. The Chaldeans of the present day, therefore, are considered also Assyrians from the country they inhabit; and with regard to their language they have always retained the Aramaic dialect, which is called in the Targum, Daniel, and Ezra, *Chaldee*, but is known in Europe as Syriac. The word Syriac, or *Siryanee*, is applied by them to the characters used by the so-called Syrians or Jacobites. It is true there is very little difference between the Chaldean and the Syriac, but the dissemblance is marked in the formation of the letters, and the pronunciation of a number of words like Yegar-sahadutha* (heap of witness), Maran-atha † (our Lord's coming), Abba ‡ (father), Talitha § (damsel), Maria (Lord), Allaha (God), which the Syrians pronounce Yogor Sohodotho, Morenotho, Obbo, Tolitho, Morio, and Olloho.

Formerly the Syrians of Mesopotamia, who were of the same descent as the Chaldeans, spoke their language and wrote like them; but in the thirteenth century Bar-Hebræus, a promoter of the Jacobites, wishing to make a thorough distinction between the writing of the Monophysites and that of the so-called Nestorians, on account of the bitter doctrinal antagonism which existed between those two sects, changed the characters and vowel points. The Chaldean P and A were changed into F and O respectively; and if we refer to Holy Writ, whether Hebrew or Greek, including the Septuagint, it will be found that the present Chaldeans keep to the old pronunciation.

There is no doubt that the Nestorians of the highland and the lowland of Assyria were of the same origin as the Chaldeans of Mossul; Baghdad, and Diarbekir; but socially speaking they do not stand on the same footing, because, while the former, with few exceptions, are rural and of the peasant class, the latter are cultured and stand in a higher status of society.

There can be no better proof of a people's nationality than the language, homestead, and history; and certainly no nation in the world has a better claim to Assyrian and Chaldean descent than the Chaldeans of Assyria and Mesopotamia. Their language has always been Chaldee, though Arabic is now the common language

* Genesis xxxi, 47.   ‡ Mark xiv, 36.
† 1 Cor. xvi, 22.   § Mark v, 41.

of the country, which was adopted in the time of the Arab conquest. Their country was known formerly as Assyria, and history has always pointed to that country as being the fatherland of the Chaldeans and Assyrians. Xenephon mentions in his Cyclopædia that when he passed through the mountainous regions of Assyria and Media he met with three nationalities, namely,—the Carduchi (Coords), Armenians, and Chaldeans; and at the present time these three distinct peoples are found in the same country. No one doubts that the two former are remnants of those mentioned by Xenephon, yet the third, who are now styled vulgarly, in a religious sense, "Nestorians," must have no nationality of their own, because, forsooth, some foreign travellers took it into their heads to attach to them a strange term as Nestorians, which is merely a nickname like Lutheran or Wesleyan. In the greater part of Assyria Chaldee is spoken; but in Mesopotamia the common language is Arabic; and each of the different Christian communities retains its mother tongue in its church services and ecclesiastical correspondence. So also in Syria, the Holy Land, and Egypt, like the Greeks, Armenians and Copts; but all official communications are carried on in Turkish. It is very remarkable that the present Chaldeans are called both Chaldeans and Assyrians, and their ancient national language is Aramean or Chaldee, derived, as that of the Hebrews, from Aram, one of the sons of Shem. There is no doubt their origin came from Arpachshad, Asshur, and Aram, mentioned in the 22nd verse of the tenth chapter of Genesis. When and how the affinity and amalgamation came into existence in ancient time must be left to conjecture, but there is one thing certain, that in accordance with Semitic custom, when people intermarried with a different nationality, they adopted the name on the mother side; and it may be that the Arpachshadites at one time or other intermarried with the Arameans, from whom they obtained their present language.

The habits, customs, and dress in biblical lands have undergone a great change, except amongst the Arabs, during the last fifty years. The higher class of Christians have adopted the European costume, and the French and English languages are being cultivated, especially the former, on account of the number of schools opened by the Vatican Missions. Formerly in most places, particularly in Syria, degrading restrictions were imposed upon the Jews and Christians in their attire; and at one time, in a large number of cities, no Christian or Jew was allowed to ride a horse, and if they

rode donkeys, as their lot, they were compelled to dismount when they passed a Moslem of rank or the precincts of a religious place. The ladies, too, have changed, in a great measure, their primitive costumes, and taken to European apparel. They even go so far as to wear gloves, laced boots, and complete their attire by carrying sunshades! The nomad Arabs and Coords, on the contrary, keep to their old costumes, which I think have not seen much change from primitive time. The food of the Coords and Arabs, and the lower classes of the inhabitants of biblical lands, has not changed much, as the "savoury meat" which Isaac desired Esau, his son, to prepare for him, is still a standing dish amongst the primitive inhabitants of the land.

The Arabs, especially the women, still go about without wearing drawers, as the custom used to be amongst the ancients like Noah* and the Israelites.† Amongst both Christians, Hebrews, and Moslems, it is a sin to enter any place of worship with their shoes on, as they adhere to God's command to Moses at the burning bush,‡ though the former and the Jews are now following the European habit of performing their religious rites with their dirty shoes and boots on. It is a notable fact that up to the present day all Moslems, whether Turks, Arabs, Persians, or Indians, conform to the same divine command by taking their boots and shoes off when they perform their worship, though they are quite ignorant of the origin of the ceremony.

The ancient custom of washing the stranger's feet is not practised now in biblical lands, but it is in vogue in Abyssinia. Generally speaking those who perform this duty are females, but I was one of those few who preferred to do the necessary ablution for myself.

The ancient biblical habits still exist in Mesopotamia, amongst both Christians and Moslems, of rending their garment§ at a calamity, or grief or anger; smiting upon the breast‖ at prayer or supplication; bowing their heads to the ground in the act of worship¶ or homage**; throwing dust on their heads, and covering

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* Genesis, ix, 21.   † Exodus xx, 26.   ‡ Exodus, iii, 5.
§ 2 Sam. xiii, 19.   ‖ Luke, xviii, 13.   ¶ Genesis, xvii, 3.
** Ruth, ii, 10. This kind of homage can also be noticed on the black obelisk found by Sir Henry Layard at Nimroud, where the ambassador of King Ahab is seen falling on his face before Shalmaneser. It is also remarkable that all Mohammedan worshippers, when praying, have *to* go down on their knees and touch the ground with their foreheads.

it with their hands in great affliction * and such like misfortune.

It was prophesied by Nahum (ii, 7) respecting the destruction of Ninevah thus: "And Huzzab shall be led away captive, she shall be brought up, and her maids shall lead her as with the voice of doves, tabering upon their breasts." This kind of lamentation is most scrupulously practised in the Irack (Babylonia) by the Sheea sect of the Moslems, when the anniversary of the murder of their patron saint Hosain is commemorated. I have seen blood gushing out from the wounds caused by the severe tabering on the breasts of young men when they were bewailing the historical tragedy.

The most remarkable observance which still exists amongst the Arabs is the "covenant of salt," as it prevailed with biblical nationalities in primitive time. We find it was a divine ordinance amongst the Israelites to celebrate their heave offerings with salt.† In writing to Artaxerxes, King of Persia, of their fidelity to him, the governors beyond the Euphrates tell him thus: "Because we eat the salt of the palace it was not meet for us to see the king's dishonour, therefore have we sent and certified the king."‡

I must end by relating a quaint story which happened to a friend at Aden, the Arabian British settlement, when I was acting as first assistant political resident there. He was looked upon with great veneration by all Arabs of Arabia Felix, not only on account of his sainted ancestors, but for his piety and influence in the country, which reminded me of the trick played upon Jacob by Laban. His name was Seyyid Alowi Alaidroos, the chiefest amongst the Aden Arabs, and he having heard that the Sultan of Lahaj had two handsome sisters, contracted to marry the youngest, who was reported to him to be the best looking of the two. Of course, according to the custom of the notable Arab families of that country he was not privileged to see his betrothed, but trusted to the praises and commendations of his female friends who, I have no doubt, related to him everything about her, even to her graceful walk and sweet sounding voice. Her brother consented to the marriage, and when the happy day came and the wedlock ceremony was performed, he found that instead of the damsel he chose, the elder one was given to him. It can well be imagined in what a state my friend

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* 2 Samuel xiii, 19.   † Lev. ii, 13,and Numbers, xviii, 19.
‡ Ezra, iv, 14.

got into when he found the unexpected change. When he remonstrated with his brother-in-law for the trick he had played him, he was told that it was contrary to Arab rule to marry the younger before the elder, but he promised him, after he would fulfil her month, to let him have her sister, which he did. I am glad to say that my friend was quite satisfied and lived a happy life with the two sisters afterwards, and the two damsels were in like manner elated at having a distinguished descendant of the prophet Mohammed as their lord and master.

There also occurred another biblical incident in my time in Abyssinia, illustrating king Saul's capricious behaviour with regard to the re-marriage of his daughter Michal, the wife of David, when the latter had to flee from the fury of the former (1 Sam. xxv, 44). When Menelik, the present Emperor of Abyssina, was a semi-captive with King Theodore, the latter gave him his daughter in marriage; but, on finding that his father-in-law was getting more cruel every day, and his best friends were not safe from his inhuman deeds, he deemed it prudent to decamp. When Theodore learnt of his son-in-law's escape, he at once re-married his daughter to another favourite courtier.

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DES CLAUDIUS PTOLEMÄUS
HANDBUCH DER ASTRONOMIE

ERSTER BAND

AUS DEM GRIECHISCHEN ÜBERSETZT UND MIT
ERKLÄRENDEN ANMERKUNGEN VERSEHEN

VON

KARL MANITIUS

184 = 7 Athyr
252 = 9 Mechir (1ʰ 20ᵐ nachts) Feb 26
228 = 2/3 Choiak (1ʰ before mid)
228 = 20/21 Payni (3/4 hr. before mid.)
239 = 17/18 Pachous (3 3/5 hr. before mid.)
247 = 26/27 Thoth (5 1/2 hrs. after mid.)
249 = 16/17 Thoth (10 1/6 hrs. after noon of 16ᵗʰ)
251 = 16 Mesore (7 hr. after noon of 16ᵗʰ)

Wenn demnach die Sonne im Herbstnachtgleichenpunkt
steht, so ist sie von dem Perigeum, d. i von ♐ 5°30′, in
mittlerer Bewegung 63°20′ gegen die Richtung der Zeichen
(d. i. westwärts) entfernt, während sie von dem Apogeum,
d. i. von ♊ 5°30′, im Mittel (180° − 63°20′ =) 116°40′
in der Richtung der Zeichen (d. i. ostwärts) entfernt steht.
Nach dieser theoretischen Erörterung wird folgendes
verständlich werden. Unter den Beobachtungen von Nacht-
gleichen, welche die ersten waren, die von uns angestellt
worden sind, befindet sich auch eine mit der größten Ge-
nauigkeit festgestellte Herbstnachtgleiche. Dieselbe ist im
17ten Jahre Hadrians am 7. ägyptischen Athyr (25. Sep-
tember 132 n. Chr.) ohne wesentlichen Fehler zwei Äquinoktial-
stunden nach Mittag eingetreten. Zu diesem Zeitpunkt hat
demnach die Sonne in mittlerer Bewegung auf dem Exzenter
in der Richtung der Zeichen von dem Apogeum (d. i. von
♊ 5°30′) 116°40′ entfernt gestanden. Nun beträgt die Zahl
der Jahre von der Regierung Nabonassars (747 v. Chr.) bis
zum Tode Alexanders (11. Juni 323 v. Chr.) nach dem
ägyptischen Kalender 424, vom Tode Alexanders (Epoche
1. Thoth = 12. Nov. 324 v. Chr.) bis zur Regierung des
Augustus 294, und vom ersten Jahre (30 v. Chr.) der Re-
gierung des Augustus vom Mittag des 1. ägyptischen Thoth
— weil wir die Epochen an die Mittagstunde knüpfen — bis
zum 17ten Jahre Hadrians zwei Äquinoktialstunden nach
dem Mittag des 7. Athyr (25. Sept. 132 n. Chr.) weitere
161 Jahre, 66 Tage und 2 Äquinoktialstunden. Folglich
ergeben sich vom ersten Jahre Nabonassars vom Mittag des
1. ägyptischen Thoth bis zu der Zeit der oben genannten
Herbstnachtgleiche in Summa (424 + 294 + 161 =) 879
ägyptische Jahre, 66 Tage und 2 Äquinoktialstunden. In
einem Zeitraum von dieser Länge legt die Sonne in mittlerer
Bewegung nach Abzug ganzer Kreise 211°25′ zurück.[25]
Wenn wir also zu den 116°40′, welche die Entfernung von
dem Apogeum des Exzenters zur Zeit der genannten Herbst-
nachtgleiche maßen, die 360 Grade eines Kreises addieren
und von der Summe die 211°25′ des auf die Zwischenzeit

entfallenden Überschusses abziehen[a]), so werden wir für die
Epoche der mittleren Bewegung am Mittag des 1. ägyp-
tischen Thoth des ersten Jahres Nabonassars (26. Februar
747 v. Chr.) als Entfernung der Sonne von dem Apogeum
(Π 5° 30′) bei gleichförmiger Bewegung 265° 15′ in der Ha 205
Richtung der Zeichen erhalten. Daraus ergibt sich als 6
mittlerer Ort der Sonne χ 0° 45′.[b])

Achtes Kapitel.
Berechnung der Länge der Sonne
nach den Tafeln.

Wenn wir den Ort der Sonne für den betreffenden Zeit-
punkt, dem die Untersuchung gilt, feststellen wollen[c]), so
gehen wir mit der Summe der Zeit, welche von der Epoche 10
bis zu dem nach der Ortszeit von Alexandria gegebenen
Zeitpunkt verflossen ist, in die Tafeln der gleichförmigen
Bewegung der Sonne ein, addieren zu den bei den betreffenden
Argumentzahlen stehenden Graden die 265° 15′ betragende
Entfernung von dem Apogeum und ziehen von dieser Summe 15
ganze Kreise ab. Die übrigbleibenden Grade zählen wir von
(dem Apogeum) Π 5° 30′ ab in der Richtung der Zeichen
weiter und werden dort, wo die Zahl ausgeht, den mitt-
leren Ort der Sonne finden. Darauf gehen wir mit der-
selben Zahl, d. h. mit der Gradzahl, welche die Entfernung Hei 258
vom Apogeum bis zu dem mittleren Ort angibt, in die 21
Tabelle der Anomalie ein. Fällt die Zahl in die ersten
Spalten, d. h. ist sie kleiner als 180°, so ziehen wir die bei
ihr in der dritten Spalte stehenden Grade von der Epoche
für den mittleren Ort ab; steht die Zahl aber in den zweiten 25
Spalten, d. h. ist sie größer als 180°, so werden wir die be- Ha 206
treffenden Grade zu dem mittleren Ort addieren und so den
genauen, d. i. scheinbaren Ort der Sonne finden.[24])

a) D. h. auf dem Sonnenkreise rückwärts zählen: 476° 40′ −
211° 25′ = 265° 15′.

b) Insofern 265° 15′ = 24° 30′ der Zwillinge + 240° (d. s. 8 Zeichen
zu 30°) + 0° 45′ der Fische.

c) Durchgeführte Beispiele der Berechnung bietet Anm. 29.

Hei 262 des Unterschieds der Sonnentage im Vergleich zu den gleich-
förmigen ein Betrag von $8\frac{1}{3}$ Zeitgraden, d. i. von $33\frac{1}{3}$ Zeit-
minuten, im Vergleich von Abschnitt zu Abschnitt aber der
doppelte Betrag von $16\frac{2}{3}$ Zeitgraden, d. i. von einer Äqui-
5 noktialstunde und $6\frac{2}{3}$ Minuten, herausstellt. Ein Unterschied
von diesem Betrage würde bei der Sonne und den anderen
Planeten, wenn er unbeachtet bliebe, der Feststellung der
an ihnen wahrgenommenen Erscheinungen vielleicht keinen
merklichen Eintrag tun, dagegen würde er bei dem Monde
10 wegen der Geschwindigkeit seiner Bewegung (in Länge) be-
reits eine beträchtliche Differenz bis zu $0''36'$ (d. s. $0°32'56''$
$+ 0°3'17''$ in $1\frac{1}{10}$ Stunde) verursachen.

Um nun die für irgendein beliebiges Intervall gegebenen
(bürgerlichen) Sonnentage, ich meine die von Mittag oder
15 Mitternacht bis wieder zu Mittag oder Mitternacht (nach
Ortszeit) gerechneten, ein für allemal in gleichförmige um-
zurechnen, werden wir sowohl für die erste wie für die letzte
Epoche des gegebenen Intervalls der (bürgerlichen) Sonnen-
Ha 210 tage feststellen, in welchem Grade der Ekliptik die Sonne
20 sowohl nach der gleichförmigen wie nach der ungleich-
förmigen (d. i. mit der Anomaliedifferenz versehenen) Be-
wegung steht. Alsdann gehen wir mit dem Intervall der
mit dem Zusatz (der Anomalie) versehenen Grade, d. i. mit
dem Intervall von dem ungleichförmigen oder scheinbaren
25 Sonnenort bis wieder zu dem scheinbaren, in die Tafel
der Aufgänge bei Sphaera recta[a]) ein und sehen nach, mit
Hei 263 wieviel Zeitgraden gleichzeitig die bezeichneten Grade des
ungleichförmigen Intervalls den Meridian passieren. Hier-
auf bilden wir die Differenz zwischen den gefundenen Zeit-
30 graden und den Graden des gleichförmigen Intervalls
und berechnen (durch Multiplikation mit 4) den Betrag der
Äquinoktialstunde, welcher durch die Zeitgrade dieser
Differenz ausgedrückt wird. Wird die Zahl der Zeit-

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a) Weil die Durchgänge durch den Horizont bei Sphaera
recta gleichzeitig als Durchgänge durch den Meridian anzu-
sehen sind. Vgl. S. 53, 19.

grade[a)] größer als das gleichförmige Intervall gefunden, so
werden wir die Differenz zu der gegebenen Zahl der Sonnen-
tage addieren, wird sie kleiner gefunden, so werden wir sie
davon abziehen. In dem Ergebnis werden wir den auf
die gleichförmigen Sonnentage entfallenden Zeitbetrag er- 5
halten, von dem wir vorzugsweise dort Gebrauch machen
werden, wo es sich um die Summierung der mittleren
Bewegungen des Mondes handelt, wie unsere Tafeln sie
bieten.[26)]

Es ist selbstverständlich, daß man aus dem gegebenen 10
Bestand der gleichförmigen Sonnentage die bürger-
lichen, d. i. die theoretisch schlechthin genommenen Tage
erhält, indem man die oben erklärte Addition oder Subtrak-
tion der Zeitgrade in umgekehrter Reihenfolge vornimmt.

Zu der von uns festgestellten Epoche, d. i. im ersten Jahre 15
Nabonassars am Mittag des 1. ägyptischen Thoth, stand die
Sonne bei gleichförmiger Bewegung, wie oben (S. 185, 7)
nachgewiesen, in)(0° 45′, bei ungleichförmiger Bewegung
(d. i. unter Hinzufügung des Maximums der Anomaliedifferenz)
in)(3° 8′.[b)]
20

Viertes Buch.

Erstes Kapitel.
Art der Beobachtungen, auf welche
sich die Theorie des Mondes zu stützen hat.

Nachdem wir in dem vorhergehenden Buche eine zusammen- {Ha 211
fassende Darstellung der Erscheinungen geboten haben, welche {Hei 265
hinsichtlich der Bewegung der Sonne wahrzunehmen sind,
beginnen wir nunmehr in der logisch gebotenen Folge die

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a) D. i. die Zahl der gleichzeitig mit den Graden des
ungleichförmigen Intervalls durch den Meridian gegangenen
Äquatorgrade. Ist sie größer, so ist die wahre Sonne voran-
geeilt, ist sie kleiner, so ist die wahre Sonne zurückgeblieben.
b) Auf 265°15′ Abstand von dem Apogeum Π 5°30′ ent-
fallen nach der Anomalietabelle + 2°23′ Anomaliedifferenz. Vgl.
S. 185, 26 hinsichtlich des positiven Werts.

Sechstes Kapitel.
Nachweis der ersten oder einfachen Anomalie des Mondes.

Hiermit sollen unsere theoretischen Vorbetrachtungen abgeschlossen sein. Wir werden nunmehr den Nachweis der in Frage stehenden Anomalie des Mondes liefern, und zwar aus dem (S. 213, 6) angegebenen Grunde nach der epizyklischen Hypothese. Zur Benutzung herangezogen haben wir an erster Stelle von den ältesten uns zu Gebote stehenden Finsternissen drei, welche den Eindruck ganz besonders sorgfältiger Aufzeichnung machen, an zweiter Stelle aber auch von den Beobachtungen neueren Datums drei, welche von uns selbst mit größter Genauigkeit angestellt worden sind. Diese (doppelte) Beweisführung bietet uns erstens den Vorteil, daß die Prüfung sich auf eine möglichst lange Zwischenzeit stützt, zweitens wird ersichtlich werden, daß sich aus dem Beweismaterial beiderlei Art nahezu dieselbe Anomaliedifferenz herausstellt; drittens wird der Überschuß der mittleren Bewegungen (in Anomalie und Breite) stets übereinstimmend mit dem Zusatzbetrag gefunden werden, welcher sich (S. 204, 24. 26) nach den angegebenen periodischen Zeiten bei dem von uns angestellten Korrektionsverfahren ergeben hat.

Zum Nachweis der ersten theoretisch für sich betrachteten Anomalie soll nunmehr die epizyklische Hypothese, wie gesagt, folgende Fassung erhalten. Man denke sich in der Sphäre des Mondes einen mit der Ekliptik konzentrischen Kreis, der auch in derselben Ebene mit ihr liegt. Ein zweiter Konzenter sei gegen diesen ersten dem Größenbetrag des Mondlaufs in Breite entsprechend geneigt und rücke bei seinem gleichförmigen Umlauf um den Mittelpunkt der Ekliptik gegen die Richtung der Zeichen nur so weit vor, als der Überschuß der Bewegung in Breite über die Bewegung in Länge beträgt. Auf diesen schiefen Kreis verlegt nun unsere Hypothese den Lauf des sogenannten Epizykels,

der sich ebenfalls gleichförmig, und zwar nach den öst-
lichen Teilen des Weltalls (d. i. in der Richtung der Zeichen)
der Wiederkehr in Breite entsprechend vollzieht. Wird
diese Wiederkehr theoretisch direkt auf die Ekliptik bezogen,
so bringt sie selbstverständlich die Bewegung in Länge zum 5
Ausdruck.[a] Auf dem Epizykel selbst endlich bewirkt der
Mond auf dem erdfernen Bogen seinen Fortschritt nach den
westlichen Teilen des Weltalls (d. i. gegen die Richtung
der Zeichen), und zwar der Wiederkehr der Anomalie ent-
sprechend. Eine kleine Erleichterung verschaffen wir uns 10
für den vorliegenden Nachweis dadurch, daß wir weder die
mit der Breite zusammenhängende rückläufige Bewegung
(der Knoten), noch die Schiefe des Mondkreises in Betracht
ziehen[b], da bei einem so geringen Betrag der Neigung dem
Lauf in Länge keine nennenswerte Differenz erwächst. 15

I. Von den drei alten Finsternissen, welche wir aus den
einst in Babylon beobachteten ausgewählt haben, hat die
erste nach dem Wortlaut der erhaltenen Aufzeichnung im
ersten Jahre des Mardokempad am 29/30. ägyptischen Thoth[27]
(19. März 721 v. Chr.) stattgefunden. Die Finsternis be- 20
gann, heißt es, als reichlich eine Stunde nach dem Aufgang[c]
verflossen war, und war total. Da nun die Sonne im letzten
Drittel der Fische stand, somit die Nacht ziemlich genau
12 Äquinoktialstunden hatte, so fiel selbstverständlich der
Anfang der Finsternis 4½ Äquinoktialstunden vor Mitter- 25
nacht ($7^h 30^m$), die Mitte, weil die Finsternis zentral war[25],
2½ Stunden vor Mitternacht ($9^h 30^m$). Da wir die nach
(Äquinoktial-)Stunden angegebenen Epochen auf den Meridian
von Alexandria reduzieren, und dieser etwa ⅚ Äquinoktial-
stunde (d. s. 50^m) westlich des Meridians von Babylon liegt[16], 30

Margin notes: Hei 302 (line 4); Halma, p. 244 (line 19); Ha 245 (line 22); Hei 303 (line 29)

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a) Projiziert man den nördlichen Grenzpunkt der Breite,
was der Wiederkehrpunkt der Breite ist, auf die Ekliptik, so
fällt das Lot auf den Anfang des Grades in Länge, welcher
gleichfalls von den Knoten beiderseits 90° entfernt ist.

b) D. h. der schiefe Kreis wird in der Ebene der Ekliptik
als unverrückbar festliegend betrachtet.

c) D. i. 1½ Stunde nach dem Aufgang um 6^h nachm., wie
sich Z. 26 herausstellte.

so hat in Alexandria die Mitte der vorliegenden Finsternis
$3^{1}/_{3}$ Äquinoktialstunden vor Mitternacht ($8^h 40^m$) statt-
gefunden, für welche Stunde nach dem von uns mitgeteilten
Rechnungsverfahren (d. i. nach den Sonnentafeln) der genaue
5 Ort der Sonne)($24^0 30'$ war.[29]

Die zweite Finsternis hat nach der Aufzeichnung im zwei-
ten Jahre desselben Mardokempad am 18/19. ägyptischen
Thoth (8. März 720 v. Chr.) stattgefunden. Die Verfinsterung
betrug, heißt es, gerade um Mitternacht 3 Zoll von Süden.
10 Da demnach die Mitte in Babylon scheinbar genau zur
Mitternachtstunde stattgefunden hat, so muß sie in Alexandria
$^{5}/_{6}$ Stunde (d. s. 50^m) vor Mitternacht ($11^h 10^m$) eingetreten
sein, für welche Stunde der genaue Ort der Sonne)($13^0 45'$
war.[29]

15 Die dritte Finsternis hat nach der Aufzeichnung in demselben
Jahre des Mardokempad am 15/16. ägyptischen Phamenoth
(1. September 720 v. Chr.) stattgefunden. Sie begann, heißt
es, nach Aufgang und betrug über die Hälfte von Norden.
Da nun die Sonne im Anfang der Jungfrau stand, so betrug
20 die Länge der Nacht in Babylon ungefähr 11 Äquinoktial-
stunden, die halbe Nacht also $5^{1}/_{2}$ Stunden. Der Anfang
hat demnach, weil er „nach Aufgang" gewesen ist, höch-
stens 5 Äquinoktialstunden vor Mitternacht (7^h) stattgefun-
den, und die Mitte $3^{1}/_{2}$ Stunden vor Mitternacht ($8^h 30^m$),
25 weil der ganze Verlauf bei einer so bedeutenden Größe der
Verfinsterung nahezu 3 Stunden gedauert haben muß.[28]
In Alexandria trat demnach wieder die Mitte der Finsternis
$4^{1}/_{3}$ Äquinoktialstunden vor Mitternacht ($7^h 40^m$) ein, für
welche Stunde der genaue Ort der Sonne ﬠ $3^0 15'$ war.[29]
30 Es leuchtet also ein, daß von der Mitte der ersten Finster-
nis bis zur Mitte der zweiten die Sonne, und somit nach
Abzug ganzer Kreise auch der Mond (von ﬠ $24^0 30'$ bis
ﬠ $13^0 45'$, d. i. einen ganzen Kreis weniger $10^0 45' =$) $349^0 15'$
zurückgelegt hat, und von der Mitte der zweiten Finsternis
35 bis zur Mitte der dritten (von ﬠ $13^0 45'$ bis)($3^0 15'$) $169^0 30'$.
Nun beträgt die Zwischenzeit von der ersten Mitte bis zur
zweiten 354 Tage und $2^{1}/_{2}$ Äquinoktialstunden, wenn man

theoretisch (mit bürgerlichen Sonnentagen) schlechthin rechnet, aber $2\frac{1}{2}$ Stunden und 4 Minuten nach der Rechnung mit gleichförmigen Sonnentagen [a], ferner die Zwischenzeit von der zweiten Mitte bis zur dritten 176 Tage und $20\frac{1}{2}$ Äquinoktialstunden schlechthin, nach genauer Rechnung $20\frac{1}{5}$ Stunden. 5

Der Mond legt in gleichförmiger Bewegung — für einen so kurzen Zeitraum wird es nämlich keinen wahrnehmbaren Unterschied machen, wenn man sich an die Umläufe hält, welche den genauen nur nahe kommen [b] — nach Abzug ganzer Kreise zurück:

10

$$\text{in } 354^d \ 2^h 34^m \begin{cases} 306^0 25' \text{ in Anomalie,} \\ 345^0 51' \text{ in Länge;} \end{cases}$$

$$\text{in } 176^d 20^h 12^m \begin{cases} 150^0 26' \text{ in Anomalie,} \\ 170^0 \ 7' \text{ in Länge.} \end{cases}$$

Es ist klar, daß die im ersten Intervall auf dem Epizykel 15 zurückgelegten $306^0 25'$ der mittleren Bewegung des Mondes (in Länge) einen Mehrbetrag von $3^0 24'$ [c], dagegen die $150^0 26'$ des zweiten Intervalls der mittleren Bewegung einen Fehlbetrag von $0^0 37'$ [d] eingebracht haben.

Die vorstehend ermittelten Werte sollen als gegeben 20 angenommen werden. Es sei ABΓ der Epizykel des Mondes, und zwar soll A der Punkt sein, in welchem der Mond zur Mitte der ersten Finsternis stand, B der Punkt, in welchem er zur Mitte der zweiten stand, und Γ der Punkt,

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a) D. h. $2\frac{1}{2}$[st] nach bürgerlicher Zeit, aber 4^m mehr nach der wahren Sonnenzeit. Vgl. erl. Anm. 26.

b) Die Bemerkung bezieht sich darauf, daß Ptolemäus die Umlaufszahlen anstatt genau, d. i. bis zu den Sexten berechnet, nur bis zu den Minuten eines Grades angibt. Berechnet sind sie, wie die Nachprüfung zeigt, mit Berücksichtigung der Sekunden. Die Mondtafeln liefern die Werte: $306^0 24' 2''$, $345^0 50' 53''$; $150^0 25' 58''$, $170^0 7' 59''$. Die Sekunden sind nur im letzten Fall zur Erhöhung der Minutenzahl sehr auffallenderweise unbeachtet geblieben.

c) Weil die S. 220,33 festgestellte mittlere Bewegung in Länge $349^0 15'$ beträgt, d. i. $345^0 51' + 3^0 24'$.

d) Weil die S. 220,35 festgestellte mittlere Bewegung in Länge $169^0 30'$ beträgt, d. i. $170^0 7' - 0^0 37'$.

infolge der durch den Lauf auf dem Epizykelbogen ΛB ein-
tretenden Anomalie.

Folglich war der mittlere Ort des Mondes in Länge zur
Zeit der Mitte der zweiten Finsternis $\mathrm{ny}\ 14^{0}44'$, da ja der
5 genaue Ort $\mathrm{ny}\ 13^{0}45'$ war, während (S. 220, 18) die Sonne
in $\asymp 13^{0}45'$ stand.

II. Von den drei Finsternissen, welche wir aus der Zahl
derjenigen entnommen haben, die von uns selbst in Alexandria
auf das sorgfältigste beobachtet worden sind, hat die erste
10 im 17ten Jahre Hadrians[30] am 20/21. ägyptischen Payni
(6. Mai 133 n. Chr.) stattgefunden. Die Mitte derselben ist
nach unserer genauen Berechnung $^{3}/_{4}$ Äquinoktialstunde vor
Mitternacht ($11^{\mathrm{h}}15^{\mathrm{m}}$) eingetreten. Die Finsternis war total.
Für diese Stunde war der genaue Ort der Sonne $\mathrm{ö}\ 13^{0}15'$.[31]

15   Die zweite Finsternis hat im 19ten Jahre Hadrians am
2/3. ägyptischen Choiak (20. Okt. 134 n. Chr.) stattgefunden.
Die Mitte ist nach unserer Berechnung eine Äquinoktial-
stunde vor Mitternacht (11^{h}) eingetreten. Verfinstert waren
von Norden $^{5}/_{6}$ des Durchmessers. Für diese Stunde war
20 der genaue Ort der Sonne $\asymp 25^{0}10'$.[31]

Die dritte Finsternis hat im 20ten Jahre Hadrians am
19/20. ägyptischen Pharmuthi (6. März 136 n. Chr.) statt-
gefunden. Die Mitte ist nach unserer Berechnung 4 Äqui-
noktialstunden nach Mitternacht (4^{h} früh) eingetreten. Ver-
25 finstert war von Norden die Hälfte des Durchmessers. Der
genaue Ort der Sonne war für diese Stunde $\asymp 14^{0}5'$.[31]

Es leuchtet ein, daß auch hier der Mond nach Abzug
ganzer Kreise von der Mitte der ersten Finsternis bis zur
Mitte der zweiten sich ebensoviele Grade wie die Sonne,
30 d. s. (von $\mathrm{m}\ 13^{0}15'$ bis $\Upsilon 25^{0}10'$) $161^{0}55'$, und von der
Mitte der zweiten bis zur Mitte der dritten (von $\Upsilon 25^{0}10'$
bis $\mathrm{ny}\ 14^{0}5'$) $138^{0}55'$ bewegt hat. Nun beträgt die Zwischen-
zeit des ersten Intervalls 1 ägyptisches Jahr, 166 Tage und
$23^{3}/_{4}$ Äquinoktialstunden schlechthin, nach genauer Rechnung
$23^{5}/_{8}$, die des zweiten Intervalls 1 ägyptisches Jahr, 137 Tage
und 5 Äquinoktialstunden schlechthin, nach genauer Rech-
37 nung $5^{1}/_{2}$.[26]

Die mittlere Bewegung des Mondes beträgt

$$\text{in } 1^{\text{a}}166^{\text{d}}23^{5}\!/_{8}{}^{\text{h}} \begin{cases} 110^0 21' \text{ in Anomalie,} \\ 169^0 37' \text{ in Länge;} \end{cases}$$

$$\text{in } 1^{\text{a}}137^{\text{d}} \; 5^{1}\!/_{2}{}^{\text{h}} \begin{cases} 81^0 36' \text{ in Anomalie,} \\ 137^0 34' \text{ in Länge.}^{\text{a)}} \end{cases}$$

5

Es ist klar, daß die $110^0 21'$ des Epizykels des ersten Intervalls dem mittleren Lauf in Länge einen **Fehlbetrag** von $(169^0 37' - 161^0 55' =) 7^0 42'$, und die $81^0 36'$ des zweiten Intervalls dem mittleren Lauf in Länge einen **Mehrbetrag** von $(138^0 55' - 137^0 34' =) 1^0 21'$ eingebracht haben.

10

Diese Werte sollen als gegeben angenommen werden. Der Epizykel des Mondes sei wieder ABΓ, und zwar sei A als der Punkt angenommen, in welchem der Mond zur Mitte der ersten Finsternis stand, B als der Punkt der zweiten, und Γ als der Punkt der dritten Finsternis. Wie oben, denke man sich den Fort-
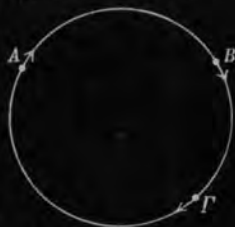
15

schritt des Mondes als von A nach B, und dann nach Γ 20 vor sich gehend, so daß der Bogen AB im Betrage von $110^0 21'$ dem mittleren Lauf in Länge, wie gesagt, einen **Fehlbetrag** von $7^0 42'$, und der Bogen BΓ im Betrage von $81^0 36'$ der Länge einen **Mehrbetrag** von $1^0 21'$ einbringt, während der noch übrige Bogen ΓA im Betrage von 25 $168^0 3'$ der Länge die übrigen $6^0 21'$ (zur Aufhebung des Fehlbetrags) zusetzt.

A. Daß auf dem Bogen AB das Apogeum liegen muß, Ha 257 geht deutlich daraus hervor, daß es weder auf dem Bogen Hei 317 BΓ, noch auf dem Bogen ΓA liegen kann, weil jeder der- 30 selben mit dem Mehrbetrag[b)] behaftet und kleiner als ein

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a) Die Nachrechnung nach den Mondtafeln ergibt folgende Werte: $110^0 21' 59''$, $169^0 37' 44''$; $81^0 36' 53''$, $137^0 33' 46''$. Überschießende Sekunden sind mithin nur im letzten Fall zur Erhöhung der Minutenzahl beachtet worden. Vgl. S. 221, Anm. [b)]
b) Derselbe kommt dem **erdnahen** Bogen des Epizykels zu.

ferner nachgewiesen worden ist, daß $\angle \triangle KN = 86^0 38'$ wie
$4R = 360^0$, so ergibt sich als Ergänzung zu $90^0 \ \angle K\triangle N$
Ha 262 mit $3^0 22'$. Da nun nach der Annahme (S. 229, 23) der
ganze Winkel $A\triangle B$ in demselben Maße mit $7^0 42'$ gegeben
5 war, so bleibt für $\angle \Lambda\triangle B$ als Differenz $4^0 20'$. Das ist der
Winkel, welcher den Ekliptikbogen unterspannt, der dem
(gesuchten) mittleren Ort in Länge abgeht[a] infolge der durch
den Lauf auf dem Epizykelbogen ΛB eintretenden Anomalie.

     Folglich war der mittlere Ort des Mondes in Länge
Hei 324 zur Zeit der Mitte der zweiten Finsternis $\Upsilon \ 29^0 30'$, da ja
11 der genaue Ort $\Upsilon \ 25^0 10'$ war, während (S. 228, 20) die
Sonne in $\triangleq 25^0 10'$ stand.

Siebentes Kapitel.
Korrektion des mittleren Laufs des Mondes
in Länge und Anomalie.

     Bei der zweiten von den alten Finsternissen stand der
Mond, wie wir (S. 228, 4) nachgewiesen haben, zur Zeit der
15 Mitte bei gleichförmiger Bewegung in Länge in $\mathem{m}$ $14^0 44'$,
in Anomalie (S. 227, 24) vom Apogeum des Epizykels
$12^0 24'$ entfernt, während er bei der zweiten der zu unserer
Zeit beobachteten drei Finsternisse, wie (oben Z. 10) nach-
gewiesen wurde, gleichfalls bei (gleichförmiger oder) mittlerer
20 Bewegung in Länge in $\Upsilon \ 29^0 30'$, in Anomalie vom Apo-
geum $64^0 38'$ entfernt stand. Daraus ist ersichtlich, daß
der Mond in der zwischen den beiden ebengenannten Finster-
nissen verstrichenen Zeit in mittlerer Bewegung nach Abzug
Ha 263 ganzer Kreise in Länge (von $\mathem{m}$ $14^0 44'$ bis $\Upsilon \ 29^0 30'$) $224^0 46'$,
25 in Anomalie ($64^0 38' - 12^0 24' =$) $52^0 14'$ als Überschuß zu-
gesetzt hat. Nun beträgt die Zwischenzeit zwischen dem
zweiten Jahre des Mardokempad von dem 18/19. Thoth

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     a) Der gesuchte mittlere Ort Λ ist dem gegebenen genauen
Ort B in der Ekliptik $4^0 20'$ voraus; folglich muß man zu dem
gegebenen genauen Ort B $4^0 20'$ addieren, um den mittleren
Ort Λ zu erhalten. Vgl. Anm. 32.

$^5/_6$ Äquinoktialstunde vor Mitternacht (8. März 720 v. Chr. $11^h 10^m$ abends) und dem 19ten Jahre Hadrians von dem 2/3. Choiak 1 Äquinoktialstunde vor Mitternacht (20. Oktober 134 n. Chr. 11^h abends) 854 ägyptische Jahre, 73 Tage und $23^5/_6$ Äquinoktialstunden schlechthin, nach genauer Rechnung mit gleichförmigen Sonnentagen[a)] $23^1/_3$, d. 8. Hei 325 311 783 volle Tage und $23^1/_3$ Äquinoktialstunden. Aus den früher mitgeteilten Beträgen der täglichen Bewegung finden wir nach den Grundwerten (S. 203, 26; 204, 4), die wir v o r der Korrektion (S. 204, 24) ermittelt hatten, daß auf diese Zahl von Tagen nach Abzug ganzer Kreise als Überschuß in Länge $224^0 46'$, als Überschuß in Anomalie $52^0 31'$ entfallen. Folglich ist der Überschuß in Länge, wie schon (S. 204, 20) bemerkt, vollkommen übereinstimmend gefunden mit dem Ergebnis, welches von uns an der Hand der mitgeteilten Beobachtungen erzielt worden ist, während der Überschuß in Anomalie einen Mehrbetrag von $(52^0 31' - 52^0 14' =) 0^0 17'$ aufweist.

Deshalb haben wir vor der Aufstellung der Tafeln, um die Korrektion der Werte des täglichen Laufs zu ermöglichen, diese 17 Minuten eines Grades auf die vorliegende Zahl von Tagen verteilt und den auf den einzelnen Tag entfallenden Quotienten im Betrage von $0^0 0' 0'' 0''' 11^{IV} 46^V 39^{VI}$ von dem v o r der Korrektion gewonnenen Werte der täglichen mittleren Bewegung in Anomalie abgezogen.[b)] Auf diese Weise haben wir den berichtigten Wert zu $13^0 3' 53'' 56''' 17^{IV} 51^V 59^{VI}$ gefunden und dementsprechend auch die weiteren für die Tafeln bestimmten sukzessiven Summierungen vorgenommen.

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a) Der ausführlichere griechische Wortlaut der Stelle Hei 304,19 ist sowohl hier als auch in späteren Stellen der Übersetzung zugrunde gelegt worden. Vgl S. 221, 2.

b) Die Multiplikation mit der alten Anomaliezahl hat ein zu großes Ergebnis erbracht, folglich war die alte Zahl zu groß.

Achtes Kapitel.
Die Epoche der gleichförmigen Bewegungen des Mondes in Länge und Anomalie.

Ha 264   Um auch die Epoche dieser Bewegungen an dasselbe erste Jahr Nabonassars, und zwar an die Mittagstunde des 1. ägyptischen Thoth (26. Februar 747 v. Chr.) zu knüpfen, haben wir die Zwischenzeit von da bis zur Mitte der zweiten
Hei 326 von den drei ersten diesem Datum näher liegenden Finster-
6   nissen gewählt. Diese Finsternis hat, wie (S. 220, 6) gesagt, stattgefunden im zweiten Jahre des Mardokempad am 18/19. ägyptischen Thoth $^5/_6$ Äquinoktialstunde vor Mitternacht (8. März 720 v. Chr. $11^h 10^m$ abends). Die Zwischen-
10 zeit beträgt 27 ägyptische Jahre, 17 Tage und $11^1/_6$ Stunden sowohl schlechthin wie nach der genauen Rechnung. Für diese Zeit bieten die Tafeln nach Abzug ganzer Kreise als Überschuß in Länge $123^0 22'$, und als Überschuß in Anomalie $103^0 35'$.[a]   Wenn wir diese Beträge von den zur
15 Mitte der zweiten Finsternis (S. 227 f.) festgestellten Epochen des Mondes (♍ $14^0 44'$ L. und $12^0 24'$ i. A.) in Abzug bringen, d. h. jeden Betrag von dem ihm entsprechenden, so werden wir für die Mittagstunde des 1. ägyptischen Thoth des ersten Jahres Nabonassars finden
20   1. als mittleren Ort in Länge[b]   ♉ $11^0 22'$,
          2. als Entfernung vom Apogeum
             des Epizykels in Anomalie[c] $268^0 49'$,
          3. als Elongation[d] $70^0 37'$.
    Letztere ergibt sich mit Rücksicht darauf, daß als Epoche
25 der Sonne zur nämlichen Stunde (S. 185, 7) ♓ $0^0 45'$ nachgewiesen wurde.

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a) Die Nachprüfung ergibt $123^0 22' 32''$ und $103^0 35' 20''$.
b) $164^0 44'$ Länge vom Frühlingspunkt ab gezählt, fallen auf ♍ $14^0 44'$, von da $123^0 22'$ rückwärts gezählt, d. i. abgezogen, führen auf $41^0 22'$, d. i. ♉ $11^0 22'$.
c) $360^0 + 12^0 24' - 103^0 35' = 268^0 49'$.
d) $29^0 15'$ der Fische, 30^0 des Widders und $11^0 22'$ des Stiers geben in Summa $70^0 37'$.

Neuntes Kapitel.
Korrektion der mittleren Bewegung des Mondes in Breite und Epoche derselben.

Die periodischen Bewegungen in Länge und in Anomalie, sowie die Epochen derselben haben wir auf dem vorstehend beschriebenen methodischen Wege festgestellt. Für die Bewegung in Breite haben wir dagegen früher fehlerhafte Beträge erzielt, solange auch wir von der Voraussetzung Hipparchs ausgingen, daß der Mond ohne merklichen Fehler 650 mal den von ihm durchlaufenen Kreis und $2^1/_2$ mal den Kreis des (Erd-) Schattens in seiner mittleren Entfernung bei den Syzygien messe.[a] Denn nur wenn diese Verhältnisse und der Betrag der Neigung des schiefen Kreises des Mondes gegeben sind, lassen sich die beiderseits des Knotens liegenden Grenzen seiner partialen Finsternisse bestimmen. Wir nahmen damals Finsternisintervalle vor, berechneten aus der Größe der Verfinsterungen zur Zeit ihrer Mitten die genauen Örter in Breite auf dem schiefen Kreise von irgendeinem der Knoten aus, gewannen durch Anbringung der nachgewiesenen Anomaliedifferenz aus dem genauen Ort den periodischen und fanden so die für die Mitte jeder Finsternis geltenden Epochen der periodischen Breite und nach Abzug ganzer Kreise den in der Zwischenzeit gewonnenen Überschuß.

Neuerdings haben wir aber bei Anwendung gefälligerer Methoden, welche zur Erlangung der angestrebten Ergebnisse von den früher gemachten Voraussetzungen unabhängig sind, den mit Hilfe jener ersten Grundlagen berechneten Ort in Breite fehlerhaft gefunden und haben nach dem jetzt unabhängig davon festgestellten Ort die Hypothesen selbst, die sich mit den Größen und den Entfernungen befassen, berichtigt, nachdem wir den Beweis ihrer Haltlosigkeit geführt

<div style="margin-left:2em">

a) D. h. daß der Durchmesser des vom Monde bei mittlerer Entfernung durchmessenen Schattenkreises $2^1/_2$ Monddurchmesser betrage.

</div>

hatten. Das entsprechende Verfahren haben wir (Buch XIII,
Kap. 1) bei den Hypothesen des Saturn und des Merkur
angewendet unter Beseitigung einiger früheren Ergebnisse,
die nicht mit genügender Genauigkeit erzielt waren, weil
5 wir später in den Besitz von besser fundierten Beobachtungen
gelangt waren. Denn wer mit wirklichem Wahrheitssinn und
unermüdlicher Gründlichkeit an die theoretische Behandlung
dieser Verhältnisse herantritt, der soll sich nicht allein zur
Berichtigung der alten Hypothesen die von der Neuzeit ge-
10 botenen Mittel und Wege, die sicherer zum Ziele führen,
zunutze machen, sondern auch zur Berichtigung der eigenen
Hypothesen, wenn sie besserungsbedürftig sind, und soll es
bei der Größe und Göttlichkeit der Lehre, zu deren Ver-
kündiger er sich berufen fühlt, für keine Schande halten,
15 wenn ihm die zu größerer Genauigkeit führende Berichtigung
auch von anderer Seite zu Teil wird, und nicht nur aus
eigener Erkenntnis.

Auf welche Weise wir den Beweis für die hier angedeu-
teten Einzelheiten liefern, werden wir in den weiteren Büchern
20 (Buch VI, Kap. 5) unseres Handbuchs an den geeigneten
Stellen darlegen. Vorläufig werden wir uns, wie es die
logische Reihenfolge verlangt, dem Nachweis des Laufs in
Breite zuwenden, dessen Gang folgender ist.

I. Zunächst haben wir zur Korrektion des mittleren Laufs
25 an sich aus der Zahl der zuverlässig aufgezeichneten Mond-
finsternisse solche von möglichst langer Zwischenzeit aus-
gesucht, bei denen erstens die Größen der Verfinsterungen
gleich waren, die zweitens in der Nähe desselben Kno-
tens stattfanden, die drittens entweder beide von Norden
30 oder beide von Süden eintraten, und bei denen viertens
der Mond in der gleichen Entfernung stand. Wenn
diese Umstände zusammenwirken, muß unbedingt das Zen-
trum des Mondes bei jeder der beiden Finsternisse die gleich-
große Entfernung nach derselben Seite von demselben
35 Knoten haben, d. h. der genaue Lauf des Mondes muß in
der zwischen den Beobachtungen liegenden Zeit ganze
Kreise der Breite umfassen.

Als erste Finsternis haben wir diejenige genommen, welche unter Darius I. in Babylon im 31ten Jahre seiner Regierung am 3/4. ägyptischen Tybi in der Mitte der 6ten (Nacht-) Stunde (25. April 491 v. Chr. 11^h 30^m abends) beobachtet worden ist. Bei derselben wurde der Mond, 5 wie die genaue Angabe lautet, 2 Zoll (d. i. den sechsten Teil seines Durchmessers) von Süden verfinstert.

Als zweite haben wir diejenige gewählt, welche in Alexandria im 9ten Jahre Hadrians am 17/18. ägyptischen Pachon 3^3/$_5$ Äquinoktialstunden vor Mitternacht (5. April 125 n. Chr. 10 8^h 24^m abends) beobachtet worden ist. Bei derselben wurde der Mond gleichfalls den sechsten Teil seines Durchmessers von Süden verfinstert.

Bei jeder der beiden Finsternisse lag der Ort des Mondes in Breite in der Nähe des niedersteigenden Knotens. 15 Dieser Umstand läßt sich nämlich schon aus Unterlagen, die noch allgemeiner gehalten sind, abnehmen.[a] Die Entfernung des Mondes war nahezu die gleiche und ein wenig erdnäher als die mittlere. Auch dieser Umstand ergibt sich ja klar aus den früher geführten Nachweisen, welche die 20 Anomalie betreffen.[b] Da nun, wenn der Mond von Süden Hei 330 verfinstert wird, sein Zentrum nördlich der Ekliptik liegt, so leuchtet ein, daß bei jeder der beiden Finsternisse das Zentrum des Mondes um den gleichen Betrag vor (d. i. Ha 268 westlich von) dem niedersteigenden Knoten stand. 25

Nun hatte der Mond bei der ersten Finsternis von dem Apogeum des Epizykels eine Entfernung von 100^0 19'. Es fand nämlich die Mitte in Babylon ^{1}/$_2$ Stunde vor Mitternacht statt, in Alexandria 1^1/$_3$ Äquinoktialstunde[c] vor Mitternacht. Somit beträgt die Zeit von der Nabonassarischen 30 Epoche (1. Thoth 747 v. Chr.) ab gerechnet 256 Jahre,

a) Insofern Verfinsterung von Süden vor dem niedersteigenden, Verfinsterung von Norden vor dem aufsteigenden Knoten eintreten muß.

b) Insofern der Stand des Mondes auf dem Epizykel, d. i. seine Entfernung vom Apogeum desselben, maßgebend ist für die größere oder geringere Entfernung von der Erde.

c) d. i. 50^m früher, vgl. S. 219, 30.

122 Tage und $10^2/_3$ Äquinoktialstunden schlechthin, nach
der Rechnung mit gleichförmigen Sonnentagen $10^1/_4$. Folglich
war der genaue Lauf 5^0 kleiner als der periodische.[a]

Bei der zweiten Finsternis hatte der Mond von dem
5 Apogeum des Epizykels eine Entfernung von $251^0 53'$. In
diesem Fall beträgt nämlich die Zeit von Beginn der Epoche
bis zur Mitte der Finsternis 871 Jahre, 256 Tage und
$8^2/_5$ Äquinoktialstunden schlechthin, $8^1/_{12}$ nach genauer
Rechnung. Folglich war der genaue Lauf $4^0 53'$ größer
10 als der mittlere.[b]

In der zwischen den beiden Finsternissen liegenden Zeit
Hei 331 von 615 ägyptischen Jahren, 133 Tagen und $21^5/_6$ Äqui-
noktialstunden umfaßt demnach der genaue Lauf des Mondes
in Breite (nach S. 238, 35) ganze Kreise, während dem
15 periodischen an ganzen Kreisen die aus beiden Anomalie-
beträgen sich summierenden $9^0 53'$ fehlen. Führt man die
Rechnung mit dem früher (S. 204, 11) mitgeteilten Wert
für den mittleren (täglichen) Lauf (in Breite) aus, welcher
auf den von Hipparch angenommenen Grundlagen beruht,
20 so fehlen in der obengenannten Zeit an ganzen Wiederkehren
$10^0 2'$. Folglich ist (nach unserer Rechnung) der mittlere
Lauf in Breite im Widerspruch mit den (von Hipparch an-
genommenen) Grundlagen $0^0 9'$ größer geworden.[c]

Diese 9 Minuten eines Grades haben wir nun auf die
Ba 269 rund 224 609 Tage, welche in der obengenannten Zeit ent-
26 halten sind, verteilt und den aus der Division erhaltenen
Quotienten von $0^0 0' 0'' 0''' 8^{IV} 39^V 18^{VI}$ addiert[d] zu dem

a) Die Nachprüfung ergibt nach den Tafeln der Anomalie
für diese Zwischenzeit $100^0 19' 19''$, wozu die Tabelle der ein-
fachen Anomalie die Anomaliedifferenz -5^0 liefert.

b) Die Nachprüfung ergibt $251^0 52' 30''$ mit der Anomalie-
differenz $+4^0 53'$

c) er Hipparchische Fehlbetrag an ganzen Kreisen von
$10^0 2'$ macht den mittleren Lauf zu klein; durch den Ptole-
mäischen Fehlbetrag von $9^0 53'$ wird er um die Differenz beider
Beträge größer gemacht.

d) Weil der Hipparchische Wert für den mittleren Lauf in
Breite durch Multiplikation zu einem zu großen Unterschied
gegen den genauen Lauf in Breite führte, mithin zu klein war.

früher mitgeteilten Betrage der mittleren täglichen Bewegung
in Breite, der auf den Grundlagen Hipparchs beruht. So
fanden wir (S. 204, 27) den berichtigten Wert zu $1^{,3}0 13' 45''$
$39''' 48^{IV} 56^{V} 37^{VI}$. Dementsprechend haben wir dann auch
wieder die weiteren für die Tafeln bestimmten sukzessiven 5
Summierungen vorgenommen.

II. Nachdem auf diese Weise ein für allemal die periodische
Bewegung in Breite nachgewiesen war, suchten wir weiter
auch zur Feststellung ihrer Epochen wieder das Intervall
von zwei zuverlässig beobachteten Finsternissen, bei denen Hei 332
die übrigen Verhältnisse dieselben waren wie im vorigen 11
Fall, d. h. wir suchten Finsternisse, bei denen die Entfernung
des Mondes nahezu die gleiche war, die Verfinsterungen von
gleicher Größe waren und entweder beide nördlich oder
beide südlich eintraten, bei denen aber der Knoten nicht 15
mehr derselbe war, sondern der gegenüberliegende.

Die erste von diesen Finsternissen haben wir (S. 220, 6)
bereits zum Nachweis der Anomalie benutzt: sie fand statt
im zweiten Jahre des Mardokempad am 18/19. ägyptischen
Thoth (8. März 720 v. Chr.), in Babylon zur Mitternacht- 20
stunde, in Alexandria $5/6$ Äquinoktialstunde vor Mitternacht
($11^h 10^m$). Bei derselben war laut ausdrücklicher Angabe
der Mond 3 Zoll von Süden verfinstert.

Die zweite, welche auch Hipparch benutzt hat, fand statt
im 20sten Jahre des Darius, des Nachfolgers des Kambyses, 25
am 28/29. ägyptischen Epiphi (19. November 502 v. Chr.),
als die Nacht $6^1/3$ Äquinoktialstunden[a] vorgeschritten war.
Bei derselben war der Mond gleichfalls (drei Zoll, d. i.) den Ha 270
vierten Teil seines Durchmessers von Süden verfinstert.
Da die halbe Nacht damals $6^3/4$ Äquinoktialstunden betrug, 30
so war die Mitte in Babylon $2/5$ Äquinoktialstunde vor
Mitternacht ($11^h 36^m$), in Alexandria $1^1/4$ Äquinoktialstunde
vor Mitternacht ($10^h 45^m$).

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a) Da die halbe Nacht $6^{st} 45^m$ beträgt, so entfallen auf den
halben Tag von Mittag bis Sonnenuntergang $5^{st} 15^m$; folglich
fällt die Mitte der Finsternis $6^{st} 20^m$ nach dem Sonnenuntergang
auf $11^h 35^m$.

Jede von diesen beiden Finsternissen fand statt, als der Mond in der größten Entfernung stand[a], aber die erste im aufsteigenden, die zweite im niedersteigenden Knoten, so daß auch in diesem Fall das Zentrum des Mondes bei ihnen (nach S. 239, 21) um den gleichen Betrag nördlich der Ekliptik lag.

Es sei ABΓ der schiefe Kreis des Mondes um den Durchmesser AΓ. Punkt A sei als der aufsteigende Knoten angenommen, Punkt Γ als der niedersteigende und Punkt B als der nördlichste Grenzpunkt. Von den beiden Knoten A und Γ trage man nach B zu zwei gleichgroße Bogen AΔ und ΓE ab, d. h.: bei der ersten Finsternis stand das Zentrum des Mondes in Δ, bei der zweiten in E.
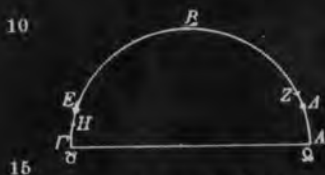
Nun beträgt bis zur ersten Finsternis die Zeit vom Beginn der Epoche 27 ägyptische Jahre, 17 Tage und $11^{1}/_{6}$ Äquinoktialstunden sowohl schlechthin wie nach genauer Rechnung. Daher war der Mond von dem Apogeum des Epizykels $12^{0}24'$ entfernt, und der periodische Lauf war $0^{0}59'$ größer als der genaue (vgl. S. 227, 24. 29). Desgleichen beträgt die Zeit bis zur zweiten Finsternis 245 ägyptische Jahre, 327 Tage und $10^{3}/_{4}$ Äquinoktialstunden schlechthin, $10^{1}/_{4}$ nach genauer Rechnung. Daher war der Mond von dem Apogeum des Epizykels $2^{0}44'$ entfernt, und der periodische Lauf war $0^{0}13'$ größer als der genaue.[b] Endlich umfaßt die zwischen den Beobachtungen verstrichene Zeit 218 ägyptische Jahre, 309 Tage und $23^{1}/_{12}$ Äquinoktialstunden und bringt nach der Rechnung mit der (S. 241, 3) nach-

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a) Wie aus den weiterhin angegebenen Entfernungen des Mondes von dem Apogeum des Epizykels hervorgeht.

b) Die Nachprüfung ergibt für diese Zwischenzeit $2^{0}44'14''$ in Anomalie, wozu sich nach der Tabelle der einfachen Anomalie, welche bei 6^{0} des Epizykels mit der Anomaliedifferenz $-0^{0}29'$ beginnt, $0^{0}13'$ berechnen lassen.

gewiesenen mittleren Bewegung in Breite einen Überschuß
von $160^0 4'$ (genau $32''$ mehr).

Den ermittelten Werten entsprechend sei nun der mittlere
Ort des Mondzentrums bei der ersten Finsternis Z, bei der
zweiten H. Aus den gegebenen Größen 5

$$b\,ZBH = 160^0 4', \quad b\,\triangle Z = 0^0 59', \quad b\,EH = 0^0 13',$$

ergibt sich $\quad b\,\triangle E = b\,ZBH + b\,\triangle Z - b\,EH = 160^0 50'.$

Folglich ist $\quad b\,A\triangle + b\,E\Gamma = 19^0 10'$ als Ergänzung zu 180^0.

Da nun diese beiden Bogen einander gleich sind, so be-
trägt jeder derselben $9^0 35'$. Um diesen Betrag war also der 10
genaue Lauf des Mondes zur Zeit der ersten Finsternis ($\triangle$)
bereits über den aufsteigenden Knoten (östlich) hinaus,
während er zur Zeit der zweiten Finsternis (E) noch eben-
soweit vor (d. i. westwärts von) dem niedersteigenden
Knoten verlief. Folglich ist 15

$$AZ = A\triangle + \triangle Z = 10^0 34',$$
$$\Gamma H = \Gamma E - EH = 9^0 22'.$$

Das heißt: der periodische Lauf des Mondes war zur
Zeit der ersten Finsternis (Z) bereits $10^0 34'$ über den auf-
steigenden Knoten (östlich) hinaus und vom nördlichen 20
Grenzpunkt B (als dem Ausgangspunkt der Bewegung in Hei 335
Breite $270^0 + 10^0 34' =$) $280^0 34'$ entfernt, während er zur
Zeit der zweiten Finsternis (H) noch $9^0 32'$ vor (d. i. west-
wärts von) dem niedersteigenden Knoten verlief und von
demselben nördlichen Grenzpunkt ($90^0 - 9^0 22' =$) $80^0 38'$ 25
entfernt war.

Nun bleibt noch folgende Operation übrig. Für die Zeit Ha 272
vom Beginn der Epoche bis zur Mitte der ersten Finsternis
ergibt sich (nach den Tafeln berechnet) ein Überschuß in
Breite von $286^0 19'$ (genau $18' 18''$). Wenn wir (um diesen 30
Überschuß nach rückwärts abtragen zu können) zu den
oben (Z. 22) für die Epoche der ersten Finsternis gefundenen
$280^0 34'$ einen ganzen Kreis addieren und von der Summe
obigen Betrag von $286^0 19'$ abziehen (d. i. rückwärts zählen),
so erhalten wir für die Mittagstunde des 1. ägyptischen 35

Thoth des ersten Jahres Nabonassars als Epoche der periodischen Breite, vom nördlichen Grenzpunkt ab gerechnet, $354^0 15'$.

5 Zur regelrechten Erledigung des rechnerischen Verfahrens, welches sich bei den Konjunktionen und den Vollmonden nötig macht, werden wir, da wir in diesen Positionen der noch nachzuweisenden zweiten Anomalie in keiner Weise bedürfen, wieder eine Tabelle für die einzelnen Abschnitte (des Epizykels) aufstellen. Die praktische Gewinnung dieser 10 Abschnitte haben wir wieder auf dem Wege der geometrischen Konstruktion wie bei der Sonne (S. 175 f., 179 f.) erzielt und hierbei das Verhältnis $60 : 5\frac{1}{4}$ [a]) (statt wie dort $60 : 2\frac{1}{2}$) in Anwendung gebracht. Wir haben wieder die am Apogeum liegenden Quadranten in Abschnitte von 6 zu 6 Grad 15 zerlegt, die am Perigeum liegenden Quadranten aber in solche von 3 zu 3 Grad, so daß das Äußere der Tabelle wieder ähnlich wie bei der Sonne wird, d. h. sich auf

Hei 336 45 (d. i. 3×15) Zeilen zu 3 Spalten erstreckt. Die ersten zwei Spalten enthalten die Argumentzahlen der Grade der 20 Anomalie (d. i. der Grade vom Apogeum des Epizykels ab), die dritte die zu jedem Abschnitt gesetzten, auf ihn entfallenden Prosthaphäresisbeträge, so genannt, weil bei der (nach dieser Tabelle vorzunehmenden) Berechnung zur Gewinnung der (genauen) Länge und Breite (aus der 25 periodischen) Abzug des Betrags (Aphäresis) eintritt, wenn die Argumentzahl der Anomalie, vom Apogeum des Epizykels ab gerechnet, unter 180^0 beträgt, Zusatz des Betrags (Prosthesis), wenn sie über 180^0 hinausgeht.[32])

Die Tabelle gestaltet sich folgendermaßen.

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a) Dasselbe war S. 233, 3 mit $60^P : 5^F 14'$ gewonnen worden.

Zehntes Kapitel.

Tabelle der ersten, d. i. einfachen Anomalie des Mondes. (Ha 273, Hei 337)

Gemeinsame Argumentzahlen		Prosthaphäresis	Gemeinsame Argumentzahlen		Prosthaphäresis	Gemeinsame Argumentzahlen		Prosthaphäresis
6°	354°	0°29'	93°	267°	5° 0'	138°	222°	3°35'
12	348	0°57'	96	264	5° 1'	141	219	3°23'
18	342	1°25'	99	261	5° 0'	144	216	3°10'
24	336	1°53'	102	258	4°59'	147	213	2°57'
30	330	2°19'	1.5	255	4°57'	150	210	2°43'
36	324	2°44'	108	252	4°53'	153	207	2°28'
42	318	3° 8'	111	249	4°49'	156	204	2°13'
48	312	3°31'	114	246	4°44'	159	201	1°57'
54	306	3°51'	117	243	4°38'	162	198	1°41'
60	300	4° 8'	120	240	4°31'	165	195	1 25'
66	294	4°24'	123	237	4°24'	168	192	1° 9'
72	288	4°38'	126	234	4°16'	171	189	0°52'
78	282	4°49'	129	231	4° 7'	174	186	0 35'
84	276	4°56'	132	228	3°57'	177	183	0 18'
90	270	4°59'	135	225	3°46'	180	180	0° 0'

Elftes Kapitel.

Nachweis, daß sich nicht wegen Verschiedenheit der Hypothesen, sondern infolge der Berechnungen nach Hipparch eine Differenz im Betrage der Anomalie des Mondes herausstellt.

Im Hinblick auf die vorstehend geführten Nachweise könnte wohl mit Recht jemand die Frage aufwerfen, wie es kommt, daß sich aus den Mondfinsternissen, die Hipparch zur Feststellung der einfachen Anomalie in Vergleich gestellt hat, weder dasselbe Verhältnis ergibt, wie das von uns (S. 233, 3 mit 60:5¼) nachgewiesene, noch Übereinstimmung des ersten Verhältnisses, welches (von Hipparch) mit Hilfe der exzentrischen Hypothese nachgewiesen worden ist, mit dem zweiten, welches mit Hilfe der epizyklischen Hypothese errechnet worden ist. Nämlich bei dem ersten Nachweis erhält er das Verhältnis des Halbmessers des

Exzenters zu der Verbindungslinie der Mittelpunkte des Ex
zenters und der Ekliptik[a] mit $(\Theta \Lambda)$ $3144^{\mathrm{p}} : (\Lambda \mathrm{M})$ $327^2/_3{}^{\mathrm{p}} =$
$60^{\mathrm{p}} : 6^{\mathrm{p}} 15'$, während er bei dem zweiten Nachweis das
Verhältnis der Verbindungslinie der Mittelpunkte der Eklip-
5 tik und des Epizykels[b] zu dem Halbmesser des Epizykels
mit $(\triangle \mathrm{K})$ $3122^1/_2{}^{\mathrm{p}} : (\mathrm{KM})$ $247^1/_2{}^{\mathrm{p}} = 60^{\mathrm{p}} : 4^{\mathrm{p}} 46'$ findet. Es
bewirkt aber das Verhältnis $60^{\mathrm{p}} : 6^1/_4{}^{\mathrm{p}}$ als Maximum der
Hei 339 Anomaliedifferenz $5^{\circ}49'$, das Verhältnis $60^{\mathrm{p}} : 4^{\mathrm{p}} 46'$ nur
$4^{\circ}34'$, während nach unserer Berechnung das Verhältnis
10 $60^{\mathrm{p}} : 5^1/_4{}^{\mathrm{p}}$ die (in der Tabelle) mitgeteilte Differenz von
rund $5''$ (genau $5^{\circ}1'$) verursacht.

275   Daß nun nicht infolge mangelnder Übereinstimmung der
Hypothesen, wie manche meinen, ein so auffallend abweichen-
des Ergebnis sich herausgestellt hat, das ist uns erstens
15 bei der gelegentlichen Erörterung kurz vorher (S. 213 – 217)
daraus ersichtlich geworden, daß nach beiden Hypothesen
unterschiedslos dieselben Erscheinungen eintreten, zweitens
aber würden wir auch mit Hilfe der Zahlen, wenn wir
uns auf die Berechnungen einlassen wollten[c], nach beiden
20 Hypothesen dasselbe Verhältnis als Ergebnis finden. Aller-
dings müßten wir uns bei dem Nachweis nach jeder der
beiden Hypothesen an dieselben Erscheinungen halten, und
nicht an verschiedene, wie dies Hipparch tut. Denn in
diesem Fall, d. h. wenn nicht dieselben Finsternisse zu-
25 grunde gelegt sind, wird es leicht möglich sein, daß der
die Abweichung verursachende Faktor entweder in den Be-
obachtungen selbst zu suchen ist oder sich bei der Berech-
nung der Intervalle (der Finsternismitten) eingeschlichen
hat. So werden wir denn wirklich bei jenen Finsternissen

a) Es ist das Verhältnis der Exzentrizität, zu welchem
man S. 216, 17 vergleiche.
b) Es ist das Verhältnis des Halbmessers des den Epizykel
tragenden Konzenters zu dem Halbmesser des Epizykels. Man
vergleiche hierzu S. 232, 18.
c) Dieselben müßten wieder auf dem umständlichen Wege
geführt werden, für welchen Beispiele (S. 222—27; 229—33) in
den Abteilungen A und B des Nachweises der Anomaliedifferenz
vorliegen.

finden, daß zwar die Syzygien sachverständig beobachtet
und mit den von uns nachgewiesenen Grundwerten der
gleichförmigen und ungleichförmigen Bewegung in Über-
einstimmung sind[a], daß aber die Berechnung der Intervalle,
auf welcher der Nachweis des zahlenmäßigen Betrags des 5
Verhältnisses beruht, nicht mit der erforderlichen Sorgfalt
angestellt worden ist. Wir werden unseren Nachweis auf
jeden dieser beiden Punkte erstrecken und machen den An-
fang mit den drei ersten Finsternissen.

1. Diese drei Finsternisse versichert er aus der Zahl der Hei 340
von Babylon herübergebrachten als dort beobachtet in Ver- 11
gleich gestellt zu haben.[b] Die erste habe stattgefunden
unter dem athenischen Archonten Phanostratos im Monat
Poseideon; vom Monde sei ein kleiner Teil der Scheibe vom
Sommeraufgang (d. i. von Nordost) her verfinstert gewesen, 15
als von der Nacht noch eine halbe Stunde übrig war; „und
noch verfinstert", sind seine Worte, „ist er untergegangen."
Dieser Zeitpunkt fällt demnach in das 366te Jahr seit Ha 276
Nabonassar, und zwar, wie er selbst angibt, auf den 26/27.
ägyptischen Thoth (23. Dezember 383 v. Chr.) $5\frac{1}{2}$ bürger- 20
liche Stunden nach Mitternacht, da ja „von der Nacht noch
eine halbe Stunde übrig war". Da nun die Sonne am Ende
des Schützen stand, so betrug die Nachtstunde in Babylon
18 Zeitgrade (d. s. 72^m) — denn die Nacht ist gleich
$14\frac{2}{5}$ Äquinoktialstunden — folglich machen die $5\frac{1}{2}$ bürger- 25
lichen Stunden $6\frac{3}{5}$ Äquinoktialstunden aus.[c] Der Anfang
der Finsternis hat also stattgefunden $(12 + 6\frac{3}{5} =) 1 \cdot \frac{3}{5}$

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a) D. h. bei Berechnung der Syzygien nach den Sonnen-
und den Mondtafeln werden Ergebnisse erzielt, welche mit
den Beobachtungen Hipparchs übereinstimmen.

b) Oppolzer (Ginzel, Kanon der Finsternisse S. 233) bezweifelt,
daß diese Finsternisse in Babylon beobachtet worden seien;
sie sollen vielmehr aus Beobachtungen, die vielleicht aus Athen
oder einer ionischen Kolonie herrühren, reduziert sein; ob mit
den richtigen Längenunterschieden, bleibe fraglich.

c) Man vergleiche die erste u. dritte Aufgabe Anm. 17:

$$1. \quad \frac{15^0 \cdot 14\frac{2}{5} \cdot 4}{12} = 5 \cdot 14\frac{2}{5} = 72^m. \quad 3. \quad \frac{5\frac{1}{2}^{st} \cdot 18}{15} = \frac{5\frac{1}{2} \cdot 6}{5} = 6\frac{3}{5}^{st}.$$

Äquinoktialstunden nach dem Mittag des 26ᵗᵉⁿ (27. Thoth
6ʰ 36ᵐ früh); da aber nur ein kleiner Teil in den Schatten
trat, so kann die ganze Dauer der Finsternis höchstens
1¹⁄₂ Stunde betragen haben; die Mitte muß demnach

5 (18³⁄₅ + ³⁄₄ =) 19¹⁄₃ Äquinoktialstunden nach dem Mittag
(27. Thoth 7ʰ 20ᵐ früh) gewesen sein. In Alexandria hat
folglich die Mitte der Finsternis 18¹⁄₂ Äquinoktialstunden
nach dem Mittag des 26ᵗᵉⁿ (27. Thoth 6ʰ 30ᵐ früh) statt-
gefunden.

10   Nun beträgt die Zeit von der mit dem ersten Jahre

_{Hei 341} Nabonassars beginnenden Epoche bis zu dem vorliegenden
Zeitpunkt 365 ägyptische Jahre, 25 Tage und 18¹⁄₂ Äqui-
noktialstunden schlechthin, 18¹⁄₄ nach genauer Rechnung.
Für diese Zeit finden wir, wenn wir die Rechnung nach den

15 von uns gegebenen Grundlagen (d. i. den Sonnen- und Mond-
tafeln) anstellen:

als genauen Ort der Sonne   ♐ 28°18′ (27°24′ + 0°54′),
als mittleren Ort des Mondes   ♊ 24°20′ (24°18′58″),
als genauen Ort des Mondes   ♊ 28°17′ (24°20′ + 3°57′),

20 weil der Mond in Anomalie 227°43′ (2″) von dem Apogeum
des Epizykels entfernt war.

_{Halma, p.}
₂₇₆ _{Hu 277}   Weiter soll die folgende Finsternis stattgefunden haben unter
dem athenischen Archonten Phanostratos im Monat Skiropho-
rion am 24/25. ägyptischen Phamenoth (18. Juni 382 v. Chr.).

25 „Verfinstert war er", so lautet seine Angabe, „vom Sommer-
aufgang (d. i. von Nordost) her in der vorgerückten ersten
(Nacht-) Stunde" (d. i. ¹⁄₂ˢᵗ nach Sonnenuntergang). Es fällt
demnach auch dieser Zeitpunkt in das 366ᵗᵉ Jahr seit
Nabonassar auf den 24/25. Phamenoth etwa 5¹⁄₂ bürgerliche

30 Stunden vor Mitternacht. Da nun die Sonne im letzten
Drittel der Zwillinge stand, so beträgt die Nachtstunde in
Babylon 12 Zeitgrade (d. s. 48ᵐ); folglich machen die
5¹⁄₂ bürgerlichen Stunden 4²⁄₅ Äquinoktialstunden aus.
Der Anfang der Finsternis hat also (4²⁄₅ˢᵗ vor Mitternacht

35 oder) 7³⁄₅ Äquinoktialstunden nach dem Mittag des 24ᵗᵉⁿ
_{Hei 342} (7ʰ 36ᵐ abends) stattgefunden; da aber die ganze Dauer

der Finsternis mit 3 Stunden angegeben wird, so ist die Mitte selbstverständlich $(7^3/_5 + 1^1/_2 =) 9^1/_{10}$ Äquinoktialstunden nach Mittag ($9^h 6^m$ abends) gewesen. In Alexandria muß sie also $8^1/_4$ Äquinoktialstunden nach dem Mittag des 24ten ($8^h 15^m$ abends) eingetreten sein.

Nun beträgt wieder die Zeit von den Epochen ab gerechnet 365 ägyptische Jahre, 203 Tage und $8^1/_4$ Äquinoktialstunden schlechthin, $7^5/_6$ nach genauer Rechnung. Für diese Zeit finden wir

als genauen Ort der Sonne	$\Pi\ 21^0 46'\ (22^0 25' - 0^0 42')$,	10
als mittleren Ort des Mondes	$⚹\ 23^0 58'\ (23^0 59' 38'')$,	
als genauen Ort des Mondes	$⚹\ 21^0 48'\ (23^0 58' - 2^0 10')$,	

weil der Mond in Anomalie von dem Apogeum des Epizykels $27^0 37' (1'')$ entfernt war.

Es beträgt mithin das Intervall von der ersten Finsternis zur zweiten (vom 27. Thoth $6^h 15^m$ früh [a]) bis zum 24. Phamenoth $7^h 50^m$ abends [b]) 177 Tage und $13^3/_5$ Äquinoktialstunden, oder in Graden, welche sich die Sonne weiter bewegt hat, (von $⚹\ 28^0 18'$ bis $\Pi\ 21^0 46'$) $173^0 28'$, während Hipparch seinen Nachweis mit dem Ergebnis abschließt, daß das Intervall 177 Tage und $13^3/_4$ Äquinoktialstunden, oder in Graden $172^0 52' 30''$ betrage. Ha 278

Die dritte Finsternis soll stattgefunden haben unter dem athenischen Archonten Euandros im Poseideon I am 16/17. ägyptischen Thoth (12. Dezember 382 v. Chr.). „Der Mond war", so lautet seine Angabe, „total verfinstert, nachdem der Anfang vom Sommeraufgang (d. i. von Nordost) her in der vorgerückten vierten (Nacht-) Stunde [c] (d. i. $3^1/_2$ bürgerliche Stunden nach Sonnenuntergang) eingetreten war. Es fällt also dieser Zeitpunkt in das 367te Jahr seit Nabonassar auf den 16/17. Thoth etwa $2^1/_2$ bürgerliche) Stunden vor Mitter- Hei 343

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a) Weil nach genauer Rechnung (S. 248, 13) $^1/_4^{st}$ früher.
b) Weil nach genauer Rechnung (oben Z. 8) 25^m früher.
c) Die Zeitbestimmung $\vartheta\ \mathring{\omega}\rho\tilde{\omega}\nu\ \pi\alpha\rho\varepsilon\lambda\eta\lambda\upsilon\vartheta\upsilon\iota\tilde{\omega}\nu$ ist sicher verderbt; ich vermute $\tau\tilde{\eta}\varsigma\ \vartheta'\ \mathring{\omega}\rho\alpha\varsigma\ \pi\rho\sigma\varepsilon\lambda\eta\lambda\upsilon\vartheta\upsilon\acute{\iota}\alpha\varsigma$. Man vergleiche die ähnliche Zeitbestimmung zur zweiten Finsternis.

nacht. Da nun die Sonne im zweiten Drittel des Schützen
stand, so beträgt in Babylon die Nachtstunde 18 Zeitgrade
(d. s. 72^m); folglich machen die 2$^1/_2$ bürgerlichen Stunden
3 Äquinoktialstunden aus. Der Anfang hat also (3st vor
5 Mitternacht oder) 9 Äquinoktialstunden nach dem Mittag
des 16ten (9^h abends) stattgefunden; da aber die Finsternis
total war, so betrug die ganze Dauer ungefähr 4 Äquinoktial-
stunden[28]), und die Mitte ist selbstverständlich (9 + 2 =)
11 Stunden nach Mittag (11^h abends) gewesen. In Alexan-
10 dria muß also die Mitte der Finsternis 10$^1/_6$ Äquinoktial-
stunden nach dem Mittag des 16ten (10^{h}10^m abends) statt-
gefunden haben.

Nun beträgt die Zeit von den Epochen ab 366 ägyptische
Jahre, 15 Tage und 10$^1/_6$ Äquinoktialstunden schlechthin,
15 9$^5/_6$ nach genauer Rechnung. Für diese Zeit finden wir

als genauen Ort der Sonne   ♐ 17°30' (16°57' + 0°28'),
als mittleren Ort des Mondes   ♊ 17°21' (17°18'42''),
als genauen Ort des Mondes   ♊ 17°28' (17°21' + 0°7'),

weil der Mond in Anomalie von dem Apogeum des Epizykels
20 181°12'(28'') entfernt war.

<div style="float:left">Ha 279)
Hei 344)</div>

Es beträgt mithin das Intervall von der zweiten Finsternis
zur dritten (vom 24. Phamenoth 7^{h}50^m abends bis zum
16. Thoth 9^{h}50^m abends^a)) 177 Tage und 2 Äquinoktial-
stunden^b), oder in Graden (von ♊ 21°46' bis ♐ 17°30')
25 175°44', während Hipparch auch dieses Intervall wieder mit
177 Tagen und 1$^2/_3$ Stunde, oder in Graden mit 175°8' als
weitere Unterlage benutzt hat.^{c})

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a) Weil nach genauer Rechnung am 24. Phamenoth (S. 249, 8)
25^m, am 16. Thoth (oben Z. 15) 20^m früher.

b) Addiert man die beiden Intervalle des Ptolemäus, so er-
hält man für das Mondjahr 354^{d}15^{h}36^m, während die beiden
Intervalle des Hipparch 354^{d}15^{h}25^m geben.

c) Mit diesen beiden Intervallen ist das Zahlenmaterial ge-
geben, auf Grund dessen Hipparch den ersten Nachweis nach
der exzentrischen Hypothese (S. 245, 10) führte, dessen Er-
gebnis die Bestimmung des Verhältnisses der Exzentrizität mit
60^p : 6^{p}15' war.

Offenbar hat demnach Hipparch bei der Berechnung der Intervalle sich verrechnet. Der Fehler beträgt bei den Tagen $\frac{1}{6}$ Äquinoktialstunde (genau $\frac{3}{20}$ oder 9^m im ersten Intervall zu viel) und $\frac{1}{3}$ (oder 20^m im zweiten Intervall zu wenig), bei den Graden in beiden Intervallen ungefähr $\frac{3}{5}°$ (oder $35\frac{1}{2}'$ bzw. $36'$ zu wenig). Das sind aber Beträge, welche einen nicht unbeträchtlichen Unterschied in der zahlenmäßigen Bestimmung des Verhältnisses zu bewirken vermögen.

II. Wir werden nunmehr zu den später von ihm mitgeteilten drei Finsternissen übergehen, welche, wie er versichert, in Alexandria beobachtet worden sind. Von diesen hat die erste seiner Angabe nach stattgefunden im 54ten Jahre der zweiten Kallippischen Periode am 16. ägyptischen Mesore (22. September 201 v. Chr.). Bei derselben begann der Mond sich zu verfinstern eine halbe Stunde vor Aufgang (d. i. $5^h 30^m$ nachm.) und trat in die letzte Phase des Austritts um die Mitte der dritten Stunde (d. i. $8^h 30^m$ nach Verlauf von 3 Stunden). Folglich ist die Mitte der Finsternis zu Beginn der zweiten Stunde (d. i. $1\frac{1}{2}$ Stunde nach $5^h 30^m$ um 7^h abends) eingetreten, d i. 5 bürgerliche Stunden oder ebensoviele Äquinoktialstunden vor Mitternacht, weil die Sonne im letzten Drittel der Jungfrau stand.[a] Somit trat in Alexandria die Mitte der Finsternis 7 Äquinoktialstunden nach dem Mittag des 16ten (7^h abends) ein.

Nun beträgt die Zeit von den Epochen im ersten Jahre Nabonassars ab gerechnet 546 ägyptische Jahre, 345 Tage und 7 Äquinoktialstunden schlechthin, $6\frac{1}{2}$ nach genauer Rechnung. Für diese Zeit finden wir

als genauen Ort der Sonne $\mathrm{m}\ 26°6' (28°18' - 2°16')$,

als mittleren Ort des Mondes $\mathcal{H}\ 22°(21°59'54'')$,

als genauen Ort des Mondes $\mathcal{H}\ 26°7' (22° + 4°7')$,

weil der Mond in Anomalie von dem Apogeum des Epizykels $300°13'$ (genau $12'27''$) entfernt war.

a) D. i. kurz vor der Herbstnachtgleiche, womit die Aufgangszeit des verfinsterten Mondes um 6^h nachm., da sie mit Untergang der Sonne zusammenfällt, gut übereinstimmt.

Halma,
p. 280

Die folgende Finsternis fand nach seiner Angabe in dem
(selben) 54ten Jahre[33] derselben Periode statt am 9. ägyp-
tischen Mechir (19. März 200 v. Chr.). Sie begann nach
Verlauf von $5\frac{1}{3}$ (bürgerlichen) Stunden der Nacht und war
total. Folglich hat der Anfang der Finsternis $(6 + 5\frac{1}{3} =)$
$11\frac{1}{3}$ Äquinoktialstunden[a] nach dem Mittag des 9ten (11^h20^m
abends) stattgefunden, weil die Sonne im letzten Drittel der
Fische stand, und die Mitte trat $13\frac{1}{3}$ Äquinoktialstunden
nach dem Mittag (1^h20^m nachts) ein, weil die Finsternis
total war.[b]

Nun beträgt die Zeit von den Epochen bis zu diesem Zeit-
Hei 346 punkt 547 ägyptische Jahre, 158 Tage und $13\frac{1}{3}$ Äquinoktial-
stunden sowohl schlechthin wie nach genauer Rechnung.
Für diese Zeit finden wir *Checks on Feb 26*

als genauen Ort der Sonne   ♓ $26°17'$ $(24°2' + 2°14')$,
als mittleren Ort des Mondes   ♎ $1°7'$ $(1°8'44'')$,
als genauen Ort des Mondes   ♍ $26°16'$ $(31°7' - 4°51')$,

weil der Mond in Anomalie von dem Apogeum (des Epi-
zykels) $109°28'$ (genau $29'40''$) entfernt war.

Es beträgt mithin das Intervall von der ersten Finster-
nis zur zweiten (vom 16. Mesore 6^h30^m abends[c] bis zum
9. Mechir 1^h20^m nachts) 178 Tage und $6^5/_6$ Äquinoktial-
stunden, oder in Graden (von ♍ $26°6'$ bis ♓ $26°17'$) $180°11'$,
während Hipparch seinen Nachweis mit dem Ergebnis ab-
schließt, daß dieses Intervall 178 Tage und 6 Äquinoktial-
stunden, oder in Graden $180°20'$ betrage.

Ha 281   Die dritte Finsternis fand nach seiner Angabe in dem
[selben] 55ten Jahre[33] der zweiten Periode statt am 5. ägyp-
tischen Mesore (12. September 200 v. Chr.). Sie begann
nach Verlauf von $6\frac{2}{3}$ Stunden der Nacht (d. i. $\frac{2}{3}$ Stunde
nach Mitternacht) und war total. Die Mitte der Finsternis

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a) Weil so kurz vor der Nachtgleiche bürgerliche Stunden
und Äquinoktialstunden einander gleich sind.
b) D. i. 2 Äquinoktialstunden später, weil die ganze Dauer
4 Äquinoktialstunden beträgt. Vgl. Anm. 28.
c) Weil nach genauer Rechnung (S. 251, 28) $\frac{1}{2}$st früher

ist nach seiner Angabe nach Verlauf von etwa $8^1/_3$ Stunden, d. i. (nach Abzug der ersten 6 Nachtstunden) $2^1/_3$ bürgerliche Stunden nach Mitternacht gewesen. Da nun die Sonne in der Mitte der Jungfrau stand, so beträgt in Alexandria die Nachtstunde $14^2/_5$ Zeitgrade (d. s. $57^3/_5^m$); folglich machen 5 die $2^1/_3$ bürgerlichen Stunden (nach Mitternacht) $2^1/_4$ Äquinoktialstunden aus. Somit ist die Mitte $14^1/_4$ Äquinoktialstunden nach dem Mittag des 5ten ($2^h 15^m$ nachts) gewesen. Hei 347

Nun beträgt wieder die Zeit von den Epochen bis zu diesem Zeitpunkt 547 ägyptische Jahre, 334 Tage und $14^1/_4$ Äqui- 10 noktialstunden schlechthin, $13^3/_4$ nach genauer Rechnung. Für diese Zeit finden wir

als genauen Ort der Sonne ♍ $15^0 12'$ ($17^0 31' - 2^0 14'$),
als mittleren Ort des Mondes ♓ $10^0 24'$ ($10^0 25' 3''$),
als genauen Ort der Sonne ♓ $15^0 13'$ ($10^0 24' + 4^0 49'$), 15

weil der Mond in Anomalie von dem Apogeum des Epizykels $249^0 9'$ ($29''$) entfernt war.

Es beträgt mithin das Intervall von der zweiten Finsternis zur dritten (vom 9. Mechir $1^h 20^m$ nachts bis zum 5. Mesore $1^h 45^m$ nachts[a]) 176 Tage und $^2/_5$ Äquinoktialstunde[b]), oder 20 in Graden (von ♓ $26^0 17'$ bis ♍ $15^0 12'$) $178^0 55'$, während Hipparch wieder auch dieses Intervall mit 176 Tagen und $^1/_3$ Äquinoktialstunde, oder in Graden mit $178^0 33'$ als weitere Unterlage benutzt hat.

Auch hier also hat Hipparch sich offenbar verrechnet, 25 und zwar beträgt der Fehler bei den Graden $^1/_6^0$ (oder $9'$ im ersten Intervall zu viel) und $^1/_3^0$ (oder $22'$ im zweiten Intervall zu wenig), bei den Tagen $^5/_6$ Äquinoktialstunden (oder 50^m zu wenig im ersten Intervall) und $^1/_{12}$ (oder 5^m zu wenig im zweiten Intervall).[c] Das sind Beträge, 30 welche gleichfalls einen beträchtlichen Unterschied hinsicht- Ha 282

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a) Weil nach genauer Rechnung (oben Z. 11) $^1/_2^h$ früher.
b) Addiert man die beiden Intervalle des Ptolemäus, so erhält man für das Mondjahr $354^d 7^h 15^m$, während die beiden Intervalle des Hipparch $354^d 6^h 20^m$ ausmachen.
c) Ich gebe $^1/_{12}$ nach Cod. D; δεκάτῳ ist sicher falsch.

laufenden Bewegung beginnen lassen. Dies ist an der oben
vorgelegten Figur der Punkt Z. Genau bestimmt wird dieser
Punkt bei der Stellung des Epizykels in den Apogeen und
den Perigeen der Exzenter von der durch alle (drei) Mittel-
5 punkte gehenden Geraden, wie an der Figur von $\triangle$ E Γ. Bei al-
len anderen Hypothesen sehen wir nun aus den Erscheinungen
absolut keinen Widerspruch gegen die Annahme hervor-
gehen, daß auch in den übrigen Positionen der Epizyklen der
durch das obenbezeichnete (mittlere) Apogeum gehende Epi-
10 zykelhalbmesser, d. i. Z Γ H, immer dieselbe Lage beibehalte,
wie die den Mittelpunkt des Epizykels gleichförmig herum-
führende Leitlinie, wie hier E Γ, d. h. daß dieser Epizykel-
durchmesser jederzeit, was man auch für das logisch rich-
tige halten möchte, die normale Richtung nach dem Zentrum
15 der Herumführung einhalte, in welchem in den gleichen Zeiten
gleiche Winkel der gleichförmigen Bewegung gebildet werden.

Nur bei dem Monde stehen die Erscheinungen der An-
nahme entgegen, daß auch in den Positionen des Epizykels
zwischen A und Γ der Durchmesser Z H die normale Rich-
20 tung nach dem Zentrum E der Herumführung einhalte, d. h.
dieselbe Lage bewahre wie die Leitlinie E Γ. Wir finden
nämlich, daß die angedeutete Neigung zwar konstant nach
einem und demselben Punkte, der auf dem Durchmesser A Γ
liegt, gerichtet bleibt, aber weder nach E, dem Mittelpunkt
25 der Ekliptik, noch nach $\triangle$, dem Zentrum des Exzenters, son-
dern nach einem Punkte, der von E um eine Strecke, die
der Verbindungslinie $\triangle$ E der Mittelpunkte gleichkommt, nach
dem Perigeum zu entfernt liegt.

Daß dem so ist, werden wir nachweisen, indem wir wieder
30 aus einer Mehrzahl von Beobachtungen zwei mitteilen, welche
ganz besonders geeignet sind, auf den fraglichen Punkt ein
helles Licht zu werfen. Das sind solche Beobachtungen, bei
denen erstens der Epizykel sich in den mittleren Elongationen
(Oktanten) befand, und zweitens der Mond in der Nähe des
35 Apogeums oder des Perigeums des Epizykels stand, weil
36 an diesen Stellen das Maximum der Differenz der betreffen-
den Neigungen eintritt.

I. Hipparch versichert, die Sonne und den Mond mit Hilfe der Instrumente in Rhodus beobachtet zu haben im 197ten Jahre nach dem Tode Alexanders (Epoche der Ära 1. Thoth = 12. Nov. 324 v. Chr.) am 11. ägyptischen Pharmuthi Ha 300 (2. Mai 126 v. Chr. 6ʰ20ᵐ früh) bei Beginn der zweiten 5 Stunde. Sein Bericht lautet: „Während die Sonne in ♉ 7°45′ anvisiert wurde, ergab sich als scheinbarer Ort des Mondzentrums)(21°40′, als genauer[a]))(21°27′30″.“ Folglich war zu der angegebenen Zeit der genaue Mond von der genauen Sonne in der Richtung der Zeichen (von ♉ 7°45′ bis 10)(21°27′) ohne merklichen Fehler 313°42′ entfernt.

Nun hatte die Beobachtung bei Beginn der zweiten Stunde stattgefunden, d. i. etwa 5 bürgerliche Stunden vor dem Mittag des 11ten; diese aber machten in Rhodus damals 5²/₃ Äquinoktialstunden aus; folglich beträgt die Zeit von 15 unserer Epoche bis zu dem Zeitpunkt der Beobachtung 620 ägyptische Jahre, 219 Tage und 18¹/₃ Äquinoktialstunden schlechthin, 18 nach genauer Rechnung. Für diese Zeit finden wir

als Ort der gleichförmigen Sonne ♉ 6°41′ 20
als Ort der genauen Sonne ♉ 7°45′
als Ort des gleichförmigen Mondes in Länge)(22°13′
als Entfernung vom mittleren Apogeum des Epizykels in Anomalie 185°30′ Hel 370
mithin die Elongation des gleichförmigen Mondes 25
von der genauen Sonne (von ♉ 7°45′ bis)(22°13′) 314°28′.

Diese Zahlen sollen als gegeben angenommen sein. Es sei ABΓ der Exzenter des Mondes um das Zentrum Δ und den Durchmesser AΔΓ. Auf letzterem sei der Mittelpunkt der Ekliptik der Punkt E. Um B als Zentrum beschreibe 30 man ZHΘ als Epizykel des Mondes. Der Epizykel soll in der in der Richtung der Zeichen vor sich gehenden Bewe- Ha 301 gung von B nach A, der Mond in der auf dem Epizykel

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a) Der genaue Ort ist der um die Anomaliedifferenz 0°46′ (S. 273, 7) verminderte gleichförmige Ort, der scheinbare der um die Längenparallaxe vermehrte genaue Ort, weil der Mond östlich des Meridians stand.

Positionen die durch die Pole des Horizonts und das Zentrum des Mondes gezogenen größten (Höhen-)Kreise ohne
Hei 406 merklichen Fehler mit den durch die Pole der Ekliptik gehenden (Breiten-) Kreisen zusammenfallen, auf welche die Örter
5 des Mondes in Breite theoretisch bezogen werden. Deshalb kann der genaue Zenitabstand ohne weiteres bequem bestimmt werden.

Wir richteten also, während der Mond genau im Meridian stand, das die Platten tragende Richtscheit auf ihn, bis sein
10 Zentrum, durch beide Absehöffnungen anvisiert, in die Mitte der größeren Öffnung zu stehen kam. Nun merkten wir auf dem schmalen Lineal den Abstand zwischen den äußersten Endpunkten der auf den Richtscheiten gezogenen geraden Linien durch einen Punkt an und legten es an die
15 sechzigteilige Skala des senkrecht stehenden Richtscheits. Hiermit fanden wir, wieviel Teile die den obenbezeichneten Abstand messende Sehne von solchen Teilen enthielt, deren bekanntlich 60 auf den Halbmesser des von der Drehung
Ha 331 (des Richtscheits) in der Ebene des Meridians beschriebenen
20 Kreises gerechnet werden. Alsdann entnahmen wir (den Sehnentafeln) den die gefundene Sehne überspannenden Bogen und erhielten somit den Bogen, welchen zurzeit der scheinbare Mond auf dem durch sein Zentrum und die Pole des Horizonts gezogenen größten (Höhen-)Kreis, der zurzeit
25 mit dem durch die Pole des Äquators und der Ekliptik gehenden Meridian zusammenfiel, Abstand von dem Zenit hatte.

Um weiter das Maximum der Breite, welches der Mond
Hei 407 erreichen kann, genau in Erfahrung zu bringen, haben wir von der Anvisierung Gebrauch gemacht, als der Mond in
30 möglichster Nähe des Sommerwendepunktes und außerdem genau im nördlichsten Grenzpunkt seines schiefen Kreises stand, weil in der Nähe dieser Punkte erstens der Mondlauf für die sinnliche Wahrnehmung auf eine ziemliche Strecke in Breite unverändert bleibt, und weil zweitens der Mond
35 für den Parallel von Alexandria, auf welchem wir unsere Beobachtungen angestellt haben, in diesem Falle dicht am Zenit steht, wo (vgl. S. 192, 32) sein scheinbarer Ort ohne

merklichen Fehler mit dem genauen (d. i. geozentrischen)
zusammenfällt. Es wurde aber in den bezeichneten Posi-
tionen das Zentrum des Mondes konstant in einem Zenit-
abstand von $2\frac{1}{8}°$ festgestellt, so daß auch aus dieser Art
der Prüfung der Nachweis des Maximums der Breite beider- 5
seits der Ekliptik mit 5° hervorgeht. Denn zieht man von
den in Alexandria vom Zenit bis zum Äquator nachgewiesenen
30°58' diese $2\frac{1}{8}°$ des scheinbaren Zenitabstandes ab, so Ha 332
ergibt der Rest einen Überschuß von 5° über die vom Äquator
bis zum Sommerwendepunkt nachgewiesenen 23°51'. 10

Um auch die Aufgabe der Parallaxenbestimmung zu lösen,
haben wir wieder auf dieselbe Weise den Mond beobachtet,
als er in der Nähe des Winterwendepunktes stand, erstens Hei 408
aus dem obengenannten Grunde[a]), und zweitens, weil er in
diesem Falle bei dem entsprechend tieferen Stande im Meridian 15
in seinem größten Zenitabstand auch eine größere und deut-
licher wahrnehmbare Parallaxe zeigen muß.

Aus einer Mehrzahl von Parallaxenbeobachtungen, welche
von uns bei den Positionen dieser Art angestellt worden
sind, wollen wir nun wieder eine mitteilen, an der wir so- 20
wohl den Gang der Berechnung erläutern, als auch den
Nachweis der weiteren Konsequenzen in der gebotenen
Reihenfolge erbringen werden.

Dreizehntes Kapitel.
Nachweis der Entfernungen des Mondes.

Im 20ten Jahre Hadrians am 13. ägyptischen Athyr $5\frac{5}{6}$
Äquinoktialstunden nach Mittag (1. Oktober 135 n. Chr. 25
$5^h 50^m$ nachmittags) haben wir, als die Sonne gerade unter-
ging, den Mond beobachtet, nachdem er in den Meridian
getreten war. Mit dem Instrument stellten wir für sein
Zentrum einen scheinbaren Zenitabstand von 50°55' fest;
denn der auf dem schmalen Lineal angemerkte Abstand be- 30

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a) Weil dort ebenfalls seine Breite auf eine ziemliche Strecke
unverändert bleibt.

trug 51^p 35' von den 60^p, in welche der Halbmesser des
durch die Drehung beschriebenen Kreises geteilt war.   Es
unterspannt aber die Sehne von dieser Größe einen Bogen
von 50^0 55', wie der Kreis 360^0 hat.

5   1. Nun beträgt die Zeit von den Epochen im ersten Jahr
Nabonassars bis zu der vorliegenden Beobachtung 882 ägyp-
tische Jahre, 72 Tage und 5$^5/_6$ Äquinoktialstunden schlecht-
hin, 5$^1/_3$ nach genauer Rechnung. Für diese Zeit finden wir

als mittleren Ort der Sonne   ♎ 7^{0}31',
10   als genauen Ort der Sonne   ♎ 5^{0}28',
als mittleren Ort des Mondes   ♐ 25^{0}44',
als Elongation (von ♎ 7^{0}31' bis ♐ 25^{0}44')   78^{0}13',
als Entfernung vom mittleren Apogeum des Epizykels 262^{0}20',
als Entfernung vom nördlichen Grenzpunkt der Breite 354^{0}40'.

15   Es betrug mithin die Anomaliedifferenz, in ihrem Gesamt-
betrag nach der betreffenden Tabelle berechnet, + 7^{0}26',
so daß der genaue Ort des Mondes in Länge zu jener Stunde
(♐ 25^{0}44' + 7^{0}26' d. i.) ♑ 3^{0}10' war, während das Mond-
zentrum in Breite auf dem schiefen Kreise (354^{0}40' + 7^{0}26'
20 d. i.) 2^{0}6' von dem nördlichen Grenzpunkt entfernt war
und auf dem durch die Pole der Ekliptik gehenden (Breiten-)
Kreis, der zurzeit ohne merklichen Fehler mit dem Meridian
zusammenfiel, von der Ekliptik einen nördlichen Abstand
von 4^{0}59' hatte.[a]

25   Nun hat der Punkt ♑ 3^{0}10' auf dem letztgenannten
Kreise (nach der Tabelle der Schiefe zu 87^0) vom Äquator
eine südliche Deklination von 23^{0}49', und der Äquator vom
Zenit in Alexandria einen gleichfalls südlichen Abstand von
30^{0}58'; mithin hatte das Zentrum des Mondes einen genauen
30 Zenitabstand von 49^{0}48'.[b] Nun betrug der scheinbare Ab-

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a) Vgl. die Tabelle der Gesamtanomalie, 7. Spalte der Breite,
erste Zeile, wo zur ersten Argumentzahl 6 die nördliche Breite
mit 4^{0}58' angesetzt ist.
   b) Da die nördliche Breite den Mond dem Zenit näher bringt,
als der tiefste Punkt der Ekliptik im Meridian steht, so ist der
Zenitabstand 23^{0}49' + 30^{0}58' um 4^{0}59' zu verkürzen.

stand $50^{0}55'$; folglich zeigte der Mond in der Entfernung, Hei 410
in welcher er zur Zeit der beobachteten Position stand, bei
dem genauen Zenitabstand von $49^{0}48'$ auf dem durch ihn
und die Pole des Horizonts gehenden größten (Höhen-) Kreis
eine Parallaxe von $(50^{0}55' - 49^{0}48' =) 1^{0}7'$. 5

II. Dieser Wert mußte fürs erste festgestellt werden. Es
seien in der Ebene des durch den Mond und die Pole des
Horizonts gehenden größten (Höhen-)Kreises um ein und
dasselbe Zentrum gezogen:

1. AB als größter Kreis der
Erde; 10

2. $\Gamma\Delta$ als der zur Zeit der
Beobachtung durch das Mond-
zentrum gehende (Höhen-)
Kreis;

3. EZHΘ als der Kreis, zu 15
welchem die Erde das Ver-
hältnis eines Punktes hat.

Gemeinsames Zentrum aller
drei Kreise sei K, die durch 20
die Scheitelpunkte gehende Gerade sei $K\Lambda\Gamma E$. Der Mond
soll bei dem oben festgestellten Zenitabstand von $49^{0}48'$ in
Punkt Δ angenommen sein. Man ziehe die Verbindungslinien
$K\Delta H$, $A\Delta\Theta$, fälle von Punkt A, der das Auge des Beob- Hei 411
achters wird, auf KB das Lot $A\Lambda$ und ziehe parallel zu 25
KH die Gerade AZ.

1. Daß der Bogen HΘ für den Beobachter in A die Paral-
laxe des Mondes darstellt, ist klar; er beträgt mithin der
Beobachtung gemäß $1^{0}7'$. Da aber der Bogen ZΘ nur un-
beträchtlich größer ist als der Bogen HΘ, weil die Erde als 30
Ganzes zu dem Kreis EZHΘ das Verhältnis eines Punktes hat,
so dürfte auch der Bogen ZHΘ ohne merklichen Fehler $1^{0}7'$ Ha 335
betragen. Da nun Punkt A wieder im Verhältnis zu dem
Kreis ZΘ nur unwesentlich verschieden von dem Mittel-
punkt desselben ist, so ist auch 35

$$\angle \, ZA\Theta = 1^{0} \ 7' \text{ wie } 4R = 360^{0},$$
$$= 2^{0}14' \text{ wie } 2R = 360^{0}.$$

geum des Epizykels in seiner größten Entfernung von der Erde steht, nicht in der mittleren, wie die früheren Astronomen auf Grund ihrer Hypothesen annahmen. Außerdem finden wir auch die Winkel an sich um ein beträchtliches

Ha 340 kleiner als die überlieferten. Indessen haben wir dieses Ergebnis nicht durch das Meßverfahren auf dem Richtscheit errechnet, sondern mit Hilfe gewisser Mondfinsternisse festgestellt. Nämlich die Frage: wann erscheinen beide Durchmesser unter den gleichgroßen Winkeln? konnte bequem

10 vermöge der Konstruktion des Richtscheits beantwortet werden, weil hiermit keinerlei Meßarbeit verbunden war; allein die Beantwortung der Frage: wie groß ist der Winkel? erschien uns recht zweifelhaft, weil bei den Verschiebungen der Deckplatte die Feststellung (des Verhältnisses) ihrer

15 Breite zur Länge der Strecke auf dem Richtscheit vom Auge bis zu der (beweglichen) Platte auf mühsamer Meßarbeit beruht[a], wodurch die Genauigkeit des Ergebnisses stark beeinträchtigt werden kann. Da aber ein für allemal der

H91 418 Mond in seiner größten Entfernung dem Auge unter dem

20 gleichgroßen Winkel wie die Sonne erschien, so haben wir mit Hilfe der Mondfinsternisse, welche bei dieser Entfernung beobachtet worden sind, die Größe des Winkels, unter dem der Mond erschien, durch Rechnung festgestellt, womit wir ohne weiteres gleichzeitig den Winkel der Sonne nachgewiesen

25 hatten. Den Gang des hierbei eingeschlagenen Verfahrens wollen wir wieder an zwei von den zugrunde gelegten Finsternissen verständlich machen.

Halma, p. 340

Im 5ten Jahre Nabopollassars, welches das 127te Jahr seit Nabonassar ist, begann am 27/28. ägyptischen Athyr (22. April

30 621 v. Chr.) gegen Ende der 11ten (Nacht-) Stunde in Babylon der Mond sich zu verfinstern; das Maximum der Verfinsterung betrug $\frac{1}{4}$ des Durchmessers von Süden. Da also der Anfang der Finsternis 5 bürgerliche Stunden nach Mitternacht stattfand, die Mitte aber ungefähr 6 solche Stunden

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a) Hultsch, Winkelmessungen durch die Hipparchische Dioptra Abh. zur Gesch. der Math. 1899.

nach Mitternacht eintrat[a], welche in Babylon damals $5\frac{5}{6}$ Äqui-
noktialstunden ausmachten, weil der genaue Ort der Sonne Ha 341
♈ 27° 3′ (♈ 25° 34′ + 1° 29′) war, so ist klar, daß die Mitte
der Finsternis, d. i. der Zeitpunkt, wo der Eintritt des Durch-
messers in den Schatten das (angegebene) Maximum erreichte, 5
in Babylon $5\frac{5}{6}$ Äquinoktialstunden nach Mitternacht ($5^\text{h}50^\text{m}$
früh), in Alexandria wieder nur 5 Stunden nach Mitternacht
(5^h früh) stattgefunden hat.

    Nun beträgt die Zeit seit der Epoche 126 ägyptische Jahre,
86 Tage und 17 Äquinoktialstunden schlechthin, aber nur Hei 419
$16\frac{3}{4}$ nach der Rechnung mit gleichförmigen Sonnentagen. 11
Folglich war

der mittlere Ort des Mondes in Länge	♎ 25° 32′;
der genaue Ort des Mondes in Länge	♎ 27° 5′;
die Entfernung vom Apogeum des Epizykels	340° 7′; 15
die Entfernung vom nördlichen Grenzpunkt	
auf dem schiefen Kreise	80° 40′.

    Hieraus ist folgendes ersichtlich. Wenn das Zentrum des
Mondes, während er in seiner größten Entfernung steht, auf
dem schiefen Kreise eine Ent-
fernung von 9° 20′ von den   20
Knoten[b] hat, und wenn das
Zentrum des Erdschattens auf
dem größten Kreise ($A\,C$) liegt,
der durch das Zentrum des Mon-
des senkrecht zu seinem schie-   25
fen Kreis gezogen wird, was
die Lage ist, in welcher (bei der genannten Entfernung von
den Knoten) das Maximum der Verfinsterungen eintritt,
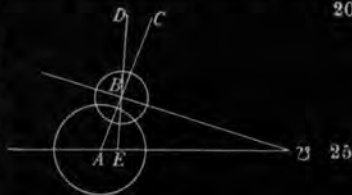
    a) Die Finsternistabellen geben zu 3 Zoll Verfinsterung bei
Erdnähe die halbe Dauer mit 32′ 20″, bei Erdferne mit 28′ 41″,
was im Mittel 30′ 30″ gibt, mithin eine Strecke, welche der Mond
in weniger als einer Stunde bei mittlerer Bewegung in Länge
zurücklegt; bei nahezu kleinster Bewegung, um die es sich hier
handelt, erscheint demnach für die Strecke von etwa 29′ die
Angabe einer bürgerlichen Stunde von $58\frac{1}{3}^\text{m}$ als angemessen.
    b) In dem vorliegenden Fall handelt es sich demnach um
die nördliche Seite des niedersteigenden Knotens.

dann fällt der vierte Teil des Monddurchmessers in den Schatten.[a]

Ferner war im 7ten Jahre des Kambyses, welches das 225te Jahr seit Nabonassar ist, am 17/18. ägyptischen Phamenoth (16. Juli 523 v. Chr.) eine (Äquinoktial-)Stunde vor Mitternacht in Babylon eine Mondfinsternis, welche sich auf die Hälfte des Durchmessers von Norden erstreckte. Es hat demnach auch diese Finsternis (d. h. ihre Mitte) in Alexandria $1^5/_6$ Äquinoktialstunde vor Mitternacht ($10^h 10^m$ abends) stattgefunden.

Nun beträgt die Zeit seit der Epoche 224 ägyptische Jahre, 196 Tage und $10^1/_6$ Äquinoktialstunden schlechthin, $9^5/_6$ nach genauer Rechnung, weil der genaue Ort der Sonne ♋ $18° 12'$[b] war. Folglich war

der mittlere Ort des Mondes in Länge	♉ $20° 22'$;
der genaue Ort des Mondes in Länge	♉ $18° 14'$;
die Entfernung vom Apogeum des Epizykels	$28° 5'$;
die Entfernung vom nördlichen Grenzpunkt des schiefen Kreises	$262° 12'$.

Hieraus ist wieder folgendes ersichtlich. Wenn das Zentrum des Mondes, während er wieder in seiner größten Entfernung steht, auf dem schiefen Kreise eine Entfernung von $7° 48'$ von den Knoten[c] hat, und wenn das Zentrum des Erdschattens die bezeichnete Lage zu ihm einnimmt, dann fällt die Hälfte des Monddurchmessers in den Schatten.

Nun beträgt, wenn das Mondzentrum auf dem schiefen Kreise eine Entfernung von $9° 20'$ von den Knoten hat, sein Abstand von der Ekliptik auf dem senkrecht zu dem schiefen Kreis (des Mondes) durch dasselbe gezogenen größten Kreise

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a) Die von mir beigegebene Figur soll auf den erst später (Buch VI, Kap. 5) erörterten Unterschied zwischen einem Breitenkreise (AC) des Mondkreises und einem Breitenkreise (ED) der Ekliptik aufmerksam machen.

b) Die Nachprüfung ergibt ♋ $19° 52' - 1° 37' = $ ♋ $18° 15'$.

c) Es handelt sich demnach im vorliegenden Fall (s. Z. 19) um die südliche Seite des aufsteigenden Knotens.

$0^0 48' 30''$.[a] Hat es aber auf dem schiefen Kreise eine Ent-
fernung von $7^0 48'$ von den Knoten, so beträgt sein Abstand
von der Ekliptik auf dem senkrecht zu dem schiefen Kreis
durch dasselbe gezogenen größten Kreise $0^0 40' 40''$. Da nun
der Unterschied der beiden Finsternisse ($^1/_2 dm - ^1/_4 dm$) den
vierten Teil des Monddurchmessers und der Unterschied der
beiden festgestellten Abstände des Mondzentrums von der
Ekliptik, d. i. vom Schattenzentrum, ($0^0 48' 30'' - 0^0 40' 40'' =$)
$0^0 7' 50''$ beträgt, so leuchtet ein, daß der ganze Durch-
messer des Mondes (als das Vierfache davon) den Bogen
eines größten Kreises im Betrage von $0^0 31' 20''$ unterspannt.

Ohne weiteres ist ferner verständlich, daß auch der Halb-
messer des bei derselben Mondentfernung eintretenden (Durch-
schnittskreises des) Schattens einen Bogen von $0^0 40' 40''$
unterspannt. Denn als (bei
der zweiten Finsternis) das
Mondzentrum (b) so viel
Sechzigteile Abstand von dem
Schattenzentrum (a) hatte,
berührte es den Kreis des
Schattens, weil die Verfinsterung die Hälfte des Mond-
halbmessers betrug.[b] Folglich ist der Halbmesser (ab)
des Schattens unbeträchtlich (d. i. $0^0 0' 4''$) kleiner als das
$2^3/_5$ fache ($= 0^0 40' 44''$) des Mondhalbmessers, der $0^0 15' 40''$
beträgt.
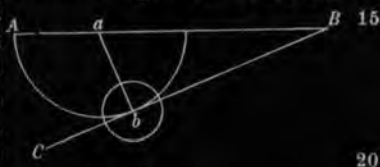
Da wir noch aus einer Mehrzahl von Beobachtungen dieser
Art die mitgeteilten Größenbeträge nahezu übereinstimmend
erhielten, so haben wir von denselben sowohl bei den anderen

a) Eine Tabelle der Schiefe des Mondkreises, welche die Ab-
stände von der Ekliptik auf den durch die Pole des Mond-
kreises gezogenen größten Kreisen gemessen gibt, hat Ptole-
mäus nicht aufgestellt. Über das Verhältnis der Entfernung
vom Knoten zum Ekliptikabstand, welcher weiterhin mit $11^1/_2 : 1$
angesetzt wird, siehe erl. Anm. 45.

b) Die von mir beigegebene Figur zeigt, daß in der be-
treffenden Entfernung vom Knoten die schiefe (geradlinige)
Mondbahn CB Tangente an den Schattenkreis ist, dessen
Halbmesser ab mithin normal zur Mondbahn steht.

Des Claudius Ptolemäus
Handbuch der Astronomie
Zweiter Band
von
Karl Manitius

Leipzig   1913

gezogenen größten Kreis damals genau wie heutzutage 0 40',
hat sich aber in Länge vom Frühlingspunkt weg in der Rich-
tung der Zeichen $3^0 45'$ weiterbewegt — denn nach der ersten
Beobachtung stand er $29^0 30'$, nach der zweiten $33^0 15'$ von
15 ihm entfernt —, während die zwischen den beiden Beobach-
tungen liegende Zeit (840 − 465 =) 375 Jahre beträgt.
In 100 Jahren hat sich demnach der nachfolgende Teil der
Pleias einen Grad in der Richtung der Zeichen weiterbewegt.

B. Die Spika betreffend.

20 1. Timocharis macht als Beobachter in Alexandria fol-
gende Aufzeichnung. Im 36ten Jahre der ersten Kallippischen
Periode am 15. Elaphebolion, d. i. am 5. Tybi, erreichte der
Mond[c] zu Beginn der dritten (Nacht-) Stunde mit der Mitte
seines dem Nachtgleichenaufgang zugewendeten Randes die
25 Spika. Und die Spika ging durch (den Mond), indem sie
von seinem Durchmesser genau den dritten Teil nach Norden
zu abschnitt.

Der Zeitpunkt fällt in das 454te Jahr seit Nabonassar auf
den 5/6. ägyptischen Tybi (9. März 294 v. Chr.), 4 bürger-

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a) Demnach stand der Mond etwa (40 Äquatorgrade oder)
$2^2/_3$ Stunden östlich des Meridians, woraus sich die in der Rich-
tung der Zeichen wirkende Längenparallaxe erklärt.

b) Somit muß das südliche Horn etwa 20' tiefer als das Mond-
zentrum geschätzt werden. S. Anm. 2 a. E.

c) Kurz nach dem Vollmond, da er die diametrale Stellung
zur Sonne erst mit 7^0 überschritten hatte.

liche Stunden, d. s. nahezu auch 4 Äquinoktialstunden vor
Mitternacht (8ʰ abends), weil die Sonne in)(15⁰ stand; die
gleiche Zahl von Stunden vor Mitternacht ergibt auch die
genaue Rechnung mit gleichförmigen Sonnentagen. Zu dieser Hei 29
Stunde war wieder   5
der genaue Ort des Mondzentrums in Länge   ♍ 21⁰ 21′ Ha 24
d. i. die Entfernung vom Sommerwendepunkt in
   der Richtung der Zeichen   81⁰ 21′
die (wahre) südliche Breite   1⁰ 50′
die scheinbare Entf. vom Sommerwendepunkt in Länge 82⁰ 5′   10
die scheinbare südliche Breite nahezu   2⁰ 0′,
   weil ♋ 15⁰ kulminierte.ᵃ⁾

Folglich war die Spika damals in Länge von dem Sommer-
wendepunkt aus dem oben (S. 23, 9) angegebenen Grunde
(weil das Mondzentrum noch 15′ westlich voranging) 82⁰20′ 15
entfernt und stand nahezu 2⁰ südlich der Ekliptik.

   2. Ferner berichtet Timocharis folgendes. Im 48ᵗᵉⁿ Jahre
derselben Periode am 6ᵗᵉⁿ Tage des letzten Drittels des
Pyanepsion, d. i. am 7. Thoth, berührte die Spika, als von
der zehnten (Nacht-)Stunde ungefähr eine halbe Stunde ver- 20
flossen und der Mondᵇ⁾ aus dem Horizont eben aufgegangen
war, genau das nördliche Horn des scheinbaren Mondes.

   Der Zeitpunkt fällt in das 466ᵗᵉ Jahr seit Nabonassar
auf den 7/8. ägyptischen Thoth (9. November 283 v. Chr.),
(9¹/₂ — 6 =) 3¹/₂ bürgerliche Stunden nach Mitternacht, wie 25
er selbst angibt; das wären 3¹/₈ Äquinoktialstunden, weil die
Sonne etwa in der Mitte des Skorpions stand. Allein, wie
eine einfache logische Erörterung zeigt, sind es nur 2¹/₂ Stun- Hei 30
den nach Mitternacht; denn so viel Äquinoktialstunden nach
Mitternacht (2ʰ 30ᵐ nachts) kulminiert ♐ 22⁰30′, während 30
nahezu die gleichen Grade der Jungfrau (♍ 22⁰ 5′) auf-
gehen, in denen damals der Mond stand, als er, wie Timocharis
angibt, „eben aufging". Nach der Rechnung mit gleichför-

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   a) Demnach stand der Mond etwa (64 Äquatorgrade oder)
4¹/₂ Stunden östlich des Meridians.
   b) Etwa einen halben Tag vor dem letzten Oktanten, weil die
westliche Elongation 52⁰ beträgt.

migen Sonnentagen finden wir aber nur 2 Äquinoktialstunden
nach Mitternacht verflossen. Zu dieser Zeit war wieder für
das Mondzentrum

Ha 25 die genaue Entfernung vom Sommerwendepunkt $81^0\,30'$

5 die (wahre) südliche Breite $2^0\,10'$

die scheinbare Entfernung in Länge $82^0\,30'$

die scheinbare südliche Breite[a] $2^0\,15'$.

Folglich stand die Spika auch nach dieser Beobachtung
genau wieder nahezu 2^0 südlich der Ekliptik[b] und war vom
10 Sommerwendepunkt $82^0\,30'$ entfernt.

Schlußfolgerung. In den $(466 - 454 =)$ 12 Jahren,
welche zwischen den beiden Beobachtungen liegen, hat sich
die Spika ungefähr $10'$ in der Richtung der Zeichen weiter-
bewegt.

15   3. Der Geometer Menelaos berichtet, in Rom folgende Be-
obachtung gemacht zu haben. Im ersten Jahre Trajans am
15/16. Mechir sei die Spika, als die 10te (Nacht-) Stunde
voll war, von dem Monde[c] bedeckt gewesen; denn man habe
sie nicht gesehen. Aber gegen das Ende der 11ten Stunde
Hei 31 sei beobachtet worden, daß sie dem Zentrum des Mondes
21 weniger als sein Durchmesser bei gleichgroßem Abstand von
seinen Hörnern westlich voraus gewesen sei.

Der Zeitpunkt fällt in das 845te Jahr seit Nabonassar auf
den 15/16. ägyptischen Mechir (11. Januar 98 n. Chr.), 4 bürger-
25 liche Stunden nach Mitternacht, wo das Mondzentrum un-
gefähr mit der Spika zusammenfiel, oder 5 Äquinoktialstun-
den (5^h früh), weil die Sonne in $\backsimeq 20^0$ stand, auf den Meri-

---

a) Bei nahezu 90^0 Zenitabstand muß der überwiegend größere
Teil der Höhenparallaxe auf die ostwärts wirkende Längen-
parallaxe entfallen. Den kulminierenden Grad s. S. 25,30.

b) Da das Mondzentrum ungefähr $15'$ südlicher als die Spika
stand, so beträgt die südliche Breite der letzteren „nahezu" 2^0.

c) Etwa 2 Tage vor dem letzten Viertel bei 114^0 westlicher
Elongation. Man vergleiche die drei Tage spätere Beobachtung
S. 28,15, bei welcher der Mond einen Tag nach dem letzten
Viertel stand.

dian von Alexandria[a]) reduziert $6^{1}/_{3}$, nach der Rechnung mit gleichförmigen Sonnentagen $6^{1}/_{4}$ oder ein wenig mehr. Zu dieser Stunde war für das Mondzentrum

die genaue Entfernung vom Sommerwendepunkt	$85^{0}\ 45'$
die (wahre) südliche Breite nahezu	$1^{0}\ 20'$ 5
die scheinbare Entfernung in Länge	$86^{0}\ 15'$
die scheinbare südliche Breite	$2^{0}\ \ 0'$,

weil $\doteq 7^{1}/_{2}^{0}$ kulminierte.[b])

Folglich hatte auch die Spika damals dieselbe Position. Ha 26 Schlußfolgerung. Die Spika stand zur Zeit des Timocharis 10 wie zu unserer Zeit wieder um den gleichen Betrag, d. i. 2^{0} südlich der Ekliptik, in Länge dagegen ist sie seit der Be- obachtung im 36ten Jahre (294 v. Chr.) in der Zwischenzeit von (845 — 454 =) 391 Jahren in der Richtung der Zeichen $3^{0}\ 55'$ vorgerückt, und $3^{0}\ 45'$ seit der Beobachtung im 48ten 15 Jahre (283 v. Chr) in der Zwischenzeit von (845 — 466 =) Hei 32 379 Jahren. Es ergibt sich demnach auch aus diesen Be- obachtungen ein Fortschritt der Spika in der Richtung der Zeichen von ungefähr einem Grade in 100 Jahren.

C. Den Stern (β) in der Stirn des Skorpions betreffend. 20

1. Timocharis berichtet als Beobachter in Alexandria fol- gendes. Im 36ten Jahre der ersten Kallippischen Periode am 25. Poseideon, d. i. am 16. Phaophi, hatte bei Beginn der 10ten (Nacht-) Stunde der scheinbare Mond[c]) mit seinem nörd- lichen Rande ganz genau den nördlichen (β) von den drei 25 Sternen ($\pi\delta\beta$) in der Stirn des Skorpions erreicht.

Der Zeitpunkt fällt in das 454te Jahr seit Nabonassar auf den 16/17. ägyptischen Phaophi (21. Dezember 295 v. Chr.),

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a) Der Meridian von Rom wird somit auf 20^{0} westlich des Meridians von Alexandria geschätzt, was etwa 4^{0} zuviel ist.

b) Demnach stand der Mond in $\text{m}\ 26^{0}15'$ etwa $^{2}/_{3}$ Stunde westlich des Meridians. Daß in dieser Stellung die Längen- parallaxe den Ort des Mondes in der Richtung der Zeichen vor- rückt, kann nicht richtig sein.

c) Etwa $^{3}/_{4}$ Tag vor dem letzten Oktanten, weil die westliche Elongation 54^{0} beträgt.

3 bürgerliche Stunden nach Mitternacht, d. s. $3^2/_5$ Äquinoktial-
stunden ($3^h 24^m$ nachts), weil die Sonne in ♐ 26^0 stand, nach
der Rechnung mit gleichförmigen Sonnentagen $3^1/_6$. Zu dieser
Stunde war für das Mondzentrum

5 die genaue Entfernung vom Herbstgleichenpunkt $31^0 15'$
   die (wahre) nördliche Breite $1^0 20'$
   die scheinbare Entfernung in Länge $32^0 \ 0'$
   die scheinbare nördliche Breite $1^0 \ 5'$,
     weil ♌ 15^0 kulminierte.[a]

10   Folglich war der nördlichste (β) von den drei Sternen
($\pi\delta\beta$) in der Stirn des Skorpions in Länge damals vom

Herbstgleichenpunkt gleichfalls 32^0 entfernt und stand
ungefähr $1^0 20'$ nördlich der Ekliptik.[b]

   2. Menelaos berichtet als Beobachter in Rom folgendes.
15 Im ersten Jahre Trajans am 18/19. Mechir stand gegen Ende
der 11ten (Nacht-) Stunde das südliche Horn des scheinbaren
Mondes[c] auf einer Geraden mit dem mittelsten (δ) und dem
südlichen (π) von den Sternen ($\pi\delta\beta$) in der Stirn des Skor-
pions, während sein Zentrum hinter dieser Geraden (östlich)
20 zurückblieb und so weit von dem mittelsten Stern (δ) abstand,
wie der mittelste (δ) von dem südlichen (π). Den nördlichen
(β) von den Sternen in der Stirn schien der Mond zu be-
decken; denn er war nirgends sichtbar.

   Der Zeitpunkt fällt wieder in das 845te Jahr seit Nabo-
25 nassar auf den 18/19. ägyptischen Mechir (14. Januar 98 n.
Chr.), 5 bürgerliche Stunden nach Mitternacht, d. s. $6^1/_6$ Äqui-
noktialstunden ($6^h 10^m$ früh), weil die Sonne in ♑ 23^0 stand,
auf den Meridian von Alexandria reduziert, $7^1/_2$, ungefähr
ebensoviel nach der Rechnung mit gleichförmigen Sonnen-
30 tagen. Zu dieser Stunde war für das Mondzentrum

---

   a) Demnach stand der Mond in ♏ 2^0 etwa $4^3/_4$ Stunden östlich
des Meridians nur wenige Grade über dem Horizont, woraus sich
die starke Längenparallaxe erklärt.

   b) D. i. etwa $15'$ oder einen Halbmesser weiter nördlich als
das Mondzentrum.

   c) Einen Tag nach dem letzten Viertel, weil die westliche
Elongation 77^0 beträgt.

die genaue Entfernung vom Herbstgleichenpunkt $35^0 20'$
die (wahre) nördliche Breite $2^0 10'$
die scheinbare Entfernung in Länge $35^0 55'$
die scheinbare nördliche Breite $1^0 20'$,
    weil ♎ 30⁰ kulminierte.[a]   5

Folglich hatte der nördlichste (β) von den Sternen in der
Stirn des Skorpions ungefähr dieselbe Position.

Schlußfolgerung. Auch an diesem Stern ist ehemals wie Hei 34
heutzutage derselbe Abstand von der Ekliptik in Breite be-
obachtet worden, während er in Länge in der zwischen den 10
Beobachtungen verflossenen Zeit, welche $(845 - 454 =)$
391 Jahre beträgt, vom Herbstgleichenpunkt ab in der Ha 28
Richtung der Zeichen $3^0 55'$ vorgerückt ist. Hieraus folgt
wieder, daß der Fortschritt dieses Sterns in der Richtung der
Zeichen in 100 Jahren einen Grad beträgt.   15

Viertes Kapitel.

Einrichtung des Fixsternkatalogs.

Aus der vergleichenden Beobachtung dieser Sterne, welche
in ähnlicher Weise auch an den übrigen glänzenden Fixsternen
vorgenommen wurde, sowie aus dem übereinstimmenden Ab-
stand der übrigen Sterne von den sicher bestimmten haben
wir es bestätigt gefunden, daß erstens die Fixsternsphäre den 20
Fortschritt von der festgestellten Größe, soweit der (verhältnis-
mäßig) so kurze Zeitraum es an die Hand zu geben vermag,
von den Wende- und Nachtgleichenpunkten aus in der Rich-
tung der Zeichen bewerkstelligt, und daß zweitens die also
sich äußernde Bewegung der Sphäre sich um die Pole des 25
durch die Mitte der Tierkreisbilder gehenden schiefen Kreises
vollzieht, aber nicht um die Pole des Äquators, d. i. des
ersten Umschwungs. Demnach haben wir es für unsere nächste

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a) Demnach stand der Mond in ♏ 6⁰ wenig über 5⁰ östlich
des Meridians, wo der überwiegend größere Teil der Höhenparal-
laxe auf die Breitenparallaxe entfallen muß.

Ferner ist $\left\{\begin{array}{l} \triangle\wedge = \mathsf{EM}, \text{ (als } ephm) \\ \llcorner\triangle\wedge\mathsf{A} = \llcorner\mathsf{EMA}, \text{ (als Rechte)} \end{array}\right.$

(mithin $\triangle\,\triangle\wedge\mathsf{A} \cong \triangle\,\mathsf{EMA}$) (als rechtwinklig)

folglich $\llcorner\triangle\mathsf{A}\wedge = \llcorner\mathsf{EAM}$, was zu beweisen war.

Siebentes Kapitel.
Nachweis des Apogeums des Merkur und der Weiterbewegung desselben.

Ha 166   Nach Feststellung dieser theoretischen Sätze erledigten
6 wir zunächst die Frage, in welchen Teilen der Ekliptik das
Hei 262 Apogeum des Planeten Merkur liegt, auf folgendem Wege.
Wir suchten Beobachtungen der größten Elongationen, bei
denen die Position (des Planeten) als Morgenstern von dem
10 mittleren Ort der Sonne, welcher zugleich der mittlere Ort
des Planeten ist, gleichweit entfernt war wie die Position
als Abendstern. Ist diese (beiderseitige) Entfernung ge-
funden, so muß nach dem soeben von uns geführten Beweis
das Apogeum des (festbleibenden) Exzenters den zwischen
15 den beiden Positionen in der Mitte liegenden Punkt ein-
nehmen.

Wir fanden nun für diesen Zweck nur wenige Beobach-
tungen geeignet, weil die betreffende Syzygie[a] nur selten
mit der erforderlichen Schärfe der Beobachtung zugänglich
20 ist. Indessen können sie wenigstens die vorliegende Auf-
gabe veranschaulichen. Derartige Beobachtungen jüngeren
Datums sind folgende.

Im 16ten Jahre Hadrians am 16/17. ägyptischen Pha-
menoth abends (2. Februar 132 n. Chr.) beobachteten wir
25 vermittelst der Einrichtung des Astrolabs den Merkur in
seiner größten Elongation von dem mittleren Orte der Sonne.
Als er damals mit Bezug auf den glänzenden Stern (Alde-

---

a) Unter Syzygie sind die paarweise zusammengehörigen
größten Elongationen zu verstehen, in denen der Planet, von
dem mittleren Ort der Sonne auf entgegengesetzten Seiten des
Apogeums gleichweit entfernt, einerseits als Abendstern, ander-
seits als Morgenstern erscheint.

baran) der Hyaden anvisiert wurde, ergab sich als sein scheinbarer Ort in Länge $)($ 1^0. Nun war zur genaunten Zeit[a]) der mittlere Ort der Sonne $\approx 9^0 45'$; folglich betrug die größte Elongation vom mittleren Ort als Abendstern $21^0 15'$.

Im 18ten Jahre Hadrians am 18/19. ägyptischen Epiphi Ha 167 früh morgens (4. Juni 134 n. Chr.) ergab sich für den Mer- 6 kur in seiner größten Elongation, als er bei recht schwachem Hei 263 Glanze mit Bezug auf den glänzenden Stern (Aldebaran) der Hyaden anvisiert wurde, als scheinbarer Ort $\upsilon 18^0 45'$. Nun war zu dieser Zeit[b]) der mittlere Ort der Sonne $\pi 10^0$. 10 Folglich betrug auch in diesem Fall die größte Elongation vom mittleren Ort als Morgenstern $21^0 15'$.

Da also nach der ersten Beobachtung der mittlere Ort des Planeten $\approx 9^0 45'$, nach der zweiten $\pi 10^0$ war und der in der Mitte zwischen diesen Positionen liegende Punkt 15 der Ekliptik in $\gamma 9^0 52' 30''$ füllt, so dürfte für die damalige Zeit der durch das Apogeum gehende Durchmesser in dieser Lage anzunehmen sein.

Wiederum beobachteten wir am Astrolab im ersten Jahre Antonins am 20/21. ägyptischen Epiphi (4. Juni 138 n. Chr.) 20 abends den Merkur in seiner größten Elongation von dem mittleren Ort der Sonne. Als er damals mit Bezug auf den Stern (Regulus) im Herzen des Löwen anvisiert wurde, ergab sich als sein scheinbarer Ort $\mathcal{S} 7^0$. Nun war zu der genannten Zeit[c]) der mittlere Ort der Sonne $\pi 10^0 30'$; 25 folglich betrug die größte Elongation vom mittleren Ort als Abendstern $26^0 30'$.

Desgleichen ergab sich im 4ten Jahre Antonins am 18/19. ägyptischen Phamenoth (2. Februar 141 n. Chr.) frühmorgens wieder in der größten Elongation unter Anvisierung Hei 264 mit Bezug auf den sog. Antares als sein scheinbarer Ort 31 $\nearrow 13^0 30'$, während der mittlere Ort der Sonne $\approx 10^0$ war.[d])

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a) Für die Zeit $878^a 195^d 7^h$ berechnet sich nach den Sonnentafeln der mittlere Ort mit $\approx 9^0 44' 23''$.
b) Für die Zeit $880^a 317^d 17^h$ ergibt die Nachprüfung $\pi 9^0 56' 42''$.
c) Für die Zeit $884^a 319^d 8^h$ ergibt die Nachprüfung $\pi 10^0 33' 28''$.
d) Für die Zeit $887^a 197^d 18^h$ ergibt die Nachprüfung $\approx 10^0 0' 29''$.

Folglich betrug auch in diesem Fall die größte Elongation
vom mittleren Ort als Morgenstern genau wieder 26°30'.

Da nach der ersten Beobachtung der mittlere Ort des
Planeten ♊ 10°30', nach der zweiten ♒ 10° war und der
5 in der Mitte dazwischen liegende Punkt der Ekliptik in
♎ 10°15' fällt, so dürfte für die damalige Zeit der durch
das Apogeum gehende Durchmesser in dieser Lage anzu-
nehmen sein.

An der Hand dieser Beobachtungen fanden wir demnach,
10 daß das Apogeum ohne wesentlichen Fehler in den 10ten Grad
des Widders oder der Scheren fällt, während es nach
den älteren Beobachtungen, die bei den größten Elongationen
angestellt worden sind, im 6ten Grade der nämlichen Zeichen
lag, wie sich aus den erhaltenen Mitteilungen berechnen läßt.

15   Im 23ten Jahre der Zeitrechnung des Dionysius[6], am Mor-
gen des 21. Hydron[a], stand nämlich „Stilbon" von dem
glänzendsten Stern (δ) im Schwanze des Steinbocks (Deneb
Algedi) drei Mondbreiten[2] nach Norden zu ab. Es stand
aber dazumal besagter Fixstern nach unseren Anfangs-
20 punkten, d. h. nach denjenigen, welche von den Wende- und
Nachtgleichenpunkten ab gerechnet werden, in ♑ 22°20',[b]
und ebenda selbstverständlich[c] auch der Planet Merkur,
während der mittlere Ort der Sonne gegebenermaßen ♒ 18°10'
war.[d] Denn der Zeitpunkt fiel in das 486te Jahr seit Na-
25 bonassar auf den 17/18. ägyptischen Choiak frühmorgens
(12. Februar 262 v. Chr.). Folglich betrug die größte Elon-
gation vom mittleren Ort als Morgenstern 25°50'.

Ttei 265 (left margin, line 23)

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a) Der Zahl κϑ' des griechischen Textes habe ich die Lesart
κα' des Cod. G vorgezogen, die von zweiter Hand auch im Cod. D
über κδ' steht, eine Verbesserung, welche schon Böckh (Sonnenkr.
d. Alten, S. 295) der Übersetzung des Gerhard von Cremona (vi-
gesimo primo die transacto mensis ydros) entnommen hat.

b) Nach dem Sternkatalog steht δ Capricorni in ♑ 26°20'
mit 2° südl. Breite, folglich genau 4 Jahrhunderte früher 4° rück-
wärts dieses Ortes.

c) Da er 3 Mondbreiten = 1½° nördlich stand, so war sein
Ort in Länge ♑ 22°20' bei ½° südl. Breite.

d) Für 485ⁿ 106ᵈ 20ʰ ergibt die Nachprüfung ♒ 18°8'2".

Eine dieser größten Elongation genau gleichkommende
als Abendstern haben wir unter den auf uns gekommenen
Beobachtungen freilich nicht gefunden, aber mit Hilfe von
zwei am nächsten kommenden Elongationen haben wir die
gleichgroße auf folgendem Wege berechnet.   5

Im nämlichen 23ten Jahre der Zeitrechnung des Dionysius Ha 169
blieb am Abend des 4. Tauron der Mer-
kur hinter der Verbindungslinie der
Hörner ($\beta\zeta$) des Stiers drei Mondbreiten
östlich zurück, während sein Vorüber-
gang an dem (mit dem Fuhrmann) ge-   10
meinsamen Stern (β) in einem Abstand
von mehr als drei Mondbreiten nach
Süden zu erwarten stand, so daß sein
Ort (in Länge) wieder nach unseren
Anfangspunkten (4° zurück) ♉ 23° 40′   15
(d. i. gleich der damaligen Länge von ζ)
war. Der Zeitpunkt fällt wieder in das
486te Jahr seit Nabonassar auf den 30.
ägyptischen Mechir[a)] zum 1. Phamenoth (25. April 262 v. Chr.)   20
abends, während der mittlere Ort der Sonne ♈ 29° 30′ war.[b)]
Folglich betrug die größte Elongation von dem mittleren
Ort als Abendstern 24° 10′.

Im 28ten Jahre der Zeitrech-
nung des Dionysius stand er   25
am Abend des 7. Didymon un-
gefähr auf einer Geraden mit
den Köpfen ($\alpha\beta$) der Zwillinge,
war aber von dem südlichen
um $^1/_3$ Mondbreite weniger als   30
den doppelten Abstand der
Köpfe nach Süden entfernt.
Folglich war der Ort des Merkur (in Länge) wieder nach Hei 266
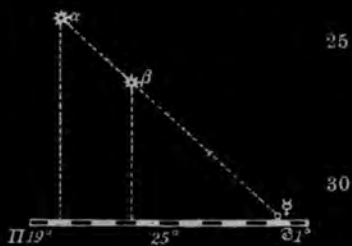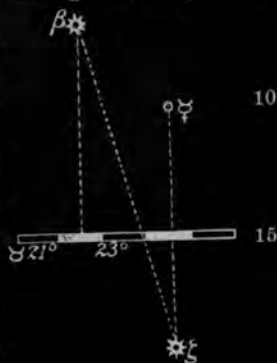
    a) Die von Petau und Ideler gegebene Verbesserung Μεχιρ τρια-
κοστῇ εἰς τὴν α′ Φαμενώθ erscheint Böckh (a. a. O. S. 296) gewalt-
sam, aber absolut gewiß. Ich halte die von Halma (Chron. de Ptol.
p. 39) vorgeschlagene Umstellung λ′ εἰς τὴν α′ Φαμενώθ für aus-
reichend.   b) Für 485[a] 179[d] 7[h] ergibt die Nachprüfung ♈ 29° 33′ 3″.

unseren Anfangspunkten ♈ 29⁰20'. Es fällt dieser Zeit-
punkt in das 491te Jahr seit Nabonassar auf den 5/6. ägyp-
tischen Pharmuthi (28. Mai 257 v. Chr.) abends, zu welcher
Stunde der mittlere Ort der Sonne ♈ 2⁰50' war.[a] Folglich
5 betrug diese Elongation 26⁰30'.

Es betrug demnach, als der mittlere Ort ♈ 29⁰30' war,
die größte Elongation 24⁰10', aber 26⁰30', als der mittlere
Ort ♈ 2⁰50' war. Da nun die Elongation als Morgenstern,
zu welcher wir die entsprechende gleichgroße als Abend-
10 stern suchten, 25⁰50' betrug, so fanden wir den mittleren
Ort, von welchem die Elongation als Abendstern wieder
25⁰50' betragen wird, aus der Differenz der beiden zur Be-
rechnung herangezogenen Beobachtungen. Es beträgt die
11a 170 Differenz zwischen den nach diesen beiden Beobachtungen
15 gegebenen mittleren Örtern (von ♈ 29⁰30' bis ♈ 2⁰50')
33⁰20', die der (beiden) größten Elongationen (als Abend-
stern 26⁰30' — 24⁰10' =) 2⁰20'. Somit entfallen auf 1⁰40',
was die Differenz von 25⁰50' und 24⁰10' (d. i. zwischen
der Elongation als Morgenstern und der nicht genügenden
20 Elongation als Abendstern) ist, ungefähr 24⁰.[b] Addieren
wir nun letzteren Betrag zu ♈ 29⁰30', so werden wir als
mittleren Ort, von dem die größte Elongation als Abend-
stern ebenfalls wieder 25⁰50' wie die als Morgenstern be-
tragen wird, ♉ 23⁰30' erhalten. Folglich liegt der in die
Hei 267 Mitte zwischen ♓ 18⁰10' (S. 132, 23) und ♉ 23⁰30' fallende
26 Punkt (des gesuchten Apogeums) in ♈ 5⁰50'.

Wieder im 24ten Jahre der Zeitrechnung des Dionysius
stand am Abend des 28. Leonton der Merkur nach den Be-
rechnungen Hipparchs ein wenig mehr als 3⁰ westlich von
30 der Spika, so daß damals nach unseren Anfangspunkten sein
Ort (in Länge 4⁰ + 3⁰10' zurück) ♍ 19⁰30' war. Der
Zeitpunkt fällt in das 486te Jahr seit Nabonassar auf den
30. ägyptischen Payni (23. August 262 v. Chr.) abends, zu

a) Für 490^a 214^d 8^h ergibt die Nachprüfung ♈ 2⁰52'25".
b) Die Differenzen der Elongationsstrecken werden sich ver-
halten wie die Differenzen der mittleren Sonnenörter, d. i.
2⁰20' : 1⁰40' = 33⁰20' : 24⁰.

welcher Stunde[a] der mittlere Ort der Sonne ♌ 27°50′ war. Folglich betrug die größte Elongation von dem mittleren Ort als Abendstern 21″40′, wozu wir wieder die genau entsprechende gleichgroße als Morgenstern mit Hilfe von zwei zu Gebote stehenden Beobachtungen berechnet haben. [5]

Im 75ten Jahre der chaldäischen Zeitrechnung stand am Morgen des 14. Dios der Merkur „eine halbe Elle"[2] oberhalb der südlichen Wage (α Zuben-el-dschenubi), so daß für die damalige Zeit nach unseren Anfangspunkten (3°50′ zurück) sein Ort ♎ 14°10′ war. Der Zeitpunkt fällt in das [10] 512te Jahr seit Nabonassar auf den 9/10. ägyptischen Thoth (30. Oktober 236 v. Chr.) frühmorgens, zu welcher Stunde[b] der mittlere Ort der Sonne ♏ 5°10′ war. Folglich betrug die größte Elongation als Morgenstern 21°.

Im 67ten Jahre der chaldäischen Zeitrechnung stand am Morgen des 5. Apellaios der Merkur „eine halbe Elle" ober- [16] halb des nördlichen Sterns (β) in der Stirn des Skorpions, so daß für die damalige Zeit nach unserer Zählung (4° zurück) sein Ort ♏ 2°20′ war. Es fällt dieser Zeitpunkt in das 504te Jahr seit Nabonassar auf den 27/28. Thoth (19. November 244 v. [20] Chr.) frühmorgens, zu welcher Stunde[c] der mittlere Ort der Sonne ♏ 24°50′ war. Folglich betrug diese (größte) Elongation 22°30′.

Bei diesen beiden Beobachtungen beträgt nun wieder die Differenz der mittleren Örter (von ♏ 5°10′ bis ♏ 24°50′) [25] 19°40′, die der größten Elongationen (22°30′ — 21° =) 1°30′. Somit entfallen auf 40′, was die Differenz zwischen der zur Untersuchung herangezogenen Elongation von 21°40′ und der kleineren (der beiden letztbesprochenen) im Betrage von 21° ist, ungefähr 9°.[d] Addieren wir diese 9° zu ♏ 5°10′, [30] so werden wir als mittleren Ort, bei welchem die größte Elongation als Morgenstern den 21°40′ der größten als Abendstern genau gleichkommt, ♏ 14°10′ erhalten. Es

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a) Für 485[a] 299[d] 8[h] ergibt die Nachprüfung ♌ 27°52′5″.
b) Für 511[a] 8[d] 18[h] ergibt die Nachprüfung ♏ 5°8′16″.
c) Für 503[a] 26[d] 18[h] ergibt die Nachprüfung ♏ 24°49′28″.
d) Nach dem Verhältnis der Differenzen 1°30′ : 40′ = 19°40′ : 9°.

liegt also wieder der in der Mitte zwischen ♌ 27°50′ (S. 135,1)
_{Hei 269} und ♍ 14°10′ fallende Punkt (des gesuchten Apogeums)
gerade in ± 6°.

Aus diesen Beobachtungen und aus der genauen Anpassung
5 des Verlaufs der Erscheinungen bei den übrigen Planeten
fanden wir schließlich das übereinstimmende Ergebnis, daß
erstens die durch die Apogeen und die Perigeen gehenden
Durchmesser bei den fünf Wandelsternen einen Fortschritt
um den Mittelpunkt der Ekliptik in der Richtung der Zeichen
10 bewerkstelligen, und daß zweitens zeitlich dieser Fortschritt
gleichgroß ist wie der der Fixsternsphäre. Denn wie letztere
_{Ha 172} nach den von uns geführten Beweisen in 100 Jahren un-
gefähr einen Grad weiterschreitet, so läßt sich auch hier
seit der durch die alten Beobachtungen gewährleisteten Zeit,
15 zu welcher das Apogeum des Merkur in den sechsten Graden
(von Widder und Scheren) lag, bis zu der Zeit der unser-
seits angestellten Beobachtungen, zu welcher seine Weiter-
bewegung, weil es in den zehnten Graden (derselben Zeichen)
liegt, ungefähr 4 Grade beträgt, eine Zwischenzeit von un-
20 gefähr 400 Jahren feststellen.

Achtes Kapitel.
Nachweis, daß der Merkur während eines Kreis-
laufs zweimal in die größte Erdnähe gelangt.

Im weiteren Anschluß an diese Ergebnisse suchten wir
die Beträge der größten Elongationen festzustellen, welche
eintreten, wenn der mittlere Ort der Sonne im Apogeum
selbst liegt, und dann wieder, wenn er sich an der diame-
_{Hei 270} tral gegenübergelegenen Stelle befindet. Hierzu geeignetes
25 Material fanden wir unter den alten Beobachtungen nicht
vor; es wurde lediglich aus den von uns selbst am Astrolab
angestellten Beobachtungen gewonnen. Für diesen Zweck
dürfte sich nämlich ganz besonders der praktische Wert der
30 mit diesem Instrument möglichen Anvisierung zu erkennen
geben. Auch wenn keine von den Fixsternen, deren Posi-

tionen nach vorausgegangener Bestimmung bekannt sind, in der unmittelbaren Nähe der zu beobachtenden Planeten sichtbar sind, was, wenn es sich um den Merkur handelt, meistens der Fall ist, weil der größte Teil der Fixsterne nur selten in dem gleichen Abstande von der Sonne wie der [5] Merkur sichtbar sein kann, so ist doch durch die Anvisierung auch weitabstehender Sterne die Möglichkeit geboten, die Positionen der in Frage kommenden Planeten in Länge und Breite genau zu bestimmen.

Im 19ten Jahre Hadrians stand am Morgen des 14/15. ägyp- [10] tischen Athyr (3. Oktober 134 n. Chr.) der Merkur in seiner Ha 173 größten Elongation bei Anvisierung mit Bezug auf den Stern (Regulus) im Herzen des Löwen in dem scheinbaren Ort ♏ 20°12′, während der mittlere Ort der Sonne ♎ 9″15′ war[a], so daß die größte Elongation 19°3′ betrug. [15]

In demselben Jahre, am Abend des 19. Pachon (5. April 135 n. Chr.), als er wieder in der größten Elongation stand und mit Bezug auf den glänzenden Stern (Aldebaran) der Hyaden anvisiert wurde, ergab sich als sein scheinbarer Ort ♉ 4°20′, während der mittlere Ort der Sonne ♈ 11°5′ war[b], [20] so daß hier die größte Elongation 23°15′ betrug, woraus ohne Hei 271 weiteres klar hervorging, **daß das Apogeum des Exzenters in den Scheren lag, nicht im Widder.**[c]

Diese Punkte sollen gegeben sein. Der durch [25] das Apogeum gehende Durchmesser sei ABΓ; als Mittelpunkt der Ekliptik, wo sich das Auge befindet, sei B angenommen, A als der Punkt unter ♎ 10°, Γ als der Punkt unter ♈ 10°. Um A und Γ beschreibe man gleichgroße Epizyklen; auf dem [30] einen soll Δ (d. i. der Punkt der größten Elongation als Morgenstern) liegen, auf dem anderen E (d. i. der Punkt der größten Elongation als Abend-

stern). Alsdann ziehe man von B aus an diese Epizyklen
die Tangenten B$\triangle$ und BE und fälle von den Mittelpunkten
aus auf die Berührungspunkte die Lote A$\triangle$ und ΓE.

Da also in den Scheren die größte Elongation vom mitt-
leren Ort als Morgenstern mit 19°3' beobachtet wurde, so
ist (als Zentriwinkel am Mittelpunkt der Ekliptik)

$$\angle AB\triangle = 19°3' \text{ wie } 4R = 360°,$$
$$= 38°6' \text{ wie } 2R = 360°,$$

mithin $b\,A\triangle = 38°6'$ wie $\bigodot A\triangle B = 360°,$
also $s\,A\triangle = 39^P9'$ wie $h\,AB = 120^P.$

11   Da ferner im Widder die größte Elongation vom mittleren
Ort als Abendstern mit 23°15' beobachtet wurde, so ist

$$\angle \Gamma BE = 23°15' \text{ wie } 4R = 360°,$$
$$= 46°30' \text{ wie } 2R = 360°,$$

15   mithin $b\,\Gamma E = 46°30'$ wie $\bigodot \Gamma EB = 360°,$
also $s\,\Gamma E = 47^P22'$ wie $h\,B\Gamma = 120''.$

Weil nun A$\triangle$ und ΓE als Halbmesser des Epizykels einan-
der gleich sind, so ist auch $\Gamma E = 39^P9'$ wie $AB = 120^P,$
und in demselben Maße (nach dem Verhältnis $39^P9' : 47^P22'$
20 $= x : 120^P$) $B\Gamma = 99^P9'$, mithin die Strecke AΓ als Summe
(AB + BΓ =) $219^P9'$. Halbiert man nun diese Strecke in
Punkt Z, so wird in demselben Maße AZ $(= Z\Gamma)$ gleich
$109^P34'$ sein, und die Verbindungslinie zwischen den Punkten
B und Z (als AB — AZ) gleich $10^P25'$.

25   Hieraus wird zunächst zweierlei klar: Punkt Z ist ent-
weder das Zentrum des Exzenters, auf welchem jederzeit der
Mittelpunkt des Epizykels liegt, oder es ist der Punkt, um
welchen sich das Zentrum des besagten Exzenters bewegt[a];
denn einzig und allein unter einer dieser beiden Voraussetzun-
30   gen kann der Mittelpunkt des Epizykels in jeder der beiden
gegebenen diametral gegenübergelegenen Stellungen (A und
Γ) gleichweit, wie (mit AZ = ZΓ) bewiesen wurde, von
Punkt Z entfernt sein.

a) In der Epizykelstellung A würde das bewegliche Zentrum
ebensoweit oberhalb Z liegen, wie es bei der Epizykelstellung Γ
unterhalb Z zu liegen kommen würde.

Allein wenn Z direkt das Zentrum des Exzenters wäre, auf
welchem jederzeit der Mittelpunkt des Epizykels liegt, so wäre [Ha 175]
erstens dieser Exzenter ein festbleibender, und zweitens
würde von allen Stellungen (des Epizykels auf einem fest-
bleibenden Exzenter) die im Widder (d. i. in Γ) die erd- [Hei 273]
nächste sein, weil von allen Linien, welche sich von B (dem [6]
Auge) aus nach dem um Z beschriebenen Kreis ziehen lassen,
die Gerade BΓ (nach Eukl. III. 7) die kürzeste ist. Nun
wird aber die Stellung im Widder nicht ausschließlich als
die erdnächste gefunden, sondern noch näher als diese und [10]
einander nahezu gleich sind die Erdnähen in den Zwil-
lingen und im Wassermann. Hieraus geht klar hervor,
daß sich das Zentrum des besagten (den Epizykel tragenden)
Exzenters um den Punkt Z in einer der Herumleitung des
Epizykels entgegengesetzten Richtung, d. i. gegen die [15]
Richtung der Zeichen, während eines (Epizykel-)Umlaufs gleich-
falls einmal herumbewegt. Auf diese Weise wird nämlich
während dieses Umlaufs der Mittelpunkt des Epizykels zwei-
mal in die größte Erdnähe gelangen.

Daß aber in den Zwillingen und im Wassermann der Epi- [20]
zykel in größere Erdnähe gelangt als bei der Stellung im
Widder, geht ohne weiteres aus den oben mitgeteilten Beob-
achtungen klar hervor. Bei der Beobachtung im 16ten Jahre
Hadrians am 16. Phamenoth (2. Februar 132 n. Chr.) betrug
nämlich die größte Elongation vom mittleren Ort als Abend- [25]
stern (S. 131,4) $21°15'$, bei der im 4ten Jahre Antonins am
18. Phamenoth (2. Februar 141 n. Chr.) die größte Elonga-
tion vom mittleren Ort als Morgenstern (S. 132,2) $26°30'$,
während bei beiden Beobachtungen der mittlere Ort der
Sonne $= 10°$ war. [30]

Ferner betrug bei der Beobachtung im 18ten Jahre Hadrians
am 19. Epiphi (4. Juni 134 n. Chr.) die größte Elongation
vom mittleren Ort als Morgenstern (S. 131,12) $21°15'$, bei
der im ersten Jahre Antonins am 20. Epiphi (4. Juni 138 [Hei 271]
n. Chr.) die größte Elongation vom mittleren Ort als Abend- [35]
stern (S. 131,27) $26°30'$, während bei diesen beiden Beob-
achtungen der mittlere Ort der Sonne Π $10°$ war. [Ha 176]

Folglich beträgt sowohl im Wassermann wie in den Zwillingen die Summe der nach entgegengesetzter Richtung eingetretenen größten Elongationen $(21^0 15' + 26^0 30' =) 47^0 45'$, während die Summe der beiden Elongationen im Widder
5 nur $(2 \times 23^0 15' =) 46^0 30'$ ausmacht; denn die Elongation (im Widder) als Abendstern, welche (nach dem S. 127,30 geführten Beweis) gleich ist der Elongation als Morgenstern, ist (S. 137,21) mit nur $23^0 15'$ beobachtet worden.

Neuntes Kapitel.
Das Verhältnis der Exzentrizität und die zahlenmäßige Größe des Epizykels des Merkur.[a]

Nachdem diese einleitenden Erörterungen erledigt sind,
10 bleibt noch der Nachweis zu führen, erstens, um welchen Punkt der Strecke AB die jährliche Wiederkehr des Epizykels in gleichförmiger Bewegung in der Richtung der Zeichen vor sich geht, und zweitens, welchen Abstand von Punkt Z das Zentrum des (beweglichen) Exzenters hat,
15 welcher die (mit dem Epizykelumlauf) gleichzeitige Wiederkehr gegen die Richtung der Zeichen bewerkstelligt.

Zur Feststellung dieser beiden Punkte haben wir wieder zwei Beobachtungen von größten Elongationen als Morgenstern und als Abendstern zur Benutzung mit herangezogen;
20 allein bei beiden war der mittlere Ort vom Apogeum beiderHei 275 seits gleichweit 90^0 entfernt, was die Stelle ist, in welcher das Maximum der Differenz der auf die Ekliptik bezogenen Anomalie eintritt (I 155,11).

Im 14ten Jahre Hadrians hatte der Merkur am Abend
25 des 18. ägyptischen Mesore (4. Juli 130 n. Chr.), wie wir in den von Theon entnommenen Beobachtungen gefunden haben, nach Theons Angabe seine größte Elongation von der Sonne, während er hinter dem Stern (Regulus) im Her-

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a) Die Kapitelüberschrift des Originals: Περὶ τοῦ λόγου καὶ τῆς πηλικότητος τῶν τοῦ τοῦ Ἑρμοῦ ἀνωμαλιῶν steht weder im Einklang mit dem Inhalt dieses Kapitels noch mit den entsprechenden Kapitelüberschriften bei den anderen Planeten.

zen des Löwen $3°50'$ östlich zurückblieb. Folglich stand
er nach unseren Anfangspunkten ohne wesentlichen Fehler
in ($♌\ 2°30' + 3°50' =$) $♌\ 6°20'$, während der mittlere
Ort der Sonne damals[a]) $♋\ 10°5'$ (d. i. $90°$ von $γ\ 10°$ ent-
fernt) war, so daß die größte Elongation als Abendstern Ha 177
$26°15'$ betrug.   G

Im 2ten Jahre Antonins fanden wir in der Morgendämmerung
zum 24. ägyptischen Mesore (8. Juli 139 n. Chr.), als wir
am Astrolab die größte Elongation des Merkur beobachteten
und ihn mit Bezug auf den glänzenden Stern (Aldebaran) 10
der Hyaden anvisierten, als (scheinbaren) Ort $π\ 20°5'$,
während der mittlere Ort der Sonne wieder $♋\ 10°20'$ war[b]),
so daß die größte Elongation als Morgenstern $20°15'$ betrug.

Diese Punkte sollen gegeben sein. Es sei AZBΓ
wieder der durch $≏\ 10°$ und $γ\ 10°$ gehende Durchmesser 15
(des festbleibenden Exzenters). Angenommen sei, wie an
der vorigen Figur, A als der Punkt, in welchem sich der
Mittelpunkt des Epizykels befindet, wenn er unter $≏\ 10°$
steht, und Γ als der Punkt, in welchem
er sich befindet, wenn er unter $γ\ 10°$ 20
steht. Der Mittelpunkt der Ekliptik sei
B und Z der Punkt, um welchen das
Zentrum des (beweglichen) Exzenters seinen   Hei 276
Fortschritt gegen die Richtung der Zeichen
bewerkstelligt.[c)]   25

I. Zunächst sei die Aufgabe gestellt,
den Abstand zu finden, welchen von Punkt
B das Zentrum (H) (des festbleibenden
Exzenters) hat, um welches wir die gleich-
förmige Bewegung des Epizykels in der   30
Richtung der Zeichen vor sich gehen lassen.
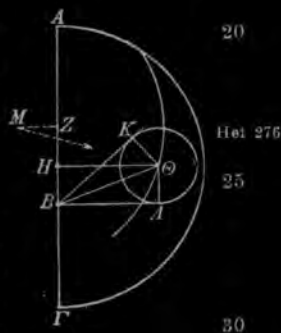
a) Für $876^a\ 347^d\ 8^h$ ergibt die Nachprüfung $♋\ 10°7'2''$.
b) Für $885^a\ 352^d\ 16^h$ ergibt die Nachprüfung $♋\ 13°11'9''$.
c) Zum Verständnis der Lage des Epizykels auf der Peripherie
AΘ des beweglichen Exzenters ist das derzeitige Zentrum M
dieses Exzenters angedeutet. Vgl. die nächste Figur.

3. Es ist weiter (s. S. 145, 22)

$$\angle\, \Delta\Gamma\Lambda = 60^\circ \qquad \text{wie } 4R = 360^\circ,$$
$$= 120^\circ \qquad \text{wie } 2R = 360^\circ;$$

mithin $\left\{ \begin{array}{l} b\,\Delta\Lambda = 120^\circ \\ ,b\,\Gamma\Lambda = 60^\circ \end{array} \right\}$ wie $\ominus\,\Gamma\Lambda\Delta = 360^\circ,$

also $\left\{ \begin{array}{l} s\,\Delta\Lambda = 103^{\text{P}}\,55' \\ ,s\,\Gamma\,\Lambda = 60^{\text{P}} \end{array} \right\}$ wie $\quad h\,\Gamma\Delta = 120^{\text{P}}.$

Setzt man $\Gamma\Delta = 3^{\text{P}}$ wie $\Gamma\mathsf{Z} = 57^{\text{P}},$

so wird $\Delta\Lambda = 2^{\text{P}}36'$ und $\Gamma\Lambda = 1^{\text{P}}30';$

mithin $\Lambda\mathsf{Z} = \Gamma\mathsf{Z} - \Gamma\Lambda = 55^{\text{P}}30'$ in demselben Maße.

Nun ist $\Lambda\mathsf{Z}^2 + \Delta\Lambda^2 = \Delta\mathsf{Z}^2,$

folglich $h\,\Delta\mathsf{Z} = 55^{\text{P}}34'$ wie *ephm* $\mathsf{Z}\Theta$ u. $\mathsf{Z}\mathsf{K} = 22^{\text{P}}30'.$

$$\text{(S. 144, 17)}$$

Setzt man $h\,\Delta\mathsf{Z} = 120^{\text{P}},$

so wird $s\mathsf{Z}\Theta$ u. $s\mathsf{Z}\mathsf{K} = 48^{\text{P}}35'$ in diesem Maße,

mithin[a)] $\left\{ \begin{array}{l} \angle\,\mathsf{Z}\Delta\Theta \\ \angle\,\mathsf{Z}\Delta\mathsf{K} \end{array} \right\} = 47^\circ 46'$ wie $2R = 360^\circ,$

folglich $\angle\,\Theta\Delta\mathsf{K} = 47^\circ 46'$ wie $4R = 360^\circ$ als Summe,

was zu beweisen war.

Zehntes Kapitel.
Korrektion der periodischen Bewegungen des Merkur.

Im Anschluß an diese Beweisführungen handelt es sich weiter darum, die periodischen Bewegungen des Merkur und seine Epochen (Kap. 11) festzustellen. Was die Bewegungen in Länge anbelangt, d. s. diejenigen, welche den Epizykel gleichförmig um das Zentrum Γ herumtragen, so sind dieselben ohne weiteres als mit denen der Sonne identisch gegeben. Dahingegen haben wir die Bewegungen in Anomalie, d. s. diejenigen, welche den Planeten auf dem Epizykel um den Mittelpunkt desselben herumtragen, aus zwei durchaus

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a) Mit Überspringung der den Sehnentafeln zu entnehmenden Bogen, von denen die Winkel als Peripheriewinkel der um die rechtwinkligen Dreiecke gezogenen Kreise überspannt werden.

sicheren Beobachtungen gewonnen. Die eine ist den zu unserer Ha 183
Zeit aufgezeichneten entnommen, die andere aus der Zahl
der alten ausgewählt.

I. Im 2ten Jahre Antonins, welches in das 886te Jahr seit
Nabonassar fiel, haben wir am 2/3. ägyptischen Epiphi 5
(17. Mai 139 n. Chr) den Merkur am Astrolab beobachtet,
als er noch nicht zur größten Elongation als Abendstern
gelangt war. Bei der Anvisierung mit Bezug auf den Stern
(Regulus) im Herzen des Löwen ergab sich als sein eigener
scheinbarer Ort ⵍ $17^0 30'$; zu gleicher Zeit blieb er hinter 10
dem Zentrum des Mondes $1^0 10'$ östlich zurück. Der Zeit-
punkt fällt für Alexandria $4^1/_2$ Äquinoktialstunden vor der
Mitternacht auf den dritten (d. i. $7^h 30^m$ abends), da am
Astrolab ⵯ $0^0 5'$ kulminierte, während die Sonne in ♉ 23^0
stand. Für diese Stunde[a] war nach den von uns bewiesenen Hei 284
Unterlagen (d. i. nach den Sonnen- und Mondtafeln) 16
der mittlere Ort der Sonne ♉ $22^0 34'$
der mittlere Ort des Mondes ⵍ $12^{u} 14'$
die Entfernung in Anomalie von dem Apogeum
 des Epizykels $281^0 20'$ 20
somit der genaue Ort des Mondzentrums[b] ⵍ $17^0 10'$
der scheinbare Ort[b] „ „ ⵍ $16^0 20'$.

Folglich war der Ort des Merkur auch hiernach, weil er
$1^0 10'$ hinter dem Mondzentrum östlich zurückblieb, ⵍ $17^0 30'$.

Dieses Ergebnis sei zugrunde gelegt. Der durch das 25
Apogeum und das Perigeum gehende Durchmesser sei ΑΒΓΔΕ;
auf demselben sei Α als der am Apogeum liegende Punkt
angenommen, Β als der Punkt, um welchen das Zentrum
des (beweglichen) Exzenters den Fortschritt gegen die Rich-
tung der Zeichen vollzieht, Γ als der Punkt, um welchen 30
der Mittelpunkt des Epizykels den Fortschritt in der Rich- Ha 184
tung der Zeichen vollzieht, endlich Δ als der Mittelpunkt

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a) Für $885^a 301^d 7^1/_2{}^h$ ergibt die Nachprüfung: ♉ $22^0 34' 9''$,
ⵍ $12^0 26' 21''$, $281^0 32' 48''$. Die Differenz hinsichtlich der Mond-
örter in Länge und Anomalie entzieht sich einer Erklärung.

b) Durch die Längenparallaxe vermindert, weil der Mond
westlich des Meridians stand.

10^*

Setzt man $\quad h\,Z\Lambda = 120^\text{p}$,

so wird $\quad s\,Z\Xi = \;\;92^\text{p}\quad$ in diesem Maße,

mithin $\quad b\,Z\Xi = 100^\circ\;\;8'\quad$ wie $\ominus\,Z\Xi\Lambda = 360^\circ$,

also $\quad \angle\,Z\Lambda\Xi = 100^\circ\;\;8'\quad$ wie $2\,R = 360^\circ$.

5 Nun war $\quad \angle\,Z\Delta\Lambda = \;\;31^\circ 12'\quad$ wie $2\,R = 360^\circ$,

(mithin $\quad \angle\,\Delta Z\Lambda = \;\;68^\circ 56'\quad$ als Differenz.) (Eukl. I. 32)

Ferner war $\quad \angle\,\Theta ZK = \;\;\;\;3^\circ 48'\quad$ wie $2\,R = 360^\circ$,   (S. 153, 18)

folglich $\quad \angle\,KZ\Lambda = \;\;65^\circ\;\;8'\quad$ als Differenz,

$= \;\;32^\circ 34'\quad$ wie $4\,R = 360^\circ$.

10 Mithin war nach dieser Beobachtung der Planet von dem Perigeum K des Epizykels $32^\circ 34'$ entfernt, von dem Apogeum natürlich $212^\circ 34'$. Es war aber die Entfernung zur Zeit unserer Beobachtung gleichfalls von dem Apogeum des Epizykels mit $99^\circ 27'$ nachgewiesen worden.

Die zwischen den beiden Beobachtungen (vom 19. Thoth 16 6^h früh 484 Nab. bis zum 2. Epiphi 7^h 30^m abends 886 Nab.) verflossene Zeit beträgt 402 ägyptische Jahre, $(12 +$ $270 + 1 =)$ 283 Tage und $13^1/_2$ Stunden ohne wesentlichen Fehler. Dieser Zeitraum umfaßt 1268 ganze Wiederkehren 20 der Anomalie des Planeten; denn da 20 ägyptische Jahre ohne merklichen Fehler 63 Umläufe ausmachen[10], so bringen 400 Jahre 1260 und die übrigen 2 Jahre mit Einschluß der überschießenden Tage weitere 8 ganze Umläufe. Demnach haben wir das klare Ergebnis gewonnen, daß in 402 25 ägyptischen Jahren, 283 Tagen und $13^1/_2$ Stunden der Merkur nach ganzen Wiederkehren der Anomalie $246^\circ 53'$ darüber zurückgelegt hat: um so viel Grade war ja der zu unserer Zeit festgestellte Ort $(99^\circ 27')$ dem früheren $(212^\circ 34')$ voraus.[a] Ebensoviel Grade des Überschusses ergibt die 30 Rechnung[b] nach den von uns oben (S. 116—18) vorgelegten Tafeln, weil wir direkt unter Benutzung des vorliegend behandelten Materials die Korrektion der periodischen Bewe-

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a) Zu einer ganzen Wiederkehr fehlten dem früheren Orte $360^\circ - 212^\circ 34' = 147^\circ 26'$, wozu noch $99^\circ 27'$ der späteren Beobachtung hinzukommen.

b) Die Nachprüfung ergibt für obige Zeit $246^\circ 53' 36''$.

gungen des Merkur vorgenommen haben, indem wir die obengenannte Zeit in Tage verwandelten und die (1268) Kreise der Anomalie unter Hinzufügung des Überschusses in Grade. Dividiert man nämlich mit der Anzahl der Tage in die Zahl der Grade, so ergibt sich die tägliche mittlere 5 Bewegung in Anomalie, wie sie von uns für den Merkur oben (S. 101, 13) mitgeteilt worden ist.

Elftes Kapitel.
Epoche der periodischen Bewegungen des Merkur.

Um nun auch für die fünf Wandelsterne, wie dies für die Sonne und den Mond geschehen ist, die Epochen an den Mittag des 1. ägyptischen Thoth des ersten Jahres der Re- Hei 294 gierung Nabonassars zu knüpfen, haben wir wieder die 11 Zwischenzeit festgestellt, welche zwischen diesem Datum und dem Zeitpunkt der älteren Beobachtung (am 19. Thoth 6^h früh 484 Nab.) verflossen ist. Sie beträgt 483 ägyptische Jahre, 17 Tage und 18 Stunden. Für diese Zeit ergibt die 15 Rechnung (nach den Tafeln S. 116 ff.) einen Überschuß der mittleren Bewegung in Anomalie von 190° 39'.[a]) Wenn wir diesen Betrag von den 212° 34' abziehen, welche nach der Ha 192 (älteren) Beobachtung über das Apogeum zurückgelegt waren, so werden wir für den Mittag des 1. ägyptischen Thoth des 20 ersten Jahres Nabonassars als Epoche erhalten:

1. vom Apogeum des Epizykels in Anomalie   21° 55',
2. in Länge dieselbe wie die der Sonne, d. i.   )(0° 45',
3. für das Apogeum der Exzentrizität   ≏ 1° 10'.

Für letzteres macht nämlich $^1/_{100}$° (Präzession) in den vor- 25 liegenden (483) Jahren 4° 50' aus, was genau die Differenz zwischen ≏ 1° 10' und ≏ 6° ist, wo zur Zeit der (zugrunde gelegten) Beobachtung (S. 151, 23) das Apogeum festgestellt wurde.

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a) Die Nachprüfung ergibt 190° 39' 4". Hieraus geht hervor, daß die Stundenangabe ιη γ' ἔγγιστα des griechischen Textes fehlerhaft ist. Diese 20^m würden einen Zuschlag von 2' 35" aus- machen. Folglich ist γ' zu streichen oder γ' ἔγγιστα zu schreiben.

Wir selbst beobachteten im 21ten Jahre Hadrians am 9/10. ägyptischen Mechir (25. Dezember 136 n. Chr. $^1/_2 7^h$ abends) die Venus in der größten Elongation von der Sonne. Sie stand etwa $^2/_3$ von der Breite des Vollmondes (d. i. $^2/_3$
5 von 36') westlich von dem nördlichsten (φ) der vier ein Viereck[a] bildenden Sterne ($\varphi \chi \psi^1 \psi^3$) hinter dem nachfolgenden (λ), welcher mit (den zwei Sternen ι und σ in) der Schamgegend des Wassermanns auf einer Geraden steht, und schien den Fixstern (φ) zu überstrahlen. Da der Ort
10 des Fixsterns (φ) zurzeit nach unseren Anfangspunkten in ♒ 20° lag und deshalb die Venus (24' westlich) in ♒ 19° 36' stand, während der mittlere Ort der Sonne ♐ 2° 4' war[b], so betrug auch hier wieder die größte Elongation als Abendstern 47° 32'.

15 Die Punkte der Ekliptik, welche zwischen den nach der
Hel 299 ersten Beobachtung in ♎ 17° 52' und nach der zweiten in ♐ 2° 4' festgestellten Örtern in der Mitte liegen, fallen ohne wesentlichen Fehler wieder einerseits in ♉ 25°, anderseits in ♏ 25°.

Zweites Kapitel.
Zahlenmäßige Größe des Epizykels der Venus.

Ha 196   Daß zu unseren Zeiten das Apogeum des Exzenters in
21 ♉ 25° und das Perigeum in ♏ 25° liegt, ist von uns hiermit festgestellt worden. Im weiteren Verfolg suchten wir wieder (wie S. 136, 21) die größten Elongationen zu den Zeiten, wo der mittlere Ort der Sonne in ♉ 25° und ♏ 25°
25 lag.

Unter den von Theon uns überlassenen Beobachtungen fanden wir, daß im 13ten Jahre Hadrians am 2/3. ägyptischen Epiphi (20. Mai 129 n. Chr. 5^h früh) die Venus als Morgenstern die größte Elongation von der Sonne hatte, in-

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a) Ein Viereck bilden diese 4 Sterne des Wassermanns heutzutage nicht mehr, da sie nahezu auf einer Geraden untereinander stehen. Neben ψ^1, einem trennbaren Doppelstern, steht übrigens noch ein fünfter Stern ψ^2.
b) Für 883^a 158^d 6$^{1/2h}$ ergibt die Nachprüfung ♐ 2° 3' 54''.

dem sie der Geraden durch den vorangehenden (γ) von den
drei Sternen ($\alpha\beta\gamma$) im Kopfe des Widders und den Stern (38)
im Hinterbein 1° 24′ westlich
voranging, wobei sie von dem
vorangehenden Stern (γ) im Kopf
ungefähr den doppelten Abstand
hatte wie von dem Stern (38)
im Hinterbein. Nun stand nach
unseren Anfangspunkten der
vorangehende (γ) von den drei
Sternen im Kopfe des Widders
damals[a]) (4′ zurück) in γ 6° 36′
mit 7° 20′ nördlicher Breite, und
der Stern (38) im Hinterbein des Widders (5′ zurück!) in
γ 14° 55′ mit 5° 15′ südlicher Breite. Folglich stand die
Venus in γ 10° 36′ mit 1° 30′ südlicher Breite. Da der
mittlere Ort der Sonne damals η 25° 24′ war[b]), so beträgt
die größte Elongation vom mittleren Ort 44° 48′.
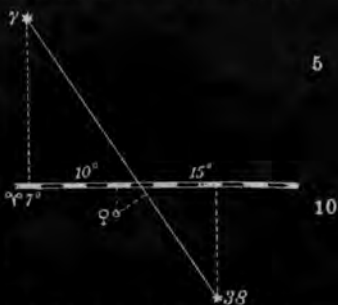
Wir selbst beobachteten im 21ten Jahre Hadrians am
2/3. ägyptischen Tybi (18. November 136 n. Chr. 5[h]) abends
die Venus in der größten Elongation von der Sonne. Bei
Anvisierung mit Bezug auf die Sterne ($\alpha\nu\beta$) in den Hörnern
des Steinbocks ergab sich als ihr scheinbarer Ort $\nearrow$ 12° 50′,
während der mittlere Ort der Sonne $\mathfrak{m}$ 25° 30′ war[c]), so daß
hier die größte Elongation vom mittleren Ort 47° 20′ betrug.

Daraus (daß letzterer Winkel der größere ist) geht deut-
lich hervor, daß in η 25° das Apogeum und in $\mathfrak{m}$ 25° das
Perigeum liegt. Ferner ist uns ersichtlich geworden, daß
der Exzenter, welcher den Epizykel der Venus trägt, ein
festbleibender ist, weil an keiner Stelle der Ekliptik die
Summe der beiderseits eintretenden größten Elongationen
vom mittleren Ort weder kleiner gefunden wird als die

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a) Bei der Zwischenzeit von 7 Jahren beträgt die Präzession
0° 4′ 12″, rund 4′ oder 5′. Hiernach ist im griechischen Text $\iota\delta$
$\Gamma^{\zeta'}\delta'$ zu schreiben, weil der Sternkatalog die Länge mit γ 15° angibt.

b) Für 875[a] 301[d] 17[h] ergibt die Nachprüfung η 25° 23′ 27″.

c) Für 883[a] 121[d] 5[h] ergibt die Nachprüfung $\mathfrak{m}$ 25° 32′ 19″.

Summe $(2 \times 44^0 48' = 89^0 36')$ der beiden Elongationen (vom mittleren Ort) im Stier, noch größer als die Summe $(2 \times 47^0 20' = 94^0 40')$ der beiden (Elongationen vom mittleren Ort) im Skorpion.

5   Die vorstehend festgestellten Punkte sollen gegeben sein. Der Exzenter, auf welchem sich jederzeit der Epizykel der Venus bewegt, sei der Kreis ABΓ um den Durchmesser AΓ, auf welchem als Zentrum des Exzenters Δ angenommen sei, E als der Mittelpunkt der Ekliptik; A sei der unter ♉ 25^0 und Γ der unter ♏ 25^0 gelegene Punkt.[a] Um die Punkte A und Γ beschreibe man gleichgroße Epizyklen, auf denen die Punkte Z und H liegen. Hierauf ziehe man die Tangenten EZ, EH und die Verbindungslinien AZ, ΓH.

1. Da ∠ AEZ als Zentriwinkel der Ekliptik die im Apogeum eintretende größte Elongation des Planeten unterspannt, welche mit $44^0 48'$ gegeben ist, so ist

$$\angle \text{AEZ} = 44^0 48' \quad \text{wie } 4R = 360^0,$$
$$= 89^0 36' \quad \text{wie } 2R = 360^0,$$

mithin $b \, \text{AZ} = 89^0 36' \quad \text{wie } \bigodot \text{AZE} = 360^0,$

also $s \, \text{AZ} = 84^p 33' \quad \text{wie } h \, \text{AE} = 120^p.$

2. Da desgleichen ∠ ΓEH die im Perigeum eintretende größte Elongation unterspannt, welche mit $47^0 20'$ ebenfalls 30 gegeben ist, so ist

$$\angle \Gamma \text{EH} = 47^0 20' \quad \text{wie } 4R = 360^0,$$
$$= 94^0 40' \quad \text{wie } 2R = 360^0,$$

mithin $b \, \Gamma\text{H} = 94^0 40' \quad \text{wie } \bigodot \Gamma\text{HE} = 360^0,$

also $s \, \Gamma\text{H} = 88^p 13' \quad \text{wie } h \, \Gamma\text{E} = 120^p.$

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a) Die Bezeichnung der Lage des Punktes Γ, welche im griechischen Text fehlt, ist nach Cod. G ergänzt worden.

3. Setzt man, da die Epizykelhalbmesser ΓH und AZ einander gleich sind, auch

$$ΓH = 84^P 33'\quad \text{wie } AE = 120^P,\quad (S.\,160,\!27)$$

so wird $\quad ΓE = 115^P\ 1'\ $ in demselben Maße,

mithin $\left\{ \begin{array}{l} AΓ = AE + ΓE = 235^P\ 1', \\ A\triangle = Γ\triangle = \frac{1}{2} AΓ = 117^P 30', \\ \triangle E = Γ\triangle - ΓE = 2^P 29'. \end{array} \right.$ 5

Setzt man $\quad A\triangle = 60^P\ $ als *exhm*,

so wird $\left\{ \begin{array}{l} \triangle E = 1^P 15'^{\,a)} \\ AZ = 43^P 10'^{\,b)} \end{array} \right\}$ in demselben Maße. 10

Somit ist die Verbindungslinie $\triangle E$ zwischen den Mittelpunkten (der Ekliptik und des Exzenters) mit $1^P 15'$, und der Halbmesser AZ des Epizykels mit $43^P 10'$ gefunden.

Drittes Kapitel.
Das Verhältnis der Exzentrizität der Venus.

Da es noch unbewiesen ist, ob die gleichförmige Bewegung des Epizykels um den Punkt $\triangle$ vor sich geht, so stellten wir auch hier zwei größte Elongationen nach den entgegengesetzten Seiten (d. i. eine westliche und eine östliche) fest, während der mittlere Ort der Sonne bei jeder (dieser Elongationen)[c] 90° von dem Apogeum entfernt lag.

Die erste dieser Beobachtungen stellten wir im 18ten Jahre Hadrians am 2/3. ägyptischen Pharmuthi (18. Februar 134 n. Chr. früh 6[h]) an, nach welcher die Venus als Morgenstern die größte Elongation von der Sonne hatte und bei der Anvisierung mit Bezug auf den sog. Antares in ♏ 11° 55' stand,

a) Nach dem Verhältnis $(\triangle E)\, 2^P 29' : (A\triangle)\, 117^P 30' = 1^P 15' : 60^P$.

b) Das nach Z. 3 bestehende Verhältnis $(AZ)\, 84^P 33' : (AE)\, 120^P$ ist in dem Maße von $A\triangle = 60^P$ gleich dem Verhältnis $(AZ)\, 43^P 10' : (A\triangle + \triangle E)\, 61^P 15'$.

c) Statt ἐφ' ἑκάτερα ist die Lesart des Cod. D ἐφ' ἑκατέρας vorgezogen worden. Mit ἐπὶ τὰ ἐναντία werden hier auf das deutlichste die beiden Seiten des Epizykels, die Morgen- und die Abendseite, bezeichnet. Vgl. S. 126 Anm. b).

während der mittlere Ort der Sonne damals ≈ 25°30′ war.[a]
Folglich betrug die größte Elongation vom mittleren Ort
als Morgenstern 43°35′.

Die zweite Beobachtung stellten wir im 3ten Jahre An-
tonins am 4/5. ägyptischen Pharmuthi (18. Februar 140
n. Chr. $\frac{1}{2}6^h$) abends an, nach welcher die Venus die größte
Elongation von der Sonne hatte und bei der Anvisierung
mit Bezug auf den glänzenden Stern (Aldebaran) der Hyaden
in ♈ 13°50′ stand, während der mittlere Ort der Sonne
wieder ≈ 25°30′ war.[b] Folglich betrug in diesem Falle
die größte Elongation vom mittleren Ort als Abendstern
48°20′.

Diese Punkte sollen gegeben sein. Der durch das Apo-
geum und das Perigeum des Exzenters gehende Durchmesser
sei ABΓ; A sei angenommen als der unter ♑ 25° liegende
Punkt, und B als der Mittelpunkt der Ekliptik.

Es sei die Aufgabe gestellt, das Zentrum zu finden, um
welches wir die gleichförmige Bewegung des Epizykels vor
sich gehen lassen.

Angenommen, Punkt Δ sei dieses Zentrum. Man ziehe
durch dasselbe unter rechten Winkeln zu AΓ die Gerade
ΔE, damit der mittlere
Ort des Epizykels den Be-
obachtungen entsprechend
90° von dem Apogeum
entfernt sei, und setze auf
ihr den nach den vorge-
legten Beobachtungen (als
mittleren Sonnenort) ge-
gebenen Mittelpunkt des
Epizykels in E an. Nach-
dem man um letzteren den
Epizykel ZH beschrieben,
ziehe man an denselben von B aus die Tangenten BZ
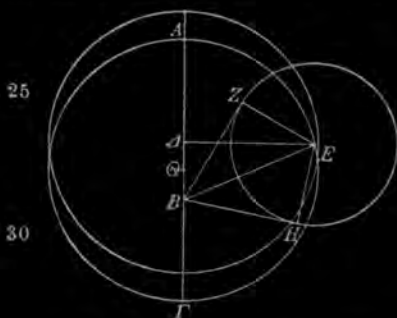
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a) Für 880ᵃ 211ᵈ 18ʰ ergibt die Nachprüfung ≈ 25°30′34″.
b) Für 886ᵃ 213ᵈ 5½ʰ ergibt die Nachprüfung ≈ 25°29′30″.

und BH und schließlich die Verbindungslinien BE, EZ, EH [a)]

1. Da nach dem gegebenen mittleren Ort (in $\approx 25^0$) die größte Elongation von demselben als Morgenstern mit $43^0 35'$ und die größte als Abendstern mit $48^0 20'$ gegeben ist, so ist folglich als Summe beider Winkel

$\angle ZBH = 91^0 55'$ wie $4R = 360^0$,

demnach $\angle ZBE = 91^0 55'$ wie $2R = 360^0$, weil halbsogroß;

mithin $b\,EZ = 91^0 55'$ wie $\ominus\,EZB = 360^0$,

also $s\,EZ = 86^P 16'$ wie $h\,BE = 120^P$.

Setzt man $EZ = 43^P 10'$ als *ephm*,
so wird $BE = 60^P 3'$ in diesem Maße.

2. Da die Differenz der vorgelegten größten Elongationen im Betrage von $(48^0 20' - 43^0 35' =) 4^0 45'$ das Doppelte der derzeitigen Differenz der auf die Ekliptik bezogenen Anomalie ist, welche von dem $\angle BE\triangle$ gemessen wird [7)], so ist

$\angle BE\triangle = 2^0 22' 30''$ wie $4R = 360^0$,

$= 4^0 45'$ wie $2R = 360^0$,

mithin $b\,B\triangle = 4^0 45'$ wie $\ominus\,B\triangle E = 360^0$,

also $s\,B\triangle = 4'' 59'$ wie $h\,BE = 120^P$.

Setzt man $BE = 60^P 3'$ wie *ephm* $= 43^P 10'$,
so wird $B\triangle = 2^P 30'$ in demselben Maße.

3. Nun wurde die Verbindungslinie zwischen dem Mittelpunkt B der Ekliptik und dem Zentrum (Θ) des Exzenters, auf welchem jederzeit der Mittelpunkt des Epizykels liegt, in demselben Maße (S. 161, 9) gleich $1^P 15'$ nachgewiesen; folglich ist sie halbsogroß wie $B\triangle$. Wenn wir also $B\triangle$ in Punkt Θ halbieren, so werden wir den Beweis geliefert haben, daß in dem Maße, in welchem der Halbmesser ΘA des den Epizykel tragenden Exzenters gleich 60^P ist, jede der beiden zwischen den Zentren liegenden Strecken $B\Theta$ und $\Theta\triangle$ $1^P 15'$ und der Halbmesser des Epizykels $43^P 10'$ beträgt, was nachzuweisen war.

a) Die Figur des Originals ist durch Zeichnung der beiden Exzenter ergänzt worden; nur so kann ΘA (Zeile 29) als Halbmesser des den Epizykel tragenden Exzenters erkannt werden

11 *

Viertes Kapitel.
Korrektion der periodischen Bewegungen der Venus.

Die Art der Hypothese und die Verhältnisse der Ano-
malien sind von uns vorstehend endgültig festgestellt worden.
Zur Ermittelung der periodischen Bewegungen des Planeten
und ihrer Epochen wählten wir nun wieder zwei durchaus
5 sichere Beobachtungen, die eine aus den zu unserer Zeit
angestellten, die andere aus der Zahl der alten.

J. Wir selbst beobachteten im 2$^{\text{ten}}$ Jahre Antonins am
29/30. ägyptischen Tybi (16. Dezember 138 n. Chr. $^3/_4 5^{\text{h}}$
Ha 202 früh) am Astrolab die Venus nach der größten Elongation
10 als Morgenstern mit Bezug auf die Spika, wobei
sich als ihr scheinbarer Ort ♏ 6" 30' ergab. Sie
stand damals mitteninne auf einer Geraden zwi-
schen dem nördlichsten (β) von den Sternen (π δ β)
in der Stirn des Skorpions und dem scheinbaren
15 Zentrum des Mondes, und zwar so inmitten,
daß sie dem Zentrum des Mondes das Andert-
halbfache derjenigen Strecke westlich voran-
ging, um welche sie östlich hinter dem nörd-
lichsten (β) von den Sternen in der Stirn zurück-
20 blieb. Nun stand der Fixstern (β) damals nach
unseren Anfangspunkten in ♏ 6° 20' mit 1° 20'
nördlicher Breite, und der Zeitpunkt (der Beobachtung) war
Hei 307 4$^3/_4$ Äquinoktialstunden nach Mitternacht, da am Astrolab,
während die Sonne in ♐ 23° stand, ♍ 2° kulminierte. Zu
25 diesem Zeitpunkt war[a]

der mittlere Ort der Sonne	♐ 22° 9'
der mittlere Ort des Mondes	♏ 11° 24'
seine Entfernung vom Apogeum in Anomalie	87° 30'
„　　　　„　　vom nördl. Grenzpunkt in Breite	12° 22'
mithin der genaue Ort des Mondzentrums	♏ 5° 45'

---

a) Die Nachprüfung ergibt für 885$^{\text{a}}$ 148$^{\text{d}}$ 16$^3/_4$$^{\text{h}}$ als mittleren
Ort der Sonne ♐ 22° 8' 49", als mittleren des Mondes ♏ 11° 31' 53".

seine (wahre) nördliche Breite 5^0 $0'$
der scheinbare Ort in Länge für Alexandria[a]   ♏ $6^0 45'$
die scheinbare nördl. Breite „   „ $4^0 40'$.

Folglich ergab sich auch auf Grund dieser Zahlen als (scheinbarer) Ort der Venus ♏ $6^0 30'$ und ihre nördliche Breite mit $2^0 40'$.

Diese Punkte sollen gegeben sein. Der durch das Apogeum gehende Durchmesser sei ABΓΔE; der Punkt A sei in ♉ 25^0 angenommen, B sei der Punkt, um welchen der Epizykel (von der Leitlinie BZ) gleichförmig herumbewegt wird, Γ das Zentrum des Ex-
zenters, auf welchem der Mittel-
punkt des Epizykels umläuft,
endlich Δ der Mittelpunkt der
Ekliptik. Da der mittlere Ort
der Sonne bei der Beobachtung
♐ $22^0 9'$ war, so daß auch der
mittlere Ort des Epizykels in der
Richtung der Zeichen vom Peri-
geum E (von ♏ 25^0 bis ♐ $22^0 9'$)
$27^0 9'$ entfernt lag, so mag sein
Mittelpunkt in Z angenommen
sein. Nachdem man um Z den

Epizykel HΘK beschrieben, ziehe man die Verbindungslinien ΔZH, ΓZ, BZΘ und fälle von Γ und Δ auf die Gerade BZ die Lote ΓΛ, ΔM. Den Planeten nehme man in Punkt K an und ziehe die Verbindungslinien ΔK, ZK; endlich fälle man (auf die Gerade ΔK) das Lot ZN.

Es sei die Aufgabe gestellt, den Bogen ΘK zu finden, welchen der Planet von dem Apogeum Θ des Epizykels[b] entfernt war.

---

a) Da der Mond östlich des Meridians stand, so wirkte die Längenparallaxe in der Richtung der Zeichen.
b) Es ist das sog. mittlere, auf der Leitlinie BZ liegende Apogeum, von welchem aus die Bewegung des Planeten auf dem Epizykel in Anomalie gezählt wird.

1. Es ist (als Entfernung des Epizykels vom Perigeum)

$$\angle EBZ = 27^\circ\,9' \quad \text{wie } 4R = 360^\circ,$$
$$= 54^\circ 18' \quad \text{wie } 2R = 360^\circ,$$

$$\text{mithin} \begin{cases} b\,\Gamma\Lambda = 54^\circ 18' \\ ,b\,B\Lambda = 125^\circ 42' \end{cases} \text{wie } \ominus\Gamma\Lambda B = 360^\circ,$$

$$\text{also} \begin{cases} s\,\Gamma\Lambda = 54^P 46' \\ ,s\,B\Lambda = 106^P 47' \end{cases} \text{wie } h\,\Gamma B = 120^P.$$

Setzt man $\Gamma B = \quad 1^P 15'$ wie $exhm\,\Gamma Z = 60^P$,

so wird $\Gamma\Lambda = \quad 0^P 34'$ und $B\Lambda = 1^P 7'$.

10   Nun ist $\Gamma Z^2 - \Gamma\Lambda^2 = Z\Lambda^2,$

mithin $Z\Lambda = $ rund 60^P in demselben Maße.

2. Weil $B\Gamma = \Gamma\Delta$ (S. 163, 31), so ist ferner

$$\begin{aligned} M\Lambda &= B\Lambda \\ \Delta M &= 2\,\Gamma\Lambda \end{aligned} \quad \text{(Eukl. VI. 2. 4)}$$

15

$$\text{mithin} \begin{cases} ZM = Z\Lambda - M\Lambda = 58^P 53' \\ \Delta M\,(= 2\,\Gamma\Lambda) \quad\;\; = \;\; 1^P\; 8' \end{cases} \text{(wie } \Gamma Z = 60^P).$$

(Nun ist $ZM^2 + \Delta M^2 = Z\Delta^2$)

mithin $h\,Z\Delta = 58^P 54'$ in demselben Maße.

Setzt man $h\,Z\Delta = 120^P,$

20   so wird $s\,\Delta M = \quad 2^P 18'$ in diesem Maße,

mithin $b\,\Delta M = \quad 2^\circ 12'$ wie $\ominus\,\Delta MZ = 360^\circ,$

also $\angle BZ\Delta = \quad 2^\circ 12'$ wie $2R = 360^\circ.$

(Nun war $\angle EBZ = 54^\circ 18'$ wie $2R = 360^\circ$)

folglich $\angle E\Delta Z = 56^\circ 30'$ als Summe. (Eukl. I. 32)

25   3. Es ist ferner, weil der Planet nach der Beobachtung (von ♏ $6^\circ 30'$ bis ♏ 25°) $18^\circ 30'$ vor dem Perigeum E, d. i. vor ♏ 25°, stand,

$$\angle E\Delta K = 18^\circ 30' \quad \text{wie } 4R = 360^\circ,$$
$$= 37^\circ \quad\; \text{wie } 2R = 360^\circ.$$

30   (Nun war $\angle E\Delta Z = 56^\circ 30'$ wie $2R = 360^\circ$)

folglich $\angle K\Delta Z = 93^\circ 30'$ als Summe,

mithin $b\,ZN = 93^\circ 30'$ wie $\ominus ZN\Delta = 360^\circ,$

also $s\,ZN = 87^P 25'$ wie $Z\Delta = 120^P.$

Setzt man $Z\Delta = 58^{P} 54'$ wie *ephm* $ZK = 43^{P} 10'$,
so wird $ZN = 42^{P} 54'$ in diesem Maße.

Setzt man $h\,ZK = 120^{P}$,
so wird $s\,ZN = 119^{P} 18'$ in diesem Maße,
mithin $b\,ZN = 167^{0} 38'$ wie $\ominus\,ZNK = 360^{0}$,   5
also $\angle\,ZK\Delta = 167^{0} 38'$ wie $2R = 360^{0}$.

Nun war $\angle\,K\Delta Z = 93^{0} 30'$ wie $2R = 360^{0}$,
folglich $\angle\,KZH = 261^{0}\,8'$ als Summe. (Eukl. I. 32)   Ha 205

Es war $\angle\,BZ\Delta = 2^{0} 12'$ wie $2R = 360^{0}$;
ebenso $\angle\,HZ\Theta = 2^{0} 12'$,   (als Scheitelwinkel)   10
folglich $\angle\,KZ\Theta = 258^{0} 56'$ als Differenz,
$= 129^{0} 28'$ wie $4R = 360^{0}$.

Mithin war die Venus zu dem gegebenen Zeitpunkt von dem Apogeum Θ des Epizykels gegen die Richtung der Zeichen vorstehende $129^{0} 28'$ entfernt, und in der Richtung 15 der Zeichen, d. i. in der nach der Hypothese (auf dem Epizykel) angenommenen Bewegung(srichtung), die am ganzen Kreis fehlenden $230^{0} 32'$, was gefunden werden sollte.

II. Von den alten Beobachtungen haben wir eine gewählt, über welche Timocharis folgende Aufzeichnung macht. Im 20 13ten Jahre des Philadelphus[a] am 17/18. ägyptischen Mesore in der 12ten (Nacht-)Stunde (12. Oktober 272 v. Chr. 6[h] früh), stand der scheinbare Ort der Venus in genauer Konjunktion mit dem der Vindemiatrix (ε Virg.) gegenüberstehenden Stern (η Virg.). Es ist der Stern, welcher nach 25 unseren Anfangspunkten hinter dem Stern (β) am Ende des   Hei 311 südlichen Flügels der Jungfrau steht; sein Ort war im ersten Jahre Antonins $\mathrm{m\!p}\,8^{0} 15'$. Da das Jahr der Beobachtung seit Nabonassar das 476te und das bis zum Regierungsantritt Antonins verflossene Jahr[b] das 884te ist, mithin auf 30 die 408 Jahre betragende Zwischenzeit etwa $4^{0} 5'$ Bewegung der Fixsterne und der Apogeen entfallen, so ist ersichtlich,

---

a) Ptolemäus Philadelphus regierte von 285—247 v. Chr.
b) Es ist das letzte Jahr Hadrians gemeint. Vgl. I Anh. Anm. 30 a. E.

Mithin war die Venus zu dem gegebenen Zeitpunkt von
dem Apogeum H des Epizykels in der Richtung der Zeichen
(d. i. von H über das Perigeum bis K) die am ganzen Kreis
fehlenden 252°7′ entfernt, was nachgewiesen werden sollte.

5   Nun war zum Zeitpunkt unserer Beobachtung die Venus
ebenfalls von dem Apogeum des Epizykels 230°32′ entfernt.
Die zwischen den beiden Beobachtungen (vom 17/18. Me-
sore 6ʰ früh 476 Nab. bis zum 29/30. Tybi ³/₄5ʰ früh 886
Nab.) verflossene Zeit beträgt 409 ägyptische Jahre und
10 (13 + 5 + 129 =) 167 Tage ohne wesentlichen Fehler und
umfaßt 255 ganze Wiederkehren der Anomalie; denn da
8 ägyptische Jahre ohne merklichen Fehler 5 Umläufe aus-
machen[10], so bringen (8 × 51 =) 408 Jahre (5 × 51 =) 255
Umläufe, während das übrige Jahr mit Einschluß der über-
15 schießenden (167) Tage die Zeit einer weiteren Wiederkehr
nicht erfüllt.[a]   Hieraus ist uns ersichtlich geworden, daß
die Venus in 409 ägyptischen Jahren und 167 Tagen nach
255 ganzen Wiederkehren der Anomalie auf dem Epizykel
einen Überschuß von 338°25′ gewinnt: um so viel Grade
war ja der zu unserer Zeit festgestellte Ort (230°32′) dem
21 früheren (252°7′) voraus.[b]   Ebensoviel Grade des Über-
schusses ergibt die Rechnung[c] nach den von uns oben (S.113ff.)
vorgelegten Tafeln der mittleren Bewegungen, weil die Kor-
rektion der Bewegungen auf Grund des (vorliegend) gefun-
25 denen Überschusses des Laufs in der Weise vorgenommen
worden ist, daß die Zeit in Tage und die Wiederkehren mit
Einschluß des Überschusses in Grade verwandelt wurden.
Dividiert man nämlich mit der Anzahl der Tage in die Zahl

---

a) Weil (nach der Anomalietabelle S. 114 f.) in 1ᵃ167ᵈ nur 328°
zurückgelegt werden.

b) Zu einer ganzen Wiederkehr fehlten dem früheren Ort
die oben (S.169,₃₄) gefundenen 107°53′; hierzu kommen die 230°32′
Überschuß über ganze Wiederkehren, welche S. 167,₁₈ aus der
späteren Beobachtung abgeleitet wurden.

c) Für 409ᵃ 167ᵈ ergibt die Nachprüfung 338°27′46″.

der Grade, so ergibt sich die tägliche mittlere Bewegung in
Anomalie, wie sie von uns für die Venus oben (S. 101, 12)
mitgeteilt worden ist.

Fünftes Kapitel.
Epoche der periodischen Bewegungen der Venus.

Da auch hier die Aufgabe übrig bleibt, die Epochen der Ha 209
periodischen Bewegungen an den Mittag des 1. ägyptischen
Thoth des ersten Jahres der Regierung Nabonassars zu
knüpfen, so stellten wir wieder die Zwischenzeit zwischen
diesem Zeitpunkt und dem der älteren Beobachtung (am 5
17/18. Mesore 6^h früh 476 Nab.) fest. Sie beträgt 475
ägyptische Jahre, 346$^3/_4$ Tage. Für diesen Zeitraum ergibt
die Rechnung nach den Spalten der Anomalie (S. 113 ff.) einen
Überschuß der mittleren Bewegung von rund 181^0.[a] Wenn
wir diesen Betrag von den (S. 170, 4) nach der Beobach- Hei 316
tung festgestellten 252^0 7' abziehen, so werden wir für den 11
Mittag des 1. ägyptischen Thoth des ersten Jahres Nabo-
nassars als Epoche erhalten:

1. vom Apogeum des Epizykels in Anomalie   71^0 7'
2. in mittlerer Länge dieselbe wie die der   15
    Sonne, d. i.   )(0^0 45'
3. für das Apogeum (der Exzentrizität)   ♉ 16^0 10'.

Daß letzteres zu dem angenommenen Zeitpunkt der Epoche
dort liegen muß, ist klar, weil es nach der (zugrunde ge-
legten) Beobachtung (vgl. S. 168, 2) in ♉ 20^0 55' lag, wäh- 20
rend auf die Zwischenzeit von rund 476 Jahren 4^0 45' (Prä-
zession) entfallen.

---

a) Für 475^a 346^d 18^h ergibt die Nachprüfung 180^0 58' 31".

sich[a] nachzuweisen. Da jedoch die Konjunktionen nicht
sichtbar sind, so bleibt nur übrig, den methodischen Gang
der Beweisführung an die Oppositionen anzuknüpfen.

Siebentes Kapitel.

Nachweis der Exzentrizität des Mars und seines Apogeums.

Ha 214   Ähnlich wie wir bei dem Monde (Buch IV, Kap. 6) die
5 Örter und Zeiten dreier Mondfinsternisse festgelegt und
daraus auf dem Wege geometrischer Konstruktion das Ver-
hältnis seiner Anomalie und die Stelle des Apogeums nach-
gewiesen haben, so beobachteten wir auf dieselbe Weise auch
hier an den astrolabischen Instrumenten mit möglichster
10 Genauigkeit für jeden der drei Planeten je drei dem mittleren
Ort der Sonne diametral gegenüber eintretende Oppositionen
und berechneten nach den zur Stunde der Beobachtung ge-
fundenen mittleren Örtern der Sonne bis auf die Minuten
Hei 322 genau Zwischenzeit und Ort, um an der Hand des so gewon-
15 nenen Materials das Verhältnis der Exzentrizität und das
Apogeum nachzuweisen.

So stellten wir denn zuerst für den Mars drei Oppositionen
fest. Wir beobachteten

die erste im 15ten Jahre Hadrians am 26/27. ägyptischen
20 Tybi eine Äquinoktialstunde nach Mitternacht (15. Dezem-
ber 130 n. Chr. 1^h nachts) in ♊ 21°;

die zweite im 19ten Jahre Hadrians am 6/7. ägyptischen
Pharmuthi drei Äquinoktialstunden vor Mitternacht (21. Fe-
bruar 135 n. Chr. 9^h abends) in ♌ 28°50′;

25   die dritte im 2ten Jahre Antonins am 12/13. ägyptischen
Epiphi zwei Äquinoktialstunden vor Mitternacht (27. Mai
139 n. Chr. 10^h abends) in ♐ 2°34′.[b]

---

a) D. i. getrennt von der in Bezug auf die Sonne eintreten-
den Anomalie, welche durch den Lauf des Planeten auf dem
Epizykel zum Ausdruck gelangt.

b) Die Nachprüfung ergibt als mittleren Ort der Sonne für
877^{a}145^{d}13^h : ♐ 20°58′52′′, für 881^{a}215^{d}9^h : ♒ 28°50′19′′, für
885^{a}311^{d}10^h : ♊ 2°31′43′′.

Die Zwischenzeiten betragen

        zwischen erster und zweiter: $4^a 69^d 20^h$;

        zwischen zweiter und dritter: $4^a 96^d 1^h$.

Nach Abzug ganzer Kreise ergibt die Rechnung (nach den Spalten der Länge des Mars S. 111 f.)

für die erste Zwischenzeit: Bewegung in Länge $81^0 44'$,

für die zweite Zwischenzeit: „   „   „ $95^0 28'.$ [a)]

Wenn wir die mittleren Bewegungen nach den nur an-nähernd angesetzten periodischen Wiederkehren in Rechnung ziehen [b)], so wird dies bei der verhältnismäßig kurzen Zeit, die in Frage kommt, keinen beträchtlichen Unterschied aus-machen.

Endlich ist klar, daß nach Abzug ganzer Kreise der schein-bare Planet sich bewegt hat in der

ersten Zwischenzeit (von ♈ 21^0 bis ♌ $28^0 50'$) $67^0 50'$,

zweiten Zwischenzeit (von ♌ $28^0 50'$ bis ♐ $2^0 34'$) $93^0 44'$.

Es seien also in der Ebene der Ekliptik drei gleichgroße Kreise beschrieben. Derjenige, welcher den Mittelpunkt des Epizykels des Mars trägt, sei der Kreis ΑΒΓ um das Zentrum Δ, der Exzenter der gleich-förmigen Bewegung sei der Kreis ΕΖΗ um das Zentrum Θ, der mit der Ekliptik konzentrische Kreis sei ΚΛΜ um den Mittelpunkt Ν, ΞΟΠΡ der durch alle drei Zen-tren gehende Durchmesser. Α sei als der Punkt angenommen, in welchem der Mittelpunkt des Epi-zykels bei der ersten Opposition stand, Β als der Punkt, in welchem er bei der zweiten stand, Γ als der Punkt, in welchem er bei der dritten stand. Man

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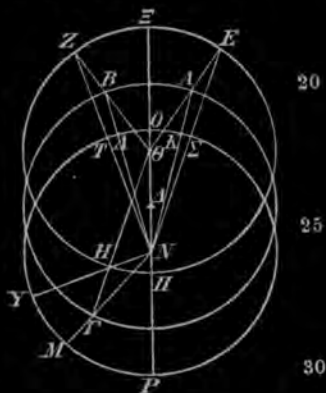
    a) Die Nachprüfung ergibt $81^0 43' 24''$ und $95^0 27' 29''$.

    b) D. h. ohne die Zahlen bis auf die Sexten genau anzugeben. Vgl. I 221, 6.

war (S. 192, 22) nachgewiesen, daß er bei der zweiten Op-
position das Apogeum $33^0 20'$ hinter sich hatte. Folglich
wurde die hieraus sich ergebende Differenz von $(180^0 -$
$[52^0 56' + 33^0 20' | =) 93^0 44'$, d. i. der Betrag, welcher auf
5 das Intervall von der zweiten Opposition bis zur dritten
entfällt, mit den für das zweite Intervall durch die Beob-
achtung (S. 177, 16) festgestellten Graden wieder in Ein-
klang gefunden.

V. Lage des Apogeums.

10   Der Planet hatte, der Theorie nach auf der Geraden NΓ
stehend, bei der dritten Opposition den durch die Beob-
achtung (S. 176, 27) festgestellten Ort ♐ $2^0 34'$ inne. Nun
wurde als Zentriwinkel der Ekliptik $\angle ΓNZ = 52^0 56'$ wie
$4R = 360^0$ nachgewiesen; folglich ist klar[a], daß das Peri-
15 geum der Exzentrizität, Punkt Z, in ♐ $25^0 30'$ lag und das
Apogeum diametral gegenüber in ♋ $25^0 30'$.

VI. Feststellung der mittleren Länge und der Anomalie.
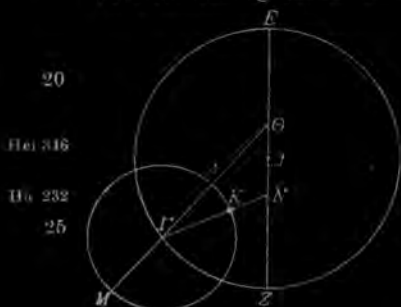
Wenn wir um den Mittel-
punkt Γ den Epizykel KΛM
20   des Mars beschreiben und die
Gerade ΘΓ (bis M) verlän-
gern, so ergibt sich zur Zeit
Hei 316   der dritten Opposition
U6 232   1. die Entfernung des mitt-
25   leren Ortes des Epizykels von
dem Apogeum des Exzenters
$(um Θ) mit (180^0 - 44^0 21' =)$
$135^0 39'$, weil $\angle ΓΘZ$, wel-
cher (bis zum Perigeum) die Ergänzung zu 180^0 bildet,
30 (S. 190, 6) mit $44^0 21'$ nachgewiesen worden ist;
2. die Entfernung des mittleren Ortes des Planeten von
dem Apogeum M des Epizykels, d. i. der Bogen MK, mit
$(180^0 - 8^0 35' =) 171^0 25'$, weil (S. 193, 25) $\angle ΘΓN = 8^0 35'$

---

a) Weil $52^0 56' - 27^0 26'$ des Schützen $= ♐ 25^0 30'$.

wie $\measuredangle R = 360^0$ nachgewiesen worden ist. Da dies ein Zentri-
winkel des Epizykels ist, so muß auch der Bogen KΛ, d. i.
der Bogen von dem Planeten in K bis zu dem Perigeum Λ,
gleich $8^0 35'$ in demselben Maße werden; folglich beträgt
der Bogen von dem Apogeum M bis zu dem Planeten als   5
Ergänzung zu 180^0, wie oben gesagt, $171^0 25'$.

So ist uns denn einschließlich der anderen Ergebnisse klar
geworden, daß zur Zeit der dritten Opposition, d. i. im
zweiten Jahre Antonins am 12/13.ägyptischen Epiphi 2 Äqui-
noktialstunden vor Mitternacht (27. Mai 139 n. Chr. 10^h 10
abends), der Planet Mars in sog. mittlerer Länge von Hei 347
dem Apogeum ($\bigcirc 25^0 30'$) des Exzenters $135^0 39'$ entfernt
stand[a], während er in Anomalie von dem Apogeum des
Epizykels $171^0 25'$ entfernt war, was nachzuweisen war.

Achtes Kapitel.
Nachweis der zahlenmäßigen Größe des Epizykels des Mars.

Da es unsere nächste Aufgabe ist, das zahlenmäßige Größen- Ha 233
verhältnis des Epizykels nachzuweisen, so wählten wir für   16
diesen Zweck eine Beobachtung, welche wir ungefähr drei
Tage nach der dritten Opposition, d i. im zweiten Jahre
Antonins am 15/16. ägyptischen Epiphi 3 Äquinoktial-
stunden vor Mitternacht (30. Mai 139 n. Chr. 9^h abends)   20
am Diopter angestellt haben: nach Maßgabe des Astrolabs
kulminierte $\doteq 20^0$, während der mittlere Ort der Sonne da-
mals[b] Π$5^0 27'$ war. Als der Stern in der Kornähre (Spika)
mit Bezug auf seinen eigenen Ort ($\mathrm{m}\!\!\!/\, 26^0 40'$) anvisiert
wurde, ergab sich als der scheinbare Ort des Mars ✗$1^0 36'$.   25
Gleichzeitig hatte der Planet von dem Zentrum des Mondes
in der Richtung der Zeichen einen scheinbaren (östlichen)

a) Der mittlere Ort war demnach der scheinbare Ort (S 176
27) ✗ $2^0 34' + \angle \Theta \Gamma N$, d. i. ✗ $11^0 9'$.
b) Für 885a 314d 9h ergibt die Nachprüfung Π $5^0 27' 31''$, d. i.
im Apogeum, wo die Anomaliedifferenz $= 0$.

13*

Setzt man hBE = 120^P,

so wird sE$\wedge$ = $17^P 28'$ in diesem Maße,

also bE$\wedge$ = $16^0 44'$ wie $\ominus$ E$\wedge$B = 360^0,

folglich $\angle$ ZBE = $16^0 44'$ wie $2R$ = 360^0.

5   3. Es beträgt der Annahme (S. 196, 12) nach als der
Winkel, um welchen der scheinbare Ort des Mars vor dem
Perigeum Γ lag,

$\angle$ ΓEΞ = $53^0 54'$ wie $4R$ = 360^0,

= $107^0 48'$ wie $2R$ = 360^0.

10   Nun war $\angle$ ZBE = $16^0 44'$ wie $2R$ = 360^0,

ferner $\angle$ BZΓ = $85^0 38'$ wie $2R$ = 360^0 nach Annahme,

mithin $\angle$ ΓEB = $102^0 22'$ als Summe,

folglich $\angle$ BEΞ = $5^0 26'$ als Differenz,($\angle$ ΓEΞ − $\angle$ ΓEB)

Hei 351   mithin b BΞ = $5^0 26'$ wie $\ominus$ BΞE = 360^0,

15   also s BΞ = $5^P 41'$ wie h BE = 120^P.

Setzt man   BE = $56^P 4'$ wie $exhm$ = 60^P, (s. S. 197, 35)

so wird   BΞ = $2^P 39'$ in diesem Maße.

Ha 236   4. Da der Punkt N von dem Apogeum H des Epizykels
$172^0 46'$, mithin von dem Perigeum K $7^0 14'$ entfernt lag,
20 so ist

$\angle$ KBN = $7^0 14'$ wie $4R$ = 360^0,

= $14^0 28'$ wie $2R$ = 360^0.

Nun war $\angle$ KBΘ = $16^0 44'$ wie $2R$ = 360^0;   (s. Z. 10)

mithin $\angle$ NBΘ = $2^0 16'$ als Differenz.

25 (Es war ferner $\angle$ BEΞ = $5^0 26'$ wie $2R$ = 360^0)

folglich $\angle$ ΞNB = $7^0 42'$ als Summe,

mithin b BΞ = $7^0 42'$ wie $\ominus$ BΞN = 360^0,

also s BΞ = $8^P 3'$ *   wie h BN = 120^P.

Setzt man   BΞ = $2^P 39'$ wie $exhm$ = 60^P,

30   so wird   BN = $39^P 30'$ als $ephm$.

Folglich beträgt das Verhältnis des Exzenterhalbmessers
zu dem Epizykelhalbmesser $60_P : 39^P 30'$, was zu finden als
Aufgabe gestellt war.

Neuntes Kapitel.

Korrektion der periodischen Bewegungen des Mars.

Zum Zweck der Korrektion der mittleren periodischen Hei 352 Bewegungen wählten wir aus der Zahl der alten Beobachtungen eine, nach welcher zuverlässig versichert wird, daß im 13ten Jahre der Zeitrechnung des Dionysius, am 26. Ägon[a)] früh, der Mars den nördlichen Stern (β) in der Stirn des 5 Skorpions scheinbar bedeckte.

Die Zeit der Beobachtung fällt in das 52te Jahr seit dem Tode Alexanders, d. i. in das 476te Jahr seit Nabonassar, Ha 237 auf den 20/21. ägyptischen Athyr frühmorgens (18. Januar 272 v. Chr. 6h früh). Zu diesem Zeitpunkt[b)] finden wir die 10 Sonne nach mittlerem Lauf in ♐ 23° 54', während der Ort des nördlichen Sterns (β) in der Stirn des Skorpions nach unseren Anfangspunkten in ♏ 6° 20' durch die Beobachtung festgestellt worden ist. Da die 409 Jahre von der Beobachtung bis zum Regierungsantritt Antonins (476 bis 885 15 Nab.) einen Fortschritt der Fixsternsphäre von ungefähr 4" 5' bedingen, so mußte zur Zeit der mitgeteilten Beobachtung der (bezeichnete) Fixstern (β), und somit natürlich auch der Mars, in ♏ 2° 15' (d. i. 4° 5' zurück) stehen. Da ferner zu unserer Zeit, d. i. bei dem Regierungsantritt Antonins, das Hei 353 Apogeum des Mars in ♋ 25° 30' lag, so mußte es zur Zeit 21 der Beobachtung in ♋ 21° 25' liegen. Somit ist klar, daß der scheinbare Planet damals von dem Apogeum eine Entfernung (♋ 21° 25' bis ♏ 2° 15') von 100° 50' hatte, während die mittlere Sonne von demselben Apogeum (♋ 21° 25' 25 bis ♐ 23° 54') 182° 29', mithin von dem Perigeum natürlich 2° 29' entfernt war.

Diese Zahlen sollen gegeben sein. Der den Mittelpunkt des Epizykels tragende Exzenter sei der Kreis ABΓ um das

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a) So mit Böckh statt 25. Ägon; s. Anm. 6.
b) Für 475ᵃ 79ᵈ 18ʰ ergibt die Nachprüfung nur ♐ 23°52'13". Aber die Stunde 6ʰ früh wird nicht nur S. 202,32 durch die Zwischenzeit bis zur dritten Opposition bedingt, sondern auch S. 203,12 durch die seit der Epoche verflossene Zeit.

(Nun ist $KB^2 + ZK^2 = ZB^2$)
mithin $hZB = 57^n 57'$ in demselben Maße.

Setzt man $hZB = 120^n$,
so wird $sZK = 11^p 28'$ in diesem Maße,
5   also $bZK = 10^u 58'$ wie $\odot ZKB = 360^0$,
mithin $\angle ZB\triangle = 10^n 58'$ wie $2R = 360^0$.

Ha 240   Nun war $\angle B\triangle A = 134^0 36'$ wie $2R = 360^0$,
mithin $\angle BZA = 145^0 34'$ als Summe,
          $= 72^0 47'$ wie $4R = 360^0$.

10   Folglich war zur Zeit der mitgeteilten Beobachtung der
mittlere Ort des Planeten in Länge, d. i. der Mittelpunkt B
des Epizykels, von dem Apogeum ($\odot$ $21^0 25'$) $72^0 47'$ ent-
fernt und befand sich somit in $\rightleftarrows 4^0 12'$.

Nun ist in demselben Maße der Annahme nach (S. 199, 27)
15   mit $2^0 29'$ der $\angle \Gamma E\Lambda$ gegeben, welcher zusammen mit den
$2R$ des Halbkreises $AB\Gamma$ (als mittlerer Ort der Sonne nach
S. 174, 15) gleich wird der Summe des $\angle BZA$ der mitt-
leren Länge und des $\angle HB\Theta$ der Anomalie, d. i. der Bewe-
gung des Planeten auf dem Epizykel. Wir erhalten

20   ($bAB\Gamma + \angle \Gamma E\Lambda = \angle BZA + \angle HB\Theta$
          $180^0 + 2^0 29' = 72^0 47' + \angle HB\Theta$)
Hei 357   somit $\angle HB\Theta = 109^0 42'$ als Differenz.

Folglich war zu derselben Zeit der Beobachtung der Planet
in Anomalie vorstehende $109^0 42'$ von dem Apogeum des
25   Epizykels entfernt, was zu finden als Aufgabe gestellt war.

Nun war von uns (S. 194, 33) der Nachweis geführt
worden, daß zur Zeit der dritten Opposition der Planet in
Anomalie von dem Apogeum des Epizykels $171^0 25'$ ent-
fernt war. Er hat demnach in der zwischen den beiden Be-
30   obachtungen (vom 20/21. Athyr 476 Nab. 6^h früh bis zum
12/13. Epiphi 886 Nab. 10^h abends) verflossenen Zeit, welche
410 ägyptische Jahre und ($10^d + 210^d + 11^d + 16^h =$)
$231^2/_3$ Tage ohne merklichen Fehler beträgt, nach Abzug

ganzer Kreise 61°43′ zugesetzt.[a] Das ist rund[b] der Überschuß, welchen wir in den von uns bearbeiteten Tafeln der mittleren Bewegungen des Mars finden, weil der tägliche Betrag der Bewegung auf Grund des vorliegenden Materials von uns dadurch festgestellt worden ist, daß mit der Anzahl der aus der Zwischen- 5 zeit gewonnenen Tage dividiert wurde in die aus der Zahl der Kreise und dem Überschuß gewonnenen Grade.

Zehntes Kapitel.
Epoche der periodischen Bewegungen des Mars.

Es beträgt wieder die seit dem Mittag des 1. ägyptischen Ha 241
Thoth des ersten Jahres Nabonassars bis zu der (S. 199, 7) Hei 358
mitgeteilten Beobachtung (20/21. Athyr 476 Nab. 6^h früh) 10
verflossene Zeit ohne merklichen Fehler 475 ägyptische Jahre
und (60^d + 19^d + 18^h =) 79^3/$_4$ Tage. Diese Zeit umfaßt
an Überschuß 180°40′ in Länge und 142″29′ in Anomalie.[c]
Wenn wir diese Beträge von den beiden Örtern, welche nach
der Beobachtung (S. 202, 13. 24) festgestellt worden sind, 15
d. i. von der Länge ≐ 4°12′ und von den 109″42′ in Anomalie zugehöriger Weise abziehen, so werden wir für den
Mittag des 1. ägyptischen Thoth des ersten Jahres Nabonassars als Epoche der periodischen Bewegungen des Mars
erhalten: 20
1. in Länge (180°40′ rückwärts von ≐ 4°12′) ♈ 3″32′
2. von dem Apogeum des Epizykels in Anomalie[d] 327°13′
3. für das Apogeum (der Exzentrizität) ♋ 16°40′.

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a) Zum ganzen Kreis fehlten dem früheren Ort 360° − 109°42′ = 250°18′; kommen hierzu 171°25′, so ist von der Summe 421″43′ wieder ein ganzer Kreis abzuziehen, was 61°43′ gibt.

b) Für 410^{a}231^{d}16^h ergibt die Nachprüfung in Länge 61″42′6″. Zur Stunde 6^h früh der ersten Beobachtung vgl. S. 199, Anm. 9).

c) Für 475^{a}79^{d}18^h ergibt die Nachprüfung in Länge 180°38′43″ und in Anomalie 142°28′27″, für 19^h in Länge genau 180°40′, in Anomalie 142°29′36″.

d) Addiert man zu der späteren Anomaliezahl 109°42′ einen ganzen Umlauf, um von der Summe 469°42′ die von der Epoche bis zur Beobachtung zurückgelegten 142″29′ abziehen, d. i. rückwärts zählen zu können, so erhält man 327″13′.

An dieser Stelle wird letzteres natürlich liegen, weil der Fortschritt der Apogeen in 475 Jahren 4°45′ beträgt, und weil (S. 199, 22) das Apogeum des Mars der (zugrunde gelegten) Beobachtung gemäß in ♋ 21°25′ lag.

Elftes Buch.

Erstes Kapitel.

Nachweis der Exzentrizität und des Apogeums des Jupiter.

Nachdem die periodischen Bewegungen und Anomalien
6 des Planeten Mars und ihre Epochen nachgewiesen sind, werden wir der Reihe nach für den Planeten Jupiter auf die nämliche Weise dieselben Aufgaben in Angriff nehmen. Zuerst stellten wir wieder zum Nachweis des Apogeums und
10 der Exzentrizität drei dem mittleren Ort der Sonne diametral gegenüber eingetretene Oppositionen fest. Wir beobachteten an den astrolabischen Instrumenten

die erste im 17ten Jahre Hadrians am 1/2. ägyptischen Epiphi 1 Stunde vor Mitternacht (17. Mai 133 n. Chr.
15 11ʰ abends) in ♏ 23°11′[a)];

die zweite im 21ten Jahre am 13/14. Phaophi 2 Stunden vor Mitternacht (31. August 136 n. Chr. 10ʰ abends) in ♓ 7°54′[b)];

die dritte im 1ten Jahre Antonins am 20/21. Athyr 5 Stun-
20 den nach Mitternacht (8. Oktober 137 n. Chr. 5ʰ früh) in ♈ 14°23′[c)].

Die Zwischenzeiten betragen
zwischen erster und zweiter: 3ᵃ 106ᵈ 23ʰ;
zwischen zweiter und dritter: 1ᵃ 37ᵈ 7ʰ.

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a) Für 879ᵃ 300ᵈ 11ʰ ergibt die Nachprüfung als mittleren Ort der Sonne ♉ 23°12′11″.

b) Für 883ᵃ 42ᵈ 10ʰ ergibt die Nachprüfung als mittleren Ort der Sonne ♍ 7°52′43″.

c) Für 884ᵃ 79ᵈ 17ʰ ergibt die Nachprüfung als mittleren Ort der Sonne ♎ 14°23′30″.

Der scheinbare Lauf des Planeten beträgt in der
ersten Zwischenzeit (von ♏ 23°11′ bis)(7°54′) 104°43′;
zweiten Zwischenzeit (von)(7°54′ bis ♈ 14°23′) 36°29′.

Endlich beträgt der mittlere Lauf in Länge
für die erste Zwischenzeit[a)]   99°55′;
für die zweite Zwischenzeit[b)]   33°26′.

Von diesen Intervallen ausgehend, haben wir nach der
für den Mars von uns entwickelten Methode zuerst den Nach-
weis der Verhältnisse geliefert, welche zu finden als Aufgabe
vorliegt, (zunächst) wieder unter der Annahme, als ob es sich nur
um den einen Exzenter (des gleichförmigen Laufs) handelte.

I. Vorläufiger Nachweis der Exzentrizität und des Apogeums.

Der Exzenter sei der Kreis A B Γ;
A sei als der Punkt angenommen,
in welchem der Mittelpunkt des
Epizykels bei der ersten Opposition
stand, B als der Punkt der zweiten
und Γ als der Punkt der dritten
Opposition. Nachdem man inner-
halb des Exzenters A B Γ den Mittel-
punkt Δ der Ekliptik angesetzt,
ziehe man die Verbindungslinien
AΔ, BΔ, ΓΔ. Nach Verlängerung von ΓΔ bis E ziehe man
die Verbindungslinien AE, EB, BA und fälle von E aus
auf AΔ und BΔ (bzw. die Verlängerung) die Lote EZ und
EH, von A aus auf EB das Lot AΘ.

A. 1. Da der Exzenterbogen BΓ der (vorläufigen) An-
nahme nach (oben Z. 3) 36°29′ der Ekliptik unterspannt,
so ist als Zentriwinkel der Ekliptik

$$\angle \, \mathsf{B}\Delta\Gamma = 36°29′ \text{ wie } 2R = 360°,$$
$$= 72°58′ \text{ wie } 4R = 360°,$$

a) Für 3ᵃ 106ᵈ 23ʰ ergibt die Nachprüfung 99°54′32″.
b) Für 1ᵃ 37ᵈ 7ʰ ergibt die Nachprüfung 33°26′20″.
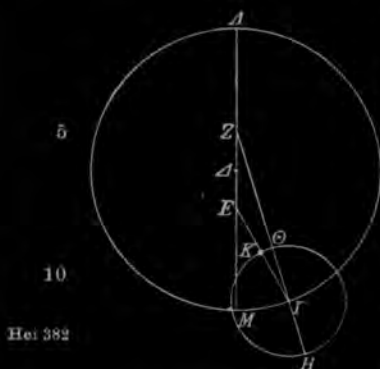
worden ist, daß $\angle E\Gamma Z = 5^0 34'$ wie $2R = 360^0$ oder $= 2^0 47'$ wie $4R = 360^0$.

Zur Zeit der dritten Opposition, d. i. im ersten Jahre Antonins am 20/21. ägyptischen Athyr 5 Stunden nach Mitternacht (8. Oktober 137 n. Chr. 5^h früh), stand demnach der Planet Jupiter, theoretisch auf die mittleren Örter bezogen, in Länge von dem Apogeum (Ⅲⱷ 14^0) des Exzenters $210^0 36'$ entfernt, d. h. sein mittlerer Ort[a] war ($\Upsilon 14^0 23' - \angle E\Gamma Z =) \Upsilon 11^0 36'$, während er in Anomalie von dem Apogeum H des Epizykels $182^0 47'$ entfernt war.

Zweites Kapitel.
Nachweis der zahlenmäßigen Größe des Epizykels des Jupiter.

Zum Nachweis der zahlenmäßigen Größe des Epizykels wählten wir weiterhin wieder eine Beobachtung, welche wir mit dem Diopter im 2ten Jahre Antonins am 26/27. ägyptischen Mesore vor Sonnenaufgang anstellten, d. i. ungefähr 5 Äquinoktialstunden nach Mitternacht (11. Juli 139 n. Chr. 5^h früh), als der mittlere Ort der Sonne ♋ $16^0 11'$ war[b] und am Astrolab $\Upsilon 2^0$ kulminierte. Mit Bezug auf den glänzenden Stern (Aldebaran) der Hyaden anvisiert, hatte der Jupiter damals als scheinbaren Ort ♊ $15^0 45'$ inne und die gleiche scheinbare Länge wie das Zentrum des südlicher stehenden Mondes. Für jene Stunde[c] fanden wir auf Grund der früher dargelegten Berechnungen

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a) D. i. der auf der Leitlinie ZΓ liegende Ort.
b) Für $885^a 355^d 17^h$ ergibt die Nachprüfung ♋ $16^0 11' 2''$.
c) Für dieselbe Zeit ergibt die Nachprüfung nach den Mondtafeln: ♊ $9^0 10' 47''$ in Länge, $272^0 13' 39''$ in Anomalie und

den mittleren Ort des Mondes in Länge   ♓ 9° 0′

die Entfernung vom Apogeum des Epizykels
    in Anomalie   272° 5′   Hei 383

den genauen Ort des Mondes[8]   ♓ 14° 50′

den scheinbaren Ort für Alexandria[a]   ♓ 15° 45′.   5

Da ferner die Zeit von der dritten Opposition bis zur
vorliegenden Beobachtung (vom 20/21. Athyr 5ʰ früh 885
Nab bis 26/27. Mesore 5ʰ früh 886 Nab.) 1 ägyptisches
Jahr und (10 + 240 + 26) 276 Tage beträgt, so bringt sie
(für den Jupiter) — es wird keinen merkbaren Unterschied 10
machen, wenn hierbei mit etwas abgerundeten Zahlen ge-
rechnet wird[b] — in Länge 53° 17′ und in Anomalie 218° 31′.
Wenn wir diese Beträge zu den für die dritte Opposition
(S. 220, 13. 16) nachgewiesenen Örtern addieren, so werden
wir zur Zeit dieser (zweiten) Beobachtung in Länge von 15
nahezu demselben Apogeum (♍ 11°) (210° 36′ + 53° 17′ =)
263° 53′ erhalten, in Anomalie von dem Apogeum des Epi-
zykels (182° 47′ + 218° 31′
— 360° =) 41° 18′.

Diese Zahlen sollen ge-   20
geben sein. Es sei wieder
die ähnliche Figur vorgelegt
wie (S. 197) bei der Beweis-
führung für den Mars, nur
daß sie den hier vorliegenden
mittleren Örtern in Länge   25
und in Anomalie entsprechend
die Lage des Epizykels nach
Passierung des Perigeums des
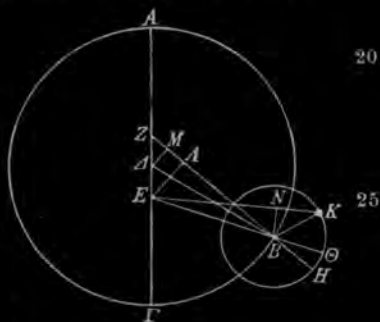
231° 8′ 44″ in Breite, woraus sich die wahre südliche Breite mit
etwa 2° 40′ ergibt. Die Mondörter in Länge und in Anomalie
zeigen wieder dieselben auffallenden Differenzen wie S.147 Anm. a).

a) Da der Mond östlich des Meridians stand, so wirkt die
Längenparallaxe in der Richtung der Zeichen.

b) Für 1ᵃ 276ᵈ ergibt die Nachprüfung in Länge 53° 16′ 52″
in Anomalie 218° 30′ 37″.

Exzenters und die Stellung des Planeten nach Passierung des Apogeums des Epizykels zeigen muß.

1. Da die Entfernung des mittleren Ortes in Länge von dem Apogeum des Exzenters $263^0 53'$ beträgt, so ist (als die um 180^0 gekürzte Entfernung von dem Perigeum)

$$\angle\, BZ\Gamma = 83^0 53' \quad \text{wie } 4R = 360^0,$$
$$= 167^0 46' \quad \text{wie } 2R = 360^0;$$

mithin $\left\{ \begin{array}{l} b\,\triangle M = 167^0 46' \\ ,b\,ZM = 12^0 14' \end{array} \right\}$ wie $\ominus\,\triangle MZ = 360^0,$

also $\left\{ \begin{array}{l} s\,\triangle M = 119^P 19' \\ ,s\,ZM = 12^P 47' \end{array} \right\}$ wie $h\,\triangle Z = 120^P.$

Setzt man $\triangle Z = 2^P 45' \quad$ wie $exhm\,\triangle B = 60^P,$
so wird $\triangle M = 2^P 44' \quad$ und $ZM = 0^P 18'.$

Nun ist $\triangle B^2 - \triangle M^2 = BM^2,$
mithin $BM = 59^P 56'$ in demselben Maße.

2. Es ist ferner $\left(\text{weil } Z\triangle = \triangle E\right)$

$$\left. \begin{array}{l} ZM = M\Lambda \\ E\Lambda = 2\triangle M \end{array} \right\} \text{ (Eukl. VI. 2. 4)}$$

mithin $\left\{ \begin{array}{l} B\Lambda = BM - M\Lambda = 59^P 38' \\ E\Lambda\,(= 2\triangle M) \quad = 5^P 28' \end{array} \right\}$ (wie $\triangle B = 60^P$).

(Nun ist $B\Lambda^2 + E\Lambda^2 = EB^2$)
mithin $h\,EB = 59^P 52'$ in demselben Maße.

Setzt man $h\,EB = 120^P,$
so wird $s\,E\Lambda = 10^P 58'$ in diesem Maße,
also $b\,E\Lambda = 10^0 30'$ wie $\ominus\,E\Lambda B = 360^0,$
mithin $\angle\,EBZ = 10^0 30'$ wie $2R = 360^0.$

Nun war $\angle\,BZ\Gamma = 167^0 46'$ wie $2R = 360^0,$
folglich $\angle\,BE\Gamma = 178^0 16'$ als Summe.

3. Da das Perigeum Γ in $)(11^0$ liegt und der Planet (S. 220, 26) seinen scheinbaren Ort auf der Geraden EK in $\Pi\, 15^0 45'$ hatte, so ist (von $)(11^0$ bis $\Pi\, 15^0 45')$

$\angle\,KE\Gamma = 94^0 45' \quad$ wie $4R = 360^0,$
$= 189^0 30' \quad$ wie $2R = 360^0.$

(Nun war $\angle$ BEΓ = 178° 16' wie $2R = 360°$)
folglich $\angle$ BEK = 11° 14' als Differenz;
mithin b BN = 11° 14' wie ⊕ BNE = 360°,
also s BN = 11ᵖ 44' wie h EB = 120ᵖ.

Setzt man EB = 59ᵖ 52' wie *exhm* = 60ᵖ, (s. S. 222, 32) 5
so wird BN = 5ᵖ 50' in diesem Maße.

4. Ferner ist (nach Annahme S. 221, 19 gegeben)
  b HK = 41° 18',
mithin HBK = 41° 18' wie $4R = 360°$,
  = 82° 36' wie $2R = 360°$.

Nun war $\angle$ EBZ = 10° 30' wie $2R = 360°$, 11
folglich auch $\angle$ HBΘ = 10° 30' als Scheitelwinkel,
mithin $\angle$ ΘBK = 72° 6' als Differenz.

Nun war $\angle$ KEΘ = 11° 14' wie $2R = 360°$, (s. oben Z. 2)
folglich $\angle$ BKN = 60° 52' als Differenz, 15
mithin b BN = 60° 52' wie ⊕ BNK = 360°,
also s BN = 60ᵖ 47' wie h BK = 120ᵖ.

Setzt man BN = 5ᵖ 50' wie *exhm* = 60ᵖ,
so wird BK = 11ᵖ 30' als *ephm*, was zu finden war.

Drittes Kapitel.
Korrektion der periodischen Bewegungen des Jupiter.

Weiter wählten wir wieder zum Zweck (der Korrektion)
der periodischen Bewegungen aus der Zahl der mit zweifel- 21
loser Sicherheit aufgezeichneten alten Beobachtungen eine,
nach welcher mit Bestimmtheit angegeben wird, daß im
45ᵗᵉⁿ Jahre[a] der Zeitrechnung des Dionysius am 10. Par-
thenon früh der Jupiter den südlichen Esel (δ Cancri) be- 25
deckte. Der Zeitpunkt fällt in das 83ᵗᵉ Jahr nach dem
Tode Alexanders (507 Nab.) auf den 17/18. Epiphi in der

a) Daß dieses mit dem 26. Juni 241 v. Chr. beginnende Jahr
in das Jahr 507 Nab. fällt, geht aus der Nachprüfung des mitt-
leren Sonnenortes hervor, welcher sich für 506ª 316ᵈ 18ʰ mit
♍ 9° 55′ 32″ ergibt.

Morgendämmerung (4. September 241 v. Chr. 6ʰ früh). Für
diese Stunde fanden wir die Sonne nach mittlerem Lauf in
^{Hei 387} ♍ 9⁰56′. Nun stand von den Sternen ($\gamma \delta \eta \vartheta$) um den Ne-
belfleck (die Krippe) im Krebs der sog. südliche Esel (δ)
5 zur Zeit unserer Beobachtung (im ersten Jahre Antonins
885 Nab. S. 199, 15) in ♋ 11⁰20′, zur Zeit der herangezo-
genen Beobachtung natürlich (3⁰47′ weiter zurück) in ♋ 7⁰33′,
weil auf die (507 bis 885 Nab.) 378 Jahre, welche zwischen
den Beobachtungen liegen, 3⁰47′ Zunahme entfallen. Folg-
10 lich stand damals auch der Jupiter, weil er diesen Fixstern
bedeckte, in ♋ 7⁰33′. Demnach mußte auch das Apogeum,
da es zu unserer Zeit in ♍ 11⁰ lag, zur Zeit der (alten)
Beobachtung in ♍ 7⁰13′, liegen. Somit ist klar, daß der
scheinbare Planet von dem damaligen Apogeum des Exzen-
15 ters 300⁰20′ entfernt stand, während der mittlere Ort der
Sonne von demselben Apogeum 2⁰43′ entfernt war.

Diese Zahlen sollen gegeben
sein. Vorgelegt sei wieder die
^{Ha 264}
20   ähnliche Figur wie (S. 200)
bei der Beweisführung für
den Mars. Nur muß sie die
hier nach der Beobachtung
gegebenen Örter zeigen, d. i.
25   erstens die Lage des Epi-
zykels in B vor dem Apo-
geum A, zweitens die Lage
des mittleren Ortes der Sonne
in Λ kurz nach demselben
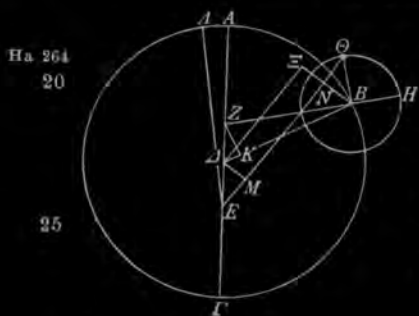
Apogeum, und deshalb drittens die Stellung des Planeten
30 in Θ nach dem Apogeum H des Epizykels. Man ziehe jeden-
falls in ähnlicher Weise die Verbindungslinien ZBH, ΔB,
^{Hei 388} BΘ, ΘE und fälle auf ΔB das Lot ZK, auf ΘE die Lote
ΔM, BN, endlich das Lot ΔΞ auf die hier nötige Ver-
längerung von BN, welche das rechtwinklige Parallelo-
35 gramm ΔMNΞ fertig macht.

     1. Als Erfüllung eines Kreislaufs in der Ekliptik zu
300⁰20′ ist

$\angle$ AEΘ = 59° 40′   wie $4R = 360°$,

ferner $\angle$ AEΛ = 2° 43′   wie $4R = 360°$, (s. S. 224, 16)

mithin $\angle$ ΛEΘ = 62° 23′   als Summe,

folglich auch $\angle$ BΘE = 62° 23′,   (Eukl. I 29)

= 124° 46′   wie $2R = 360°$,

mithin b BN = 124° 46′   wie ⊖ BNΘ = 360°,   5

also s BN = 106ᴾ 20′   wie h BΘ = 120ᴾ.   Hel 389

Setzt man $ephm$ BΘ = 11ᴾ 30′,

so wird   BN = 10ᴾ 12′   in demselben Maße.

2. Es ist ferner (als derselbe wie $\angle$ AEΘ)   10

$\angle$ ΔEM = 59° 40′   wie $4R = 360°$,

= 119° 20′   wie $2R = 360°$,   Ha 265

folglich $\angle$ MΔE = 60° 40′   als Komplementwinkel,

mithin b ΔM = 119° 20′   wie ⊖ ΔME = 360°,

also s ΔM = 103ᴾ 34′   wie h ΔE = 120ᴾ.   15

Setzt man   ΔE = 2ᴾ 45′   wie $exhm$ ΔB = 60ᴾ,

so wird   ΔM = 2ᴾ 23′   in demselben Maße.

(Nun ist   ΔM = NΞ)   (Eukl. I. 34)

mithin   BΞ = BN + NΞ = 12ᴾ 35′ in demselben Maße.

Setzt man h ΔB = 120ᴾ,   20

so wird s BΞ = 25ᴾ 10′   in diesem Maße,

mithin b BΞ = 24° 14′   wie ⊖ BΞΔ = 360°,

also $\begin{cases} \angle \text{BΔΞ} = 24° 14′ & \text{wie } 2R = 360°, \\ \angle \text{BΔM} = 155° 46′ & \text{als Komplementwinkel.} \end{cases}$

(Nun war $\angle$ MΔE = 60° 40′   wie $2R = 360°$)   25

folglich $\angle$ BΔE = 216° 26′   als Summe,

endlich $\angle$ BΔZ = 143° 34′   als Nebenwinkel,

mithin $\begin{cases} b \text{ ZK} = 143° 34′ \\ {}_,b \text{ ΔK} = 36° 26′ \end{cases}$ wie ⊖ ZKΔ = 360°,

also $\begin{cases} s \text{ ZK} = 113ᴾ 59′ \\ {}_,s \text{ ΔK} = 37ᴾ 31′ \end{cases}$ wie h ΔZ = 120ᴾ.   Hel 390   31

Setzt man   ΔZ = 2ᴾ 45′   wie $exhm$ ΔB = 60ᴾ,

so wird   ZK = 2ᴾ 37′   und ΔK = 0ᴾ 52′,

mithin   KB = ΔB − ΔK = 59ᴾ 8′.

(Nun ist $KB^2 + ZK^2 = ZB^2$)
mithin $h\,ZB = 59^{p}12'$ in demselben Maße.

Setzt man $h\,ZB = 120^{p}$,
so wird $s\,ZK = 5^{p}18'$ in diesem Maße,

Ha 266   also $b\,ZK = 5^{0}\ 4'$ wie $\ominus\,ZKB = 360^{0}$,

6   mithin $\angle\,ZB\triangle = 5^{0}\ 4'$ wie $2\,R = 360^{0}$.

(Nun war $\angle\,B\triangle Z = 143^{0}34'$ wie $2\,R = 360^{0}$)
folglich $\angle\,AZB = 148^{0}38'$ als Summe,
$= 74^{0}19'$ wie $4\,R = 360^{0}$.

10   Hiermit ist der Winkel der gleichförmigen Länge (welcher an einem Umlauf fehlt) gefunden.

Nun bildet (s. S. 173, 31) der $\angle\,HB\Theta$ (der Anomalie) zusammen mit dem Winkel von $180^{0} + \angle\,BZ\Gamma$ (der Länge vom Apogeum ab) — d. h. hier unter Abzug des $\angle\,AZB$[a]

15   — den $\angle\,AE\Lambda$ der Sonne, welcher mit $2^{0}43'$ (S. 224, 16) gegeben ist. Wir erhalten

$(\angle\,HB\Theta - \angle\,AZB = \angle\,AE\Lambda$
$\angle\,HB\Theta - 74^{0}19' = 2^{0}43')$
demnach $\angle\,HB\Theta = 77^{0}\ 2'$ wie $4\,R = 360^{0}$.

20   Damit ist der Winkel gefunden, welcher den Lauf des Planeten von dem Apogeum des Epizykels ab mißt.

Hel 391   Es ist demnach von uns der Beweis erbracht worden, daß zur Zeit der vorgelegten Beobachtung der Jupiter, theoretisch nach dem mittleren Lauf betrachtet, in Länge von dem

25   Apogeum ($\mathfrak{m}\ 7^{0}13'$) des Exzenters ($360^{0} - 74^{0}19' =$) $285^{0}41'$ entfernt stand, d. h. daß sein mittlerer Ort $\Pi\,22^{0}54'$ war, während er von dem Apogeum des Epizykels in Anomalie $77^{0}2'$ entfernt war.

Nun war aber von uns (S. 220, 16) der Nachweis geführt

30   worden, daß er zu der Zeit der dritten Opposition von dem Apogeum des Epizykels $182^{0}47'$ entfernt war; er hat also in der zwischen den beiden Beobachtungen (vom 17/18. Epiphi 6^{h} früh 507 Nab. bis 20/21. Athyr 5^{h} früh 885 Nab.)

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a) D. i. unter Abzug der Länge bis zum Apogeum.

verflossenen Zeit, welche 377 ägyptische Jahre und $(12 + 5 + 90 + 21 =)$ 128 Tage weniger eine Stunde beträgt, nach Abzug von 345 ganzen Kreisen in Anomalie einen Überschuß von $(182^0 47' - 77^0 2' =) 105^0 45'$ gewonnen. Das ist rund[a] wieder der Überschuß an Graden der Anomalie, wel- 5 cher aus den von uns bearbeiteten (Tafeln der) mittleren Bewegungen gewonnen wird, weil wir direkt aus dem hier vorliegenden Material die Feststellung des täglichen Betrags der Bewegung dadurch erzielt haben, daß mit der Anzahl der aus der Zwischenzeit gewonnenen Tage dividiert wurde Ha 267 in die aus der Zahl der Kreise und dem Überschuß gewon- 11 nenen Grade.

Viertes Kapitel.
Epoche der periodischen Bewegungen des Jupiter.

Die seit dem Mittag des 1. ägyptischen Thoth des ersten Jahres Nabonassars bis zu der (S. 223, 27) vorgelegten alten Beobachtung (am 17/18. Epiphi 6^h früh 507 Nab.) verflos- 15 sene Zeit beträgt ohne wesentlichen Fehler 506 ägyptische Jahre und $(300^d + 16^d + 18^h =) 316^3/_4$ Tage. Diese Zeit umfaßt an Überschuß $258^0 13'$ in Länge und $290''58'$ in Anomalie.[b] Daher werden wir auch hier wieder, wenn wir diese Grade von den nach der Beobachtung (S. 226, 26. 28) 20 festgestellten Örtern ($285''41'$ in Länge und $77^0 2'$ in Anomalie) zugehörigerweise abziehen, für dieselbe Zeit der Hei 392 Epoche wie bei den anderen Planeten als mittleren Ort für den Planeten Jupiter erhalten

1. in Länge ($258^0 13'$ rückwärts von π $22^0 54'$) $\doteq 4^0 41'$ 25
2. von dem Apogeum des Epizykels in Anomalie[c] $146^0 4'$
3. für das Apogeum der Exzentrizität $\text{my } 2^0 9'$.

An dieser Stelle wird letzteres aus demselben Grunde[d] ($5^0 4'$ rückwärts von $\text{my } 7^0 13'$) gelegen sein.

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a) Die Nachprüfung ergibt für $377^a 127^d 23^h$ in Anomalie $105^0 45' 46''$.

b) Die Nachprüfung ergibt für $506^a 316^d 18^h$ in Länge $258^0 12' 40''$, in Anomalie $290^0 58' 0''$.

c) $360^0 + 77^0 2' - 290^0 58' = 146^0 4'$.

d) Aus dem bei dem Mars S. 204, 1 angegebenen Grunde

Fünftes Kapitel.

Nachweis der Exzentrizität und des Apogeums des Saturn.

Da für die vorliegende Aufgabe noch übrig bleibt, auch die an dem Planeten Saturn theoretisch betrachteten Anomalien und ihre Epochen nachzuweisen, so wählten wir, zunächst wieder zur Feststellung des Apogeums und der Exzentrizität, wie bei den anderen Planeten, drei dem mittleren Orte der Sonne diametral gegenüber eingetretene Oppositionen. An den astrolabischen Instrumenten beobachteten wir

die erste im 11ten Jahre Hadrians am 7/8. ägyptischen Pachon abends (26. März 127 n. Chr. 6ʰ abends) in ♎ 1°13′;[a]

die zweite im 17ten Jahre Hadrians am 18. ägyptischen Epiphi; hier berechneten wir Zeit und Ort der genauen Opposition mit Hilfe der vor und nach derselben angestellten Beobachtungen auf 4 Stunden nach dem Mittag des 18. Epiphi (3. Juni 133 n. Chr. 4ʰ nachmittags) in ♐ 9°40′;[b]

die dritte im 20ten Jahre Hadrians am 24. ägyptischen Mesore; auch hier berechneten wir wieder die Zeit der genauen Opposition: sie hatte genau am Mittag des 24 Mesore (8. Juli 136 n. Chr. 12ʰ mittags) stattgefunden, ihr Ort war ♒ 14°14′.[c]

Die beiden Zwischenzeiten betragen
zwischen erster und zweiter: 6ᵃ70ᵈ22ʰ;
zwischen zweiter und dritter: 3ᵃ35ᵈ20ʰ.

Der scheinbare Lauf des Planeten beträgt in der ersten Zwischenzeit (von ♎ 1°13′ bis ♐ 9°40′) 68°27′; zweiten Zwischenzeit (von ♐ 9°40′ bis ♒ 14°14′) 34°34′.

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a) Für 873ᵃ246ᵈ6ʰ ergibt die Nachprüfung als mittleren Ort der Sonne ♈ 1°12′54″.

b) Für 879ᵃ317ᵈ4ʰ ergibt die Nachprüfung als mittleren Ort der Sonne ♊ 9°39′16″.

c) Für 882ᵃ353ᵈ0ʰ ergibt die Nachprüfung als mittleren Ort der Sonne ☉ 14°14′38″.

Endlich beträgt der mittlere Lauf in Länge (auf Minuten) abgerundet

<div style="text-align:center">

für die erste Zwischenzeit[a)] $75°43'$,

für die zweite Zwischenzeit[b)] $37°52'$.

</div>

Unter Zugrundelegung dieser Intervalle weisen wir wieder 5 die in Frage stehenden Verhältnisse vermittelst desselben Beweisverfahrens, als ob es sich zunächst nur um einen Exzenter handelte, auf folgende Weise nach.

I. Vorläufiger Nachweis der Exzentrizität und des Apogeums.

Um unnötige Wiederholungen zu vermeiden, sei (ohne weiteres) die demselben Beweisgang entsprechende Figur vorgelegt.

A. 1. Da der Exzenterbogen BΓ (S. 228, 25) nach der Annahme $34°34'$ in der Ekliptik unterspannt, so ist als Zentriwinkel der Ekliptik

10

{ Ha 269
{ Hei 394

15

$$\angle\ B\triangle\Gamma = 34°34' \text{ wie } 4R = 360°,$$
$$= 69°\ 8' \text{ wie } 2R = 360°,$$

folglich auch $\angle\ E\triangle H = 69°\ 8'$ (als Scheitelwinkel),   20

mithin $b\,EH = 69°\ 8'$ wie $\bigodot EH\triangle = 360°,$

also $s\,EH = 68^P\ 5'$ wie $h\,\triangle E = 120^P.$

Da ferner der Bogen BΓ (oben Z. 4) $37°52'$ beträgt, so ist als Peripheriewinkel

$$\angle\ BE\Gamma = 37°52' \text{ wie } 2R = 360°.$$ 25

(Nun war $\angle\ B\triangle\Gamma = 69°\ 8'$ wie $2R = 360°$)

folglich $\angle\ EBH = 31°16'$ als Differenz,

mithin $b\,EH = 31°16'$ wie $\bigodot EHB = 360°,$

also $s\,EH = 32^P\ 20'$ wie $h\,BE = 120^P.$

Setzt man $EH = 68^P\ 5'$ wie $h\,\triangle E = 120^P,$ 30

so wird $BE = 252^P\ 41'$ in demselben Maße.   Hei 395

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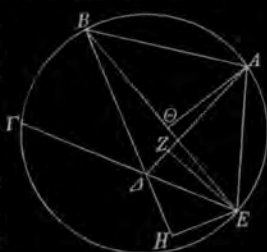
a) Für $6^a\ 70^d\ 22^h$ ergibt die Nachprüfung $75°42'51''$.
b) Für $3^a\ 35^d\ 20^h$ ergibt die Nachprüfung $37°52'19''$.

2. Es ist ferner (weil $Z\Delta = \Delta E$)

$$\left.\begin{array}{l} ZH = H\Theta \\ E\Theta = 2\Delta H \end{array}\right\} \text{ (Eukl. VI. 2. 4)}$$

5   mithin $\left\{\begin{array}{ll} \Gamma\Theta = \Gamma H + H\Theta = 61^P49' \\ E\Theta (= 2\Delta H) \quad = \ 5^P42' \end{array}\right\}$ (wie $\Delta\Gamma = 60^P$).

(Nun ist $\Gamma\Theta^2 + E\Theta^2 = \Gamma E^2$)
mithin $h\,\Gamma E = \ 62^P\ 5'$ in demselben Maße.

Setzt man $h\,\Gamma E = 120^P$,
so wird $s\,E\Theta = \ 11^P10'$ in diesem Maße,
10   also $b\,E\Theta = \ 10^0 32'$ wie $\ominus E\Theta\Gamma = 360^0$,
mithin $\angle\,E\Gamma\Theta = \ 10^0 32'$ wie $2R = 360^0$.

Nun war $\angle\,\Gamma Z\Lambda = 113^0$ wie $2R = 360^0$,
folglich $\angle\,\Gamma E\Lambda = 102^0 28'$ als Differenz,
              $= \ 51^0 14'$ wie $4R = 360^0$.

15   So viel Grade lag demnach bei der dritten Opposition der
scheinbare Ort des Planeten hinter dem Apogeum. Nun
war nachgewiesen, daß er auch bei der zweiten Opposition
dasselbe Apogeum $16^0 40'$ hinter sich hatte. Folglich be-
läuft sich, wieder in Übereinstimmung mit den (S. 228, 25)
20 aus den Beobachtungen gewonnenen Geraden, das scheinbare
Intervall von der zweiten bis zur dritten Opposition als Dif-
ferenz (von $51^0 14' - 16^0 40'$) auf $34^0 34'$.

V. Lage des Apogeums.

Der Planet hatte bei der dritten Opposition in ♎ $14^0 14'$
25 das Apogeum, wie (eben) nachgewiesen wurde, $51^0 14'$ hin-
ter sich. Folglich ist ohne weiteres klar, daß damals das
Apogeum der Exzentrizität ($51^0 14'$ rückwärts) in ♏ 23^0
lag und das Perigeum diametral gegenüber in ♑ 23^0.

VI. Nachweis der mittleren Länge und der Anomalie.

30   Wenn wir um den Mittelpunkt Γ den Epizykel HK be-
schreiben, werden wir ohne weiteres erhalten

1. von dem Apogeum des Exzenters ab den mittleren Ort des Epizykels in Länge mit den (S. 238, 23) nachgewiesenen $56^0 30'$;

2. den Epizykelbogen ΘK (von dem Perigeum K bis zu dem Planeten in Θ) mit $5''16'$ (wie $e \rho z = 360^0$), weil (S. 242, 11) nachgewiesen worden ist, daß $\angle E\Gamma Z = 10^0 32'$ wie $2R = 360^0$. Es bleibt somit für den Bogen $H\Theta$ von dem Apogeum des Epizykels bis zu dem Planeten $(180^0 - 5^0 16' =) 174^0 44'$ übrig.
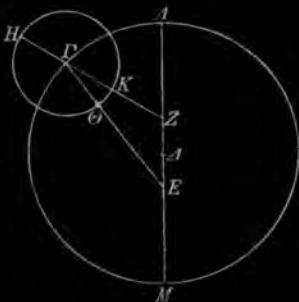
Zur Zeit der dritten Opposition, d. i. im 20ten Jahre Hadrians am 24. ägyptischen Mesore mittags (8. Juli 136 n. Chr. 12^h mittags), stand demnach der Planet Saturn, theoretisch auf die mittleren Örter bezogen, in Länge von dem Apogeum ($\mathfrak{m}$ 23^0) des Exzenters $56^0 30'$ entfernt, d. h. sein mittlerer Ort[a] war ($\rightleftarrows 14^0 14' + \angle E\Gamma Z =$) $\rightleftarrows 19^0 30'$, während er in Anomalie von dem Apogeum des Epizykels $174^0 44'$ entfernt war. Dies zu finden war als Aufgabe gestellt.

Sechstes Kapitel.
Nachweis der zahlenmäßigen Größe des Epizykels des Saturn.

Weiter wählten wir wieder, um die zahlenmäßige Größe des Epizykels nachzuweisen, eine Beobachtung, welche wir im 2ten Jahre Antonins am 6/7. ägyptischen Mechir 4 Äquinoktialstunden vor Mitternacht (22. Dezember 138 n. Chr. 8^h abends) angestellt hatten. Am Astrolab kulminierte Υ 30^0, während die mittlere Sonne in $\nearrow$ $28''41'$ stand.[b] Damals hatte der Planet Saturn, mit Bezug auf den glänzenden Stern

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a) D. i. der auf der Leitlinie $Z\Gamma$ liegende Ort.
b) Für $885^a 155^d 8^h$ ergibt die Nachprüfung $\nearrow$ $28^0 41' 14''$.

(Aldebaran) der Hyaden anvisiert, als scheinbaren Ort ≈ 9° 4'
inne und blieb hinter dem Zentrum des Mondes ungefähr
einen halben Grad (östlich) zurück; denn so weit stand er
von dem nördlichen Horn des Mondes[a] entfernt. Nun war
5 für jene Stunde[b] (nach den Mondtafeln berechnet)

der mittlere Ort des Mondes   ≈ 8° 55'
die Entfernung von dem Apogeum des Epizykels
   in Anomalie   174° 15'
daher der genaue Ort[8]   ≈ 9° 40'
Hei 415 der scheinbare Ort für Alexandria[c]   ≈ 8° 34'.

11   So mußte also der Planet Saturn, da er ungefähr einen
halben Grad hinter dem Zentrum des Mondes (östlich) zu-
rückblieb, in ≈ 9° 4' stehen, war demnach von demselben
Apogeum des Exzenters (d. i. von ♏ 23°), weil dieses auf
15 eine so kurze Zeit keinen nennenswerten Fortschritt in Be-
wegung zeigt, 76° 4' entfernt.

Da ferner die von der dritten Opposition bis zu dieser
Beobachtung (vom 24. Mesore mittags 883 Nab. bis zum
Ha 285 6. Mechir 8ʰ abends 886 Nab.) verflossene Zeit 2 ägyptische
20 Jahre, (7 + 5 + 150 + 5 =) 167 Tage und 8 Stunden be-
trägt, und da sich der Saturn in dieser Zeit rund[d] 30° 3'
in Länge und 134° 24' in Anomalie bewegt, so werden wir,
wenn wir diese Grade zu den für die dritte Opposition (S. 243,
19. 21) festgestellten Örtern addieren, zur Zeit der vorliegen-
25 den Beobachtung in Länge von dem Apogeum des Exzen-
ters (56° 30' + 30° 3' =) 86° 33' erhalten, in Anomalie
von dem Apogeum des Epizykels (174° 44' + 134° 24' =)
309° 8'.

a) Der Mond stand in Sichelform etwa 5° vor dem ersten
Oktanten und hatte 1° 36' südliche Breite. S. Anm. 22.1.
   b) Die Nachprüfung ergibt ≈ 8° 57' 43'' und 174° 19' 53'' in
Anomalie. Da der Mond 40° mittlere Elongation hatte, so machte
sich die zweite Anomalie geltend. Hierzu s. Anm. 8.
   c) Da der Mond westlich des Meridians stand, so wirkte die
Längenparallaxe gegen die Richtung der Zeichen.
   d) Die Nachprüfung ergibt 30° 2' 59'' in Länge und 134° 23' 33''
in Anomalie.

Diese Zahlen sollen gegeben sein. Es sei wieder die Figur (S. 221) für den ähnlichen Beweis vorgelegt. Nur muß sie (hier) den zugrunde gelegten Örtern entsprechend die Lage des Epizykels nach Passierung des Apogeums des Exzenters und den Planeten in der Stellung vor Passierung des Apogeums des Epizykels zeigen.
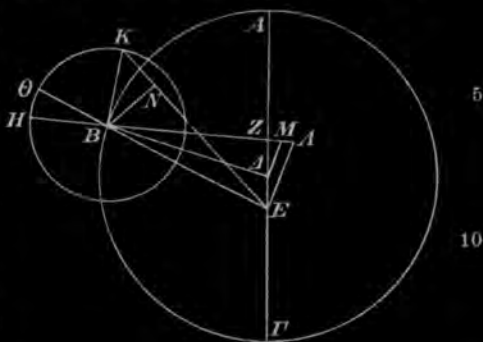
1. Als gegeben ist zugrunde gelegt

$$\angle\, AZB = 86°33' \quad \text{wie } 4R = 360°,$$
$$= 173°\ 6' \quad \text{wie } 2R = 360°,$$

folglich auch $\angle\, \Delta ZM = 173°\ 6'$ (als Scheitelwinkel),

mithin $\left\{ \begin{array}{l} b\,\Delta M = 173°\ 6' \\ ,b\,ZM = 6°54' \end{array} \right\}$ wie $\bigcirc \Delta MZ = 360°,$

also $\left\{ \begin{array}{l} s\,\Delta M = 119^\mathrm{p}47' \\ ,s\,ZM = 7^\mathrm{p}13' \end{array} \right\}$ wie $h\,\Delta Z = 120^\mathrm{p}.$

Setzt man $vbl\,\Delta Z = 3^\mathrm{p}25'$ wie $exhm\,\Delta B = 60^\mathrm{p},$
so wird $\Delta M = 3^\mathrm{p}25'$ und $ZM = 0^\mathrm{p}12'$

Nun ist $\Delta B^2 - \Delta M^2 = BM^2,$
mithin $BM = 59^\mathrm{p}54'$ in demselben Maße.

2. Es ist ferner (weil $Z\Delta = \Delta E$)

$$\left. \begin{array}{l} ZM = M\Lambda \\ E\Lambda = 2\Delta M \end{array} \right\} \text{(Eukl. VI. 2, 4)}$$

mithin $\left\{ \begin{array}{l} B\Lambda = BM + M\Lambda = 60^\mathrm{p}\ 6' \\ E\Lambda\ (= 2\Delta M) = 6^\mathrm{p}50' \end{array} \right\}$ (wie $\Delta B = 60^\mathrm{p}$).

(Nun ist $B\Lambda^2 + E\Lambda^2 = EB^2$)
mithin $h\,EB = 60^\mathrm{p}29'$ in demselben Maße.

Setzt man $h\,EB = 120^P$,

so wird $s\,EA = 13^P\,33'$ in diesem Maße,

also $b\,EA = 12^\circ\,58'$ wie $\odot\,EAB = 360^\circ$,

mithin $\angle\,EBZ = 12^\circ\,58'$ wie $2R = 360^\circ$.

5   Nun war $\angle\,AZB = 173^\circ\,6'$ wie $2R = 360^\circ$,

folglich $\angle\,AEB = 160^\circ\,8'$ als Differenz.

3. Nach Annahme (S. 244, 16) war gegeben als der Winkel, welcher die scheinbare Entfernung des Planeten vom Apogeum mißt,

10                        $\angle\,AEK = 76^\circ\,4'$ wie $4R = 360^\circ$,

                              $= 152^\circ\,8'$ wie $2R = 360^\circ$.

(Nun war $\angle\,AEB = 160^\circ\,8'$ wie $2R = 360^\circ$)

folglich $\angle\,KEB = 8^\circ$ als Differenz,

mithin $b\,BN = 8^\circ$ wie $\odot\,BNE = 360^\circ$,

Hei 418   also $s\,BN = 8^P\,22'$ wie $h\,EB = 120^P$.

16   Setzt man $EB = 60^P\,29'$ wie $exhm = 60^P$,   (S. 245, 34)

so wird $BN = 4^P\,13'$ in diesem Maße.

4. Da die Entfernung des Planeten von dem Apogeum des Epizykels (S. 244, 28) $309^\circ 8'$ betrug, so ist als Supple-
20 mentbogen

                    $b\,HK = 50^\circ 52'$,

Ha 287   mithin $\angle\,HBK = 50^\circ 52'$ wie $4R = 360^\circ$,

                       $= 101^\circ 44'$ wie $2R = 360^\circ$.

Nun war $\angle\,EBZ = 12^\circ 58'$ wie $2R = 360^\circ$,

25   mithin auch $\angle\,HB\Theta = 12^\circ 58'$ (als Scheitelwinkel),

folglich $\angle\,\Theta BK = 88^\circ 46'$ als Differenz.

Nun war $\angle\,KEB = 8^\circ$ wie $2R = 360^\circ$,

folglich $\angle\,BKN = 80^\circ 46'$ als Differenz,

mithin $b\,BN = 80^\circ 46'$ wie $\odot\,BNK = 360^\circ$,

30   also $s\,BN = 79^P\,45'$ wie $h\,BK = 120^P$.

Setzt man $BN = 4^P\,13'$ wie $exhm = 60^P$,

so wird $BK = 6^P\,30'$ als $ephm$.

Somit sind wir zu dem Ergebnis gelangt, daß erstens
(S. 242, 27) zur Zeit des Regierungsantrittes Antonins das
Apogeum des Saturn in ♏ 23⁰ lag, daß zweitens (S. 238,14) Hei 419
die Verbindungslinie zwischen den Zentren der Ekliptik und
des Exzenters, welcher die gleichförmige Bewegung bewirkt, 5
6ᴾ 50′ in dem Maße beträgt, in welchem der Halbmesser
des den Epizykel tragenden Exzenters gleich 60ᴾ ist, daß
endlich in demselben Maße der Halbmesser des Epizykels
6ᴾ 30′ beträgt, was zu finden als Aufgabe gestellt war.

Siebentes Kapitel.
Korrektion der periodischen Bewegungen des Saturn.

Da noch die Korrektion der periodischen Bewegungen 10
nachzuweisen bleibt, so wählten wir auch für diesen Zweck
wieder eine von den mit zweifelloser Sicherheit aufgezeich- Ha 388
neten alten Beobachtungen, nach welcher mit Bestimmtheit
angegeben wird, daß im 82ᵗᵉⁿ Jahre der Zeitrechnung der
Chaldäer am 5. Xanthikos abends der Planet Saturn zwei 15
Zoll unterhalb der südlichen Schulter (γ) der Jungfrau ge-
standen habe.

Der Zeitpunkt fällt in das 519ᵗᵉ Jahr seit Nabonassar auf
den 14. ägyptischen Tybi abends (1. März 229 v. Chr. 6ʰ
abends). Für diese Stunde[a] fanden wir die mittlere Sonne 20
in ♓ 6⁰ 10′. Nun stand der Fixstern (γ) an der südlichen
Schulter der Jungfrau[b] zur Zeit unserer Beobachtung[c] (885 Hei 420
Nab.) in ♍ 13⁰ 10′, zur Zeit der vorgelegten Beobachtung,
weil auf die Zwischenzeit von 366 Jahren ohne wesentlichen
Fehler 3⁰ 40′ Bewegung der Fixsterne entfallen, natürlich 25
in ♍ 9⁰ 30′, wo auch der Planet Saturn stehen mußte, weil

a) Für 518ᵃ 133ᵈ 6ʰ ergibt die Nachprüfung ♓ 6⁰ 8′ 50″, ge-
nauer für 7ʰ ♓ 6⁰ 11′ 17″. Vgl. jedoch S. 251, 10

b) Im Sternkatalog wird dieser Stern (Nr. 7) bezeichnet als
„von den vier Sternen im linken Flügel der dem vorangehen-
den (η) nachfolgende“.

c) Gemeint ist das Jahr 137 n. Chr. des Regierungsantrittes
Antonins, wie aus der Zwischenzeit von 366 Jahren (519 bis
885 Nab.) hervorgeht. Vgl. S. 15, 5; 167, 30; 199, 15. 20.

also　　b Z K $=$　　$6^0 22'$　wie $\odot$ Z K B $= 360^\circ$,

mithin L Z B K $=$　　$6^0 22'$　wie $2R = 360^\circ$.

Nun war L B △ A $= 146^0 32'$　wie $2R = 360^\circ$,

folglich L A Z B $= 152^0 54'$　als Summe,

$= 76^0 27'$　wie $4R = 360^\circ$.

Hiermit ist der Winkel gefunden, welcher den (an einem Umlauf fehlenden) gleichförmigen Lauf in Länge mißt.

Es stand demnach der Saturn zur Zeit der vorgelegten Beobachtung in mittlerem Lauf in Länge $(360^0 - 76^0 27' =)$ $283^0 33'$ von dem Apogeum ($\text{m}\ 19^0 20'$) entfernt, d. h. sein (mittlerer) Ort war $\text{m}\gamma\ 2^0 53'$. Da aber auch der mittlere Ort der Sonne mit $106^0 50'$ gegeben ist, so werden wir, wenn wir die 360^0 eines Kreises dazu addieren und von der erhaltenen Summe $466^0 50'$ die $283^0 33'$ der Länge abziehen, auch die Anomalie (d. i. den L H B Θ) von dem Apogeum des Epizykels ab mit $183^0 17'$ erhalten.[a]

Es ist also nachgewiesen, daß der Planet zur Zeit der vorgelegten Beobachtung, welche in das 519te Jahr seit Nabonassar auf den 14. Tybi abends (6^h) fällt, von dem Apogeum des Epizykels $183^0 17'$ entfernt war; es ist ferner (S. 243, 21) nachgewiesen, daß diese Entfernung zur Zeit der dritten Opposition, welche in das 883te Jahr seit Nabonassar auf den 24. Mesore mittags fällt, $174^0 44'$ betrug. Hieraus geht hervor, daß sich der Planet Saturn in der zwischen den Beobachtungen verflossenen Zeit, welche 364 ägyptische Jahre und $(16^d + 180^d + 23^d + 18^h =)\ 219^3{}_4$ Tage umfaßt, nach Abzug von 351 ganzen Kreisen[10] $351^0 27'$ in Anomalie[b] bewegt hat. Das ist wieder rund[c] der Überschuß an Graden (der Anomalie), welcher aus den von uns be-

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a) Weil Länge + Anomalie des Planeten = mittlerer Sonne. Vgl. S. 173, 31. Die Anomalie berechnet sich also nach der Formel: $x + 283^0 33' = 360^0 + 106^0 50'$ mit $x = 466^0 50' - 283^0 33' = 183^0 17'$.

b) Zum ganzen Kreise fehlen dem früheren Orte $360^0 - 183^0 17' = 176^0 43'$; hierzu kommen $174^0 44'$.

c) Die Nachprüfung ergibt für $364^* 219^d 18^h$ in Anomalie $351^0 26' 57''$.

arbeiteten (Tafeln der) mittleren Bewegungen gewonnen wird, weil die Feststellung des mittleren täglichen Laufs direkt auf Grund des hier vorliegenden Materials dadurch erzielt worden ist, daß in die aus der Zahl der Kreise und dem Überschuß gewonnenen Grade dividiert wurde mit der An- Hal 125 zahl der aus der Zeit gewonnenen Tage. 6

Achtes Kapitel.

Epoche der periodischen Bewegungen des Saturn.

Die seit dem Mittag des 1. ägyptischen Thoth des ersten Ha 292 Jahres Nabonassars bis zu der vorgelegten alten Beobachtung (14. Tybi 6ʰ abends 519 Nab.) verflossene Zeit beträgt 518 ägyptische Jahre und $(120^d + 13^d + 6^h =) 133^1/_4$ Tage. 10 Diese Zeit umfaßt an Überschuß $216^0 9'$ in Länge und $149^0 15'$ in Anomalie.[a] Daher werden wir, wenn wir diese Grade von den nach der Beobachtung (S. 250, 10. 16) festgestellten Örtern ($283^0 33'$ in Länge und $183^0 17'$ in Anomalie) abziehen, wieder für dieselbe Zeit der Epoche als 15 mittleren Ort für den Saturn erhalten

1. in Länge ($216^0 9'$ rückwärts von ⠍ $2^0 53'$)   ♎ $26^0 44'$
2. von dem Apogeum des Epizykels in Anomalie 34^0 $2'$
3. für das Apogeum der Exzentrizität   ⠍ $14^0 10'$.

An dieser Stelle wird letzteres aus demselben Grunde[b] 20 ($5^0 10'$ rückwärts von ⠍ $19^0 20'$) gelegen sein. Dies zu finden war als Aufgabe gestellt.

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a) Die Nachprüfung ergibt für $518^a 133^d 6^h$ in Länge $216^0 8' 25''$, in Anomalie $149^0 15' 24''$.
b) Aus dem bei dem Mars S. 204, 1 angegebenen Grunde.

THE

FLINDERS PETRIE PAPYRI

TRANSCRIPTIONS, COMMENTARIES

INDEX.

BY

REV. JOHN P. MAHAFFY, D.D., F.T.C.D.

AUTOTYPES I. to XXX.

and aided with assiduity and care by several of my younger colleagues in Trinity College, whose names will frequently appear in the following pages. And if I have thus been the means of bringing this remarkable discovery to the great Irish seats of learning, I have at least done my utmost to secure its prompt transmission to the world. It will be the province of greater experts to fill up the gaps which are still left in the interpretation of these priceless documents.

I have given as far as I could a transcription of the text of each fragment into ordinary Greek letters, and when desirable a translation— not, of course, of the *Phædo*, of which good translations are easily accessible. In the *Antiope* fragments, I have only transcribed the very letters I could read, now more correctly and fully than before, and have given all conjectures and emendations in the annexed Commentary.* Several imperfections in my former transcript, owing to the letters being disguised by small fragments of clay of exactly the same colour as the papyrus, have now been removed. In the other Autotypes I have supplied the missing parts either from our received texts of Plato, or from the study of parallel documents which suggest the missing words, espe- cially in the wills. In this work, I cannot hope to have avoided mistakes; I shall only quote the words with which the Abbé Peyron concludes a kindred inquiry: "Superest, ut viri docti æqui bonique faciant conatus meos. Ac facient profecto si secum recogitent prima tentamina in re non bene perspecta optima esse, si mediocritatem attingant." I have not always found my critics so reasonable.

It now only remains for me to add some account of what we already know, or may fairly infer, from these texts, concerning the history and condition of the Greek society in the Fayyum in the days of the early Ptolemies.

§ 10. **Historical—Ptolemy Philadelphus.**—A brief survey of the reigns of the two Ptolemies with whom we are concerned will be sufficient.

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* I need hardly remind the reader, that with very faint traces before us, the divining of the sense often precedes the correct decipherment. But the divination which can be tested by the extant vestiges of the text are far more satisfactory than those which demand assent on purely subjective grounds.

I have already discussed their position in the Hellenistic world in another work;* and those who desire fuller details will find the chronology in Clinton, and the political and economic details discussed in Droysen's *Geschichte des Hellenismus.* The only English history of the Ptolemies is in Sharpe's *History of Egypt,* a meritorious but now superannuated book.

The second Ptolemy, who was the first to call himself Philadelphus, owing to his strong attachment to his second queen, Arsinoe, who was also his full sister, succeeded to the throne upon the abdication of his father Ptolemy Soter in 284 B.C., and reigned till 247–6 B.C. Though Soter died within two years of his abdication, it seems, from the researches of M. Revillout and some earlier numismatists (*Études égyptol.,* vol. i., pp. 12 *sqq.*), that his name was used upon coins and in official proclamations for several years longer. This fact is important, and perplexing in determining various chronological questions. Thus there is a difficulty, of which more presently, about the closing year of the third Ptolemy, which is perhaps caused by this practice.

Ptolemy Philadelphus succeeded to a prosperous empire, a full treasury, an efficient army. The great troubles caused by the invasion of the Galatæ (278 B.C.) into Macedonia, Greece, and Asia Minor soon passed away. He had indeed pretended, through the mouth of his court poets, to have been one of the liberators of Hellenism from the Galatian fury, but his part in the transaction seems to have been no more glorious than to hire 2000 of the barbarians as mercenaries, and then, when they grew turbulent and dangerous, to have them massacred on an island of the Nile. Throughout his long reign he was never engaged in any great war, all his policy being one of diplomacy, of aiding the arms of allies by subsidies, of creating a balance of power between Macedon and Syria, of commanding with his fleet the coasts of the Ægean, and thus supporting his many Greek allies. Cyprus and Cyrene only caused him passing troubles.

I cannot but feel that his second wife Arsinoe, who attained so exceptional a position as to make a new precedent for all the succeeding Ptolemaic queens, giving them titular equality with their husbands, may

* *Greek Life and Thought, from the death of Alexander to the Roman Conquest,* chaps. ix. and x.

[3]

have owed her importance to her diplomatic talents, and to her development of this peace policy. She founded cities called by her name, as far away as Bœotia,* and the very district which specially concerns us —the Fayyum—was renamed in her day the *Arsinoitic nome.†* Can we show any reasons why this might seem appropriate? Why should the old Egyptian name be abandoned, and the nome cease to be called after its capital, the city of the Crocodiles? If Arsinoe Philadelphus was indeed the author or promoter of the peace policy of her brother, with its subtle and brilliant diplomacy, she was probably also the cause of the diminution of the enormous standing army which paraded the streets of Alexandria at the coronation of the new king.‡ And this army was not only dismissed with handsome gifts, but its veterans, from what the present papers tell us, were settled as landed proprietors and pensioners in the fertile slopes around the famous Lake Mœris.

We know from the somewhat parallel case of the settlement of Cæsar's veterans in Italy, what such a military colonization meant in ancient times. The Sovran, or the State, being the owner in theory of all or most of the land, of which the occupier was only the tenant, even after centuries of settled life, acknowledged no fixity of tenure, and no compensation for disturbance. We know that the first Ptolemy had wisely changed as little as he could of the internal government of the Pharaohs. So also it is not known to us that he made any new Greek settlement in the country except at Ptolemais, and perhaps Thebes (Diospolis), which had fallen into decay, and found its population too small for its magnificent buildings.

§ 11. **The Military Settlement in Arsinoe.**—But all the acts of Philadelphus show a far greater contempt for the conquered nation, and a more determined policy of Hellenizing the country. Hence he did not scruple to dispossess the native farmers of the Fayyum, and establish in

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* I have elsewhere conjectured that the founding of cities in far away countries was for the purpose of obtaining a legal voice in the deliberations of local Hellenistic Federations, which were thus brought under the influence of Egyptian diplomacy.

† The capital, known to Strabo as Arsinoe, is never so called in the following documents, but always Crocodilopolis.

‡ Cf. my *Greek Life and Thought*, pp. 200–205.

his renamed nome of Arsinoe, as landlords (κληροῦχοι), a large body of his veterans, whose regiments are mentioned in their family papers. We may assume this important innovation to have taken place after his second marriage, and therefore not before the 16th or 17th year of his reign,* for with the renaming came the repopulating of the district. The earliest date I have yet found among these papers seems to be his 16th year (cf. XXIII., and the commentary thereon), and most of the records which refer to quarrels among these landowners date from his 35–37th years. I note that in the following reign the *cleruchs*, who appear as testators or witnesses, are usually described as 70 years old or upwards. If we imagine them disbanded after reasonable service,† but still young enough to be enterprising settlers, we may place the colony about 35 years earlier. This computation, reckoning back from the year 10 of the third Ptolemy (237 B.C.), will bring us to about 270 B.C., which corresponds with the conjecture I have made upon other grounds.

The position I have maintained, that in the ΚΛΗΡΟΥΧΟΙ we have the original military settlers, is confirmed by the use of another title in connexion with it. If the witness be not a *cleruch*, he is usually called a member ΤΗϹ ΕΠΙΓοΝΗϹ, of the second generation, or the second enlistment—a term which was already known, and has been much discussed, but without any certain conclusion being attained.‡ The details of the question will be given in the description of the wills below, § 21. I note that the people with this title are a generation younger than the *cleruchs*, and that as the sons of *cleruchs* should have been of this age, there is no impossibility in interpreting the term as merely the second generation. But the many difficulties which stand in the way must not now detain us. The original

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* 268–7 B.C. The date of Philadelphus' second marriage is stated by M. Revillout to have been his 16th year, but I cannot find his authority. The early tragedies of this Arsinoe's life were over in 277 B.C., and she seems then to have gone home to her brother in Egypt. His mother Berenice did not die till the 16th year, and her feelings should no doubt have been opposed to his incestuous marriage. But all this is conjecture.

† The youngest I find mentioned is 30 years old, but also an officer (XI., 1. 18).

‡ A. Peyron, *op. cit.* ii. 7, B. Peyron, *op. cit.* pp. 42–45, Boeckh, CIG iii. 287, with many references.

them oil and wine, in addition to the ordinary products of the country. While the natives still made their contracts in demotic, all the official documents of the colony were in Greek, and though in dating letters and contracts, the Egyptian month was given with the Macedonian, and often indeed by itself, we find the testamentary dates of the third Ptolemy's reign exclusively Macedonian. The language of these documents is fluent, and evidently that of a population which spoke Greek as a mother-tongue; even in the formulæ of the wills we find many small variations, showing that these formulæ were not slavishly used, but understood by the testator. State documents of the period, such as the inscription of Canopus, show that very long periods were written correctly in official circles —at least as correctly as our official classes use English. There are a few new words, not to be found even in the elaborate Lexicon of Gleanings, in which Professor Komanudis has gathered some 6000 words from beyond the pale of *Liddell and Scott*. But as yet there is little trace of that Egyptian influence which in the course of centuries told upon even these higher classes. The names of workmen and of petty overseers are Egyptian; measures and weights at least partially so; the laws are adaptations of the old régime to Macedonian titles and ideas. As has already been observed, the local administration generally remained what it had been under the Pharaohs; so it lasted under the Romans, even down to the Arab conquest.

§ 12. **Ptolemy Euergetes I.** (246–221 B.C.)—We now come to the reign of the third Ptolemy, within which most of our papyri are dated. I do not know whether among the notes and letters which Mr. Sayce is still deciphering, very early years of this king may not be explicitly mentioned. As every king of the series lived a few years, small figures without further specification tell us nothing; whereas such numbers as 35 added to the sign for a *year*, limit the possible application to very few kings indeed; and fortunately we have, in the famous Canopus inscription, an elaborate statement of all the means for fixing a year known in those days. The Egyptian priests then issued a proclamation in which they voted sundry divine honours to the king and queen, and made ordinances that these honours should be kept on days determined according to the

reformed calendar of 365¼ days, not according to the old Egyptian calendar of 365. Lepsius, in his monograph on the decree above mentioned, has fixed the date of this decree—the ninth year of Ptolemy III. (Euergetes)—as 238 B.C.

I shall here write out the full formula, which bears upon the dating of many of the following documents, premising that the Brother* Gods (ΘΕΟΙ ΑΔΕΛΦΟΙ) mean the deified Philadelphus and Arsinoe, and the Benefactor Gods (ΘΕΟΙ ΕΥΕΡΓΕΤΑΙ) mean the deified reigning king and queen. "In the reign of Ptolemy, son of Ptolemy and Arsinoe the brother gods, the 9th year, Apollonides son of Moschion being priest of Alexander [the Great] and of the Gods Brothers and the Gods Benefactors; the Canephorus [priestess] of Arsinoe Philadelphus being Menekrateia, the daughter of Philammon, in the month Tybi, &c. &c." The dating of the Rosetta inscription is on the same principle, except that the priesthoods created in honour of the intervening kings and queens during the next fifty years have been added, thus making the preamble too tedious for me to quote. So much was this felt even in Egypt that in later documents no care was taken to find out the names of the priests and priestesses officiating in the particular year, but they are spoken of as ' the existing ' (ΤΩΝ ΟΝΤΩΝ ΚΑΙ ΟΥϹΩΝ). In still more compendious copies of legal instruments we have even the phrase *after the general formulæ* (ΜΕΤΑ ΤΑ ΚΟΙΝΑ) into which the preamble is curtailed.†

These details I here give because the reader must be satisfied that I have really determined the early date of the papyri in this Report. If he will turn to the wills of the year 10 of Ptolemy III. (XIV., XV., XVI.), he will find the formula of the Canopus inscription repeated word for word, even to the names of Apollonides and Menekrateia, the *eponymous* priest and priestess of the year, with merely the figure 9 changed to 10, and the note that one or both priesthoods were now being held for their second year—a most exceptional circumstance. For *eponymous* priesthoods would obviously

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* The German *Geschwister* would be a better translation of ΑΔΕΛΦΩΝ, which here means brother and sister.

† Cf. examples of both these compendious expressions in Leemans' *Leiden Papyri*, N. and O., which date from the seventh or a later Ptolemy.

be useless if the same names were frequently repeated. The Canopic decree of the priests in the year 9 mentions two circumstances which may have caused a reappointment of the eponymous officers for the next year. Firstly, new honours and dignities were heaped on the king and queen, and perhaps the priest and priestess may have claimed the first performance of the accompanying ceremonies. Secondly, there were special changes made in the estimating of the year—which in the case of the new honours was henceforth to be the solar, not the Egyptian year—and this may possibly have caused the prolongation, or apparent prolongation of offices shortened or altered in their tenure by these changes. These, however, are only suggestions which may help to explain an undoubted fact. In another document (XXVIII. (2)) we have LIA ῶC ΔЄ . . . oΔoI LIB, viz. year 11, but, according to . . . περίοδοι? year 12, which seems to me to allude to the new uncertainty introduced by the decree of the year 9.

The habit of dating, not only by the year of the king and the day of the month, but also by the names of eponymous priesthoods, was common to the old Greek and Asiatic worlds. We can see specimens of it in Thucydides and elsewhere, and when there was no recognized epoch, the coincidence of several priests and priestesses who were appointed in various months might limit the time very closely. Thus, if the priesthood of Alexander and the Canephoria of Arsinoe were independent creations in relation to independent feasts, the coincidence of the Priest A with the Canephorus B might only extend over a few months, and so define the date more precisely. For example, in the document just cited, which hesitates between the year 11 and 12, Seleucus is the priest, while we know that in the year 12 Eukles was priest and Stratonice Canephorus; unfortunately the name of the Canephorus coincident with Seleucus is lost. Similarly, in the wills of the year 10, the Canephorus is sometimes in her second year, while the priest is not ; if this were not due to an oversight, it establishes my conjecture. I have already mentioned how the multiplication of these priesthoods for the successive kings, while useless in further determining a date perfectly settled by the year and day of the king, became so cumbrous as to be curtailed, and even omitted. I will only add that the earliest Canephorus as yet ascertained is, according to M. Revillout, in the 19th

year of Ptolemy Philadelphus,[*] therefore but a few years after the promotion of the second Arsinoe to be his queen. We may suppose that she was deified and honoured in this way upon her marriage.

One other chronological question must be raised before we return to the events of Ptolemy Euergetes' life.[†] The chronologers agree in allotting 25 years to his reign, but if we are to believe the transcription, by the monk Cosmas, of the inscription he saw at Adule,[‡] it was dated in his 27th year. There seems to be some inaccuracy here ; but if we allow 25 years, it is not at all impossible that he may have reached the early days of his 26th year, seeing that the remainder would (according to the received precedent) count a full first year with the new king. What, then, are we to think of documents produced below (XI.), dated, simply, *year 26* ? are they of this king's reign, or 38 years earlier, and to be referred to the second Ptolemy ? On this point I feel much hesitation, and have not assigned the earlier date to any document which does not bear some additional internal evidence to support me.

§ 13. **Character of his Reign.**—The reign which has now supplied us with so many dated documents commenced in stormy excitement. Not only did the young and vigorous man succeed to one worn out with long dissipation, ill-health, and the fatigues of government, but the new king was hurried off at the very commencement of his reign into an Asiatic campaign, which turned out only inferior in brilliancy and success to those of Alexander—if we believe the Adule inscription and the priests—and from which he came back loaded with spoil, and covered with glory, restoring to the Egyptians the gods and sacred treasures carried away long since by the victorious Persians. But from this time onward we

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[*] The document (XXIII.) which I date in the 16th year of this king has accordingly no Canephorus, but apparently it has a priest of Alexander and the Brother Gods, which would disprove M. Revillout's theory that this latter office was probably created in the 20th year of Philadelphus : cf. *Revue égyptol.*, vol. i., pp. 12 *sqq.*

[†] As we have here nothing to say to Euergetes II., I need not repeat that our king was the first who bore the title.

[‡] Cf. the text quoted in Clinton's *Fasti*, iii. 382, note.

hear of no great wars, and though strong and respected, the king of Egypt becomes pacific, political, perhaps even lethargic, up to his death.

What became of the great victorious army he brought home from Asia? Many of them must have been disbanded with honours and rewards. Are these, then, the men called **THC ЄПΙΓοΝΗC**, and was this the time and the motive of a fresh settlement of veterans in the Fayyum? I confess I am considerably tempted to adopt this explanation.* If so a new burden must have been put on the necks of the Egyptian peasants, and whatever remained to them of land in the Fayyum must have been saddled with a race of upstart landlords, for whom the previous owner or tiller under the crown now worked as a labourer. Such contempt of the rights of the natives had been the declared policy of the previous king : he had done all in his power to Hellenize the country out and out. But the reaction was coming ; the passive persistence of the Egyptian Fellah was insuperable, and there are symptoms all through Euergetes' later days of a tendency to conciliate national feelings by erecting temples, and honouring native cults. If he did make these concessions, we can well explain the results which followed. No sooner did the government allow that the natives had rights which had long been disregarded, than the discontent at the violence long tolerated would assume a voice, and would be strengthened by the voice of the priests reminding the people of their violated rights. According as the king grew old, and his government careless, these doctrines would be preached without repression, and gather force in the native mind. With the death of the king, and the advent to power of a profligate weakling, Ptolemy Philopator, the agitation of the natives would increase, and all but burst

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* If so, any undated will, in which we find this description of a testator or witness, should necessarily be of the third Ptolemy's time. Unfortunately not a single such fragment, however it may have features of greater antiquity, actually bears a date of the second Ptolemy, except it be that headed *year* 26 (XI.), and here there is a lacuna after a witness's name in which ἐπιγόνης would fit very naturally (line 12). But in this will the witnessing *cleruchs* are all so exceptionally young, that it *must* date from the second Ptolemy.

I think I can read, in an unsatisfactory fragment (XIII. 2, l. 8) the words τῶν ἐπηγγμ[έ]νω[ν in the description of a witness. This new title again occurs in a list of witnesses (marked as O, 4, iv., among the Petrie papyri) now in my possession. I refer the reader to my Commentary on XIII. for further details.

into a rebellion. But when a threat of invasion from Syria set the young king's advisers to the task of reconstructing, quickly, an army which had been allowed to fall into idleness and decay—Polybius distinctly implies that the standing army was quite unfit to take the field—they were obliged to call out the veterans settled in the country,* and, what was far more dangerous, arm the discontented natives, and train them to fight in phalanx. No sooner had these latter finished their victorious campaign at Raphia, than the insurrection seems to have broken out. We have no details of what happened, save that the revolt was long and obstinate, overcome with difficulty, and renewed again upon the accession of the next king. And from this time onward Hellenism began to wane among the Egyptians, and the reconquest of the land by the old race set in.

Even if we count the few documents dated *year* 26 as belonging to the third Ptolemy, the Petrie papyri from Gurob, so far as Mr. Sayce and I have examined them, show a sudden termination before or at the end of this reign. There are numerous documents dating from his later years. We have not a single date of the fourth Ptolemy.† It seems very difficult, if not impossible, to attribute this sudden limitation to mere chance. We can infer from the renaming of the *nome* that the settlement was not founded till after Ptolemy II. married his second wife, (the second) Arsinoe. The dates begin, therefore, as we should expect, about the 20th year of his reign. They extend through its later years to the close of the next reign (about 269–225 b. c.). There they seem suddenly to stop. Shall we say that the disturbances which supervened in Egypt began with the outlying Fayyum, that in any case when the knights were called out by the new king, they returned to find themselves dispossessed, and unable to reconquer their lands in the general confusion of the national insurrection? I

* Esp. ἱππέας τῶν κατοίκων (Polybius). These κάτοικοι are either never alluded to in the present documents, or they are identical with the *cleruchs* we have before us. To this point I shall return.

† I have since found, in a mummy-case sent to me by Mr. Petrie, the year ιη (18) of Ptolemy, *son of the Gods Philopatores* mentioned. This title means Epiphanes, the fifth Ptolemy, who is the king of the Rosetta stone, and the date 186 b.c. But Mr. Petrie informs me that this case came from the Hawara Necropolis. Mr. Sayce has found one text in which φιλομητοροu (*sic*) occurs, but the context is lost, and we cannot use the single word as an argument of any weight.

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capital importance. It is, moreover, inconceivable that such official copies, by various hands, should ever have been recorded except at the very time when the testament was drawn up and witnessed. From the headings here and there to be seen, the records seem to have been monthly. I have only been able to reproduce a portion of these documents, but have chosen from them the most complete and the most contrasted. A number of lesser fragments in my hands give corroboration to my readings, and sometimes supply words wanting in the more complete copies. Only three of all the mummy-cases we examined produced these documents, and produced them in groups close together, so that a lucky accident has here saved for us a distinct class of texts nowhere else represented.

§ 19. **Their Formulæ.**—The first and most elaborate of the formulæ with which these wills open is—

(1) The date; and as certainty is here vital to this Memoir, I have explained the system in full detail above (§ 12). Our fragments follow accurately the official wording of the Canopus inscription, and we have certainly wills of the 10th, the 12th, and the 22nd year of the third Ptolemy before us (237, 235, 225 B.C.). There are others mentioning other years, but unfortunately the name of the king is lost, so that we cannot tell whether they date from the second or the third Ptolemy. But in no case do the formulæ of the fourth (Philopator) or fifth (Epiphanes) or any later sovran appear. The dating of the Rosetta stone, as well as of many of the later papyri preserved at Turin, Leyden, &c., show us that the titles of each new king and queen were added to the list of deities whose worship was conducted by the " priest of Alexander." Moreover, an *Athlophorus* of Berenice was created beside the *Canephorus* of Arsinoe, and presently other dignitaries of the same rank and privileges. The dates before us, in which none of these names appear, are therefore unmistakable, and in no case have we even the compendious forms which came into use when the list of priests and the gods they represented became cumbrous.

After the date which gives (*a*) the year of the reigning king, (*b*) the names of the priests of Alexander, &c., and of the Canephorus of Arsinoe Philadelphus, (*c*) the day of the month, (*d*) the locality, there follows—

(2) The preamble and description of the testator, in this form: "Being of sound mind and good understanding, A, son of B, made the following bequest," and then he is described as so many years old, from such a country, either tall, short, fat, or lean, with straight or curly hair, with his moles and his scars, the latter being a prominent feature among the Greek settlers of the Fayyum. For these veterans also name their old regiment, mentioning (I suppose with special pride) the guards or the cavalry.

(3) The opening words of the actual will are also a formula, though admitting of some variations, which show that no mere office clerk drew them up. "May it be my lot to keep in health and manage my own affairs, but if I should suffer anything human, I bequeath . . .".

(4) The details of the bequest. In the cases where these are lengthy, they are all so torn and mutilated as to be only partly intelligible; but where a single heir inherits everything—a not uncommon case—it is the wife, the son, the daughter; in one instance a Thracian young woman not more closely described. Nor is the bequest to the wife or daughter coupled (so far as our fragments disclose) with the name of any trustee or κύριος. In the wills made under the third Ptolemy, there usually follows—

(5) The appointment of the king and queen, and their descendants, as executors, which, I suppose, means no more than that the State administrated the testator's dispositions. There is no instance of the appointment of the second Ptolemy; whether because none of the wills date from his day, or because the practice arose from some new legislation under his son, I cannot tell.

The documents conclude with—

(6) The enumeration of the witnesses, each described as to age, prominence, military rank, and personal appearance. A comparison of many such lists led me to conclude that six was the normal number: though this, too, seems to have been variable;* and I since found in Leemans' papyri that

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* The document on XIX. exhibits only four, but was doubtless continued on the next column. This scribe, as appears from other fragments, was most particular in having a broad margin, and continues his text on the ensuing column without any break or paragraph. One other fragment has seven.

THE

EMPIRE OF THE PTOLEMIES

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CONQUEST'; 'A HISTORY OF CLASSICAL GREEK LITERATURE';
'THE GREEK WORLD UNDER ROMAN SWAY,' ETC.

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APPENDIX I

THE INSCRIPTION OF SÂN

The discovery of this trilingual[1] inscription among the
ruins of Tanis (Sân) has done much not only to illustrate the
history of the third Ptolemy, but to explain difficulties in the
long known decree of Memphis (Rosetta stone) which is of a
kindred character.   In the first place we may deliberately call
it trilingual, though two of the scripts represent Egyptian lan-
guage; for it is now certain that hieroglyphic writing was a thing
foreign and artificial, even to the Egyptian priests of that age,
and by most of them imperfectly understood.   The variations
undergone by the language since the days when hieroglyphics
were the only script, and the manifest efforts at what is subtle
and recondite in this form of writing under the Ptolemies, show
clearly enough that the 'sacred script' was no mere transcript
from the demotic, but a distinct version almost in the sense
that the Greek was.   This consideration is of great importance
in settling a controversy which Letronne raised, and determined
without sufficient consideration.   Assuming that the hieroglyphic
was the *bona fide* Egyptian version, and very imperfectly in-
formed regarding the demotic, he was urged by various small
points of difference to maintain that on the Rosetta stone (the
only one then accessible) the Greek was the original, after-
wards translated into Egyptian.   Revillout, coming long after
him, and with the Sân stone also before him, armed moreover
with a knowledge of demotic, asserted that he was wrong.   For,
finding great contrasts in the style of the two documents, of
which the later is very much more contorted and verbose, he
asserted that while in the Rosetta stone the Egyptian was
certainly the leading language, it was not so in the Sân stone,
and that here the original text had been Greek.

It seems very difficult to maintain this distinction.   The
circumstances of both decrees make it quite certain that the

[1] The demotic version was in this case round the edge of the stone,
and not at first observed.   Another version of this kind has since been
found.   The bibliography relating to the inscription is given by Groff
Rev. Eg. vi. 13.

conclave of Egyptian priests, meeting for the transaction of their own business, with no foreigner present, discussed this business in the native tongue, and had their resolutions taken down by their secretaries in demotic script. Then they had recourse to interpreters on the one hand, with whom they concocted a Greek version for the Ptolemaic court ; on the other, to the department of their own body that understood hieroglyphics—probably the ἱερογραμματεῖs—to compose the version which would give a sacred and dignified character to their proclamation. But as the hieroglyphic was not understanded of the people, and probably not intended to be read, this artificial text should not have been compared by Letronne with the Greek, and its variations assumed to have any real import in the question. For according to Revillout's studies, there are considerable variations between it and the demotic, which was certainly the text understood, and therefore drawn up by the whole sacerdotal conclave.

M. Revillout has therefore done the right thing for the proper understanding of both texts when he published a literal translation of the demotic text, giving in parallel lines the Greek version.[1] Though there are still disputes and doubts regarding his decipherment, it is certainly the foundation from which all future considerations of these texts must start.

The facts which made him assert the priority of the Greek in the earlier of these decrees are mainly I think concerned with the dating, which here follows the usual formulae now known to us in many early papyri, while the dating of the decree of Memphis, which the Greek strives to copy, is quite foreign, not only to that tongue and its grammar, but to the practice of the Greek population in Egypt. But this striking contrast is to be easily explained by the character of the Greeks who were entrusted with the translation. In the days of the third Ptolemy, the foreign population was still dominant, and had taken little care to accommodate itself to the prejudices of the natives. Thus when the native scribes began with their 'year 9,' with which both demotic texts open, the officials of Euergetes exclaimed 'Nonsense, that won't do ; we must at least date the thing according to our practice,' and so they adopted their usual formula, advising the Egyptians to accommo-

[1] Cf. his *Chrestomathie démotique.*

date the demotic as best they could. Hence a whole group of inflated praises, which in the Memphis decree come between βασιλεύοντος and Πτολεμαίου do not appear here. It seems also to be true that the Greek and demotic of the earlier text are in much closer harmony than those of the later. M. Revillout has indeed published a special Essay in which he calls attention to discrepancies between the two extant demotic copies of the text, inferring from them that they were independent versions of the hieroglyphic and Greek originals. The differences alleged are, however, so unimportant, and the vagaries of demotic writing such, that he probably lays too much stress upon them. Variations are much more likely to occur in the ordinary script of the day, and with writers who perfectly apprehended the sense, than in copies of obsolete or foreign writing.

But to imagine that Greek scribes composed as the original such passages as those describing the honours to the princess Berenike, is to me absurd.[1] No Greeks would have the necessary knowledge of these ceremonies, and even if they had, could they have ventured to dictate them to the Egyptian priests. The whole therefore even of the earlier document is distinctly and essentially Egyptian, though from ignorance or insolence the Greek officials may have departed in some cases from the demotic version as explained to them. I have set down the date, according to Lepsius' determination, in the year 238 B.C. When the month comes to be fixed, there is considerable difference of opinion. Lepsius decides for March and this was generally accepted, but recently Ed. Mahler has endeavoured to establish with much learning that the real date was 3rd December.[2] Fortunately this controversy does not affect the history of the period.

I now proceed to comment upon the text of the decree of Canopus, chiefly with a view to illustrate the likenesses and unlikenesses it shows to the sister decree.

Superfluous words and syllables, written by mistake of the scribe, are enclosed in square brackets. Necessary additions or corrections in round brackets.

[1] I am glad to find that Mommsen (*RG* v. 564) implies that he holds the same view as mine.

[2] Cf. *Congress of Orientalists for* 1893, vol. ii. p. 327.

The Decree of Canopus (Sân Stone) 238 B.C.

§ 149. Βασιλευοντος Πτολεμαιου του Πτολεμαιου και
Αρσινοης θεων Αδελφων, ετους ενατου, εφ ιερεως Απολλωνιδου
του | Μοσχιωνος Αλεξανδρου και θεων Αδελφων και θεων
Ευεργετων, κανηφορου Αρσινοης Φιλαδελφου Μενεκρατειας |
της Φιλαμμονος, μηνος Απελλαιου εβδομηι, Αιγυπτιων δε Τυβι
επτακαιδεκατηι. ΨΗΦΙΣΜΑ. οι αρχιερεις | και προφηται
και οι εις το αδυτον εισπορευομενοι προς τον στολισμον των
θεων και πτεροφοραι και ιερογραμματεις και | οι αλλοι ιερεις οι
συναντησαντες εκ των κατα την χωραν ιερων εις την πεμπτην
του Διου, εν ηι αγεται τα γενεθλια του | βασιλεως, και εις την 5

ll. 1, 2. I found this very formula repeatedly in the wills now
published in the *Petrie Papyri* vol. i., and the same eponymous
officers, with this difference only, that they are noted as serving
their *second* year of office in the *tenth* of the king's reign. That
such officials should be re-appointed was unusual—I doubt
whether another case is known—and may have been in con-
nexion with these very ceremonies, and with the reform of the
calendar instituted below. The priest of Alexander etc. and the
Canephoros of Arsinoe Philadelphus always bear Greek names,
and the former need not at all be identified with the *priest of
all Egypt*, as Letronne imagined. That priest must rather
have been the Chairman of the Board to be discussed below.

l. 3. The demotic version (DV) which begins with *year* 9,
in the native style, omits to add the date in Tybi, thus only
giving the Macedonian month. This, if correctly deciphered,
must be a mere oversight of the copyist.

l. 4. The form πτεροφόραι (not οι) which appears also on
the Rosetta stone (R), and was there suspected by Letronne, is
by this case supported, and points to a form πτεροφόρας.
Diodoros (i. 87) identifies these *feather-bearers* with the *hiero-
grammateis*, but there was evidently some difference.

l. 5. We find the Macedonian calendar, so inferior in precision
to the Egyptian, still dominant. The greater convenience,
however, of the native system gradually asserted itself, as
may be seen from a comparison of these with later documents.

THE CHRONOLOGY

OF

ANCIENT · NATIONS

AN ENGLISH VERSION OF THE

ARABIC TEXT OF THE ATHÁR-UL-BÁKIYA OF ALBÍRÚNÍ,

OR

"VESTIGES OF THE PAST,"

COLLECTED AND REDUCED TO WRITING BY THE AUTHOR
IN A.H. 390—1, A.D. 1000.

TRANSLATED AND EDITED, WITH NOTES AND INDEX, BY

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PREFACE.

It was Sir Henry Rawlinson who first directed public attention to this work of Albîrûnî, in his celebrated article on Central Asia in the " Quarterly Review " for 1866, in which he gave some valuable information derived from his own manuscript copy, now the property of the British Museum. In offering the book, both in text and translation, to the learned world, I feel bound to premise that it is scarcely of a nature to attract the interest of the general reader. It appeals to minds trained in the schools of various sciences. Even competent scholars will find it no easy matter to follow our author through all the mazes of his elaborate scientific calculations. Containing, as it does, all the technical and historical details of the various systems for the computation of time, invented and used by the Persians, Sogdians, Chorasmians, Jews, Syrians, Harránians, and Arabs, together with Greek traditions, it offers an equal interest to all those who study the antiquity and history of the Zoroastrian and Jewish, Christian and Muhammadan religions.*

The work of Albîrûnî has the character of a primary source. Oriental philologists are accustomed to see one book soon superseded by another, Barhebraeus by Ibn-al'athîr, Ibn-al'athîr by Al-Ṭabarî. Although it is likely enough

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* By Christians, I understand the Melkite and Nestorian Churches, whilst the author does not seem to have known much more of the Jacobites than the name.

that on many subjects in this book we shall one day find better authenticated and more ancient information, I venture to say, that, as a whole, it will scarcely ever be superseded. It is a standard work in Oriental literature, and has been recognised as such by the East itself, representing in its peculiar line the highest development of Oriental scholarship. Perhaps we shall one day find the literary sources themselves from which Albîrûnî derived his information, and shall be enabled to dispense with his extracts from them. But there are other chapters, *e.g.* those on the calendars of the ancient inhabitants of Central Asia, regarding which we shall, in all likelihood, never find any more ancient information, because the author had learned the subject from hearsay among a population which was then on the eve of dying out. As the first editor and translator of a book of this kind, I venture to claim the indulgence of the reader. Generations of scholars have toiled to carry the understanding of Herodotus to that point where it is now, and how much is wanting still! The work of generations will be required to do full justice to Albîrûnî. A classical philologist can edit a Greek text in a correct form, even though he may have no complete understanding of the subject-matter in all possible relations. Not so an Arabic philologist. The ambiguity of the Arabic writing—*proh dolor!*—is the reason why a manuscript expresses only three-quarters of the author's meaning, whilst the editor is compelled to supply the fourth quarter from his own knowledge and discernment. No number in any chronological table can be considered correct, as long as it is not proved by computation to be so, and even in the simplest historical narrative the editor and translator may most lamentably go astray in his interpretation, if there is something wrong with the method of his research.

I have boldly attacked the sometimes rather enigmatic style of the author, and if I have missed the mark, if the bewildering variety and multiplicity of the subject-matter have prevented me reaching the very bottom of every question, I must do what more or less every Oriental author does at the end of his work,—humbly ask the gentle reader to pardon my error and to correct it.

I. *The Author.*

The full name of the author is *Abû-Raihân Muhammad b. 'Ahmad Albîrûnî.* He quotes himself as *Abû-Raihân* (*vide* p. 134, l. 29), and so he is generally called in Eastern literature, more rarely *Albîrûnî.*

The latter name means, literally, *extraneous*, being a derivative from the Persian بيرون which means *the outside* as a noun, and *outside* as a preposition. In our time the word is pronounced *Bîrûn* (or *Beeroon*), *e.g.* in Teheran, but the vowel of the first syllable is a *yâi-majhûl*, which means that in more ancient times it was pronounced *Bêrûn* (or *Bayroon*). This statement rests on the authority of the Persian lexicographers. That the name was pronounced in this way in Central Asia about the author's time, we learn from an indisputable statement regarding our author from the pen of Alsam'ânî, a philologist and biographer of high repute, who wrote only one hundred years after the author's death (*vide* Introduction to my edition of the text, p. xviii.).

He was a native of Khwârizm, or Chorasmia, the modern Khiva; to speak more accurately, a native either of a *suburb* (*Bêrûn*) of the capital of the country, both of which bore the same name *Khwârizm*, or of the *country-district* (also called *Bêrûn*) belonging to the capital.

Albîrûnî was born A.H. 362, 3. Dhû-alhijja (A.D. 973,

The matter standing thus, it is our duty to proceed from what is near to the more distant, from what is known to that which is less known, to gather the traditions from those who have reported them, to correct them as much as possible, and to leave the rest as it is, in order to make our work help him, who seeks truth and loves wisdom, in making independent researches on other subjects, and guide him to find out that which was denied to us, whilst we were working at this subject, by the will of God, and with his help.

In conformity with our plan, we must proceed to explain the nature of day and night, of their totality, *i.e.* the astronomical day, and assumed 10 beginning. For day and night are to the months, years, and eras, what one is for the numerals, of which they are composed, and into which they are resolved. By an accurate knowledge of day and night, the progress towards learning that which is composed of them and built upon them, becomes easy.

CHAPTER I.

ON THE NATURE OF DAY AND NIGHT, OF THEIR TOTALITY AND OF THEIR BEGINNINGS.

I say: Day and night (*i.e. νυχθήμερον*) are one revolution of the sun in the rotation of the universe, starting from and returning to a circle, which has been assumed as the beginning of this same Nychthemeron, whichsoever circle it may be, it being determined by general consent. This *circle* is a "great" circle; for each great circle is dynamically an horizon. By "*dynamically*" (τῇ δυνάμει), I mean that it (this circle)
10 may be the horizon of any place on the earth. By the "*rotation of the universe*," I mean the motion of the celestial sphere, and of all that is in it, which we observe going round on its two poles from east to west.

The Setting of the Sun as the beginning of the Day.—Now, the Arabs assumed as the beginning of their Nychthemeron the point where the setting sun intersects the circle of the horizon. Therefore their Nychthemeron extends from the moment when the sun disappears from the horizon till his disappearance on the following day. They were induced to adopt this system by the fact that their months are based upon the course of the moon, derived from her various motions, and
20 that the beginnings of the months were fixed, not by calculation, but by the appearance of the new moons. Now, full moon, the appearance of which is, with them, the beginning of the month, becomes visible towards sunset. Therefore their night preceded their day; and, therefore, it is their custom to let the nights precede the days, when they p. 6. mention them in connection with the names of the seven days of the week.

Those who herein agree with them plead for this system, saying that darkness in the order (of the creation) precedes light, and that light suddenly came forth when darkness existed already; that, therefore,
30 that which was anterior in existence is the most suitable to be adopted

as the beginning. And, therefore, they considered absence of motion as superior to motion, comparing rest and tranquillity with darkness, and because of the fact that motion is always produced by some want and necessity; that weariness follows upon the necessity; that, therefore, weariness is the consequence of motion. Lastly, because rest (the absence of motion), when remaining in the elements for a time, does not produce decay; whilst motion, when remaining in the elements and taking hold of them, produces corruption. As instances of this they adduce earthquakes, storms, waves, &c.

The Rising of the Sun as the beginning of the Day.—As to the **10** other nations, the Greeks and Romans, and those who follow with them the like theory, they have agreed among themselves that the Nychthemeron should be reckoned from the moment when the sun rises above the eastern horizon till the same moment of the following day, as their months are derived by calculation, and do not depend upon the phases of the moon or any other star, and as the months begin with the beginning of the day. Therefore, with them, the day precedes the night; and, in favour of this view, they argue that light is an *Ens*, whilst darkness is a *Non-ens*. Those who think that light was anterior in existence to darkness consider motion as superior to rest (the absence **20** of motion), because motion is an *Ens*, not a *Non-ens*—is life, not death. They meet the arguments of their opponents with similar ones, saying, *e.g.* that heaven is something more excellent than the earth; that a working man and a young man are the healthiest; that running water does not, like standing water, become putrid.

Noon or Midnight as the beginning of the Day.—The greater part and the most eminent of the learned men among astronomers reckon the Nychthemeron from the moment when the sun arrives on the plane of the meridian till the same moment of the following day. This is an intermediate view. Therefore their Nychthemera begin from the **30** visible half of the plane of the meridian. Upon this system they have built their calculation in the astronomical tables (the Canons), and have thereby derived the places of the stars, along with their equal motions and their corrected places, in the almanacks (*lit.* year-books). Other astronomers prefer the invisible half of the plane of the meridian, and begin, therefore, their day at midnight, as *e.g.* the author of the Canon (Zîj) of Shahriyârân Shâh. This does not alter the case, as both methods are based upon the same principle.

People were induced to prefer the meridian to the horizon by many circumstances. One was, that they had discovered that the Nych- **40** themera vary, and are not always of the same length; a variation which, during the eclipses, is clearly apparent even to the senses.

The reason of this variation is the fact that the course of the sun in the ecliptic varies, it being accelerated one time and retarded another; and that the single sections of the ecliptic cross the circles (the horizons)

at a different rate of velocity. Therefore, in order to remove that variation which attaches to the Nychthemera, they wanted some kind of equation ; and the equation of the Nychthemera by means of the rising of the ecliptic above the meridian is constant and regular every-where on the earth, because this circle is one of the horizons of the globe which form a right angle (with the meridian) ; and because its conditions and qualities remain the same in every part of the earth. This quality they did not find in the horizontal circles, for they vary for each place ; and every latitude has a particular horizon of its own,

10 different from that of any other place, and because the single sections of the ecliptic cross the horizons at a different rate of velocity. To use the horizons (for the equation of the Nychthemera) is a proceeding both imperfect and intricate.

Another reason why they preferred the meridian to the horizon is this, that the distances between the meridians of different places correspond to the distances of their meridians on the equator and the parallel circles ; whilst the distances between the horizontal circles are the same with the addition of their northern and southern declination. An accurate description of everything connected with stars and their

20 places is not possible, except by means of that direction which depends upon the meridian. This direction is called "longitude," which has nothing in common with the other direction, which depends upon the horizon, and is called "latitude."

Therefore they have chosen that circle which might serve as a regular and constant basis of their calculations, and have not used others ; although, if they had wished to use the horizons, it would have been possible, and would have led them to the same results as the meridian, but only after a long and roundabout process. And it is the greatest mistake possible purposely to deviate from the direct route in order to

30 go by a long roundabout.

Day, Night, and the Duration of the Day of Fast.—This is the general definition of the day which we give, the night being included. Now, if we proceed to divide and to distinguish, we have to state that the words "*Yaum*" (day) in its restricted signification, and "*Nahâr*" (day), mean the same, viz., the time from the rising of the body of the sun till its setting. On the other hand, *night* means the time from the setting of the body of the sun till its rising. Thus these two terms are used among all nations by general consent, nobody disputing their meanings, except one Muslim lawyer, who has defined the beginning of

40 the day to be the rise of dawn, and its end to be the setting of the sun, because he presumed that the day and the duration of fasting were identical. For this view of his he argues from the following word of God (Sûra ii. 183) : "Eat and drink till you can distinguish a white thread from a black thread at the light of *dawn*. Thereupon fast the entire day till the *night*." Now, he has maintained that these two terms

(*dawn* and *night*) are the two limits of the day (*beginning* and *end*).
Between this view, however, and this verse of the Coran there is not the
slightest connection whatsoever. For if the beginning of fasting was
identical with the beginning of the day, his (God's) definition of some-
thing that is quite evident and well known to everybody, in such terms,
would be like a pains-taking attempt to explain something void of sense.
Likewise he has not defined the end of day and the beginning of night
in similar terms, because this is generally known among all mankind.
God orders that fasting should commence *at the rise of dawn*; but the
end of fasting he does not describe in a similar way, but simply says   10
that it should end at "*night*," because everybody knows that this means
the time when the globe of the sun disappears. Hence it is evident that
God, by the words of the first sentence (*i.e.* eat and drink till you can
distinguish a white thread from a black thread at the light of dawn),
does not mean the beginning of day.

A further proof of the correctness of our interpretation is the word of
God (Sûra ii. 183): "It has been declared as lawful to you during the
p. 8. night of fasting to have intercourse (*lit.* to speak obscene things) with
your wives," &c., to the passage, "Thereupon fast the entire day till the
night." Thereby he extends the right of having intercourse with one's   20
wife, and of eating and drinking, over a certain limited time, not over
the entire night. Likewise it had been forbidden to Muslims, before
this verse had been revealed, to eat and drink after night-prayer (the
time when the darkness of night commences). And still people did not
reckon their fasting by days and parts of the night, but simply by days
(although the time of fasting was much longer than the day).

Now, if people say that God, in this verse (Sûra ii. 183), wanted to
teach mankind the beginning of the day, it would necessarily follow
that before that moment they were ignorant of the beginning of day and
night, which is simply absurd.   30

Now, if people say the *legal* day is different from the *natural* day,
this is nothing but a difference in words, and the calling something by
a name, which, according to the usage of the language, means something
else. And, besides, it must be considered that there is not the slightest
mention in the verse of the day and of its beginning. We keep, how-
ever, aloof from pertinacious disputation on this subject, and we are
willing to agree with our opponents as to the expressions if they will
agree with us regarding the subject-matter.

And how could we believe a thing the contrary of which is evident to
our senses? For evening-twilight in the west corresponds to morning-   40
dawn in the east; both arise from the same cause, and are of the same
nature. If, therefore, the rise of morning-dawn were the beginning of
the day, the disappearance of evening-twilight would be its end. And
actually some Shiites have been compelled to adopt such a doctrine.

Let us take it for granted that those who do not agree with us

regarding that which we have previously explained, agree with us as to the fact that twice a year night and day are equal—once in spring and once in autumn. Further, that he thinks, like us, that we have the longest day when the sun stands nearest to the north pole ; the shortest day when the sun is at the greatest distance from the north pole ; that the shortest summer night is equal to the shortest winter day ; and that the same meaning is expressed by the two verses of the Coran : "God makes night enter into day, and he makes day enter into night" (Sûra xxxv. 14), and "He wraps night around day, and he wraps day

10 around night" (Sûra xxxix. 7). Now, if they do not know this, or pretend not to know it, at all events they cannot help admitting that the first half of the day is six hours long, and likewise the latter half. Against this they cannot pretend to be blind, because of the well known and well authenticated tradition which relates to the prerogatives of those who hasten to the mosque on a Friday, and which shows that their wages are the highest, although their time of work in the six hours from the beginning of the day till the time of the decline of the sun is the shortest. This is to be understood of the *Horæ temporales obliquæ* (ὧραι καιρικαί), not of the *Horæ rectæ*, which are also called *æquinoctiales*

20 (ὧραι ἰσημεριναί).

Now, if we should comply with their wish, and acknowledge their assertions as truth, we should have to believe that an equinox takes place when the sun moves on either side of the winter solstice (*i.e.* near to the point of the winter-solstice either arriving there or leaving it) ; that this takes place only in some parts of the earth to the exclusion of others ; that the winter night is not equal to the summer day, and that noon is not then when the sun reaches the midst between his rising and setting points. Whilst just the contrary of these necessary inferences

30 from their theory is the conclusion generally accepted even by those who have only a slight insight into the matter. That, however, similar absurdities must follow out of their reasoning he only will thoroughly comprehend who is to some degree acquainted with the motions of the (celestial) globes.

If somebody will stick to what people say at dawn-rise, "*morning has come, night has gone;*" what is he to think of what they say when the sun is near setting, and becomes yellow—" evening has come, day has gone, night has come?" Such expressions merely indicate the approaching, the advancing, and the receding of the precise time in which people just

40 happen to be. These phrases are to be explained as metaphors and metonymics. They are allowed in the usage of the language, *cf. e.g.* the word of God (Sûra xvi. 1) : "The order of God has come ; therefore do not *hurry* it."

Another argument in favour of our view is the following saying, which is attributed to the Prophet, to whom and to whose family may God be merciful : " The prayer of the day is silent." And the fact that

this persuasion is established, that he had received divine inspiration and help.

p. 26.   For it is quite possible that these (celestial) bodies were scattered, not united at the time when the Creator designed and created them, they having these motions, by which—as calculation shows—they must meet each other in *one* point in such a time (as above mentioned). It would be the same, as if we, *e.g.* supposed a circle, in different separate places of which we put living beings, of whom some move fast, others slowly, each of them, however, being carried on in equal motions—of its peculiar sort of motion—in equal times; further, suppose that we knew their 10 distances and places at a certain time, and the measure of the distance over which each of them travels in one Nychthemeron. If you then ask the mathematician as to the length of time, *after* which they would meet each other in a certain point, or *before* which they had met each other in that identical point, no blame attaches to him, if he speaks of billions of years. Nor does it follow from his account that those beings *existed* at that (past) time (when they met each other), or that they would *still exist* at that (future) time (when they are to meet again); but this only follows from his account, if it is properly explained, that, *if* these beings really existed (in the past), or would still exist (in future) in that same 20 condition, the result (as to their conjunctions) could be no other but that one at which he had arrived by calculation. But then the verification of this subject is the task of a science which was not the science of 'Abû-Ma'shar.

If, now, the man who uses the cycles (the star-cycles), would conclude that they, viz. the stars, if they stood in conjunction in the first part of Aries, would again and again pass through the same cycles, because, according to his opinion, everything connected with the celestial globe is exempt from growth and decay, and that the condition of the stars in the past was exactly the same, his conclusion would be a mere assumption 30 by which he quiets his mind, and which is not supported by any argument. For a proof does not equally apply to the two sides of a contradiction; it applies only to the one, and excludes the other. Besides it is well known among philosophers and others, that there is no such thing as an *infinite* evolution of power (δύναμις) into action (πρᾶξις), until the latter comes into real existence. The motions, the cycles, and the periods of the past were computed whilst they in reality existed; they have decreased, whilst at the same time increasing in number; therefore, they are not *infinite*.

This exposition will be sufficient for a veracious and fair-minded 40 student. But if he remains obstinate, and inclines to the tricks of overbearing people, more explanations will be wanted, which exceed the compass of this book, in order to remove these ideas from his mind, to heal what is feeble in his thoughts, and to plant the truth in his soul. However, there are other chapters of this book where it will be more

suitable to speak of this subject than here. The discrepancy of the cycles, not the discrepancy of the observations, is a sufficient argument for—and a powerful help towards—repudiating the follies committed by 'Abû-Ma'shar, and relied upon by foolish people, who abuse all religions, who make the cycles of Sindhind, and others, the means by which to revile those who warn them that the hour of judgment is coming, and who tell them, that on the day of resurrection there will be reward and punishment in yonder world. It is the same set of people who excite suspicions against—and bring discredit upon—astronomers and mathe-

10 maticians, by counting themselves among their ranks, and by representing themselves as professors of their art, although they cannot even impose p. 27. upon anybody who has only the slightest degree of scientific training.

Era of Nabonassar.—The next following era is the Era of the first Nebukadnezar (Nabonassar). The Persian form of this word (*Bukh-tanaṣṣar*) is *Bukht-narsi*, and people say that it means "one who weeps and laments much"; in Hebrew, "Nebukadnezar," which is said to mean "Mercury speaking," this being combined with the notion that he cherished science and favoured scholars. Then when the word was Arabized, and its form was simplified, people said "*Bukhtanaṣṣar.*"

20 This is not the same king who devastated Jerusalem, for between these two there is an interval of about 143 years, as the following chronological tables will indicate.

The era of this king is based upon the Egyptian years. It is employed in the Almagest for the computation of the places of the planets, because Ptolemy preferred this era to others, and fixed thereby the mean places of the stars. Besides he uses the cycles of Callippus, the beginning of which is in the year 418 after Bukhtanaṣṣar, and each of which consists of seventy-six solar years. Those who do not know them (these cycles), try to prove by what they find mentioned in Almagest, that they are of

30 Egyptian origin; for Hipparchus and Ptolemy fix the times of their observations by Egyptian days and months, and then refer them to the corresponding cycles of Callippus. Such, however, is not the case. The first cycle, employed by those who compute the months by the revolution of the moon and the years by the revolution of the sun, was the cycle of eight years, and the second that of nineteen years. Callippus was of the number of the mathematicians, and one who himself—or whose people—considered the use of this latter cycle as part of their laws. Thereupon, he computed this cycle (of seventy-six years), uniting for that purpose four cycles of nineteen years.

40 Some people think that in these cycles the beginning of the months was fixed by the appearance of new moon, not by calculation, as people at that (remote) age did not yet know the calculation of the eclipses, by which alone the length of the lunar month is to be determined, and these calculations are rendered perfect; and that the first who knew the theory of the eclipses was Thales of Miletus. For after having frequently

attended the lectures of the mathematicians, and having learned from
them the science of form and motions (astronomy), he proceeded to dis-
cover the calculation of the eclipses. Then he happened to come to
Egypt, where he warned people of an impending eclipse. When, then,
his prediction had been fulfilled, people honoured him highly.

The matter, as thus reported, does not belong to the impossible. For
each art goes back to certain original sources, and the nearer it is to its
origin, the more simple it is, till you at last arrive at the very origin
itself. However, this account, that eclipses were not known before
Thales, must not be understood in this generality, but with certain local 10
restrictions. For some people refer this scholar (Thales) to the time of
Ardashîr ben Bâbak, others to that of Kaikubâdh. Now, if he lived at
p. 28. the time of Ardashîr, he was preceded by Ptolemy and Hipparchus; and
these two among the astronomers of that age knew the subject quite
sufficiently. If, on the other hand, he lived at the time of Kaikubâdh,
he stands near to Zoroaster, who belonged to the sect of the Ḥarrânians,
and to those who already before him (Zoroaster) excelled in science, and
had carried it to such a height as that they could not be ignorant of the
theory of the eclipses. If, therefore, their report (regarding the dis-
covery of the theory of the eclipses by Thales) be true, it is not to be 20
understood in this generality, but with certain restrictions.

Era of Philippus Aridæus.— The era of Philip, the father of
Alexander, is based upon Egyptian years. But this era is also frequently
dated from the death of Alexander, the Macedonian, the Founder. In
both cases the matter is the same, and there is only a difference in the
expression. Because Alexander, the Founder, was succeeded by Philip,
therefore, it is the same, whether you date from the death of the former,
or the accession of the latter, the epoch being a connecting link common
to both of them. Those who employ this era are called *Alexandrines*.
On this era Theon Alexandrinus has based his so-called " Canon."   30

Era of Alexander.—Then follows the era of Alexander the Greek, to
whom some people give the surname *Bicornutus*. On the difference of
opinions regarding this personage, I shall enlarge in the next following
chapter. This era is based upon Greek years. It is in use among most
nations. When Alexander had left Greece at the age of twenty-six years,
prepared to fight with Darius, the king of the Persians, and marching
upon his capital, he went down to Jerusalem, which was inhabited by the
Jews; then he ordered the Jews to give up the era of Moses and David,
and to use his era instead, and to adopt that very year, the twenty-
seventh of his life, as the epoch of this era. The Jews obeyed his 40
command, and accepted what he ordered; for the Rabbis allowed them
such a change at the end of each millennium after Moses. And at that
time just a millennium had become complete, and their offerings and
sacrifices had ceased to be practised, as they relate. So they adopted his
era, and used it for fixing all the occurrences of their months and days,

as they had already done in the twenty-sixth year of his life, when he
first started from home, with the view of finishing the millennium (*i.e.*
so as not to enter upon a new one). When, then, the first thousand
years of the Æra Alexandri had passed, the end of which did not coin-
cide with any striking event which people are accustomed to make the
epoch of an era, they kept the Æra Alexandri, and continued to use it.
The Greeks also use it. But according to the report of a book, which
Ḥabîb ben Bihrîz, the metropolitan of Mosul, has translated, the Greeks
used to date—before they adopted the Æra Alexandri—from the migration
10 of Yûnân ben Paris from Babel towards the west.

Era of Augustus.—Next follows the era of the king Augustus, the p. 29.
first of the Roman emperors (*Cæsares*). The word "*Cæsar*" means in
Frankish (*i.e.* Latin) "he has been drawn forth, after a cutting has been
made." The explanation is this, that his mother died in labour-pains,
whilst she was pregnant with him; then her womb was opened by the
"Cæsarean operation," and he was drawn forth, and got the surname
"*Cæsar.*" He used to boast before the kings, that he had not come out
of the *pudendum muliebre* of a woman, as also 'Aḥmad ben Sahl ben
Hâshim ben Alwalîd ben Ḥamla ben Kâmkâr ben Yazdajird ben
20 Shahryâr used to boast, that the same had happened to him. And he
(Augustus) used to revile people calling them "*son of the pudendum
muliebre.*"

The historians relate, that Jesus, the son of Mary, was born in the
forty-third year of his reign. This, however, does not agree with the
order of the years. The chronological tables, in which we shall give a
corrected sequence of events, necessitate that his birth should have taken
place in the seventeenth year of his reign.

It was Augustus who caused the people of Alexandria to give up their
system of reckoning by non-intercalated Egyptian years, and to adopt
30 the system of the Chaldæans, which in our time is used in Egypt. This
he did in the sixth year of his reign; therefore, they took this year as
the epoch of this era.

Era of Antoninus.—The era of Antoninus, one of the Roman kings,
was based upon Greek years. Ptolemy corrected the places of the fixed
stars, dating from the beginning of his reign, and noted them in the
Almagest, directing that their positions should be advanced one degree
every year.

Era of Diocletianus.—Then follows the era of Diocletian, the last of
the Roman kings who worshipped the idols. After the sovereign power
40 had been transferred to him, it remained among his descendants. After
him reigned Constantine, who was the first Roman king who became a
Christian. The years of this era are Greek. Several authors of Canons
have used this era, and have fixed thereby the necessary paradigms of
the prognostics, the *Tempora natalicia*, and the conjunctions.

Era of the Flight.—Then follows the era of the Flight of the

3

the end of the month Ispandârmajî, with the same name by which they
begin the days of the month; the second day they call Azmîn, the third
Ardawasht, and so on till the fifth day Ispandârmajî. Then they return
and commence anew with the first day بهمن, the 1st of the month
Nâwasârjî. They do not use or even know special names for the
Epagomenæ, but I believe that this fact simply arises from the same
confusion, regarding these names, which prevails among the Persians
and Sughdians. For after Ḳutaiba ben Muslim Albâhilî had killed their
learned men and priests, and had burned their books and writings, they
became entirely illiterate (forgot writing and reading), and relied in   10
every knowledge or science which they required solely upon memory.
In the long course of time they forgot that on which there had been a
divergence of opinion, and kept by memory only that which had been
generally agreed upon. But Allâh knows best!

As to the three identical names of days (the 8th, 15th, and 23rd,—
Dai in Persian, *Dast* in Sughdian, *Dadhû* in Khwârizmian), the Persians
refer them to the following, and compound them with these, saying
Dai-ba-Ádar, and *Dai-ba-Mihr*, and *Dai-ba-Dîn*. Of the Sughdians and
Khwârizmians some do the same, and others connect the words in their
language for "the first, the second, the third," with each of them.   20

In the early times of their empire the Persians did not use the week.
For, first, it was in use among the nations of the west, and more particu-
larly among the people of Syria and the neighbouring countries, because
there the prophets appeared and made people acquainted with the first
week, and that in it the world had been created, in conformity with the
beginning of the Thora. From these the use of the week spread to the
other nations. The pure Arabians adopted the week in consequence of
p. 49. the vicinity of their country to that of the Syrians.

We have not heard that anybody has imitated the example of the
Persians, Sughdians, and Khwârizmians, and has adopted their usage (of 30
giving special names to the thirty days of the month, instead of dividing
them into weeks), except the Copts, *i.e.* the ancient inhabitants of
Egypt. For they, as we have mentioned, used the names of the thirty
days till the time when Augustus, the son of Gajus, ruled over them.
He wanted to induce them to intercalate the years, that they might
always agree with the Greeks and the people of Alexandria. Into this
subject, however, it would be necessary to inquire more closely. At that
time precisely five years were wanting till the end of the great inter-
calation period. Therefore, he waited till five years of his rule had
elapsed, and then he ordered people to intercalate one day in the months 40
in every fourth year, in the same way as the Greeks do. Thereupon
they dropped the use of the names of the single days, because, as people
say, those who used and knew them would have required to invent a
name for the intercalary day. They (the names of the days of the
month) have not been handed down to posterity.

Months of the Egyptians.—The following are the names of their months:—

I.	Thot	30 days.	VII.	Phamenoth	30 days.
	Paophi	30 „		Pharmuthi	30 „
	Athyr	30 „		Pachon	30 „
	Choiak	30 „		Payni	30 „
	Tybi	30 „		Epiphi	30 „
	Mechir	30 „		ابيقا	30 „

These are the ancient names of the months. In the following we give
10 the names which were modernized by one of their princes, after inter-
calation had been adopted:—

I.	توت	VII. برمهات
	بابه	برمودة
	هتور	بشنس
	كيهك	بونه
	طوبه	ابيب
	امشير	مسرى

Some people call the months كيهك, برمهات, بشنس, and مسرى by the
names كياك, برمهوط, بشانس and ماسورى. These are the forms on which
20 people agree; in some books, however, these names are found in forms
somewhat different from those we have mentioned.

The five additional days they call, Ἐπαγομέναι, which means "*the
small month*;" they are appended at the end of Mesori, and at the same
place the intercalary day is added, in which case the Epagomenæ are
six days. The leap-year they call النقط, which means "*the sign*."

Months of the People of the West.—'Abû-al'abbâs Alâmulî relates
in his *Kitâb-dalâ'il-alḳibla*, that the *Western people* (of Spain?) use
months, the beginnings of which agree with those of the Coptic months.
They call them by the following names:—

30	I. May	30 days.	VII.	November	30 days.
	June	30 „		December	30 „
	July	30 „		January	30 „
	August	30 „		February	30 „
	September	30 „		March	30 „
	October	30 „		April	30 „

Then follow the five Epagomenæ at the end of the year.

Months of the Greeks.—The months of the Greeks are always
twelve in number. Their names are these:—

	I. Ἰανουάριος	31 days.	IV.	Ἀπρίλις	30 days.
40	Φεβρουάριος	28 „		Μαῖος	31 „
	Μάρτιος	31 „		Ἰούνιος	30 „

was a *protégé* of those people, entirely mixed up with them, and because
it was he who polished for them their scientific work. He had collected
the materials of this book with the object of explaining the fact of the
solar years not being always equal to each other, on account of the
motion of the apogee. With all this he was compelled to assume equal
circles, and equal motions along with their times, in order to derive
thereby the mean motion of the sun. But he did not find equal circles,
except those which move in an excentric plane, described (*viz.* the circles)
round a point within it, which point is assumed exclusively for these
circles. And this circle, which was sought for, extends the six hours by 10
additional fractions (*i.e.* its time of revolution is 365 days 6 hours + *a
fraction*), as Ḥamza has related. However, such a circle is not called a
solar year, for the solar year is, as we have defined already, that one, in
which all natural occurrences which are liable to growth and to decay
return to their original condition.

Jewish Months.—The Hebrews and all the Jews, who claim to be
related to Moses, have the following twelve months:—

I. Nîsân	of 30 days.	VI. Tishrî	of 30 days.
Jyâr	of 29 „	Marḥeshwân	of 29 „
Sîwân	of 30 „	Kislew	of 30 „ 20
Tammûz	of 29 „	Ṭêbeth	of 29 „
Âbh	of 30 „	Shefaṭ (Shebhaṭ)	of 30 „
Elûl	of 29 „	Adhâr	of 29 „

The sum total of their days is 354, being identical with the number
of days of the lunar year. If they simply used the lunar year as it is,
the sum of the days of their year and the number of their months
would be identical. However, after having left Egypt for the desert
Al-tîh, after having ceased to be the slaves of the Egyptians, having
been delivered from their oppression, and altogether separated from
them, the Israelites received the ordinances and the laws of God, 30
described in the second book of the Thora. And this event took place
in the night of the 15th Nîsân *at full moon* and *spring time.* They
were ordered to observe this day, as it is said in the second book of the
Thora (Exodus xii. 17, 18): "Ye shall observe this day as an ordinance
to your generations for ever on the fourteenth of the first month." By
the "*first month*" the Lord does not mean Tishrî, but Nîsân; because in
the same book he commands Moses and Aaron, that the month of pass-
over should be the first of their months, and the beginning of the year
(Exodus xii. 2).

Further, Moses spake unto the people: "Remember the day when ye 40
came out from bondage. Therefore ye shall not eat leavened bread on
this day in that month when the trees blossom." In consequence, they
were compelled to use the solar year and the lunar months; the solar
year in order that the 14th Nîsân should fall in the beginning of spring,

when the leaves of the trees and the blossoms of the fruit trees come forth'; the lunar months in order that, on the same day, the body of the moon should be lit up completely, standing in the sign of Libra. And as the time in question would naturally advance for a certain number of days (the sum of the days of twelve lunar months not being a complete year), it was necessary for the same reason to append to the other months those days, as soon as they made up one complete month. They added these days as a complete month, which they called the *First Adhâr*, whilst they called the original month of this name the
10 *Second Adhâr*, because of its following immediately behind its namesake. The leap-year they called '*Ibbûr* (עִבּוּר), which is to be derived from *Me'ubbereth* (מְעֻבֶּרֶת), meaning in Hebrew, "*a pregnant woman*." For they compared the insertion of the supernumerary month into the year, to a woman's bearing in her womb a foreign organism.

According to another opinion, the First Adhâr is the original month, the name of which without any addition was used in the common year, and the Second Adhâr is to be the leap-month, in order that it should have its place at the end of the year, for this reason, that according to the command of the Thôrâ, Nîsân was to be the first of their months.
20 This, however, is not the case. That the Second Adhâr is the original month, is evident from the fact, that its place and length, the number of its days, the feast- and fast-days which occur in it, are not liable to any changes. And of all these days nothing whatsoever occurs in the First Adhâr of a leap-year. Further, they make it a rule that, during the Second Adhâr, the sun should always stand in the sign of Pisces, whilst in the First Adhâr of a leap-year he must be in the sign of Amphora.

Five Cycles.—Now for the leap-years they wanted a certain principle of arrangement as a help to facilitate their practical use. Therefore they looked out for cycles which were based upon solar years, consisting
30 of lunar months. Of those cycles they found the following five:—

I. The cycle of 8 years consisting of 99 months, of which there are 3 leap-months.

II. The cycle of 19 years, called the *Minor Cycle*, consisting of 235 months, of which there are 7 leap-months.

III. The cycle of 76 years, consisting of 940 months, of which there are 28 leap-months.

IV. The cycle of 95 years, called the *Middle Cycle*, consisting of 1,176 months, of which there are 35 leap-months.

V. The cycle of 532 years, called the *Major Cycle*, consisting of 6,580
40 months, of which there are 196 leap-months.

Of these cycles they choose that one, the observation of which would be the easiest and simplest. This quality is peculiar to the cycles of 8 and of 19 years, with this difference, however, that the latter one agrees

The first (outer) circle indicates the quality of the year, whether it is a common year or a leap-year. The three other circles contain the three *formulæ*, indicating the order of the leap-years in the Maḥzôrs; the

second circle, the formula בהזיגוח; the third circle, the formula אדוטבדהז; and the inner circle, the formula גבטבג.

The cycles which we have mentioned hitherto, are derived from the moon, though not exclusively. The solar cycle consists of 28 years, and serves to indicate on what days of the week the solar years commence. For if the Jewish year had simply 365 days without the quarter-day, the beginning of the year would in every seven years return to the 10 same week-day. Since, however, they are intercalated once in four years, the beginning does not return to the same day, except in 28 years, *i.e.* 4 × 7 years. Likewise the other cycles, heretofore mentioned, do not, on being completed, return to the same week-day, except the largest cycle, on account of its arising from a duplication of the cycle of 19 years with the solar cycle.

The three kinds of the Jewish Year.—I say further : If the Jewish years had simply the first two qualities, *i.e.* were either common years or leap-years, it would be easy to learn their beginnings, and to distinguish between the two qualities which are proper to them, provided 20 the above-mentioned formula of computation for the years of the Maḥzôr be known. The Jewish year, however, is a threefold one. For they have made an arrangement among themselves, that New Year shall not fall on a Sunday, Wednesday, or Friday, *i.e.* on the days of the sun and his two stars (Mercury and Venus); and that Passover, by which the beginning of Nîsân is regulated, shall not fall on the days of the inferior stars, *i.e.* on Monday, Wednesday, and Friday, for reasons on which we shall hereafter enlarge as much as possible. Thereby they were compelled either to postpone or to advance New Year and Passover, when they happened to fall on one of the days mentioned. 30

For this reason their year consists of the following three species :—

I. The year called حسارين, *i.e.* the imperfect one (חֲסֵרָה), in which the months Marḥeshwân and Kislêw have only 29 days.

II. The year called كسدران, *i.e.* the intermediate (כְּסִדְרָן), lit. *secundum ordinem suum*, in which Marḥeshwân has 29 days, and Kislêw 30 days.

III. The year called هلاسيم, *i.e.* the perfect one (שְׁלֵימָא), in which both Marḥeshwân and Kislêw have 30 days.

Each of these three species of years may be either a common year or a leap-year. So we get a combination of six species of years, as we 40 have here illustrated in the form of a genealogical diagram, and distributed in the following representation.

THE YEAR.

Common year of 12 months.	Leap-year of 13 months.
Perfect, of 355 days. Marḥeshwân, 30 days. Kislêw, 30 days.	Perfect, of 385 days. Marḥeshwân, 30 days. Kislêw, 30 days.
Intermediate, of 354 days. Marḥeshwân, 29 days. Kislêw, 30 days.	Intermediate, of 384 days. Marḥeshwân, 29 days. Kislêw, 30 days.
Imperfect, of 353 days. Marḥeshwân, 29 days. Kislêw, 29 days.	Imperfect, of 383 days. Marḥeshwân, 29 days. Kislêw, 29 days.

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　　For the deduction of these differences they have many modes of computation as well as tables, which we shall not fail to explain hereafter.

　　Determination of New Moon.—Regarding their knowledge of the beginning of the month, and the mode in which it is computed and used, the Jews are divided into two sects, one of which are the Rabbanites. They derive the beginning of the month by means of calculation from the mean motions of the two luminaries (sun and moon), no regard being had as to whether new moon is visible already or not. For it was their
20 object to have a conventional time, that was to begin from the conjunction of sun and moon. By the following accident they were, as they relate themselves, induced to adopt this system : at the time when they returned to Jerusalem, they posted guards upon the tops of the mountains to observe new moon, and they ordered them to light a fire and to make a smoke, which was to be a signal for them that new moon in fact had been seen. Now, on account of the enmity which existed between them and the Samaritans, these latter went and sent up the smoke from the mountain one day before new moon was seen. This practice they continued during several months, at the beginnings of
30 which heaven always happened to be clouded. Finally, people in Jerusalem found out this, observing that new moon, on the 3rd and 4th of the month, rose above the horizon from the east. Hence it was evident that the Samaritans had deceived them. Therefore they had recourse to the scholars of their time, in order to be protected by a system of calculation against the deceitful practices of their enemies, to which they were exposed by their present method.

　　In order to prove that it was legally permitted to fix the beginning of the month by calculation instead of observation, they referred to the duration of the deluge. For they assert that Noah computed and fixed
40 the beginnings of the months by calculation, because heaven was covered

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and clouded for so long as six months, during which time neither new
moon nor any other phase of the moon could be observed.

The mathematicians, therefore, computed for them the cycles, and
taught them how to find, by calculation, the conjunctions and the
appearance of new moon, viz. that between new moon and the con-
junction the time of 24 hours must elapse. And this comes near the
truth. For if it was the corrected conjunction, not the mean one, the
moon would in these hours move forward about 13 degrees, and her
elongation from the sun would be about 12 degrees.

This reform was brought about nearly 200 years after Alexander. **10**
Before that time they used to observe the *Tekûfôth* (תְּקוּפוֹת), *i.e.* the
year-quarters, on the computation of which we shall enlarge hereafter,
and to compare them with the conjunction of that month, to which
the Tekûfâ in question was to be referred. If they found that the con-
junction preceded the Tekûfâ by about 30 days, they intercalated a
month in this year, *e.g.* if they found that the conjunction of Tammûz
preceded the Tekûfâ of Tammûz, *i.e.* the summer-solstice by about
30 days, they intercalated in that year a month Tammûz, so that it had
one Tammûz and a second Tammûz (תַּמִּוּז וְתַמִּוּז). In the same way
they acted with the other Tekûfôth. **20**

Some Rabbanites, however, deny that such guards were posted, and
that they made a smoke as a signal. According to their opinion, the
cause of the deduction of this system of calculation was the following :
the scholars and the priests of the Israelites, feeling convinced that their
people would be scattered and dispersed in consequence of the last
destruction of Jerusalem, as they thought, were afraid that their com-
patriots, being scattered all over the world, and solely relying upon the
appearance of new moon, which of course in different countries would be
different for them, might, on account of this, fall into dissensions, and
a schism in their doctrine might take place. Therefore they invented **30**
these calculations,—a work which was particularly attended to by
Elîezer ben Pârûah, and ordered people to adhere to them, to use them,
to return to them, wherever and under whatever circumstances they
lived, so that a schism among them might be avoided.

The second sect are the *Milidites*, who derive the beginning of the
month from the conjunction ; they are also called *Alkurrâ* and *Al'ish-
ma'iyya*, because they demand that people shall only follow the wording
of the text, no regard being had to considerations and analogies, etc.,
even if it may be illogical and impracticable.

One party of them is called the *'Ânânites*, who derived their name **40**
from 'Ânân, the head of the emigration (ראש גלותא), who lived between
100 and 110 years ago. A head of the emigration must of necessity be
one of the descendants of David ; an offspring of another family would
not be fit for this office. Their common people relate, that only he is
qualified who, standing upright, can reach his knees with the tops of his

fingers; just as people relate such things of the prince of the true believers, 'Alî ben 'Abî Tâlib, and of those of his descendants who are qualified for the Imâma and the rule of the community (the Muhammadan world).

The genealogy of this 'Ânân is the following :—

<div dir="rtl">

I. עֲנָן בן דניאל ב׳ שאול ב׳ ענן ב׳ דוד

VI. ב׳ חסדאי ב׳ כפנאי ב׳ בסתנאי ב׳ הנומר ב׳ זוטרא

XI. ב׳ רב הונא ב׳ שפטיה ב׳ הונא ב׳ נתן ב׳ אבא מר

XVI. ב׳ רבנא עקיבא ב׳ שבניא ב׳ זכאי ב׳ חזקיא ב׳ שמעיא

XXI. ב׳ שפתיא ב׳ יוחנן ב׳ רצוציתא ב׳ ענן ב׳ ישעיא

XXVI. ב׳ זכריא ב׳ ברכיא ב׳ עקוב ב׳ חנניא ב׳ בסדיא

XXXI. ב׳ מעשיא ב׳ פדיה ב׳ זרבבל ב׳ שאלתיאל ב׳ יהויכין

XXXVI. ב׳ יהויקים ב׳ יהואחז ב׳ יאשיה ב׳ אחזיא ב׳ יהורם

XLI. ב׳ יהושפט ב׳ אסה ב׳ אביה ב׳ רחבעם ב׳ שלמה

XLVI. ב דוד

</div>

He opposed a community of Rabbanites in many of their observances. He fixed the beginning of the month by the appearance of the new moon in a similar way, as is prescribed in Islâm, not caring on what day of the week the beginning of the month happened to fall. He gave up the system of computation of the Rabbanites, and made the intercalation of a month depend upon the observation of barley-seed in 'Irâk and Syria between the 1st and the 14th Nîsân. If he found a first-fruit fit for friction and reaping, he left the year as a common year; if he did not find that, he intercalated the year. The mode of prognosticating the state of the corn was practically this, that one of his followers went out on the 23rd Shebât, to examine—in Syria and the countries of a similar climate—the state of the barley-seed. If he found that the Safâ, i.e. the prickles of the beard of the ear of corn, had already come out, he counted from that day till Passover 50 days; if he found that it had not yet come out, he intercalated a month into the year. And some added the intercalary month to Shefat, so that there was a *Shefat* and an *U-Shefat*; whilst others added it to Adhâr, so that there was an *Adhâr* and a *We-Adhâr*. The Ânânites mostly use Shefat, not Adhâr, whilst the Rabbanites use exclusively Adhâr.

This system of prognosticating the state of the corn is a different one according to the difference of the air and the climate of the countries. Therefore it would be necessary to make a special rule for every place, and not to rely upon the rule made for one certain place, because this would not be applicable elsewhere.

Syrian Months.—The Christians in Syria, 'Irâk, and Khurâsân have combined Greek and Jewish months. For they use the months of the Greeks, but have adopted the 1st of the Greek October as the beginning

Nâjir is derived from *najr*, which means " intense heat," as it is used in the following verse :—

> " A stinking water, on account of which a man turns his face aside,
> Even he who is tortured by thirst, if he tasted it in a ' *boiling hot*' month."

Khawwân is the form فَعَّال of the verb " *to deceive*," and *Ṣuwân* is the form فُعَال of the verb " *to preserve, to take care*." And these significations agreed with the natures of the months at the time when they were first employed as names for them.

Zabbâ means a " *great and frequently occurring calamity*." The month **10** was called so, because in it there was much and frequent fighting.

Bâ'id, too, received its name from the fighting in it, for many people used to " *perish* " in it. This circumstance is expressed in the following proverb : " *All that is portentous happens between Jumâdâ and Rajab*." For in this month people were in great haste and eagerness to carry out whatever blood revenge or warlike expeditions they were upon, before the month Rajab came in.

'Aṣamm was called so, because in it people abstained from fighting, so that the clash of weapons was not heard.

Wâghil means " *one who comes to a drinking-party without having been* **20** *invited*." This month was called so, because it suddenly comes in after Ramaḍân, and because in Ramaḍân there was much wine-drinking, on account of the next following months being the months of pilgrimage.

Nâṭil means " *a measure, a pot of wine*." The month was called so, because in it people indulged in drinking debauches, and frequently used that pot.

'Âdil is derived from " *'adl* " (which means either " to be just " or " to turn aside "). The month was called so, because it was one of the months of pilgrimage, when they used to abstain from the use of the Nâṭil, *i.e.* the wine-pot.   **30**

Ranna was called so, because the sheep were " *crying* " on account of the drawing near of the time when they were to be killed.

Burak was called so, because of the kneeling down of the camels on being led to the slaughtering-place.

A better versification of these names than the above-mentioned one is that by the Wazîr 'Ismâ'il ben 'Abbâd :—

> " You wanted to know the months of the pagan Arabs. Take them according to the order of Muḥarram (Ṣafar, etc.), of which they partake.
> First comes *Mu'tamir*, then *Nâjir;* and *Khawwân* and *Ṣuwân* are **40** connected by one tie.
> *Ḥanîn, Zabbâ, 'Aṣamm, 'Âdil, Nâfik* with *Waghl*, and *Ranna* with *Burak*."

If the etymologies of these two classes of names of the months are such as we have related, we must suppose that between the two periods of giving the names there was a great interval of time. Or else our explanations and etymologies would not be correct. For in one class of the months the highest pitch of the heat is Safar, whilst in the other it is Ramaḍân; and this (that the greatest heat should be either in Safar or in Ramaḍân) is not possible at one and the same period, or at two periods which are not very far distant from each other.

Intercalation of the Ancient Arabs.—At the time of paganism 10 the Arabs used their months in a similar way to the Muslims; their pilgrimage went wandering around through the four seasons of the year. But then they desired to perform the pilgrimage at such time as their merchandise (hides, skins, fruit, etc.) was ready for the market, and to fix it according to an invariable rule, so that it should occur in the most agreeable and abundant season of the year. Therefore they learned the system of intercalation from the Jews of their neighbourhood, about 200 years before the Hijra. And they used intercalation in a similar way to the Jews, adding the difference between their year and the solar year, when it had summed up to one complete month, to the months of 20 their year. Then their intercalators themselves, the so-called *Kalâmis* of the tribe Kinâna, rose, after pilgrimage had been finished, delivered a speech to the people at the fair, and intercalated the month, calling the next following month by the name of that month in which they were. The Arabs consented to this arrangement and adopted the decision of the *Kalammas*. This proceeding they called " *Nasî*," *i.e. postponement*, because in every second or third year they *postponed* the beginning of the year for a month, as it was required by the progression of the year. One of their poets has said :—

" We have an intercalator, under whose banner we march ;
30   He declares the months profane or sacred, as he likes."

The first intercalation applied to Muḥarram; in consequence Safar was called Muḥarram, Rabî' I. was called Safar, and so on ; and in this way all the names of all the months were changed. The second intercalation applied to Safar ; in consequence the next following month (Rabî I.) was called Safar. And this went on till intercalation had passed through all twelve months of the year and returned to Muḥarram. Then they commenced anew what they had done the first time.

The Arabs counted the cycles of intercalation and fixed thereby their dates. They said for instance : " From the time x till the time y the 40 years have turned round one cycle."

But now, if notwithstanding intercalation it became evident that a month progressed beyond its proper place in the four seasons of the year, in consequence of the accumulation of the fractions of the solar year, and of the remainder of the *plus-difference* between the solar year

and the lunar year, to which latter they had added this plus-difference,
they made a second intercalation. Such a progression they were able to
recognize from the rising and setting of the Lunar Mansions. This went
on till the time when the Prophet fled from Makka to Madîna, when the
turn of intercalation, as we have mentioned, had come to Sha'bân.

p. 63.　　Now, this month was called Muḥarram, and Ramaḍân was called
Ṣafar. Then the Prophet waited till the "*farewell pilgrimage*," on which
occasion he addressed the people, and said: "The season, the time has
gone round as it was on the day of God's creating the heavens and the
earth." (Sûra ix. 38.) By which he meant that the months had returned 10
to their original places, and that they had been freed from what the Arabs
used to do with them. Therefore, the "*farewell pilgrimage*," was also
called "*the correct pilgrimage*." Thereupon intercalation was prohibited
and altogether neglected.

Months of the Themudeni.—'Abû-Bakr Muḥammad ben Duraid
Al'azdî relates in his *Kitâb-alwishâḥ*, that the people Thamûd called the
months by the following names :—

I. Mûjib *i.e.* Muḥarram.	VII. Haubal.	
Mûjir.	Mauhâ.	
Mûrid.	Daimur.	20
Mulzim.	Dâbir.	
Muṣdir.	Ḥaifal.	
Haubar.	Musbil.	

He says that they commenced their year with the month Daimur, *i.e.*
Ramaḍân. The following is a versification of these names by 'Abû-Sahl
'Îsâ ben Yaḥyâ Almasîḥî :—

"The months of Thamûd are *Mûjib, Mûjir, Mûrid;* then follow
　　Mulzim and *Muṣdir.*
Then come *Haubar* and *Haubal*, followed by *Mauhâ* and *Daimur.*
Then come *Dâbir*, and *Ḥaifal*, and *Musbil*, till it is finished, the most 30
　　celebrated among them."

Arabic Names of Days.—The Arabs did not, like the Persians, give
special names to the single days of the month, but they had special
names for each three nights of every month, which were derived from
the state of the moon and her light during them. Beginning with the
first of the month, they called—

The first three nights (1st–3rd) *ghurar*, which is the plural of *ghurra*,
　　and means *the first of everything*. According to others they were
　　called so, because during them the new moon appeared like *a blaze
　　on the forehead of a horse.*   40
The second three nights (4th–6th) *nufal*, from *tanaffala*, which means,
　　"*beginning to make a present without any necessity*." Others call
　　them *shuhb, i.e.* the white nights.

"Sed neomenia Judaica, Arabica, & Samaritana excedit mo-
dum φάσεωςut plurimū. ita civiles neomenie mensium Lunariū
sint triplicis generis: Atticae ἀπὸ τῆς συνόδου: Calippi-
cae ἀπὸ τῆς αποκρύσεως:Judaicae, Samaritanae, & Arabicae,
ἀπὸ τῆς μηνοειδῶις χήματος, a tertia, inquam, die."--
Scaliger, Joseph, "De Emendatione Temporum," p. 6.

Translation: But the Jewish, Arabic, and Samaritan new
moon commonly exceeds the size of the phasis [moon's first
appearance], so that the civil new moons of lunar months are
a triple kind: the Attic, from the conjunction; the Calip-
pic, from the waxing; the Jewish, Arabic, and Samaritan,
from the shape of the moon from the third day, I say.

[Roman months seem to copy Greek moons]
The Ides correspond to the 15th of March, May, July and
October, and to the 13th of the other months. Webster.

"Nonnullis placet, Idus dictas vocabulo Graeco, à specie,
quae apud illosἐιδέα vocatur, quod ea die plenam speciem luna
demonstret."-- Venerabilis Bedae, "Opera Quae Supersunt Omnia,"
Edited,G.A. Giles, Vol. VI, Londini, 1843, p. 176.

Translation: Some hold that in the Greek language, Ides
was called from "specie," which with them is called "ἐιδέα,"
because on that day the moon shows a full face.
'Ειδέω corresponds to Latin "video."

"In the beginnings of the Church, both the Apostles and
and those who followed after them for a hundred years,
always celebrated the Jewish passover, as testifies Eu-
sebius and his ancient ecclesiastical history, and af-
ter all, Nicephorus Callistus. But under Commodus,
those who were observing the Jewish passover, were con-
demned of heresy by Victor, bishop of Rome, and by oth-
ers whom he himself had called into the synod. But the
difference in this celebration is twofold, in fact, ei-
ther in the calculation of the moon or in the rite. In
like manner, the difference is twofold in reference to
the calculation of the moon. For either in the new
moon, to the extent the new moons were triply employed
by the ancients, as we have discussed in the Greek year;
or in the embolism. For the new moons are reckoned ei-
ther according to the conjunction, as of the ancient At-
tics; or according to the waxing, as the Calippics; or
according to the shape of the moon, such as of the Jews,
Arabs, ancient Chaldeans, and Damascenes. ['In the first
it was quite dark; in the second it did open itself to
receive the sun-beams; in the last it did appear, cornic-
ulata, horned.'-- Godwyn, Thomas, "Moses and Aaron,"
London, 1685, p. 122.] The embolisms differ as to the
calculation of the beginning of the cycles, since indeed
some begin their cycles one way, and some another, so
that the first year of the Jewish cycle is fourth in
that of our Tisri, and fifth in Nisan. In this manner
the Paschal month of the Christians often runs in Adar
of the Jews. But the rite of the "fourteenth day" was
differing from the rite of the Europeans in time alone,
because the Europeans decree that the passover of the
resurrection must be celebrated on the Lord's day, but
the "fourteenth day" people were celebrating the passo-
ver of the crucifixion on the 14th of the moon. I earn-
estly desire to weigh diligently these differences. For
in ignorance of them, they who condemned the quartadeci-
mans have followed this, so that not only do they them-
selves not know the day of the passion of the Lord, but
they have even left it hidden to posterity in great
shadows of ignorance. But what, or of what kind the cy-
cle of the quartadecimans was, even if I keep silent,
they who read Eusebius and the ecclesiastical writers of
history know. For it is not hidden that the cycle of
those who imitated in every way the Apostles in this
thing -- and very many of them had crossed over from
Judaism to Christianity -- was pure Jewish and Chalda-
ic, whose earliest Nisan in the times of Dionysius was
March 24, in the first Dionysian cycle of the moon. But

the latest, was April 20, by the twelfth Dionysian cycle.
Would that those enemies of the quartadecimans had care-
fully taken note of this fact. . . Page 105.

"Although we have touched somewhat in the foregoing
chapter concerning the ancient rite of the Passover by
the Christians, yet this place demands that we speak more
fully concerning this. All the ancient Christians were
regulating the Passover according to the lunar year, us-
ing the canon only for it, and thereby thinking that
they trod in the footsteps of Moses and the Jews. But
there was a twofold difference. One is, that some soon-
er, others later, were intercalating the months. For the
Asians, who were following the footsteps of John the Evan-
gelist, and of others who were the equal of the Apostles,
were using the pure Jewish year. But the Europeans were
placing their cycle at the equinox, and were celebrating
the Passover on the full moon next after the equinox.
This was the difference in the months. Another difference
was in the day: because indeed some were appointing the
paschal festival on the Jewish 14th of Nisan, others, on
the next Lord's day after the 14th of the moon. . . p.
106.

"But those ancients [early Church], when they used
this cycle, were thinking that they celebrated the Passo-
ver in the Jewish Nisan, which was Adar in the years 2, 4,
5, 7, 10, 12, 13, 15, 16, 18, as the Table [page 107]
indicates, which now will first teach our men how much
those ancients erred in ignorance of a thing of no little
moment, since from which the computation of the times of
the preaching of Christ and of His passion was pending.
We certainly know this from no Christian man, but of
those who have either published the Jewish year, or have
written concerning the day of the Lord's passion that
thus far have perceived the position and place of the
Jewish new moons and their embolisms."-- Scaliger, Joseph,
"De Emendatione Temporum," p. 107.

The third three nights (7th–9th) *tusa'*, because the *ninth* night is the last of them. Others call them *buhr*, because in them the darkness of the night is particularly *thick*.

The fourth three nights (10th–12th) *'ushar*, because the *tenth* night is the first of them.

The fifth three nights (13th–15th) *bid*, because they are *white* by the shining of the moon from the beginning of the night till the end.

The sixth three nights (16th–18th) *dura'*, because they are black at the beginning like the sheep *with a black head and a white body.* p. 64.
10 Originally the comparison was taken from a coat of mail in which people are clad, because the colour of the head of him who is dressed in it, differs from the colour of the rest of his body.

The seventh three nights (19th–21st) *zulam*, because in most cases they were *dark*.

The eighth three nights (22nd–24th) *ḥanádis* (from *ḥindis*=extremely dark). Others call them *duhm*, on account of their being dark.

The ninth three nights (25th–27th) *da'ádi'*, because they are remainders (or last parts). Others derive it from the mode of walking of the camels, viz., *stretching forth the one foot, to which the other is*
20 *quickly following.*

The tenth three nights (28th–30th) *miḥák*, on account of the *waning* of the moon and the month.

Besides, they distinguished certain nights of the month by special names, *e.g.* the last night of the month was called *sirár*, because in it the moon *hides herself*; it was also called *faḥama* on account of there being no light in it, and *bará'*, because the sun has nothing to do with it. Likewise the last day of the month was called *naḥír*, because it is in the *naḥr* (throat) of the month. The 13th night is called *sawá'*, the 14th the night of "*badr*," because in it the moon is *full*, and her light complete.
30 For of everything that has become complete you say *badara*; *e.g.* 10,000 dirhams are called one *badra*, because that is supposed to be the most complete and the last number, although it is not so in reality.

The Arabs used in their months also the seven days of the week, the ancient names of which are the following:—

1. 'Awwal, *i.e.* Sunday.
2. 'Ahwan.
3. Jubâr.
4. Dubâr.
5. Mu'nis.
40 6. 'Arûba.
7. Shiyâr.

They are mentioned by one of their poets in the following verse:—
" I strongly hope that I shall remain alive, and that my day (of death) will be either *'Awwal*, or *'Ahwan*, or *Jubár*,

But, when they tried to fix thereby the beginning and end of fasting, their calculation, in most cases, preceded the legitimate time by one day. Whereupon they set about eliciting curious things from the following word of the Prophet: "Fast, when she (new-moon) appears, and cease fasting when she re-appears." For they asserted, that the words " fast, *when* she appears " (صوموا لرؤيته), mean the fasting of *that* day, in the afternoon of which new-moon becomes visible, as people say, "*prepare yourselves to meet him* " (تهيّوا لاستقباله), in which case the act of preparing precedes that of meeting.

10 Besides, they assert that the month of Ramaḍân has never less than thirty days. However, astronomers and all those who consider the subject attentively, are well aware that the appearance of new-moon does not proceed regularly according to one and the same rule for several reasons : the motion of the moon varies, being sometimes slower, sometimes faster; she is sometimes near the earth, sometimes far distant ; she ascends in north and south, and descends in them; and each single one of these occurrences may take place on every point of the ecliptic. And besides, some sections of the ecliptic sink faster, others slower. All this varies according to the different latitudes of the countries, and 20 according to the difference of the atmosphere. This refers either to different places where the air is either naturally clear or dark, being always mixed up with vapours, and mostly dusty, or it refers to different times, the air being dense at one time, and clear at another. Besides, the power of the sight of the observers varies, some being sharp-sighted, others dim-sighted. And all these circumstances, however different they are, are liable to various kinds of coincidences, which may happen at each beginning of the two months of Ramaḍân and Shawwâl under innumerable forms and varieties. For these reasons the month Ramaḍân is sometimes incomplete, sometimes complete, and all this varies accord-30 ing to the greater or less latitude of the countries, so that, *e.g.* in northern countries the month may be complete, whilst the same month is incomplete in southern countries, and *vice versâ.* Further, also, these differences in the various countries do not follow one and the same rule ; on the contrary, one identical circumstance may happen to one month several consecutive times or with interruptions.

But even supposing that the use which they make of those tables and calculations were correct, and their computation agreed with the appearance of new-moon, or preceded it by one day, which they have made a fundamental principle, they would require special computations for each 40 degree of longitude, because the variation in the appearance of new-moon does not depend alone upon the latitudes, but to a great extent also upon the longitudes of the countries. For, frequently, new-moon is not seen in some place, whilst she *is* seen in another place not far to the west ; and frequently she is seen in both places at once. This is one of the reasons for which it would be necessary to have special calculations

and tables for every single degree of longitude. Therefore,
now, their theory is quite utopian, viz. that the month of
Ramaḍân should always be complete, and that both its beginning
and end should be identical in the whole inhabited world, as
would follow from that table which they use.

. . . Compare with this the following saying of the Prophet:
"We are illiterate people, we do not write nor do we reckon the
month thus and thus and thus," each time showing his ten fin-
gers, meaning a complete month or thirty days. Then he repeat-
ed his words, saying, "and thus and thus and thus," and at the
third time he held back one thumb, meaning an incomplete month
or twenty-nine days. By this generally known sentence, the
Prophet ordained that the month should be one time complete,
and incomplete another time, and that this is to be regulated
by the appearance of the new moon, not by calculation, as he
says, "we do not write, nor do we reckon (calculate)."

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For the same reason, three months which are perfect accord-
ing to the appearance of new moon, can follow each other,
whilst of the imperfect months not more than two can follow
each other. And their following each other is possible only
in consequence of the variation of the motions of the two great
luminaries (sun and moon), and of the variation of the setting
of the zodiacal signs (i.e. the varying velocity with which the
sun moves through the various signs of the Ecliptic).

In what Period the beginning of the Jewish Year returns to
the same Date.--If the conjunctions at the beginnings of two
consecutive great cycles (of 532 years) coincided with each oth-
er (i.e. if they were cyclical in such a way as to begin always
at the same time of the week), we should be able to compute the
qualities of the Jewish years by means of tables, comprising
the years of a great cycle, similar to the Chronicon of the
Christians. However, the moleds of these cycles do not return
to the same time of the week except in 689,472 years, for the
following reason:

The Character of the small cycle, i.e. the remainder which
you get by dividing its number of days by 7, is 2d. 16h. 595H.
This fraction is not raised to one whole, except in a number
of cycles, which is equal to the number of Ḥalâḳîm of one Nych-
themeron, i.e. 25,920. Because fractions are not raised to
wholes, except when multiplied by a number which is equal to
the complete number of the same kind of fractions of one whole
(i.e. by the denominator).

But as both the number of the Ḥalâḳîm of the Nychthemeron

Cr the following day, *Dubâr*, or if I get beyond that, either *Mu'nis* or *'Arûba* or *Shiyâr*."

Afterwards the Arabs gave them the following new names :—

       Al-'aḥad,   *i.e.* one.
       Al-ithnân,   „   two.
       Al-thulathâ,   „   three. ·
       Al-'arbi'â,   „   four.
       Al-khamîs   „   five.
       Al-jum'â,   „   gathering.
       Al-sabt,   „   sabbath.   10

The Arabs fixed the beginning of the month by the appearance of new moon, and the same has been established as a law in Islâm, as the Lord has said (Sûra ii. 185): " They will ask thee regarding the new moons. Speak : they are certain moments of time for the use of mankind (in general) and for pilgrimage."

Determination of the length of Ramadan, the Month of Fasting.—Some years ago, however, a pagan sect started into existence somehow or other. They considered how best to employ the interpretation (of the Koran), and to attach themselves to the system of the exoteric school of interpreters who, as they maintain, are the Jews and   20 Christians. For these latter have astronomical tables and calculations, by means of which they compute their months, and derive the knowledge of their fast days, whilst Muslims are compelled to observe new moon, and to inquire into the different phases of the light of the moon, and into that which is common to both her visible and invisible halves. But then they found that Jews and Christians have no certainty on this subject, that they differ, and that one of them blindly follows the other, although they had done their utmost in the study of the places of the moon, and in the researches regarding her motions (*lit.* expeditions) and stations.   30

Thereupon they had recourse to the astronomers, and composed their *Canons* and books, beginning them with dissertations on the elements of the knowledge of the Arabian months, adding various kinds of computations and chronological tables. Now, people, thinking that these **p. 65.** calculations were based upon the observation of the new-moons, adopted some of them, attributed their authorships to Ja'far Al-ṣâdiḳ, and believed that they were one of the mysteries of prophecy. However, these calculations are based not upon the apparent, but upon the mean, *i.e.* the corrected, motions of sun and moon, upon a lunar year of 354½ days, and upon the supposition that six months of the year are complete, six   40 incomplete, and that each complete month is followed by an incomplete one. So we judge from the nature of their *Canons*, and from the books which are intended to establish the bases on which the *Canons* rest.

IV. They determine this space of time (between the conjunction and the appearance of new moon) by ὦραι καιρικαί. Whilst it is well known that it is not allowed to use them for the computation of conjunction, except on the equator.

V. They compute the conjunctions by the mean, not the apparent motion. Therefore passover frequently falls two complete days later than the real opposition—one day in consequence of the *Equations*, another day in consequence of their postponing passover from a *Dies illicita* to a *Dies licita*.

Computation of the Moled of a Year according to the Jewish System.—If we, now, want to find the *Môlêd* of a year, which term the Jews apply to the conjunction at the beginning of each month as well as the conjunction at the beginning of every cycle, we take the complete years of the *Æra Adami*, i.e. till the end of the year which is preceded by the month *Tishri* in question. We convert the number of years into *Minor Cycles*, and multiply the number of cycles by 2d. 16h. 595^H, which you get as a remainder if you convert the days of the minor cycle into weeks. The product which arises we keep in mind.

Thereupon, we consider the remainder of years that do not fill up one complete minor cycle. How many of them are common years, how many leap years, we learn by the *Ordo intercalationis*,

בהזיגרח

(i.e. the 2nd, 5th, 7th, 10th, 13th, 16th, and 18th years of the cycle are leap years).

The number of common years we multiply by 4d. 8h. 876^H, the number of leap years by 5d. 21h. 589 . The product of these two multiplications we add to the sum we have kept in mind.

To the sum we always add

5d. 14h.,

which represents the interval between the time of the conjunction and the beginning of the night of Sunday that was the commencement of the first year of the *Æra Adami*.

Then we raise each 1,080 Halaks to 1 hour, and add it to the other hours ; each 24 hours we convert into 1 day, and add it to the other days. The sum of days that arises we convert into weeks, and the remainder of days that are less than a week is the distance of the *Môlêd* from the beginning of the night of Sunday. Now, that time to which in the last instance our calculation leads us, is the time of the conjunction at the beginning of *Tishri*.

p.147.

We have made such a computation for a year of the *Æra Alexandri*, in order to facilitate the process and to simplify the apparatus.

If you want to find the conjunction at the beginning of Tishrî, take the years of the *Æra Alexandri*, and subtract therefrom always 12 years, which are the remainder of the minor cycle at the epoch of the Æra

Alexandri, according to the *Ordo intercalationis* גבטבג. The remainder of years divide by 19; the quotient you get is the number of minor cycles.

Convert these minor cycles into great cycles, if they are of a sufficient number to give complete great cycles, and keep in mind what remainder of years you have got. They are the current years of the cycle in question, according to the *Ordo intercalationis* גבטבג.

The great cycles, if you get such, compare with the table of the great cycles, and take the number of days, hours, and Ḥalâkîm which you find opposite them.

The small cycles compare with the table of the small cycles, and the number of days, hours, and Ḥalâkîm which you find opposite them.

These two numbers add together, days to days, hours to hours, and Ḥalâkîm to Ḥalâkîm.

This sum add to the *Basis*, which is written in the table uppermost, and which is the Môlêd of the 12th year of the *Æra Alexandri*. Convert each 1,080 Ḥalâkîm into an hour, each 24 hours into a day, and the days into weeks. The remainder of days you get is the distance between the beginning of the night of Sunday and the time of the conjunction. This is according to Jewish calculation.

We have used as the starting-point in this our calculation the beginning of the night for no other reason but this, that they commence the *Nychthemeron* with sunset, as we have mentioned in the first part of this book.

Here follows the table, computed by that method of calculation which we have explained in the preceding pages:—

p.148.

The Numbers of the Small Cycles.	The Years of the Small Cycles.	Days.	Hours.	Ḥalâkîm.
1	19	2	16	595
2	38	5	9	110
3	57	1	1	705
4	76	3	18	220
5	95	6	10	815
6	114	2	3	330
7	133	4	19	925
8	152	0	12	440
9	171	3	4	1,035
10	190	5	21	550
11	209	1	14	65
12	228	4	6	660
13	247	6	23	175
14	266	2	15	770
15	285	5	8	285

10

(25,920) and the number of the remainder of the Halakim of the cycles (595) may be divided by 5, the fractions will be raised to wholes if multiplied by a number of cycles, which is equal to 1/5 of the Halâkîm of the Nychthemeron, i.e. 5184.

Now, the conjunction (at the beginning of the year) does not return to the same time of the week except in a number of cycles which is the sevenfold of this number (5184), i.e. 36,288. And this is the number of cycles which represent the above-mentioned number of years (viz. 689,472).

In general, conjunction and opposition return to the same place (i.e. happen again at the same time of the week) in each 181,440 months, which is the product of the multiplication of the number of Hâlakîm of one Nychthemeron (25,920) by 7.

159

Likewise there is a difference between Jews and Christians regarding the leap year, as we shall explain in the chapter on the Christian Fast, if God permits. If, now, there is a difference between them, and they are willing to accept our decision, we shall consider the two oppositions of their two passovers, and shall say, that that opposition at which the moon moves in the middle part of Spica or of Cancer, or the sun is about to leave Aries, is to be rejected according to both systems, whilst the contrary is to be adopted. To the lover of truth, the correctness of these two assertions will be apparent, if the conditions we have mentioned are observed.

/ = Virgo's "ear of corn"

273

Adhâr II

This is the original Adhâr, which is called so in general (without the addition of I. or II.) in common years. There cannot be any ambiguity about what we just mentioned, speaking of another Adhâr preceding this one (because this only relates to leap-years). It has two Rosh-Hôdesh and 29 days.

302

The followers of Jesus wanted to know beforehand the Passover of the Jews, in order to derive thence the beginning of their Lent. So they consulted the Jews, and asked them regarding this subject, but the Jews, guided by the enmity which exists between the two parties, told them lies in order to lead them astray. And besides, the eras of both parties differed.

* Cf translated excerpt from Scaliger on p. 75ᵃ of albirûnî

Finally, many of the Christian mathematicians took the work in hand and made calculations with the various cycles and different methods. Now, that method which they at least agreed to adopt, is the table called Χρονικόν, of which they maintain that it was calculated by Eusebius, Bishop of Caesarea, and the 318 bishops of the Synod of Nicaea.

314-315

As regards the Sabians, we have already explained that this name applies to the real Sabians, i.e. to the remnant of the captive Jews in Babylonia, whom Nebukadnezar had transferred from Jerusalem to that country. After having freely moved about in Babylonia, and having acclimatized themselves to the country, they found it inconvenient to return to Syria; therefore they preferred to stay in Babylonia. Their religion wanted a certain solid foundation, in consequence of which they listened to the doctrines of the Magians, and inclined towards some of them. So their religion became a mixture of Magian and Jewish elements like that of the so-called Samaritans who were transferred from Babylonia to Syria.

Their day begins with sunrise, whilst all others, who use lunar months, make it begin with sunset. [This statement refers to the Ḥarrânians].

Their lunar month begins with the second day after conjunction (new moon). If, now, conjunction precedes sunrise only by one minute, the third following day is the beginning of the month. But if conjunction coincides with sunrise or falls only a little later, the second day after conjunction is the beginning of the month.

319

(The author tries to form his information regarding the Harranian calendar into a system.)--Because their great fasting falls into the first phase (quadrature) of Hilal [new moon] Adhar, whilst sun and moon stand in two double-bodied signs (Pisces and Gemini?), and because the end of the fasting falls into the first phase of Hilâl Nisân, whilst the sun and moon stand in certain two inclining signs (Aries and Cancer), their months must of necessity revolve in the solar year in a similar way to the Jewish months, that is to say: on an average. And between the causes of each of these two things there is a connection. For the Jewish Passover demands that the sun and moon should stand in the first opposition in two signs of the equinoxes-- for they may stand in opposition, and not only once, but twice-- and the Ḥarrânian fast-breaking demands that which we have men-

tioned (in Hilâl Adhâr). Hence follows that the phase (quadrature) next preceding the Jewish Passover is the fast-breaking of the Ḥarrânians, and that the conjunction which falls next to the autumnal equinox is the beginning of their year, never falling beyond Îlûl.

If we compute these elements for a cycle of 19 years, we get a rough sort of computation, but only a rough one, for they themselves try to correct it by means of the time of the conjunction, as we have mentioned.

The methods of both Jews and Christians for the computation of Passover are based upon such motions of the luminaries, of which we have found out that they remain back behind real time, especially as regards the sun (the precession of the equinoxes having been neglected). If we examine the oppositions according to the motions that have been found by recent observations, we find that some of them precede the Easter-limit according to both Jewish and Christian systems; they, however, disregard this precession, whilst it is really the case, and we find that others of them (the oppositions) fall near the end of the Easter-limit; these latter oppositions they adopt and rely upon them, whilst they are utterly wrong; for the real time (or opposition) precedes that time already by one month.

386

p. 63, l. 15. This view, that Adhâr II. is the leap-month, was held by the Karaeans, according to Eliah ben Mose in Selden, "Dissertatio de civili anno Judaico," cap. v. p. 166.

389

II. Enneadecateris

Meton discovered that 235 synodical months pretty nearly correspond to 19 solar years. In constructing his cycle of 19 years, he reckoned the solar year at 365 and 5/19 d., i.e. by 1/76 d. longer than it had been reckoned in the Octaeteris (a mistake which afterwards Callippus strove to retrieve). More correct was the following Jewish calculation with Hipparchic measures:

235 lunations, each = 29d. 12h. 793 Ḥ., give the sum of--
$$6,939 \text{ d. } 16\frac{595}{1080} \text{ h. } = 179,876,755 \text{ Ḥ.}$$

If we divide this sum of Ḥalaḳs by the length of the solar year of --
$$365 \text{ d. } 5\frac{3791}{4104} \text{ h. } = 9,467,190 \text{ Ḥ.,}$$
we get as quotient 19 (years), and a remainder of only 145 Ḥ.

According to this computation, the difference between the rotations of sun and moon at the end of the first Enneadecateris

would not be more than 145 H., or $\frac{29}{216}$ h., i.e. a little more than 1/7 h., or than 1/168 d., whilst, according to Callippus, this difference was greater, viz. 19/76 d. = 1/4 d.

This reform of the Metonic Enneadecateris enabled the Jews to dispense with the 76 years cycle of Callippus, which he constructed of four-times the Enneadecateris with the omission of one day. The Jewish calculation is more correct than that of Callippus, who reckoned the solar year too long.

390

p. 66, l. 23. The words that Passover by which the beginning of Nîsân is regulated I understand in this way, that Passover, i.e. the 15th Nîsân, and the 1st Nîsân always fall on the same week-day.

391

p. 68, l. 35. If the Mîlâdîtes commenced the month with the moment of the conjunction, they differed from the Rabbanites in this, that the latter made the beginning of the month (e.g. the beginning of the first month or New-year's-day) depend not alone upon conjunction, but also upon certain other conditions, for example, the condition ח׳ (Lazarus Bendavid, section 36). The Rabbanites tried in everything to assimilate their calendar, based upon the astronomical determination of conjunction, to the more ancient calendar which had been based upon the observation of New Moon. The conservative tendency of this reform of the Jewish calendar is pointed out by A. Schwarz, "Der Jüdische Kalendar," pp. 59-61.

438

p. 300, l. 4. The Jews count 3,448 years between Adam and Alexander. If you divide this sum by 19, you get 9 as a remainder, i.e. the first year of the Aera Alexandri is the 10th year of the cycle.

The division of 5180 by 19 gives a remainder of 12, i.e. the first year of the Aera Alexandri is, according to the Christians, the 13th year of the cycle.

names [1]. Thus arises the division of the month into three decades, in which however the last decade may vary between 9 and 10 days.

The division into decades is not so common as the halving of the month. The Zuñi of Arizona divide the month into three decades, each of which is called a 'ten' [2]. The Ahanta of the western Gold Coast divide the moon-month into three periods, two of ten days each, the third — which lasts until the new moon appears — of about $9\frac{1}{2}$ days (more correctly, no doubt, varying between 9 and 10 days.) The Sofalese of East Africa must have done the same, since de Faria says that they divided the month into 3 decades and that the first day of the first decade was the feast of the new moon [3]. The Masai, who number either the days of the whole month consecutively, or the days of its two halves, nevertheless give special prominence to the initial days of the decades (alongside of other notable days), and call them *negera* [4].

Among the Greeks the division into decades displaced the older bisection. Of the names of the decades the first and third refer to the concrete form of the moon: μὴν ἱστάμενος, older αὐξόμενος [5], literally 'the appearing, waxing moon', and μὴν φθίνων, 'the waning moon'. For originally μὴν must here have had the sense of 'moon' which the etymology suggests. The second decade was called μὴν μεσῶν, 'the month at the middle': the epithet shews that μὴν here means 'month', and not 'moon'. This name is therefore younger than the two others, which must once have been used to describe the two halves of the month, and do so still in Homer [6].

The custom of reckoning on the fingers or on a notched stick has doubtless lent assistance to the counting of the days of the month. The Wa-Sania make a notch in a stick for every day, and when the month is ended they put this stick aside and begin a new one [7]. At the southern corner of Lake Nyassa the days are counted by means of pieces of wood threaded on a string [8]. A complete enumeration of the days however

[1] Below, pp. 188 and 206 f. [2] Stevenson, p. 108. [3] Ellis, *Yoruba*, p. 144. [4] Merker, pp. 154 ff. [5] Hesiod, *Op.*, v. 773. [6] See my remarks in *Arch. f. Religionswiss.*, 14, p. 432. [7] Barrett, p. 35. [8] Stannus, p. 288.

only exists among highly developed peoples who have discarded a more concrete time-reckoning in favour of an abstract system, just as the civilised peoples of modern Europe abandoned the Roman system of time-reckoning, which was still often used in the Middle Ages (though indeed it had long since departed from its concrete basis), in favour of a simple enumeration of the days of the month.

Finally a couple of curious East African reckonings of the days of the month are to be mentioned, although they are not primitive but have a lengthy development behind them. A common feature of both is that the day of the new moon is already the fourth day, so that the counting of the days begins with the moon's invisibility, which can hardly have been the original practice. The Wadschagga divide the month into four parts the days of which are numbered, the first and third parts consisting of ten days each, and the second and fourth of five days each. Accordingly they begin to count the new moon at 'the fourth day, which brings the moon', the day on which the slender delicate crescent of the moon first reappears after sunset: for the rites of this day see above, p. 153. On the fourth day of the second division (the eleventh after new moon) they say that 'the moon turns to the back of the house': when twilight falls it is already seen beyond the culmination-point. The fourth day of the third division (the 16th after new moon) is called 'the day that brings the moon up from below' (i. e. from the eastern horizon), where 'it appears like a pot'; the fourth day of the last division is called 'the four, which dismisses the moon', and the first of the first division, when the moon vanishes, 'the one, which floats away the moon so that it is no longer visible': it 'tramples into pieces the days of the God' [1]. The natural phases of the moon therefore make themselves felt in spite of the counting. With this, as is so often the case, is connected a fully developed superstition concerning the days of the month. The Masai in ordinary life reckon their moon-months as consisting of 30 days, and number the days from 1 to 30 or

[1] Gutmann, pp. 238 ff.

CHAPTER VIII.

OLD SEMITIC MONTHS.

1. BABYLONIA.

In the much disputed questions of the ancient Babylonian astronomy and calendar the non-expert is in a situation of despair: for whoever cannot himself make use of the sources is referred to the often directly contradictory statements of the experts. I cannot however shirk the task of investigating whether in Babylonian calendric systems traces of the primitive time-reckoning are not also to be found. Unfortunately I cannot limit myself to matters upon which a certain unity of opinion prevails, but must also touch upon burning questions, such as the intercalation. What is here offered is in the nature of things only an attempt: but I may perhaps be allowed to express the hope that competent specialists, not led astray by chronological hypotheses, may afterwards observe how far the few but obvious characteristics of the primitive time-reckoning recur also in the Babylonian system.

The multiplicity and variability of the names of the months are found once more in ancient Sumer. In so comparatively late a period as the kingdom of Ur (in the middle of the second half of the third millenium B. C.) each minor state had its own list of months, which I here reproduce, together with the suggested explanations, chiefly from the latest work of Landsberger [1]. At this time there was in use in Nippur a list of months the terms of which later served as general ideograms for the months. The names are: — 1, *bar-zag-gar(-ra),* month

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[1] The explanations given by Muss-Arnolt are known to me only through Ginzel, I, 117 ff.

of habitation or inhabitants of the sanctuary; 2, *gu(d)-si-sa,* the name is derived by the Babylonians themselves from an agricultural occupation, the driving of the irrigating-machine drawn by oxen: the moderns connect this name with the *gu(d)-si-su* festival celebrated in this month at Nippur; 3, *šeg-ga,* shortened from *šeg-u-šub-ba-gar-ra,* 'month in which the brick is laid in the mould'; 4, *šu-kul-na,* probably 'sowing-month', although the time does not fit: for displacements see below p. 261; 5, *ne-ne-gar(-ra),* named from a festival; 6, *kin-ᵈInanna,* named from an Istar festival; 7, *du(l)-azag(-ga),* from a festival; 8, *apin-du-a,* 'month of the opening of the irrigation-pipes', which fits very well with the time of year; 9, *kan-kan-na,* probably 'ploughing-month', which also agrees very well with the season; 10, *ab(-ba)-e(-a),* from a festival; 11, *aš-a(-an),* 'month of the spelt'; 12, *še-kin-kud-(du),* 'month of the corn-harvest'. There are therefore some names of the familiar kind, taken from agricultural occupations, but more are borrowed from festivals. It is very natural that the list of months should be regulated by ecclesiastical points of view, since Nippur was a great and very ancient centre of the religious cult.

Most interesting are the months from Girsu (Lagash). From the pre-Sargonic period about 25 names of months have hitherto been found, of which only 8 or 9 persisted up to the second and third periods. These 25 names of months are divided by Landsberger into the following groups: — (1) occasional names of months, under which he includes those which are consciously named after the object or employment mentioned in the document itself, or even improvised from the domestic occupation in question. Four names are given but are not translated. (2) isolated and foreign names of months: 'month in which the shining (or white) star sinks down from the culmination-point', a type familiar to us; 'month in which the third people came from Uruk', doubtless an accidental description. Further, two months named from festivals at Lagash. (3) agricultural by-names: *itu še-kin-kud-du,* see above; *itu gur-dub-ba-a,* 'month in which the granary is covered with grain'; further a name not explained, perhaps identical with the foregoing. (4) terms belonging to the religious cult.

Of these no fewer than 17 exist, not counting those already mentioned: they are nearly all named after festivals. Great pains have been taken to arrange the months in their position in the calendar, and the superfluous names have been set down merely as doublets, since they have been judged by the lists of months current among ourselves. When we compare the terms with those of the primitive time-reckoning, it becomes clear that the naming of the months is here in the same fluctuating state as e. g. among the Melanesians. According to circumstances, an agricultural occupation, the rising of a star, a festival, etc. is seized upon in order to describe the month. Certainly the months can be chronologically arranged, but to draw up a fixed series from these 25 names is impossible, even if tendencies towards the formation of such a series already exist. The development tends in this direction in order to facilitate a general understanding, and in the second period, at the time of the kingdom of Akkad in the 28th to 26th centuries, a list of this nature occurs [1]: — 1, *itu ezen gan-maš*, perhaps 'month of the reckoning', i. e. of the profits of the agriculture, or '*mois où la campagne resplendit*'; 2, *itu ezen har-ra-ne-sar-sar*, 'month in which the oxen work'; 3, *itu ezen dingir ne-šu*, of uncertain meaning but connected with the cult; 4, *itu šu-kul*, see above; 5, *itu ezen dim-ku*, month of the feast in which the *dim* consecrated to the deity was eaten; 6, *itu ezen* dingir *Dumu-zi*, month of the Tammuz feast; 7, *itu ur;* 8, *itu ezen* dingir *Bau*, month of the feast of the goddess Bau; 9, *itu mu-šu-gab*, meaning uncertain; 10, *itu mes-en-du-še-a-na* (?); 11, *itu ezen amar-a(-a)-si, amar* = 'young brood', *a* = 'water', *si = malu =* 'to be full', and therefore probably 'spawning month'; 12, *itu še-še-kin-a*, another form for *še-kin-kud;* 13, *itu ezen še-illa, 'mois où le blé monte',* according to Radau 'grain grow(n)', according to de Genouillac, whom Kugler follows, '*mois où on lève le blé pour les moutons':* i. e. after the corn has been trodden out on the threshing-floor by the oxen, the stalks are taken up for the cattle. The list has therefore thirteen months. Further, two points are to be noted.

[1] The respective explanations are from Kugler, II: 1, pp. 176 ff., and Thureau-Dangin.

In the first place only eight months (nos. 1, 2, 3, 5, 8, 11, 12, and 13), or perhaps nine — if *itu ur* is to be regarded as an abbreviation of *itu ga-udu-ur-(ra-)ka* — are taken over from the preceding period. The multiplicity and instability of the names of months were therefore at an earlier period still greater than the known names indicate. In the second place the word *ezen*, 'feast', is a secondary addition to the names of the 2nd, 3rd, 13th, and probably the 4th months, that is to say, the ecclesiastical point of view has penetrated into the nomenclature of the months to such an extent that even months with names borrowed from agricultural occupations are explained anew by festivals. The third period is the time of Dungi and his successors. The list of months differs only in that 7, *itu ur,* was re-named as *itu ezen* dingir *Dungi,* and the tenth month of the above list is missing, so that we have 10, *itu amar-a-asi;* 11, *itu še-kin-kud;* 12, *itu se-illa;* in the intercalation 11 is doubled, *itu dir še-kin-kud.* The seventh month takes its name from a festival celebrated in honour of the deified king Dungi; it is therefore the oldest example of a naming of a month from deified rulers which originates in the festivals bound up with the cult; such names are familiar from the Graeco-Roman period and examples still survive in the words 'July' and 'August'. Still another version of this list exists in the so-called syllabar of months, in which six series of names of months are enumerated. This list is not completely preserved. The most considerable deviation is that only two months instead of three intervene between the months *šu-kul-na* and *ezen* d *Bau:* the order of succession is therefore broken. Landsberger conjectures that we have to do either with a later form of the calendar from Lagash, at the time of the kings of Larsa and Isin — afterwards the Nippur list was used, this being employed everywhere, at least ideographically — or else with a local offshoot. In any case the list affords valuable evidence of the instability of the months.

In modern Drehem there is found a list of months in which each month is allotted to an official of the cult, so that the result is a monthly regulation of the cult. The list is assigned to the town of Ur. 1, *maš-da-ku*, 'month of the gazelle eating',

from a festival ceremony; 2, *šeš-da-ku*, and 3, *u-bi-ku*, borrowed from religious festivals; 4, *ki-sig* [d] *Nin-a-zu*, month of the mourning festival of Ninazu; 5, *ezen* [d] *Nin-a-zu*, month of the (joyful) festival of Ninazu; 6, *a-ki-ti*, named from a feast; 7, *ezen* [d] *Dungi*, see above; 8, *šu-eš-ša*, unexplained, later ousted by [itu] *ezen* [d] *Su-* [d] *Sin*; 9, *ezen-mah*, 'month of the high feast'; 10, *ezen-an-na*, month of the Anu feast; 11, *ezen Me-ki-gal*, doubled in intercalation; 12, *še-kin-kud*. There are also many variants. The names, with the exception of that of the old harvest month, are all taken from feasts: the ecclesiastical nomenclature has therefore been carried out very fully.

The list of months from Umma: — The months 1, 2, and 6 are borrowed from the Nippur list. Of undoubted religious origin are: — 9, [d] *Ne-gun;* 10, *ezen* [d] *Dungi;* 12, [d] *Dumu-zi*. 11 has the variant [itu] [d] *Pap-u-e*. To none of the four local systems can [itu] *azag-šim* be allotted.

A fifth list is known only from the above-mentioned syllabar, and is not certainly localised. The names of months refer to festivals and religious ceremonies, and have not all been completely preserved.

We have seen what a multiplicity prevails among the Sumerian names of months. At the time of the dynasty of Hammurabi the signs of the Nippur list are used as ideographic signs of the months. The phonetic readings are known. The names are the common ones which were also adopted by the Jews in exile. The explanations are, according to Muss-Arnolt: — 1, *nisanu*, from *nesu* = 'to stir, to move on, to leap'; 2, *airu*, from *aru*, 'bright', or '*ir*, 'to send out, to sprout', and therefore the month of blossoming and sprouting; 3, *sivanu;* 4, *duzu*, 'son of life'; 5, *abu*, 'hostile' (on account of the heat); 6, *ululu;* 7, *tašritu*, 'origin, beginning'; 8, *arah-samna*, 'the eighth month'; 9, *kislivu;* 10, *dhabitu*, 'the gloomy month'; 11, *sabadhu*, 'the destroyer'; 12, *addaru*, 'the dark (month)'. The names are therefore borrowed throughout from natural phenomena. Numerous phonetic writings in legal documents are alone sufficient to shew that, at least for Sippar, our common pronunciations of the month-ideograms of this time were not the only ones in use. Landsberger gives 12 other names, of which only

a few can be explained. *Sibutim*, *sibutu* is the name for the 7th day and its festival, as the name of a month therefore, carrying over the idea to the year, it is the *sibutu* of the year; *ki-nu-ni*, 'oven month', because the oven must then be heated; *arah ka-ti-ir-si-tim*, 'hand of the underworld', probably something like 'month of epidemics'. One or two are named from gods. Therefore among the Semites of Babylonia also a fixed series of months was formed only gradually, by selection, and indeed under the influence of the Sumerian calendar from which the ideograms were borrowed.

The Elamite calendar is known partly from the so-called syllabar of months, and partly from documents [1]: the latter offer 13 names of which Hrozný tries to explain away the last by identifying it with another. The names in the two sources sometimes vary considerably, but are chiefly of Babylonian origin. Several, according to Hrozný's interpretations, refer to the seasons: *še-ir(-i)-eburi*, (month of the) prospering of the harvest; *tam-ti-ru-um*, month of rain; *tar-bi-tum* (month of the) growth (of plants). *Pi-te-bâbi* means 'opening of the gate', and probably refers to a religious ceremony.

The ancient Assyrian list of months is partly preserved in the syllabar of months, and also occurs in the inscriptions of the early Assyrian kings and in the so-called Cappadocian tablets, which come from an Assyrian colony of the third millenium at Kara Eyjuk in Asia Minor. We find: — 2, perhaps month of the moon-god; 3, *ku-zal-li*, shepherd's month; 4, *al-la-na-a-ti*, also shepherd's month; 6, *ša sa-ra-te*, perhaps the name of some employment; 12, *qar-ra-a-tu*, name of an occupation (?). The other names are missing or are uncertain. In regard to the interpretation of the names from occupations a certain caution should be exercised, since in accordance with all the examples hitherto given a name like 'shepherd's month' ought to refer not to the occupation as such but to the pasture season. All other explanations are quite problematical.

In the above I have only been able to reproduce the material collected by Assyriologists and the explanations given by them: but from this it clearly appears that the development

[1] Hrozný, pp. 85 ff.

of the series of months has proceeded in the same fashion here
as elsewhere. At the beginning we find an indefinite number
of names of months borrowed principally from natural pheno-
mena. Among these a selection takes place, the result of
which, however, is different in each city. At first it seems as
though series of 13 months arose. But these series, as the
examples from Lagash shew, were not fixed throughout.
New names penetrate into them, even the position of the month
can be altered. Finally the series becomes quite fixed, and
with this seems to be connected the falling away of the
thirteenth month: in the series of months now fixed at twelve
the leapmonth becomes a doubling of the preceding month.
While this development continues, the calendar takes on more
and more an ecclesiastical stamp, since months named from festi-
vals are constantly ousting those named from natural pheno-
mena, and finally attain to almost exclusive predominance.
This is easily to be understood in the case of ancient Sumer,
since not only were the priests alone — here as elsewhere
— in possession of the art of writing and the other higher
branches of knowledge of the people, but the temples also had
the largest landed property, with an extensive administration.
Occupations and religious ceremonies, festival seasons and
time-reckoning for practical purposes were more closely connec-
ted at that time than at any other. The Semitic calendars
all present the same characteristics as the ancient Sumerian,
a resemblance which is only slightly disguised by the fact that
the signs of the now fixed Sumerian series of months are used
as ideograms of the months. Everyone read the ideograms in
accordance with his custom, so that a variety in the names of
months still existed, as the phonetic writings testify. But the
fixed writing naturally contributed to bring about fixed read-
ings, i. e. a fixed series of months.

2. THE ISRAELITES.

The Israelites, like all Semitic races, reckoned in lunar
months. I need not discuss the views which ascribe to them a
solar year, or would make the old Canaanitish months divi-

sions of the solar year. From early times the day of the new
moon was celebrated with general festivities and rest from
labour, and the old feasts of the agricultural year seem to
have been postponed till the time of full moon. Like the
Homeric Greeks, the Jews at their immigration had no names of
months. Hence they took over the old Canaanitish names.
The latter appear in the oldest portions of the law, in the regula-
tions for the feast of the Passover, which is to be celebrated
in *chodesh ha-abib*, the month of ears of corn, and in the
history of the building of Solomon's temple [1], where three
others — *chodesh* or *yerash ziv, yerash bul, yerash ha-etanim*
— are mentioned and compared with the numerical months
by which their position is fixed. Of these *y. bul* and *y. etanim*
recur among the eleven Phoenician names of months known
from inscriptions. The above-mentioned series of months, which
we possess only in fragments, was therefore at least in part
identical with the Phoenician: hence the term 'old Canaanitish'
is justified. The explanations are also clear, having regard to
the position of the months in the year. *Chodesh ha-abib*, corres-
ponding to the first month, about April, is the month of the
ripening ears. *Yerash ziv*, the second, about May, the month
of brightness (though certainly the etymology is not certain),
is referred to the splendour of the blossoming season, though
this falls earlier. But in May the dry season begins, and so
one would think rather of the splendour of the sun. *Yerash
ha-etanim*, corresponding to the seventh, about September,
means month of the flowing, i. e. of the perennial streams,
which now at the end of the dry season are the only ones
that have water. *Yerash bul*, the eighth, cannot be referred
to the gathering of the fruit *(bul)*, which has already taken
place, but probably means the rainy month, since the autumn
rains now begin [2]. The descriptions are therefore of the kind
already sufficiently familiar.

But in the writings of the Old Testament the numbering
of the months, beginning at the Feast of the Passover, is the
common method of description, which is only replaced by the

[1] I Kings, Chap. VI and VIII. [2] Dillman, p. 926, König, p. 612 ff., and
elsewhere.

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