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DIO

&

The Journal for
Hysterical Astronomy

Ancient Spherical Trig:

Journal for History of Astronomy Muff
Solves Ancient Regulus Misplacement:
Hipparchos-Evans Parallax Sign Error

Diller Verified on Klimata
After 75^{y} Shunning & Mob Hits

***JHA*'s Subtraction from the Sum of Human Knowledge**

DR to Muffia: Is 14-out-of-14 Enuffia?

Pytheas Observatory Located

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History vs Unfalsifiability: Crock of Ages Clefted But *JHA*-Xerxesed

DIO's rise in prominence (e.g., *NYTimes* 2009/9/8 Science)[1] has only fanned the cowering *Journal for the History of Astronomy*'s eternal loathing (www.dioi.org/qqq.htm#sdmh, or ‡3 fn 56 here). When not [a] shunning DR or *DIO*, *JHA* runs articles on him which are reliably [b] destruct***ive***[2] & [c] scientifically self-destruct***ing***, e.g., J.Evans 1987, B.Schaefer 2001. Article ‡3 here micro-shreds a *JHA* attack that achieves [a]&[b]&[c] ***all at once***. As noted & developed in *DIO 4.2* pp.55-57 (1994), leading classicist A.Diller in 1934 showed in the eminent journal *Klio* that Strabo's Hipparchos klimata were consistent with sph trig computations, using accurate obliquity 23°2/3. How have history-of-astronomy's "Muffia" & *JHA* cults thanked Diller for one of the great contributions to the history of math? Muffia founder O.Neugebauer abusively attacked Diller for 40^{y}. ON's competing pseudo-solution was long sacred though (‡3 Table 1) it fits only 6 of the 14 Hipparchos klimata, while the proscribed Diller-DR scheme has always fit virtually (now exactly) ALL 14 data at issue; yet M'fketeers for decades (1934-2002) kept certifying[3] ON's seemingly ageless crock. Finally, in 2002, **just** as *Isis* honored Diller-DR's proof with publication (‡3 fn 23), the 68^{y} Muffia-damn broke: A.Jones' *JHA* paper dumped Neugebauer's folly. But the same paper (oft called "MuJHA"[4] within) Xerxesially insta-replaces it with a new crock (‡3 §E6 here), trying to weasel (*DIO 11.3* ‡6 p.70) out of crediting Diller's ever-more-obvious success. The last miniblock to the ***totality*** of Diller's victory collapsed in 2009 (on April 1, aptly) when the only datum hitherto seen as not fitting Diller's theory was found to do so after all (see here at ‡3 eq.3) — and his hit-score became 14-of-14: ***on the nose in every case***.

The Conservative Aspects of DIO's Triple Eclipse-Induction

DIO's solutions (www.dioi.org/cot.htm#jqsk) of all previously unsolved ancient lunar speeds use attested, normal ancient methodology & produce ***precisely all 6 attested 4-digit integers: 24 digits*** (no other theory does either: www.dioi.org/thr.htm#xzpt), assuming Greek-Seleukid use of now-lost 13th century BC eclipses. Finding no mismath or alternate eclipses to complain of, Muffiosi just scoff at data-remoteness. But neutral experts' dates for Babylon observations' start dovetail[5] with *DIO*'s theory; *Isis 83*:474 (1992): c.1350 BC.

[1] The *NYTimes* article (link to full version: www.dioi.org/cot.htm#qxzj) notes that *DIO* opponents display a lamentably common mental impenetrability. Cooperatively proving the point: during our 19^{y} of existence, the publishers of the *JHA* & *DIO* (top UK & US history of astronomy journals: ‡3 fn 56) have never communicated, despite urgings at, e.g., *DIO 1.3* fn 269, *DIO 4.2* ‡3 §E3, *DIO 11.2* p.30. (Rational, pacific discourse shows who's right&numerate, so: **why would archons tolerate peace**?)

[2] *DIO* both criticizes&praises *JHA*-Muffia output. Latter: ‡1 head, ‡3 §E7&fnn 55&56, *DIO 6* ‡3 fnn 7&8. Shirt-unstuffings are entirely ***reactive*** to truth-warps by usual establishment anti-rebel ploys: money, shunning, money, censorship, money, kept "experts", money, goons, money, threats, money.

[3] E.g., 1991&1994 (see *DIO 4.2* p.55 & fn 2), as well as J.Britton by phone (c.2000). No Muffioso has yet faced the Diller-DR theory's subtle-as-a-ton-of-hits preferability. History of astronomy forums (by contrast to *Isis* printing Thurston 2002S) [vs now! *DIO 22* ‡1 2018] won't even ***cite*** the perfect fit Diller-DR have achieved. Britton&Jones just rank archon-authority above statistics! Muffthink lives.

[4] We usually call this unrefereed paper "MuJHA" to stress the Muffia-*JHA* cult-rooted cementalism here, which has never been any one scholar's responsibility. Extra weirdness: MuJHA conceded (without citing *DIO*) most of the central points asserted in 1994's *DIO 4.2* (p.56 Table 1): [i] Neugebauer's competing scheme was invalid. [ii] Hipparchos used sph trig; but the *JHA* then pretended that Diller didn't prove this important contribution to math history, instead acting as if the Muffia-*JHA* gang was doing so itself! — this, after 68^{y} of Muffia denial (e.g., Neugebauer 1975 p.337; *DIO 7.1* ‡2) of the same proposition. (Similar side-switch⇒claim-jump: www.dioi.org/fff.htm#cqtw.)

[5] Which parallels our 2001 star-dating the Great Pyramid to c.2600 BC (*Nature 412*:699). This we'd known was a conventional figure; but *DIO* was unaware of the 1350 BC date when researching ancient lunar theory, so our 13th century BC results constitute an entirely independent multiple verification.

‡1 Hipparchos' Eclipse-Based Star Longitudes: Spica & Regulus

His 3 Worst Ref-Star Longitudes & 3 Eclipses ⇒ 3 Neat Fits

2nd Century BC Spherical Trig, But No Equation of Time

Muffioso Toomer's Hipparchan Lunar Distance Verified

Muffia-J.H.A. Pb-Papers Reincarnate Ancient Muff

Classic Coherent Historical-Theory Fruitfulness

A Klan-Klod-Klue

A1 Among the numerous[1] gymnastic hysterical-astronomy pratfalls enlivening *JHA*'s hefty (64 pp) James Evans 1987 double-lead-paper attack[2] upon (then-minority) Ptolemy-doubters was [*JHA* Editor-to-be] Evans' lordly illustration of their dumb overestimation of ancient ocular accuracy. To illustrate his point Evans 1987 n.50 (p.275) presents his own non-telescopic (cross-staff) 1981/7/16 Seattle observational determination of the longitude of a star (λ Sgr) by using a lunar eclipse (as Hipparchos had) — which after Evans' reduction produced a longitude erroneous by $-2°/3$, thus according to him (*idem*) showing that the huge errors in some ancient observations were so ordinary that such were a poor basis for learning anything about ancient science. As further examples, Evans specifically mentions (*idem* & p.235) Hipparchos' two hugely disparate Spica data (explained below: §B) which disagree by over 1°. He then draws for us a Muffiose lesson (emph added): "***No better demonstration could be wished*** of the uncertainty attached to the method" of fixing stars' longitudes by eclipses. However, when instructor Evans ***repeats the very same sermon*** (on Hipparchos' eclipse-star errors) 11^{y} later at Evans 1998 p.259 ("This shows the size of the possible errors in ancient measurements of absolute star longitudes"), he slyly deletes mention of his formerly prominent 1981 eclipse-star measures — which shows that (during the 1987-1998 interim) Evans had read Rawlins 1991W fn 288 (below: §A2) and therefore learned that DR had discovered that Evans' and Hipparchos' errors ***WERE NOT OF MEASUREMENT BUT OF BASIC SPHERICAL-ASTRONOMY MATHEMATICS*** (an embarrassment explained below at §A2). I.e., when ineducable educator Evans' 1st-hand evidence somersaults, ***he just pretends he was right anyway***, unable to admit *DIO* scored & "premier" *JHA* bellyflopped: standard *JHA* honesty and inquiring empiricism. All of which sets up an irony whose fruitful blossoming is the present paper's main subject.

A2 As just noted: said irony's core was revealed[3] in Rawlins 1991W fn 288. Contra Evans, neither his own nor Hipparchos' problems were observational. Both simply miscomputed the reduction of valid observational data by using invalid math: the ***wrong sign*** for their parallax corrections. For the 1981 Evans case, at mid-eclipse, the longitudinal lunar parallax p_λ was virtually $1°/3$. So Evans' sign-confusion created a huge net error because, whereas longitude parallax p_λ (the difference between topocentric [observer-centered: outdoor-visible] and geocentric [indoor-tabular] longitude: eq.2) is obviously supposed to be ADDED when converting a calculated geocentric lunar longitude into a topocentric (observer-centered) longitude, Evans instead SUBTRACTED it as if reducing

[1] See also *DIO 3* §L8 & fnn 95-97, and *DIO 4.1* ‡5 §A. Funnier yet: www.dioi.org/cot.htm#sckp.

[2] Typical of the modern Ptolemy salescorps, *JHA* Assoc.Ed Evans makes his attacks on DR only in captive arenas (safe there from reply or debate), while never citing any external source correcting his mis-science. Similar integrity: ‡3 fn 56. On error-admission fear: ‡4 §G2; www.dioi.org/mot.htm#jrgs.

[3] Rawlins 1991W's math has been verified in detail by Hugh Thurston and John Britton. We thank both for an arduous, specialized task.

an outdoor topocentric observation to find geocentric longitude. Thus the sign mixup would naturally cause an error of about $-2^\circ/3$ or $-40'$ — and the laughably impossible "observational" longitude he reports is indeed (Evans 1987 p.275 n.50): "too small by about $40'$ ". (Typically, Evans has had no comment since, despite DR [South Bend, IN, 1997 June, face-to-face] and Hugh Thurston [by letter] gently bringing the matter to his attention.)[4] After correcting for this Muff, we can verify the admirable smallness of the 1981 observational error of Evans (a dedicated student of ancient instruments and possessor of a steady hand, since the cross-staff requires it): merely one or two arcmin — just the sort of accuracy DR has consistently[5] ascribed to the best ancient naked-eye observations.

A3 Only a scholar catering to modern Hist.astron's cult-klan could straightfacedly propose that an error of magnitude $2^\circ/3$ — nearly *triple* the lunar semi-diameter — is observational and so by implication helps excuse the tight adherence of Ptolemy's "observations" to indoor-calculations (i.e., frauds) while disagreeing hugely with the outdoor sky.

A4 Note that a major member of Ptolemy's faked "observations" (*Almajest* 5.12-13) is also off by $2^\circ/3$. (See discussion at R.Newton 1977 pp.182-191. Also *DIO 8* ‡1 fn 13.) Scribbling a drawing will give one an idea of how ridiculous this is: mislocating a disk so grossly that the real and theoretical disks ($1^\circ/2$ wide in these lunar cases) don't even come close to *overlapping*,[6] the very feat Evans misclaimed he'd personally achieved in 1981 and is now too embarrassed and too steeped in Muffia academic integrity[7] to retract.

A5 NB: After the three-fold (§A6) [now **four-fold** (§F3)] collapse of Evans' implicit alibis (Hipparchos' eclipse-stars & his own: §A1) for Ptolemy's huge "observational" errors, ***the Muffia of course hasn't abandoned its support*** [see §A1 sermon] ***for the same-old Ptolemy-worship the alibis were designed for***. (Which figures, since evidence has little relation to that cult's belief-system.) It hasn't occurred to Muffiosi (whose strong points don't include philosophy of science) to ponder a simple question: if devotion to our favorite positions keeps leading us into embarrassing crackpot-level muffs (e.g., §A1 & *DIO 2.3* ‡8 §§C10-C15), does this not suggest that said positions are less than completely secure?[8]

[4] Both inquirers were told by Evans that he would look into it. But he never communicated what he found. Except by implication: the deft Evans text-surgery cited at §A1 & fn 7.

[5] E.g., Rawlins 1982G p.263 & n.17, Rawlins 1985G *passim*, & Rawlins 1985H.

[6] Also true of all four of Ptolemy's *Almajest* 3.1&7 solar equinox-solstice "observations" of the Sun, which agree 50 times better (Rawlins 1987 p.236) with his indoor tables than with the actual outdoor Sun. See Thurston on R.Newton at *DIO 8* ‡1 §A.

[7] Evans 1987 n.50's misadmonishment (§A1) is repeated in his later book: Evans 1998 pp.256-259; but this (post-*DIO 1.3* fn 288) Spica sermon quietly avoids discussion of his Seattle observation of the 1981/7/16 eclipse in this connexion (just photo at p.48, 100s of pages distant from his Hipparchos-Spica comments), shifting attention instead to the previously unadduced eclipse of 1977/4/3-4, seen from Spokane. (Why must Evans go back 21^y for a "recent" [*ibid* p.256] eclipse [mildly reminiscent of a Ptolemy ploy: www.dioi.org/cot.htm#cknh], considering that Evans 1987 went back merely 6^y to find a usable eclipse? Implication: 1977 is ere 1981, and JE here has his signmanship OK at last, so: *seeeee*, he knew how to do it all along. The catch: unlike at Evans 1987 n.50, no 1977 data are reported as outdoor-measured by Evans, though he repeatedly [Evans 1998 pp.256-257] speaks of "observations" or "observed".) So he knows he screwed up the 1981 eclipse's parallax-sign, but CAN'T admit that (§A2) *DIO* corrected it for him. (Note contrast to, e.g., *DIO 2.1* ‡4 fn 18 & *DIO 11.2* cover.) Or admit the falsity of his alibi-for-silence-on-errors pretense (*DIO 9.1* p.2) of not reading *DIO*. (Had he faced reality on Regulus at Evans 1998 pp.259f, he could've made the present Regulus discovery himself. More wages of shunning.) For Evans' citation-practice integrity, see ‡3 fn 24. (NB: This chauvinist lawyer-for-Ptolemy [www.dioi.org/cot.htm#msmr&#gsfh & fff.htm#gckp] is heirhead-apparent to the *JHA*'s M.Hoskin, hist.astron's own Lord Sommers [*DIO 2.3* ‡1 fn 18]. Who'll dispute the aptness?) Another corruptive consequence of a cult's living with the shame of knowing that its sacred mission (hyping derivative Babylonian astronomy & Ptolemy as original genius) is unadmittably indefensible.

[8] Indeed, Muffia desperation to reject non-cult common-sense has now reached the point where the clique has even (presumably unknowingly) brought in Velikovskian-circle expertise to denigrate RN-DR work. During my 1995/2/26 chat with B. van Dalen, he mentioned that the reason his (generally wonderful) paper van Dalen 1994's n.1 had cited the 1989 Fomenko *et al* paper (which, with Velikovskian boldness and correctness has re-dated the Ancient Star Catalog by ordmag a *millennium*) is that it showed that one could prove anything with statistics. (Is the Muffia aware that Fomenko believes that the *Almajest* is a late medieval document, and that the Nabonassar epoch [747 BC for most of us] is actually from the AD era? Full information available from the Velikovskians' least favorite mongoose, Leroy Ellenberger, 3929 Utah Str, St.Louis, MO 63116; phone 314-772-4286. See also the excellent *Isis* review of Fomenko's book. A central technical flaw undoing the entire Fomenko *et al* analysis is revealed in the 1995-added note in *DIO 4.3* ‡14.) Yes, one can prove anything with statistics — if the sample is biased or the math miscomputed. But it is up to the Muffia to show what relation such a truism has to statistical findings it loathes, e.g., Rawlins 1994L. Merely doubting statistical results in general is a pathetic pose. It should be added that two expert mathematicians (K.Pickering & H.Thurston) have already checked and verified in detail the math of the 1994 paper — a paper showing that Ptolemy not only stole the Catalog but clumsily attempted to hide this theft by the very method R.Newton 1977 had charged. Yet, Muffia publications — with their usual respect for academic decency & honesty — arrogantly continue to learn nothing from these results, in order that they may go right on profitably peddling their hero-plagiarist to the world as The Greatest of ancient astronomers. And such scholarship is published without a blush by centrist forums. Rarely does selectively-scattershot agnosticism scrape this low in the barrel. Rawlins 1982C's simple statistical proof (Tables IV&V) that the Star Catalog was stolen from Hipparchos by Muffia-hero C.Ptolemy, was similarly attacked (*JHA 23.3*:173-183; 1992/8) by Muffia capo N.Swerdlow, a disaster undercut by several freshman-level Swerdlow goofs (immediately revealed [1992/10] at *DIO-J.HA 2.3* ‡8 §C). Since that contretemps, a general Muffia ducking (even re-invention: www.dioi.org/det.htm#zmcg) of the whole field of statistics seems not only expected but downright inevitable.

A6 So much for the bad news. Now for the glad news: as on other occasions (Rawlins 1991W §§D1, O1, & S3), I have here become indebted to Muffia blundering for putting me onto a useful idea (though never so directly as in this gloriously delusional instance). For, Evans' §A1 sign-Muff quickly led me to wonder: could the same eclipse-parallax-sign-error *also* explain Hipparchos' most notorious empirical disaster (§B2)? — his grossly discrepant attempts to place the star Spica via two of the three lunar eclipses we know he observed. (If so [and we are about to see that this theory is indeed valid: eqs.6&7], then ***all three*** of Evans' ancient & modern sermon-star examples [§A1] — aimed at alibiing Ptolemy & showing up skeptic R.Newton's supposed naïveté about observational astronomy — are fallaciously adduced.) In Rawlins 1991W fn 288, it was remarked that the theory clicked. The following paper will provide (§B) for the 1st time full reconstructions of Hipparchos' math for these two Spica-misplacing eclipses, and then will go beyond, with an exploratory application (§E) to the only other extant Hipparchos eclipse, which we discover was used to position his hitherto-inexplicably ultra-misplaced fundamental star Regulus.

B Reconstructing Hipparchos' Eclipse-Placements of Spica & His Neglect of the Equation of Time

B1 Fundamental astronomers attempting to find fundamental stars' longitudes wrestled for centuries with an obvious inherent problem: 0° longitude is the Vernal Equinox, but that is the location of a solar event and the stars are invisible when the Sun is visible. The best-known pre-modern method was to use the Moon (or Venus) as a stepping stone: near sunset, find the arc between Sun and Moon while the former was still visible, then find the arc between star and Moon a little later (method nicely diagrammed by Evans 1987 p.235 Fig.4); finally, use mostly simple arithmetic (Rawlins 1982C App.B) to find the arc between star and Sun. But Hipparchos also applied an ingenious alternate method, which avoids such a rickety scheme: just measure how far a star is from the Moon at mid-eclipse, when the Moon is guaranteed to be virtually (though see fn 19) 180° from the Sun.

B2 Ptolemy tells us (*Almajest* 3.1) that Hipparchos used the eclipses of $-145/4/21$-22 and $-134/3/20$-21 to try locating Spica. The results: $173^\circ 1/2$ & $174^\circ 3/4$, resp, a terrible disagreement — over a degree! (Remember: the lunar semi-diameter is merely 1/4 degree.) So, we now apply the parallax-sign-error theory to both eclipses.

B3 For each eclipse, Hipparchos' method was:
[a] Measure by armillary astrolabe[9] the actual longitudinal difference $\Delta\lambda$ between the star, at longitude λ_a, and the mid-eclipse Moon at observed (topocentric) longitude λ'_M:

$$\Delta\lambda = \lambda_a - \lambda'_M \tag{1}$$

[b] Compute from his tables the longitudinal lunar parallax p_λ, which is the difference between λ'_M and the Moon's true (geocentric) longitude λ_M:

$$p_\lambda = \lambda'_M - \lambda_M \tag{2}$$

[c] ***Without applying the equation of time***, find via Hipparchos' PH theory[10] the Sun's true geocentric longitude λ_S at the time (according to Hipparchos' lunisolar theory) of mid-eclipse, which yields true geocentric λ_M by the simple equation:

$$\lambda_M = \lambda_S \pm 180^\circ \tag{3}$$

[d] Adding eq. 1 to eq. 2 and subtracting eq. 3 produces an equation for the desired stellar longitude λ_a:

$$\lambda_a = \lambda_S + p_\lambda + \Delta\lambda \pm 180^\circ \tag{4}$$

B4 If our theory is correct, Hipparchos mistakenly subtracted p_λ and thus found (instead of λ_a) an erroneous value which we will call λ_x (the "x" subscript signifying that this longitude is infected with wrong-sign parallax):

$$\lambda_x = \lambda_S - p_\lambda + \Delta\lambda \pm 180^\circ \tag{5}$$

B5 For the −145/4/21-22 eclipse: the outdoor longitude difference $\Delta\lambda$ (between Spica & the Moon) at the time when Hipparchos' indoor luni-solar theory predicted mid-eclipse (23:38 Lindos Mean Time),[11] was about $-33^\circ.8$, so he likely measured close to $\Delta\lambda = -33^\circ 5/6$. [b] Hipparchos' PH solar theory[12] placed the Sun at about $\lambda_S = 27^\circ 2/3$ at this time. (So geocentric $\lambda_M = 207^\circ 2/3$.) [c] The *Almajest* syzygial lunar theory puts the eclipsed Moon at $58^e.3$. (We define 1^e as one Earth-radius.) [d] For this distance at the Rhodos klima 36°N, the *Almajest* 2.13 parallax tables give $p_\lambda = +20'$. [e] So eq. 5 (which, recall, proposes using the wrong sign for p_λ) yields:[13]

$$\lambda_x = 27^\circ 2/3 - 1^\circ/3 + (-33^\circ 5/6) + 180^\circ = 173^\circ 1/2. \tag{6}$$

B6 For the time of −134/3/20-21 tabular mid-eclipse (just before 3^h), Hipparchos' outdoor measure of $\Delta\lambda$ would find close to $-2^\circ 3/4$. [b] Hipparchos' PH theory gives solar $\lambda_S = 357^\circ 1/4$. [c] The *Almajest* geocentric lunar distance is $64^e.9$. [d] Thus, for latitude 36°N, *Almajest* 2.13 $p_\lambda = -15'$. [e] So eq. 5 yields:

$$\lambda_x = 357^\circ 1/4 - (-1^\circ/4) + (-2^\circ 3/4) - 180^\circ = 174^\circ 3/4. \tag{7}$$

B7 We note that both results (eqs. 6&7) exactly equal the quite inaccurate (and even more grossly disparate) λ values reported at *Almajest* 3.1. (See §B2.)
B8 These matches strongly suggest the validity of the wrong-p_λ-sign hypothesis. They also offer other historical information, which we turn to next.

C The Hipparchos Lunar Model's Scale

C1 As we know (e.g., Rawlins 1991W eqs.23&24 and §R), Hipparchos used several different lunar distances throughout his career. If his mean distances assumed for the present parallactic computations differed drastically from c.60^e, this would affect p_λ inverse-proportionally. The fits attained here suggest that he or his computers used conventional values during the period of the present calculations. Which is consistent with our finding at fn 14.
C2 One can argue for nonpreliminary Hipparchan mean lunar distances of from 52^e to 67^e. (See Rawlins 1991W eqs.23-24 & §R1.) But use of these values instead of Ptolemy's (59 Earth radii: *Almajest* 5.13 & Toomer 1984 p.251 n.49) will affect eqs. 6-8 by only a very few arcmin. Nonetheless, though the present eclipse analyses (as well as fn 14) can work for 67^e, they won't for 52^e. A reasonable conclusion is that we here have come upon indications in favor of Gerald Toomer's finding (see, e.g., Toomer *loc cit*) that Ptolemy's 59^e lunar mean distance was that of Hipparchos.

D Hipparchos' Sph Trig Reconfirmed by His Parallax Corrections

D1 It has long been recognized (e.g., Neugebauer 1975 p.323) that parallax tables were in use in the 2nd century BC. (This was always obvious from *Almajest* 5.5, but perhaps no one has previously caught the implication for ***the onset of spherical trigonometry.***[14] Neugebauer *loc cit* explicitly contradicts it.) These tables were essentially the same as

[9] Hipparchos might read a slightly different result because of Earth-spin. The systematic errors of his Ancient Star Catalog indicate that he averaged 19^s of time-delay after setting the armillary astrolabe (by his reference-object) before getting the reading on his quarry-object. (See Rawlins 1991H §G4: 1/3 of $-13'$ is about $-4'$.) Whether the same error held during careful, repeated eclipse observations, we cannot be sure; but it makes little difference, given the rounding roughness of ancient data.

[10] See Rawlins 1991W §K10. PH theory's tables (possible tiny discrepancy suggested: *ibid* fn 199) at *Almajest* 3.2&6; λ_S was (similarly to the case of the Hipparchos lunar observations reported at *Almajest* 5.3&5) pre-computed for the tabular time of eclipse. The present results agree with Hipparchos' consistent neglect to apply the equation of time even to lunar data, as was earlier induced on quite independent grounds by Toomer, Jones, & DR. (Rawlins 1991W §§N1&N8. To repeat the note made there at the time: we thus have no evidence of the equation of time's use before Ptolemy.) This omission has a serious effect on calculations (lucky, allowing us to be sure of the eq.time's neglect), as do the $0^\circ.4$-amplitude & $0^\circ.2$-amplitude periodic errors of the Hipparchos-Ptolemy solar&lunisolar theories, resp. (Hipparchos worked by apparent time, though PH is for mean.)

[11] Hipparchos' likely location on the island of Rhodos (Rawlins 1994L §§F-G), near Lindos city: 36°08′N, 28°05′E. Keep in mind that in antiquity (in the absence of reliable mechanical clocks) most timekeeping was by Local Apparent Time, customarily via sundial. Hipparchos' clock-stars (Hipparchos *Comm* 3.5) would allow night timekeeping. But there is also the "moondial" possibility, especially easy while a lunar eclipse is proceeding: a sundial (or equivalent) could find pretty accurate time just by adding 12^h to the Moon's hour angle or (when moonlight was bright enough) to sundial-shadow position. The method is slightly corrupted by lunar parallax. For the −140 eclipse, the time-error would add $1'$ to the absolute magnitude of $\Delta\lambda$. (PH assumed for Lindos, not Alexandria.)

[12] See Rawlins 1991H §C6 for the standard *Almajest* 3 solar orbit which Hipparchos used during the period (§D5) which includes all three of the eclipses here discussed.

[13] We assume accurate observation and the ancients' common practice of rounding quantities to fractional degrees. Our fits here are almost too good (fn 22), which can be due to [a] Hipparchos having averaged a careful series of mid-eclipse data for each eclipse, and-or [b] DR having acquired Ptolemy's habit of favoring (postulating likely Hipparchan) roundings that lead to exact agreement. But the putative latter factor's net effect is trifling. [Rawlins 2018U §O realized Hipparchos' 1st Rhodos observation was the –146 S.Solst, 1st of the 3 cardinal-pt data he computed the PH orbit from, after his –145 Vernal Equinox, in time to predict mideclipse for his planned −145/4/21 Spica placement.]

[14] Toomer 1984 p.227 n.21 correctly points out the accuracy of Hipparchos' longitudinal parallax correction for the luni-solar observation he made on −126/5/2 at 6:20 Rhodos Apparent Time. (See also Neugebauer 1975 pp.92 & 323.) His correction was rightly positive (so he [or a member of his school] had by this late point in his career straightened out the signage of his procedure): $1^\circ/8 + 1^\circ/12$. (That is, $+12'1/2$, apt to a lunar distance of well over 60 Earth-radii.) The actual parallax was

those used by Ptolemy 3 centuries later. *Since parallax tables are contructed by spherical trigonometry, this finding confirms once again*[15] *the contention of Diller, van der Waerden,*[16] *Dicks 1994, and DIO that spherical trig throve in the 2nd century BC.*

D2 Note that *Ptolemy himself* indicates same through his suggestion (*Almajest* 3.1) that Hipparchos' Spica discrepancy may have been in his calculation of the parallax correction.

D3 The italicized §D1 point is utterly self-evident,[17] yet it has been missed by scores of prominent, well-paid professional historians-of-astronomy, each of whom has read the same passage dozens of times. And we may be sure that *JHA* & like establishment publications will not miss a beat in continuing to sanctify these same can't-see-nose-before-face archons — who, in Hist.astron circles, are the arbiters of accepted wisdom. And acceptable scholars.

D4 (Neglected, quite ambivalent hints that sph trig might be even older than Hipparchos are found at fn 16 & ‡3 §D5. Also Rawlins 1985G §8: 2nd table, the ancient data of which could actually be due to Ptolemy and thus not pre-Hipparchos.)

D5 It has been (Rawlins 1991H fn 7 & §C4 [& Rawlins 2018U *loc cit*]) theorized that the PH solar theory & tables were based upon observations of [–146 &] –145 and that his subsequent UH tables were based upon observations of −142/9 & −134/6 (thus could not be earlier than the latter date) — independently suggesting that Hipparchos' PH tables were used by him during the period −145/4/21-22 to −134/3/20-21.

E Sources of Error in Hipparchos' Placement of Regulus

E1 We now turn to the 3rd (and only other) eclipse known to have been observed & reported by Hipparchos — an eclipse which happens to have occurred *near the star Regulus*. Two initial comments: [i] Only 2 stars' explicit Hipparchos longitudes survive (*Almajest* 7.2): Regulus 119°5/6 and Spica 174°, **ideal fundamental stars, the nearest 1st magnitude stars to the ecliptic**. [ii] For Spica, the discrepant eclipse-based results he complains of (§§A6&B2) evidently (fn 22) induced him later to opt for placing this star instead[18] by conventional astrolabe technique (which was in fact more reliable than his mis-signed eclipse method); however, Regulus is the zodiacal bright star with the largest negative Hipparchos λ error for his Ancient Star Catalog's epoch (−126.28: Rawlins 1991H §F4): −35′. Rawlins 1991W (fn 147) remarked aloud at the enormity of this error (which led Ptolemy into a fraudulent copy of it: *DIO 8* ‡1 ⊙7), despairing as to whether its explanation would ever become known. (Another fruit of having at last the solution to the Regulus longitude mystery: Shevchenko 1990 had proposed that Hipparchos' Moon-star

about +1°/4, though that from Ptolemy's tables was +19′ for his ludicrous lunar distance of 43 Earth-radii. (The Neugebauer 1975 p.92 value [16′] is explicitly based upon Ptolemy's simple syzygial lunar model, not his final one.) Obviously, Hipparchos did not share Claudius Indoor Ptolemy's notorious belief that the Moon's angular size varied by a huge factor (of up to nearly two). Indeed, the smallness of Hipparchos' 12′1/2 parallax for the −126/5/2 observation indicates that his parallax calculations used a conventional lunar distance (as we already realized at §C1). We can check this by computing via modern theory the lunar parallax on the assumption that the geocentric lunar distance was 60 Earth-radii (vs 57 in reality): 14′; thus correcting Hipparchos' −126/5/2 observation of topocentric lunar longitude 351°2/3, we have 351°26′, for which the nearest Hipparchan approximation would be 351°3/8, which is just the Hipparchan geocentric longitude reported at *Almajest* 5.5 (Neugebauer 1975 p.92).

[15] See ‡3 Table 2 (or *DIO 5* Table 0, *DIO 4.2* [1994] p.56 Table 1).

[16] Rawlins 1985G n.9.

[17] We may get a glimpse of the inevitable escape routes (from this evidence) at A.Bowen & B.Goldstein *Amer Philos Soc Proc 135.2*:233 (1991) where triggish work is (automatically) ascribed (p.235) to arithmetic methods (an approach that has caused other amusing Muffia catastrophes: e.g., fn 15 & *DIO 1.2*); and ancient testimony regarding predecessors' technique is doubted (B&G n.5).

[18] If Hipparchos tried (assuming clear weather) confirming his Regulus longitude via the −131/1/17-18 eclipse (record not extant), the result would have been roughly 119°1/2, not discrepant enough (nothing like the enormous Spica −145 vs −134 clash) to cause his rejection of the −140 value in favor of an astrolabe-based result (as with Spica).

fundamental astronomy was in the evening, and Rawlins 1991W fn 138 had remarked on this proposal's redemption by Rawlins 1991H §G1. The only important exception seemed possibly to be Regulus. But the present results resolve the problem [indicating that Regulus alone among major Hipparchos-Ptolemy stars was not placed by astrolabe], so we may conclude that all the Hipparchos principal stars' astrolabe-based placements occurred in the evening, just after the Sun's setting, using a crescent Moon: Rawlins 1991H §G2.)

E2 Inductive detectives' highest ecstasy is the experience of coherent fruitfulness: when a theory already successful in one case is applied to an independent case and *the very same theory* comes up aces. (E.g., Jones & Duke at *DIO 11.2* [2003] cover & p.33; A.Diller's vindication below at ‡3 §E3; www.dioi.org/cem.htm#xidv.) Our outstanding mystery here is Regulus' perplexing Hipparchan super-misplacement (§E1), and our so-far successful theory is that eclipse-parallax-sign-error accounts for Hipparchos' horrible stellar longitude errors. If the theory is valid, can it also explain the *only other* attested (*Almajest* 7.2) Hipparchan stellar longitude, the very worst of the lot: Regulus?

E3 We now apply §B3's method — already good with both his two eclipse-based Spica observations (§§B5&B6) plus Evans' 1981 case — to Regulus & the nearby −140/1/27-28 eclipse (the *only* other Hipparchos-observed eclipse record we have: *Almajest* 6.5&9).

E4 For the −140/1/27-28 eclipse: [a] At tabular[19] mid-eclipse (22h), actual $\Delta\lambda$ was 5°07′, so (especially given his now-famous proclivity for integral[20] data), he likely expressed the measurement as exactly $\Delta\lambda = 5°$. [b] Hipparchos' PH theory gives λ_S = 305°09′ (*Almajest* 6.5 makes it 305°08′), so he would record $\lambda_M = 125°1/6$. [c] *Almajest* lunar theory distance = 54e3/4. [d] So for Rhodos, *Almajest* parallax tables, $p_\lambda = +29' \doteq 1°/2$ which would become −1°/2 after sign-mistake. [e] So eq. 5 yields, adding in 8′ (c. 1°/6) of Hipparchos-Ptolemy 1°/100y precession[21] (from −140 to catalog epoch −126.28):

$$\lambda_x = 305°1/6 - 1°/2 + (-5°) - 180° + 1°/6 = 119°5/6. \qquad (8)$$

E5 It is wonderful to find that this precisely[22] matches the egregiously erroneous (hitherto-unexplained) Ancient Star Catalog longitude for Regulus (119°5/6: §E1).

E6 Two curious historical notes in passing: [a] Regulus' λ was not used as a ref-star for astrolabe-placing the other Catalog stars of Leo, whose mean error at epoch was merely

[19] *Almajest* 6.5 just computes the time of mid-eclipse as 22:10 by finding when the Hipparchos-Ptolemy lunisolar tables have the true geocentric lunar longitude (125°08′ by the *Almajest* calculation) 180° different from the true solar longitude. But mid-eclipse accurately calculated (by one of Hipparchos' computers) from these tables would be nearer 22h. The difference (about −10m) is due to the c.5° tilt of the lunar motion vs the ecliptic in this partial eclipse, a factor that is even more trivial (−1m & −2m, resp) for the total −145 and −134 eclipses, where Hipparchos also likely rounded the tabular-predicted Lindos Apparent Times (to 23h2/3 and 3h, resp). If Hipparchos' presumed −140 use of 22h was not just a rounded value but due to accounting for tilt, then he made a tiny slip, since at the tabular mid-eclipse moment (22h) the Moon's longitude was about 5′ short of being opposite the Sun. (If Hipparchos actually used 22h1/6 Lindos App. Time: −5° would still be the likely recorded $\Delta\lambda$.)

[20] See, e.g., R.Newton 1977 pp.245f, Rawlins 1994L §E4, *DIO 10* [2000] fn 177.

[21] Hipparchos' −140 Regulus longitude would've been listed at 119°2/3. Though 8′ is something less than 1°/6, the Ancient Star Catalog's longitudes are almost exclusively expressed in units of 1°/6, so though precession to the Catalog's epoch yields 119°4/5, this would still end up being listed as 119°5/6, since nothing in the Catalog is expressed in degree-fifths.

[22] *DIO 8* ‡1 ⊙11 found that astrolabe lunisolar observations showed ±0°.1 consistency. Ancient Star Catalog longitudes' mean error is 22′ (R.Newton 1977 p.216), but stars brighter than 3rd magnitude used by pre-Ptolemy ancient astronomers for observations cited in the *Almajest* (dropping too-south Sco, and 2 quarter-degree ending stars: *DIO 2.3* ‡8 fn 20), are β Tau, α Gem, β Gem, γ Vir, α Vir, α Lib, δ Cap, whose longitudes' deviations from a zodiacal error-wave (melded from Rawlins 1991H §§F1-F2) of $-9' - 13' \sin(\lambda - 96°)$, show scatter ±0°.1, around an average of +0°.1.
[Note added 2017. For −145, −140, −134, +1987 eclipses, *JHA*'s view insists on longitude errors of, resp, −33′, −35′, +33′, −40′. Removing parallax-mis-signs, & defects in Hipparchos' PH solar theory: errors in outdoor-observed star-Moon gaps were, resp, −2′, +7′, +1′, +2′. (All 6 ancient results share in common the same trivial error, due to ΔT uncertainty, of ordmag 0°.1 for that era.)]

$-15'$ ($20'$ offset[23] from Regulus' error). [b] Hipparchos stayed with his -140 Regulus λ fixed by eclipse, even after -134 indication (via Spica) of the method's unreliability.
E7 Late Ptolemy works' use of Regulus as a foundation-point suggests that Hipparchos held Regulus as a pivotal star in his astronomy, which could help explain why his -140 measurement of its position was retained inviolate to the end of his career. And Ptolemy's.

F Evaluating Hipparchos & the Sign-Slip Theory

F1 We conclude that our parallax-sign-error theory has survived the §E2 fruitfulness test: 4 hits for 4 at-bats. But the traditional image of Hipparchos as among the greatest of ancient scholars survives less robustly. (See also Rawlins 1991W § N16&S.)
F2 A temperate conclusion is that Hipparchos was a vital promoter of astronomy in antiquity, if not quite the critical scientific figure he was once thought to have been. (Indeed, some of his attempts at improving basic astronomical parameters may have degraded them. See, e.g., Rawlins 1991W §S1.) He is today most famous for discovering precession, yet Rawlins 1999 shows that it was known to Aristarchos of Samos about 1 1/2 centuries earlier.
F3 But this doesn't dim our gratitude for his merits, e.g., [a] Grounded in empiricism.[24] [b] Developed nested calendar (Rawlins 2002A fnn 14&17) and durable luni-solar theory. [c] Likely invented the clever "circuli" scheme (‡3 §I1). [d] Determined accurate obliquity. [e] Took accurate solstices [*DIO 20* ‡2 Table 3]. [f] Oversaw creation of his ever-remembered Ancient Star Catalog, the oldest extant detailed compendium of the starry heavens. [g] [Draconitic ratio good to ordmag $0^s.1$ via $-1244/11/13$ eclipse: www.dioi.org/jb13.pdf.]

References

Almajest. Compiled Ptolemy c.160 AD. Eds: Manitius 1912-3; Toomer 1984.
B.van Dalen 1994. Centaurus *37*:97.
David Dicks 1994. DIO *4.1* ‡1.
J.Evans 1987. JHA *18*:155 & 233.
J.Evans 1998. *History & Practice of Ancient Astronomy*, Oxford U.
Hipparchos. *Commentary on Aratos & Eudoxos* c.130 BC. Ed: Manitius, Leipzig 1894.
Karl Manitius 1912-3, Ed. *Handbuch der Astronomie* [*Almajest*], Leipzig.
O.Neugebauer 1975. *History of Ancient Mathematical Astronomy* (*HAMA*), NYC.
R.Newton 1977. *Crime of Claudius Ptolemy*, Johns Hopkins U.
D.Rawlins 1982C. Publications of the Astronomical Society of the Pacific *94*:359.
D.Rawlins 1982G. Isis *73*:259.
D.Rawlins 1985G. Vistas in Astronomy *28*:255.
D.Rawlins 1985H. BullAmerAstronSoc *17*:583.
D.Rawlins 1987. American Journal of Physics *55*:235.
D.Rawlins 1991H. DIO *1.1* ‡6.
D.Rawlins 1991W. DIO&Journal for Hysterical Astronomy *1.2-3* ‡9.
D.Rawlins 1994L. DIO *4.1* ‡3.
D.Rawlins 1999. DIO *9.1* ‡3. (Accepted JHA 1981, but suppressed by livid M.Hoskin.)
D.Rawlins 2002A. DIO *11.1* ‡1.
D.Rawlins 2018U. DIO *20* ‡2.
B.Schaefer 2001. JHA *32*:1.
M.Shevchenko 1990. JHA *21*:187.
Gerald Toomer 1984, Ed. *Ptolemy's Almagest*, NYC.

[23] I have elsewhere (Rawlins 1991W fn 253) suggested that Hipparchos' stable of mathematicians sometimes operated independently of him. (Perhaps occasionally with eyes aroll.) The nonrelation of Regulus to Leo's Catalog stars hints at an instance of this.

[24] ***All 4 observations examined here (3 ancient & 1 modern), superficially in error by ordmag 1°, fit our parallax-sign-slip theory and so turn out to have been accurate to within a very few arcmin***. The accuracy of Hipparchos' draconitic month was a pinnacle of Greek empiricism: *DIO 11.1* ‡3.

‡2 Pytheas' Solstice Observation Locates Him: Cape Croisette

Pytheas' Solstice: Oldest Vertical-Instrument Transit Observation
Why Has No Historian Taken Pytheas' Precision Seriously?
Or Bothered Consulting a Map of Marseilles?

Summary

The earliest person known as a scientist-explorer is Pytheas, native & citizen of the Hellenistic colony of Massalia: modernly Marseilles, still the main city of south-coastal France. A legendary figure, Pytheas was known (‡3 §G1) as an able mathematician, astronomer, and geographer. In the history of the exact sciences he is primarily remembered for his Summer Solstice observation (‡3 eq.10) of the shadow/gnomon ratio at Massalia at Local Apparent Noon:

$$s_s/g = \frac{41\frac{4}{5}}{120} \doteq \tan 19^\circ 12' \qquad (1)$$

It is the purpose of the present article to establish several points.
[1] The reality & historical utility of eq.1 is shown by two independent indicia:
[a] The ordmag $1'$ precision of his Marseilles datum is that expected of real outdoor pre-telescopic measurement.
[b] Said precision narrows Pytheas' location to a coast near Marseilles (Fig.1) which turns out to be the ideal Marseilles-region location for an astronomical observatory — far better than Marseilles proper.
[2] Pytheas' Summer Solstice observation was presumably based upon the average of repeated sightings (perhaps in annual bunches) at his long-term home-town observatory, which would yield a precise result constituting *the oldest extant raw astronomical transit observation*.[1]
[3] The exact location of his observatory is recoverable to a precision of ordmag 1 mile — in both latitude and longitude — at Cape Croisette (a few miles south of Marseilles), a vantage-point *having an astronomer's ideal southern view over the Mediterranean*.

A Having a Fortuitous Ball

A1 We have elsewhere (e.g., ‡1 fn 15 & ‡3) dispensed with a 2002 Muffia-descended last-gasp attack upon one of the glories of rational scientific history — specifically: upon Aubrey Diller's immortal priority in proving Hipparchos' use of spherical trig and an accurate obliquity in the 2nd century BC. But we happily have a positive outcome from the Muffia's 75^y "hubbub" on the Diller issue (to borrow MuJHA p.15's flip sneer at the firmness of Diller-DR's diamond-clear discovery): we will respond to the offending paper's mis-adducement of the famous S.Solstice gnomon observation of Pytheas of Marseilles (which alleges it was just a calculated non-observation), by running with the ball fortuitously lobbed our way, recognizing the datum as that of a patently high-precision ***observation*** — and thereby locating the Mediterranean spot near Marseilles where this legendary astronomer-navigator-explorer did his astronomy: Cape Croisette (Fig.2), $0^\circ.1$ south of Marseilles-harbor proper (Fig.1).

[1] Without certainty, one presumes Pytheas observed before Timocharis since the latter probably used a transit circle, an advance over the gnomon. Anyway, Timocharis' star declinations are not raw data.

A2 MuJHA p.17 having claimed that the Summer Solstice datum (eq.1 or ‡3 eq.10) of Pytheas was not an observation, we explore (as scientists should) an alternate possibility, namely, that Pytheas' eq.1 was a real gnomon observation. (Which is actually, *a priori*, much more than a possibility.) We know that many Greeks' gnomons were vertical & *asymmetric*. (See, e.g., diagrammed discussions at Manitius 1912-3 1:419-420 & R.Newton 1977 pp.38-39. Also developments in, e.g., Rawlins 1982G & Rawlins 1985G pp.260f.) This produces a shadow corresponding (eq.5) to the S.Solst zenith distance Z_s of the *top* (not center) of the solar disk: the upper limb. (I.e., measured Z will be $16'$ [the solar semi-diameter ssd] less than the Z of the solar center, a fact many well-known Greeks were naïve about.)[2] Thus, a solstitial s_s/g with such an instrument will produce a latitude L which is $16'$ less[3] than the true value. A useful 1st estimate of the uncertainty in Pytheas' Z_s follows from checking its limits (via eq.1), knowing ancient rounding practices (discussed at, e.g., Rawlins 1994L §B3), which used degree halves, thirds, fourths, fifths, & sixths:

$$s_\mathrm{s}/g = \frac{41\frac{3}{4}}{120} \doteq \tan 19^\circ 11' \qquad \& \qquad s_\mathrm{s}/g = \frac{41\frac{5}{6}}{120} \doteq \tan 19^\circ 13' \tag{2}$$

Thus, crudely:

$$Z = 19^\circ 12' \pm 1' \tag{3}$$

A3 But we can improve the precision here by examining[4] ancient rounding even more finely than at §A2: if Pytheas' reading (of his 120-unit-high gnomon) were nearer 41 3/4 or 41 5/6, he would not have rounded to eq.1's 41 4/5. (Ancient unit-division was limited to quarters & sixths for celestial longitudes & latitudes but fifths of degrees were ordinary for meridian-observation based data: e.g., Hipparchos *Comm* [Rawlins 1994L §F4], *Almajest* 7.3.) So the true brackets are the half-way points in the ranges 41 3/4-to-41 4/5 (41 31/40) and 41 4/5-to-41 5/6 (41 49/60), the precise mean of which is (including plus-or-minus found from each difference):

$$[\frac{41\frac{31}{40}}{120} + \frac{41\frac{49}{60}}{120}]/2 \rightarrow \frac{41\frac{191\pm5}{240}}{120} \doteq \arctan 19^\circ 12'.2 \pm 0'.5 \tag{4}$$

[2] The Greeks' proclivity for the flawed idea of using an asymmetric gnomon has never been confronted. (Perhaps partly because ancient-astronomy historians tend not to actually try using the equipment they write about.) So, here's a go at resolving the issue: the edge of the penumbral fuzziness of a vertical stake's shadow-tip is not vague. When all but $1'$ of the solar diameter is covered, the remaining sliver of the solar disk's dazzlingly brilliant area is ordmag 1% of the whole, so that such a sliver is ordmag 10000 times brighter than the full Moon — which is why the edge of the penumbra is much sharper and thus more precisely determinable than most expect. Thus, a $1'$ random error is unlikely for careful use of a vertical gnomon. And the experiment is easy to render so precise that the main non-ssd error will be minuscule diffraction. Arrange that the gnomon's shadow be cast into a room protected from non-direct sunlight. Use a vertically-oriented rectangular-plate gnomon (see, e.g., R.Newton 1973-4 p.373 Fig.1). Then, between it and the shadow, bring down another vertically-oriented rectangular-plate until it virtually chops off the solar beam cast upon a flat-horizontal, carefully ruled shadow-measurer. (Due to diffraction, for 5m-high equipment, the gap between shadow-edge & first intensity maximum is c.$1'$; but the uncertainty in that edge's position is smaller: ordmag $1'/10$.)

[3] Subtracting $ssd = 16'$ from eq.5 shows that if Pytheas knew the correct obliquity (but didn't know of the gnomon's ssd-error), he would have thought that his observatory was at about $L = 42^\circ 56'$.

[4] We are here taking it for granted that 41 4/5 was Pytheas' original raw datum. (And the original reading would probably have been in shadow/gnomon terms.) Yet we may test the faint possibility that whatever the original reading was, it came to later antiquity as $19^\circ 1/5$, and only subsequently (in a trig era) was its tangent calculated as a fraction of 120. (But such an assumption itself assumes ancient tangent tables [none have survived] and that these were based upon unit-120, though division of a tabular sine by its complement's sine would cancel their 120-denominators.) However, [a] It seems rather a stretch to suppose that a later ancient would go to such trouble, to turn around the data-reduction process in order to "reconstruct" a lone pseudo-raw datum. Why would such be preserved as special? [b] A firmer objection is that, if Z were $19^\circ 1/5$, ‡3 eq.15 would not yield its (attested) sum.

Figure 1: Entire Marseilles harbor (Carte Touristique 67 [Marseilles-Carpentras] Institut Géographique National (IGN) France, Paris), including Cape Croisette area (etc) south of the city. Short, narrow east-west white lines mark eq.5's brackets for the latitude of Pytheas' observatory. (Northern bracket's west end is at latter "E" in "CROISETTE"; southern bracket's east end is near southeast tip of Isle de Jarre.) The mainland capes immediately west (off map to left) of Marseilles Bay do not stretch as far south as the upper bracket and so are not potential Pytheas-observatory locations.

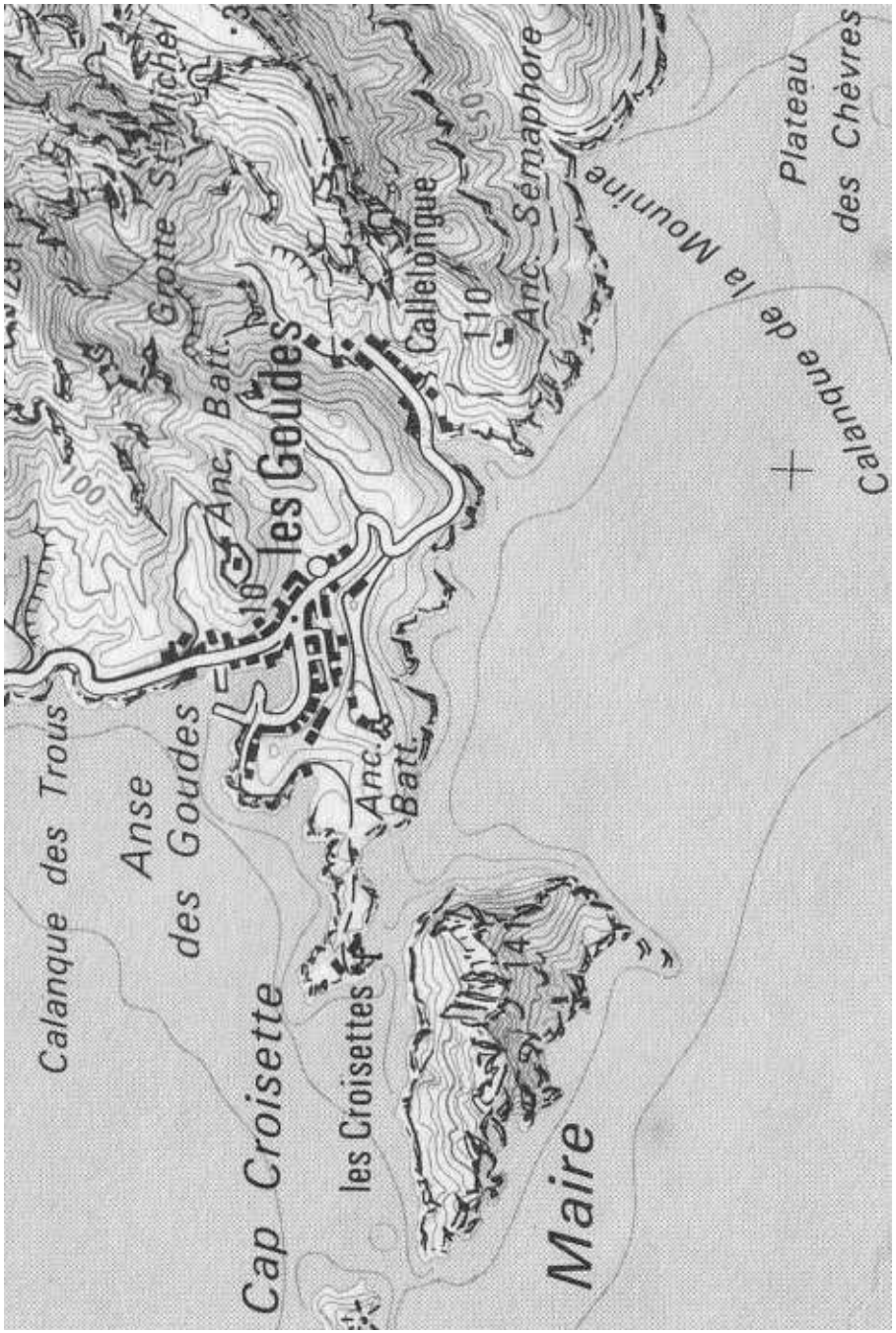

Figure 2: Detail of the region south of Marseilles: Cape Croisette, les Goudes, Callelongue. (Carte de France XXXI 45 [IGN].)

B Finding Pytheas

B1 Now at last we are closing in on the Pytheas observatory's latitude. Using eq.4 and eq.1 we can find the actual latitude L at which Pytheas observed the Sun; the correct empirical relation is (including $ssd = 15'.8$ and r&p = $0'.3$, with [for epoch -310 ± 25^{y}] obliquity $23°44'.0 \pm 0'.2$, error from uncertainty of Pytheas' exact epoch):

$$L = 19°12'.2(\pm0'.5) + 23°44'.0(\pm0.'2) + 15'.8 + 0'.3 = 43°12'.3 \pm 0'.7 \quad (5)$$

We ignore rms, instead looking for the maximum additive range of errors that are not at all likely to be exceeded if the measurement was indeed carefully *and repeatedly* carried out. I.e., our treatment here is not based upon Gaussian statistics but upon Greek rounding's implied precision, as expressed in eq.4: producing a simple bracket instead of a bell-curve. Eq.5's bracket is obviously from $43°11'.6$ to $43°13'.0$ and is drawn in pale lines upon Fig.1.

B2 We are not the 1st to compute a latitude similar to (if not exactly equalling) eq.5. But previous investigators merely concluded: well, Marseilles is at $43°.3$ N, so Pytheas was only $0°.1$ off the mark — OK-not-bad-and-end-of-story.

B3 But let us instead pay close attention to some previously neglected points.

[a] Pytheas' clear precision was $\pm0'.5$ (eq.4), not §B2's $\pm0°$ .1 (c.10 times looser).

[b] The actual possible accuracy for a plain meridian observation has a similar error-bracket. On these bases, DR proposes accepting the theory that the measurement (with the error indicated in eq.5) was as accurate as its precision — and then investigating whether there is independent confirmation that it has provided virtually the ***exact*** latitude of Pytheas' observatory.

B4 Obvious next step: we **check modern maps**[5] of the Marseilles (Massalia) region: Figs.1&2. And we thus find that the best spot an ancient astronomer could have picked near Marseilles is a few miles south of it (Fig.1), the southern part of a peninsula now called Cape Croisette. Its southern coast offers an observatory-dream ***unobstructed southern vista over water***. (Like Tycho's equally well-chosen observatory at Hvin; similarly, Eudoxos' at Knidos and [*DIO 4.1* ‡3 §E] Hipparchos' at Cape Prassonesi [the southern tip of Rhodos] for his southern stars.) Central novel realization here: *the southern part of the Cape Croisette peninsula is a far better location for an astronomical observatory than Marseilles itself, which (Fig.1) faces* **westward** *on the water*. And what is Cape Croisette's location? It is at latitude $43°.2$ N (longitude $5°.3$ E) which neatly matches that found via eq.5 from Massalian Pytheas' S.Solst observation.

C Exploring for As-Yet Impossible Exactitude

C1 We can enjoy further speculation by asking what an astronomer would be looking for in this region. Note (Fig.2) that the easy coastal road, over pretty flat terrain (today called Boulevard Alexandre Delabre), runs into un-negotiably steep coast and mountains about where the Cape Croisette coast turns the corner and starts trending eastward instead of southward. An attractive prospect for the Pytheas observatory's location is on the tiny spit of land that is the extreme west extension of Cape Croisette: a wide hill, about 50m high[6] — almost exactly the height of Tycho's observatory — just high enough to not-infrequently be above the nocturnal aerosol layer.[7] It is marked on Fig.2 as having been the site of "Anc. Batt." (old battlements). Despite its modest height, the hill has a flat water horizon to the south and of all the likely prospects considered here for Pytheas' location, this would have

[5] As with *DIO 14* ‡3 §F's discovery (www.dioi.org/gad.htm#blsl) that the Blest Isles were the Cape Verde Islands (not the Canaries, the longtime traditional guess), one wonders why no one previously ever just checked a map and published the obvious solution.

[6] The topo-curves are at 20m intervals for each of the accompanying maps here.

[7] Our thanks again to Nels Laulainen for his 2000-2001 expert advice to *DIO* on such matters.

Figure 3: Panoramic view of Maire Island from very nearby W tip of Cape Croisette.

been the most easily accessible for his Marseilles students or clients. (Cape Croisette would also be an apt location for a sailor-explorer: right on the Mediterranean.)
We next check out a few other candidates.

C2 On a sharper hill to the east (just south of the town of Callelongue), there is an antique semaphore-station marked on Fig.2 (over 100m high) at[8] 43°12′38″.7 N, 5°21′21″.1 E, just beyond the end of the extended easy (non-mountain) road from Marseilles to Cape Croisette (i.e., Delabre Boulevard).

C3 As Pytheas was a sailor, we must also consider the possibility that he (like Tycho) operated on an island. The most obvious choice would be tiny but spectacular-gradient Maire Island (whose highest peaks exceed 450′), which is literally throwing-distance from the west spit of Cape Croisette. (See Fig.2.) Maire's southern coast, though partially quite steep (and not [now] conveniently accessible from Cape Croisette without boat), has the best viewing of any likely[9] location considered here. If Pytheas' 120-unit-high gnomon was 120 Greek *feet* (a Greek foot being 12″1/7 in modern measure), the high, steep cliffs of Maire (Fig.3) might allow a mostly natural gnomon of such height (which would ensure negligible imprecision from diffraction): the gnomon's verticality verified by plumb-line with a bob dense enough to minimize wind-influence, and the shadow-surface's horizontality verified by use of a water-filled hose. A direct exam of Maire's topography could determine whether this would be feasible.

C4 And there are a few other islands which might be mentioned as possibilities: Tiboulen, de Jarron, de Jarre. All these places' latitudes are easily consistent with the limits of §B1's eq.5. Recall that we began investigating this region due to those very same mathematically-derived latitude limits — and only subsequently noted potential confirmation when finding (§B4) that this put us exactly at the observatory-friendly clear-southern-view coastal region that was nearest Marseilles by road.

C5 Does that striking coincidence assure us that the Cape Croisette region is where Pytheas made his observations? — including the miraculously extant Summer Soltice s_s/g. Hopefully, an archaeological miracle will someday discover the exact spot where stood the scientific home of legendary astronomer-explorer Pytheas of Marseilles.

Acknowledgements: for expert assistance in locating materials, etc, I thank Keith Pickering and Jim Gillispie.

[8] The (over)precision here is c.10 ft. Atop the hill today, Microsoft maps show a lone building which is at least twice 10 ft across.

[9] Maire Island's peak would have even better seeing than its south shore (far lower aerosols on many nights), though with the same extreme isolation-inconvenience that presumably kept Hipparchos from using Mt.Atabyron on Rhodos Island. (Mountain astronomical observatories are a modern phenomenon, due to influence of atmospheric unsteadiness in a telescopic era.)

References

Almajest. Compiled Ptolemy c.160 AD. Eds: Manitius 1912-3; Toomer 1984.
Hipparchos. *Commentary on Aratos & Eudoxos* c.130 BC. Ed: Manitius, Leipzig 1894.
MuJHA 2002. JHA *33.1*:15
Karl Manitius 1912-3, Ed. *Handbuch der Astronomie* [*Almajest*], Leipzig.
R.Newton 1973-4. QJRAS *14*:367, *15*:7, 107.
R.Newton 1977. *Crime of Claudius Ptolemy*, Johns Hopkins U.
D.Rawlins 1982G. Isis *73*:259.
D.Rawlins 1985G. Vistas in Astronomy *28*:255.
D.Rawlins 1994L. DIO *4.1* ‡3.
Gerald Toomer 1984, Ed. *Ptolemy's Almagest*, NYC.

‡3 Aubrey Diller, Hipparchos, & Sph Trig's History

Does Spherical Trigonometry Go Back to the 2nd Century BC? Unexpected Perfect-Fit 2009 Induction Snuffs 75y Controversy Refless Alex Jones Banzai-Sneers at Three Refereed Discoveries Strange *JHA* 2002 Attack on A.Diller Finally Refereed 7y Late Uncriticized Inept Archonal Chauvinism Disgraces Entire Field

A Diller's Tri-Discovery: Early SphTrig, Accurate Tilt, Klimata Key

A1 In 1934, the eminent classical philologist Aubrey Diller provided the 1st conclusive proof that spherical trigonometry went back to the 2nd century BC, by showing that Hipparchos' klimata[1] latitudes L (given in stades by Strabo) were beautifully satisfied — see Table 2! — by L values computed from sph trig (eq.4) for each Hipparchos-Strabo longest-day M using an obliquity (Earth-tilt) $\epsilon_{\rm H2}$ equal to $23^\circ 2/3$ or $23^\circ 40'$: eq.2 below.
A2 In 1979, DR independently discovered Diller's solution and (after learning of his prior publication) contacted him (1979/11/26) — while continuing to improve it. Besides adding (to the data-set) Hipparchos-Strabo klimata unknown to Diller 1934 (but perfectly fitting it anyway, a striking fruitfulness-display: e.g., fn 55), DR showed that if Hipparchos' sph-trig-calculated klimata had been anciently rounded to and tabulated at the $5'$ ($1^\circ/12$) precision of the klimata list of the canonical *Geographical Directory* (*GD* 1.23), before conversion (eq.1) to stades, then: all but one of Diller 1934's fits became precise hits.
(In 2009, the one non-fit also finally became precisely satisfied: eq.3.) See at Table 2 here.
A3 If we assume $\epsilon_{\rm H2}$ was measured in standard fashion (eq.8, below) and account for refraction&parallax, an ideal Hipparchos determination of ϵ would have been $23^\circ 42'$, and standard ancient rounding was to the nearest $5'$, so $\epsilon_{\rm H2} = 23^\circ 40'$ was correct to its precision. Even ignoring rounding and r&p, it was (as it stands) accurate to about a 20th of a degree. This long-lost value for the obliquity was probably measured using Hipparchos' 135 BC Summer Solstice (*Almajest* 3.1; Rawlins 1991H), but attestation of it had not survived[2] so (ere Diller) no one had previously suspected that the ancients ever had an accurate obliquity. In short, Diller 1934 simultaneously announced 3 major discoveries: [1] solution of Strabo's klimata, [2] Hipparchos' use of spherical trig, [3] his adoption of the only accurate obliquity-measure we can recover from antiquity. That a pack of possessive snobsters has nearly submerged such scholarly triumphs for 81y is itself a triumph of organized truth-warping, providing a history (see p.2 & fn 7) warmly recommended to sociologists of cult-think.
A4 The Hipparchos-Strabo data-base which Diller satisfied appears as the middle column of our Table 1 here, based on Hipparchos' well-known scale

$$1^\circ = 700 \text{ stades} \tag{1}$$

(Strabo 2.5.7&34 or Neugebauer 1975 p.305 n.27).[3] All 13 said data were computed from klimata M values via eq.4 (below), using the unattested but impressively accurate ϵ value

$$\epsilon_{\rm H} = 23^\circ 2/3 = 23^\circ 40' \tag{2}$$

[1] Strabo 2.1&5, very well illustrated schematically in Neugebauer 1975's Fig.291, p.1313 (an easy page# to remember, given Diller's 13-for-13 success with the data). For reasons of sph trig (astrological-house-computing) efficiency (Rawlins 2008S §A4 [2]), ancient astrologers (Hipparchos, Ptolemy) assigned the term "klima" (from which our word "climate" derives) for latitudes L corresponding (via eq.4) to longest day values M, usually at intervals of about 1/4 or 1/2 hour (*Almajest* 2.6&8). A common number of primary klimata was seven; see, e.g., Pliny 6.39.211-218, Honigmann 1929, Neugebauer 1975 pp.722f.

[2] This is one of the costs of having much of one's heritage of high ancient astronomy coming to us through the filter of an only-intermittently-reliable mathematician-astrologer, C.Ptolemy.

[3] *JHA* "refereeing" missed that [a] MuJHA n.7 cites the wrong volume of Neugebauer 1975, & [b] MuJHA n.10 consistently muffs Syracuse's Strabo L by 200 stades. Not the 1st time this fitfully perceptive & ever creative author has been let down by fake refereeing. See also fn 31 & *DIO 1.2*.

which proved 2nd century BC use of sph trig, plus Hipparchos' careful observation and mathematical use of the only accurate ϵ (eq.2) we know was adopted in antiquity: merely c.$3'$ off the truth (mostly rounding error).

B Correcting Meroë's Misfiling Elevates Diller's Score to 100%

B1 Since 1934 it has been known that the standout non-fit for the Diller theory is Meroë, the 13h klima. Meroë was long the single seeming blemish in Diller's tabulation, e.g., Table 1 of *DIO 4.2* (1994) p.56, a table otherwise perfectly demonstrating the neat success of the Diller-DR sph trig solution of the Hipparchos-Strabo data. But, then, this is not the first time that DR has (embarrassingly slowly in this case and[4] others) finally followed in the tradition of Kepler and A.C.Doyle[5] by realizing that the aggravating non-fit is precisely what can be beckoning one on to new discoveries.
B2 On 2009/3/24 (30^y after independently happening upon Diller's solution) DR at last saw the elementary reason that Meroë's 11800-stade latitude became the sole non-fit:

Meroë at latitude 11800 stades is not a klima — it's a ***city****.*

(Diller himself suspected this: §B5.) I.e., 11800 stades for Meroë *city* should never have been in the Strabo-*klimata* tables of Diller 1934, Neugebauer 1975 p.305, or *DIO 4.2* p.56 in the 1st place.[6] The city-vs-klima distinction has been right before our eyes for years through the clue that Strabo 2.5.38 (see also chart at Neugebauer 1975 p.1313) provides explicitly in the case of Alexandria, noting that this city is separated from the nearby "Lower Egypt" 14h klima by 400 stades — this, though it was common in antiquity to casually call[7] the 14h klima "Alexandria". (Strabo 2.5.38 inadvertently does likewise: §F4.)
B3 The case of Meroë is complicated by the fact that there is both an "island" Meroë (described at Strabo 1.2.25 as the Nile's largest: §B4) containing, in its north part, the *city* Meroë, whose actual latitude is $L = 16^\circ 57'$N. It is the city-vs-island confusion (as also for Rhodos) we will now eliminate. *The very names of klimata illustrate that most were named not for cities but for sprawling regions*[8] — such as bays, straits, river-mouths, or islands. (In ancient geography, Syene [modern Aswan] is often just a sloppy amalgam of city, tropic, & klima.)[9] This, because few if any important cities were likely (being tiny areas) to oblige by falling smack upon a klima. (This obvious point had become obscured by the time of

[4] See, e.g., Rawlins 1991W §D2 and *DIO 4.1* ‡3 §A5 [p.35]. Also the ancient galactic-circle CygSegment on the Farnese globe: www.dioi.org/fff.htm#gtgm.

[5] See *DIO 4.1* ‡3 fn 2 [p.33].

[6] This realization is not our 1st restorative correction of the mis-filing of a famous item. See, e.g., *DIO 8* ‡5 fn 5.

[7] E.g., Pliny 6.212; Honigmann 1929 (*The Seven Klimata and the Important Cities*) pp.34, 40, 43_1, 52, 147; S&G p.116 n.4. Also Neugebauer 1975 pp.730&732, though at p.305, mathematician Neugebauer deluded himself into thinking his own theory better than non-mathematician Diller's (an imagined superiority insultingly expressed at p.734 n.14 — but now accepted nowhere) by: [i] Overruling Strabo 2.5.38 (and his own Neugebauer 1975 p.336 n.29: see below at §F4) so as to equate Alexandria city and klima at 21800 stades. [ii] Ignoring all klimata south thereof (this, even while knowing that his scheme didn't fit them but the exiled Diller's did). [iii] Skipping the 15h1/2 Pontos klima, where his scheme also failed. At *DIO 4.2* p.55 fn 4, the Neugebauer theory (Neugebauer 1975 p.305) was reduced to a cubic polynomial (4 coefficients) $L = 50[M^3 - 62M^2 + 1307M - 8454]$. (If one tries a polynomial of high enough order, one can mimic any curve of the sort examined here. See www.dioi.org/biv.htm#lqsn.)

[8] Examples from the names of the *Almajest* 2.6&8 klimata: "Avalite Gulf", "Lower Egypt", "Rhodos", "Mid-Pontos", "Southernmost Brittania", "Mouths of the Tanais [Don]". And, as we now realize, the island "Meroë". (Note: the Don klima was generally placed at c.54°N, e.g., *Almajest* 2.6&8; *GD* 3.5.24. The actual Don mouths are at c.47°N. Perhaps an ancient slip occurred when its distance north of one of our §C trio was undone by confusion as to which southern site was the basis of the differential datum.)

[9] Contradictory ancient definitions of Syene are touched upon below at eq.17.

Table 1: Hipparchan Klimata Fits: Princetitute vs Diller-DR

Klima	Longest Day M	Hipparchos-Strabo L [Data]	Princetitute-Muffia L [Babylonian]	A.Diller-DR L [Greek]
Equator	12^h	0	1500	0
Cinnamon	$12^h 3/4$	8800	10200	8800
Meroë	13^h	11600	12800	11600
Syene	$13^h 1/2$	16800	17600	16800
Lower Egypt	14^h	21400	21800	21400
Phoenicia	$14^h 1/4$	23400	23700	23400
Rhodos	$14^h 1/2$	25400	25500	25400
Hellespont	15^h	28800	28800	28800
Massalia	$15^h 1/4$	30300	30300	30300
Pontos	$15^h 1/2$	31700	31600	31700
Borysthenes	16^h	34100	34100	34100
Tanais	17^h	38000	38000	38000
S.Little Britain	18^h	40800	40800	40800
N.Little Britain	19^h	42800	42800	42800

Ptolemy's *GD* — perhaps as early as Hipparchos. See *DIO 5* fn 19 on commerciality.) So it would make sense that the 13^h klima was for Meroë ***Island***. (This is made explicit at Pliny 6.220 & *Almajest* 2.6.) Moreover, we notice that the latitude differences in stades given by Strabo connected to Meroë are generally expressed with respect to other *cities*. Indeed, since these distances are (§C2) due to Eratosthenes (who probably did not use sph trig klimata) they cannot be klimata-based and their contexts usually do not discuss hours.[10] When Strabo finally speaks of the supposed Meroë *klima*, he does not speak of a spot called Meroë (as elsewhere) but says (Strabo 2.5.36): "In the regions of Meroë and of [Ptolemy's Hunting Lodge], the longest day [M] has thirteen equinoctial hours".

B4 And Strabo 17.2.2 estimates the north-south extent of Meroë as about 3000 stades, which (even if [as he wonders] exaggerated) rather more than covers the 200-stade discrepancy between the value predicted by Diller-DR's theory for the Meroë klima (11600 stades) and the city's measured latitude (11800 stades) *which has hitherto been mis-filed among the Hipparchos-Strabo klimata*. Conclusion: Meroë at 11800 stades latitude is a *city* and thus (as noted at §B2) no more belongs in klimata Table 1 than does Alexandria city, which had thus already at the outset been eliminated by everyone but Neugebauer 1975 p.305.

B5 Diller 1934 p.267 realized the difference between the Meroë city & klima but supposed (like DR for decades) that Strabo had neglected to supply the klima's L. Which brings us to reprising the shocker 1^{st} revealed in *DIO 5* (2009). By contrast to all his inter-city placements of Meroë *city* (fn 10): during his lone reference to the Meroë 13^h ***klima***, Strabo 2.5.36 hands us its latitude by stating that it is 1800 stades nearer Alexandria than to the Equator. As DR 1^{st} realized 2009/4/1 (merely 5^d before *DIO 5*'s online publication! — this, after 25^y of delay in publishing Diller's *GD* 8 ms in that volume, as long planned): ***since the context***[11] ***is klimata*** (not cities) and since the 14^h klima is at 21400 stades (Table 1 AND[12] Strabo 2.5.38), we use this Alexandria **klima** latitude to solve for the Meroë **klima** latitude K by simple arithmetic in stades:

$$K - (21400 - K) = 1800 \qquad \Longrightarrow \qquad K = (21400 + 1800)/2 = 11600 \qquad (3)$$

— precisely the Meroë latitude predicted at Diller 1934 p.267, over 3/4 of a century of Muffia sneering ago. Result: ***ALL FOURTEEN data fit the Diller-DR scheme***. This is evident from our depictions of Diller's triumph in Tables 1&2 and Fig.1: an astonishingly flawless record of, again, ***fourteen*** successive hits out of fourteen data. Has any comparable ancient astronomy discovery ever[13] enjoyed such perfect verification?

B6 Muffia 2002-2009 reaction? Strabo's klimata data suddenly aren't trustworthy anymore![14] As posted by DR (www.dioi.org/cot.htm#dmfe) a few days earlier in anticipation

[10] Examples for Meroë are: 5000 stades to the town Syene (Strabo 2.2.2, 5.7&35), c.10000 to Alexandria (Strabo 2.5.7, 17.3.1) c.15000 to Athens (Strabo 2.1.2) — just as Alexandria city is usually placed, e.g., 3750 to Rhodos City (Strabo 2.5.24).

[11] Another part of the context is Strabo 2.5.38's demonstrable confusion of klimata and cities for Alexandria and Carthage: see fn 35 or *DIO 5* fn 25. I.e., in the Strabo passages examined here, his subject is so thoroughly klimata that even key supposed non-klimata entities turn out to be [a] twisted or [b] mis-taken versions of klimata after all. (Respective restorations: [a] §F4 & [b] eq.3.)

[12] §§B2&F4. If not cult-bound, Jones' classics expertise could've found eq.3 long before DR.

[13] Has any academic cult ever matched the Muffia's gift for (1934-2002) rejecting virtual perfection in favor of a theory fitting (Table 1) less than half the available data? See www.dioi.org/biv.htm#kpvs.

[14] A dodge which only entered the debate in 2002 when the hilarious Diller-vs-Princetitute-Neugebauer contrast of Table 1 finally caused *Isis*' citation of the devastating display of it at *DIO 4.2* p.56. To sum up: ***the very same data*** that were for decades unrelievedly sacrosanct to Muffiosi (being the basis of the Muffia-Princetitute *DSB*-placed whacko Neugebauer scheme: see Table 1 & ***especially*** §J1 here) — who typically team-permitted not a peep of doubt on the subject — are dumped just at the moment the cult is *Isis*-faced with the fact that these data much more convincingly back Diller, not his slanderer (fn 58), Muffia-guru Neugebauer. One is reminded of the notorious BS 2001 *JHA* attack on Hipparchos' authorship of the Ancient Star Catalog, based on assuming a high atmospheric density. When BS told DR of this plan (1999/10/1), DR immediately suggested the reverse: use Hipparchos' established authorship to gauge ancient atmospheric opacity. (See www.dioi.org/gad.htm#fnpw for this and similar cases of mis-weighing evidences' relative strengths.) In the present instance, it would have been wiser to realize that the steadiness of the fit of Diller's math tells us that Strabo's data (if not always his interpretations) are more trustworthy than some of us had previously thought — and that is yet another enlightenment owed to the original intellect of Aubrey Diller.

Table 2: Sph Trig: Hipparchan Longest-Days in Hours ⇒ Latitudes in Stades

Klima	Longest Day M	L Computed via Sph Trig Eq.4	Rounded to Nearest Degree 12^{th}	Converted to Stades via Eq.1	Rounded to Nearest 100 Stades
Equator	12^h	0°	0°	0	0
Cinnamon	$12^h 3/4$	$12^\circ 36' 23''$	$12^\circ 7/12$	8808	8800
Meroë	13^h	$16^\circ 35' 04''$	$16^\circ 7/12$	11608	11600
Syene	$13^h 1/2$	$23^\circ 59' 43''$	24°	16800	16800
Lower Egypt	14^h	$30^\circ 33' 49''$	$30^\circ 7/12$	21408	21400
Phoenicia	$14^h 1/4$	$33^\circ 31' 04''$	$33^\circ 1/2$	23450	23400
Rhodos	$14^h 1/2$	$36^\circ 15' 25''$	$36^\circ 1/4$	25375	25400
Hellespont	15^h	$41^\circ 07' 34''$	$41^\circ 1/6$	28817	28800
Massalia	$15^h 1/4$	$43^\circ 16' 44''$	$43^\circ 1/4$	30275	30300
Pontos	$15^h 1/2$	$45^\circ 15' 40''$	$45^\circ 1/4$	31675	31700
Borysthenes	16^h	$48^\circ 45' 50''$	$48^\circ 3/4$	34125	34100
Tanais	17^h	$54^\circ 14' 53''$	$54^\circ 1/4$	37975	38000
S.Little Britain	18^h	$58^\circ 12' 31''$	$58^\circ 1/4$	40775	40800
N.Little Britain	19^h	$61^\circ 04' 56''$	$61^\circ 1/12$	42758	42800

of the all-too-predictable: "DR to Muffia: Is 13-out-of-13 Enuffia?" See *DIO 5* fn 22 and in-love-Osgood Gingerich at *DIO 11.3* ‡6 §A1 on the Muffia's decades-long tolerance of all manner of imperfection in Ptolemy&Neugebauer, even while (the source being of non-Muffia breeding) blind to a now-***literally*** perfect fit. (Thereby inverse-fastidiously outnuttying *Some Like It Hot*'s original indefatigable old masher Osgood, even while Diller-DR provides an exception to his Nobody's-Perfect capper: *idem*.) As observed in *ibid* (e.g., fn 12): a cult which systematically, pseudo-effetely labels&treats others as cranks (www.dioi.org/cot.htm#slst), while transforming journals & conferences into elaborate balls devoted to cranks' favorite dance — dodging dissonant evidence — needs to fill several lacks: common sense, statistical sense, Occam sense, humor sense. And a mirror.

C Philo's Geographical Symmetry Verified

C1 Strabo 2.5.7 (emph added) describes Eratosthenes' geography of the Nile: "from Meroë to Alexandria . . . is about 10000 stades; and Syene ***must lie in the center*** of that distance; so that the distance from Syene to Meroë is 5000 stades." This statement has not generally been taken seriously, perhaps because of its numerological look, plus the myth of the Greeks as non-empirical. (See Rawlins 2008Q §K4.) ***Yet it is in fact precisely accurate.*** The actual latitudes: Meroë $16^\circ 57'$, Syene $24^\circ 05'$, Alexandria $31^\circ 12'$; so the gaps are each nearly $7^\circ 1/8$; or, using eq.1 and rounding as usual to the nearest 100 stades: 5000 stades.
C2 So the ancient finding of the equality of Alex-to-Syene and Syene-to-Meroë turns out to be impressively true: to $\pm 1'$. (And it is less likely to be based upon accident than the equally remarkable ancient record [also correct to $\pm 1'$] that Aldebaran and Antares were 180° apart in celestial longitude: *DIO 2.1* ‡2 fn 5.) The basis of this geographical discovery was most likely careful $1'$ measurement. Note that the city latitudes cited at §B3 are largely accurate[15] to ordmag $0^\circ.1$. Rawlins 1982G shows that Eratosthenes had learned that Rhodos City's $L = 36^\circ 5/12$ (good to $1'$) — or 25500 stades — and that only his foolish use of gnomon for Summer (not Winter) Solstice threw off his measure of Alexandria's L by half the solar semi-diameter, yielding $31^\circ 04'$ (Rawlins 1982C eq.10, Rawlins 1994L fn 44). His place for Alexandria was, like Meroë's, adopted (Strabo 2.5.7) by Hipparchos (who never visited Africa) and typically rounded to $31^\circ 1/12$[16] & $16^\circ 11/12$. Strabo 2.1.20 relates that an observer named Philo had taken astronomical measures by gnomon at Meroë, and his statement (*idem*) that the Sun is at zenith 45^d before S.Solst is encouragingly accurate.[17] Strabo's report of gnomon-use at first looks discouraging due to its systematic error from solar semi-diameter ssd. However, while outside the tropics, ssd will foul up the L half of eq.8 instead of the ϵ half, the reverse is true in the tropics. A transit instrument would get the correct L, but even if we assume[18] that Philo used a gnomon at both solstices, he would have found (accounting for both r&p and ssd) zenith distances $Z_\mathrm{W} = 40^\circ 24'-$ and $Z_\mathrm{S} = 6^\circ 31'$, yielding (by eq.8) nearly correct $L = 16^\circ 56'$, which Hipparchos would round to $16^\circ 11/12$. From eqs.2&4, we have Syene klima at 24° or 16800 stades, thus not a bad Hipparchos L-threesome: Meroë $16^\circ 11/12$, Syene 24°, Alexandria $31^\circ 1/12$: rms error $5'$. (Notably, the *GD* errors for the same trio are $-32'$, $-15'$, & $-12'$, resp: rms error $22'$.)
C3 Moreover, we find that the Hipparchos trio maintains (albeit slightly corruptly) the remarkable symmetry, presumably Philo-discovered[19] (Eratosthenes&Hipparchos-adopted), that Syene is exactly 1/2-way between Alexandria & Meroë, the Hipparchan value[20] for both intervals being $7^\circ 1/12$ or (by eq.1) 5000 stades. In reality (using eq.1), both L intervals are even closer to 5000 stades (sum 9975 stades): could this accidental symmetry be one of the causes of eq.1's establishment? (By Philo? Sostratus? Eratosthenes? Anonymous?)
C4 Most revealing conclusion here: Eratosthenes' outdoor-determined African city-latitudes (which non-peripatetic Hipparchos adopted: §C2) were from an era before latitudes were twisted (§B3 & fn 18) to conform to indoor-computed klimata.

D The Birth of Spherical Trig

D1 The variables in Table 1, longest-day M (hours) and latitude L (degrees), are related by a spherical trig equation:

$$\cos(15M/2) = -\tan L \tan\epsilon \qquad \text{thus} \qquad L = \arctan[-\cos(15M/2)/\tan\epsilon] \tag{4}$$

(*Almajest* 2.3) where obliquity ϵ was usually taken to be that of Eratosthenes-Ptolemy (eq.5) or nearby $23^\circ 5/6$, or one of Hipparchos' two values (eqs.6&2), the latter ($23^\circ 2/3$) being the exclusive and totally unexpected discovery of Diller 1934. (All three of these obliquities are discussed in, e.g., Rawlins 1982C, Rawlins 1985G, & *DIO 5*.)
D2 The Rawlins 1985G tables discovered that numerous major cities' L & M did indeed correlate with either Eratosthenes' obliquity (*Almajest* 1.12)

$$\epsilon_\mathrm{E} \doteq 23^\circ 51' 20'' \doteq 180^\circ \cdot 11/83 \tag{5}$$

or the early Hipparchos obliquity

$$\epsilon_\mathrm{H1} = 23^\circ 55' \tag{6}$$

D3 The Rawlins 1985G tables showed for Ptolemy's *GD*:
[a] The major cities correlated with Eratosthenes' eq.5 or $23^\circ 5/6$ included Babylon, Korinth, Kyrene, & Meroë — all related to Eratosthenes' birth or writings.
[b] The major cities correlated with Hipparchos' eq.6 included Arbela, Athens, Carthage, Nicaea, & Rhodos — all related to Hipparchos' birth, life, or writings.

[15] Even the rough latitude for Athens (Strabo 2.1.2), $38^\circ+$, is much better than Hipparchos' later false value of c.37° (Hipparchos *Comm* 1.11.3&11), which became adopted in astrology manuals for centuries after, e.g., *GD* 3.15.22 & (see *DIO 5*) 8.12.18. (For speculative explanation of his error: www.dioi.org/fff.htm#rvbv.) This relates to DR's contention (www.dioi.org/fff.htm#gbpp) that most astronomers (as against astrologers) knew Athens' actual latitude, and that this may relate to the origin of the Farnese globe: of indicated home latitude 38° (presumably either Pergamon or Athens).

[16] Rawlins 1994L fn 44. Strabo 2.5.39 confirms this by putting Hipparchos' Alexandria 3640 stades south of the Rhodos $14^\mathrm{h} 1/2$ klima, thus at latitude 21760 stades or $31^\circ 1/12$. Further if less precise confirmation: Strabo 2.5.38 says the transit of Arcturus is a little south of the zenith, consistent with the star's quite erroneous 31° Hipparchan declination (*Almajest* 7.3). We have elsewhere proposed that since culminating Arcturus was actually c.$0^\circ.1$ *north* of the zenith at Alexandria in Hipparchos' era, he (again: ‡1) made a sign or translation error and subtracted c.$0^\circ.1$ from his $31^\circ 1/12$ Eratosthenian Alexandria latitude to find the awful figure 31° (error $-0^\circ.3$) for the declination of Arcturus.

[17] The actual interval would have been 46^d. But we find that his figure is accurate to its precision, if we inquire as to how Philo determined the time of Summer Solstice: he would use equal-altitudes, so why not choose the two zeniths' dates, for $L = 16^\circ 57'$ (assuming epoch c.270BC, though there is little time-sensitivity here) just under 91^d apart? Philo would then find the S.Solst 1/2 way between those two dates and report the semi-arc as half of $91^\mathrm{d}-$, or: 45^d.

[18] Possibly Strabo made no distinction between asymmetric gnomon, symmetric gnomon, and transit instrument. Regardless, it appears that Philo was discoverer of the later-canonical A-S-M symmetry, which was abandoned by the time of Ptolemy, whose intervals were: A-S = $7^\circ 1/6$ vs S-M = $7^\circ 5/12$. Ptolemy's klima→city Meroë confusion caused a $1^\circ/2$ discord between his & Hipparchos' L, hinting that Hipparchos was not responsible for the *GD*'s klima-polluted L mis-geography.

[19] If Philo travelled to Meroë, he must have visited Syene. So he presumably knew that its latitude was $24^\circ 05'$. And every scientist but Eratosthenes (§C2, Rawlins 1982G, Rawlins 1994L Table 3) then knew that Alexandria's L was nearly $31^\circ 1/5$. So the A-S-M symmetry was not only true but competently known to be true in Alexandria's community of genuine scientists, which again excludes Eratosthenes. His & Hipparchos' later symmetrical A-S-M schemes were (as just noted) slightly less accurate than the presumed original latitudes (of, e.g., Philo) but were perhaps nudged to ensure adherence to an A-S-M symmetry likely well-known long before either's geographical scheme.

[20] Doubling makes Hipparchos' Meroë-Alexandria distance $14^\circ 1/6$, so (eq.1) not 10000 but 9900 stades. But Strabo (2.5.7 & 17.3.1) says "about" 10000 stades. This favors $16^\circ 11/12$ (& thus Philo's accuracy) as Eratosthenes' & Hipparchos' Meroë L, rather than $16^\circ 5/6$. Either satisfies 11800 stades.

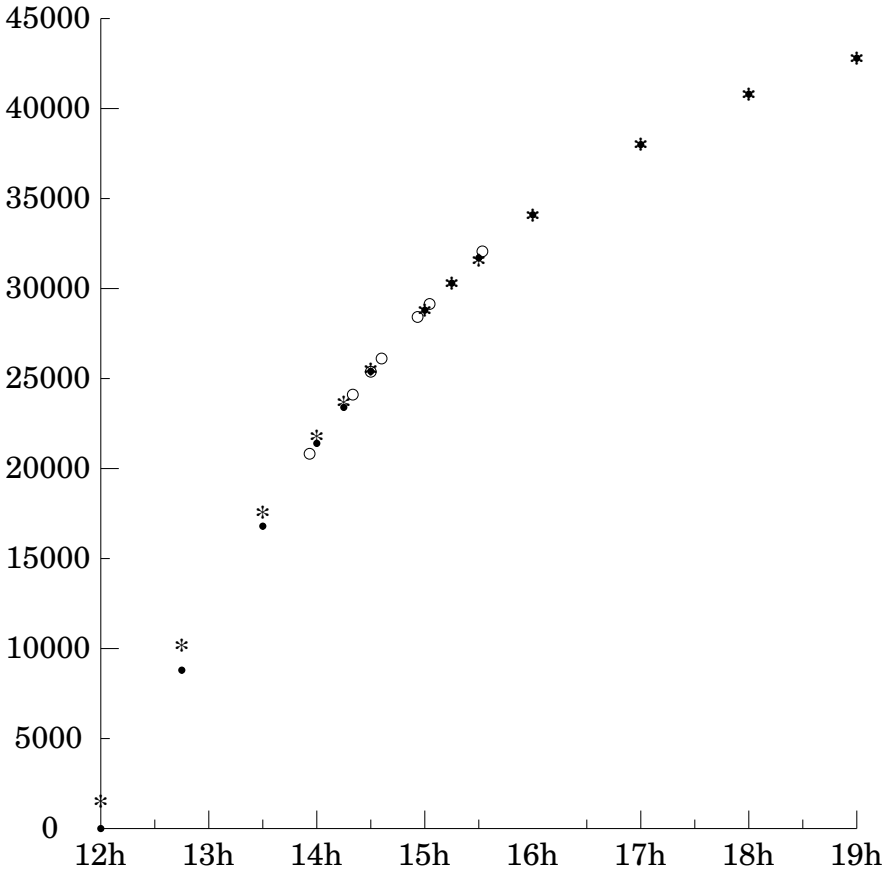

Figure 1: Latitude L graphed in dark (filled) dots as function of longest day M, sph-trig-computed via Diller's eqs.1, 2, & 4, at all 14 M for which Strabo gives Hipparchan L: M in hours; L in stades, rounded (like all Strabo klimata) to 100s. Each Strabo datum is marked by the same dark dot, since Diller's sph trig theory matches perfectly for all 14 cases. Asterisks mark the corresponding L for the arithmetical folly (fn 7) which Neugebauer ineducably Princetitooted his horn for. North of Rhodos, the dots&asterisks nearly merge in most cases (former smaller, so superposition won't prevent seeing both), but the Neugebauer theory's failure at lower L (most amusingly at Equator: §J6!) is lethally blatant. Hollow dots mark the 7 klimata of Rawlins 1985G p.263's reconstruction of the pre-tampered original of the scheme underlying Pliny's "circuli" (fn 48), showing how neatly the ingenious device of the ancient creator (§I: Hipparchos?) tracks klimata for the slim range of Mediterranean L which it was invented to fit via Diller's Hipparchan ϵ: fn 50. Jones' "unshifting" all Strabo L by 100 stades would be hard to show in our graph since the amount is so tiny ($1^\circ/7$) that the shifted points would be *inside the dark dots* marking Strabo's data. The fit is so ***fragile*** that such a minuscule shift destroys (§I3) any chance of fitting eq.4 to the Strabo data, regardless of ϵ-choice. So the graph's larger message ironically redounds against Jones' §I1 prong [b] wetdream that "one or two modest changes in the intervals" could best Diller: the above curve is too *super-precisely* characteristic of sph trig eq.4 & Hipparchan ϵ to allow explicit or even implicit denial of credit to Diller as discoverer of the true basis of Strabo's Hipparchan klimata, which lay secret for 2 millennia.

D4 Since §D3's correlation [a] was found via the sph trig of eq.4, we have here (also Rawlins 1982N n.11) a shaky suggestion that (contra §E1) sph trig was known in the 3rd century BC. Indeed, there is even a hint (‡2 fn 32) that trig may go back to c.300 BC. Trig's absence from surviving mathematical texts (e.g., Rawlins 2008Q fn 32) has been taken to indicate its late appearance; but another possible explanation is that trig was long scorned (by academically powerful pedantic pure-math geometers) as a mere engineers' tool which should not foul mathematical treatises. (The potential analogy with Isaac Newton's presentations in his *Principia* is obvious.) Powerfully against this theory, however: Eratosthenes' important geographical parallels (e.g., Meroë, Athens, Hellespont, Borysthenes) appear to be unrelated to klimata calculations. (The eq.2 calculations via eq.5 in §D3 [a] seem to be Ptolemy's, not Eratosthenes'.)

D5 If known to Eratosthenes, the simple double-sunset Earth-measure method (requiring sph trig) would have faced him with the large disagreement between the lighthouse method's 256000-stades (likely known before him: Rawlins 1982N p.215 & Rawlins 2008Q §I1) vs the sunset method's 180000-stades. (The latter being the Poseidonios-Marinos-Ptolemy value which eventually became dominant. Conversion discussed in Rawlins 2008Q & Rawlins 2008S.) Did he face the disjunct? (See detailed discussion at *DIO 5* fn 18.)[21]

E Cripples, Bigotry, & Pigotry: the Grovels of Academe

E1 While such speculations provide no proof that sph trig was known to Eratosthenes, Table 1 proves positively that sph trig (eq.4) was known to Hipparchos, ***as Diller 1934 was 1st to prove***. (A powerful array of the evidences for sph trig's use in Hipparchos' century is brought together for the 1st time at www.dioi.org/cot.htm#mmsz.)

E2 But, at a time when the hist.astron field is run by "just a bunch of politicians" (as an aghast eminent astronomer describes the field's debate-fleeing dominatrices), the reaction to such a massive demonstration of said gang's fallibility is predictably Doc-Cookian: deny, deny, deny — *never confess*. (See Joey Bishop at *DIO 11.2* [2003] pp.32-33.) It would be merely pathetically funny if it weren't so damaging to the balance of communal micro judgement here and macro understanding of the entire subject of ancient astronomy.

E3 Continuing obtuseness (§E1 item [c]), defying Diller 1934's multiple [now ***SEVENFOLD***] predictive vindications (*DIO 5* §D3), is noted at *DIO 11.1* p.26 fn 1 item [iv] — as well as the even more revealing fact that the near (now total) perfection of *DIO 4.2* Table 1's fit is not mathematically challenged (or challengeable) *nor is this literally PERFECT fit even mentioned by the history of ancient astronomy community*: As of 2015,that's 21^y of cultist bibliographical deceit[22] by this odd community, which only adds to the parallel disgrace of not even comprehending the statistical and Occamite preferability glaring from Table 1.[23]

[21] If Eratosthenes and-or his critics tried both the lighthouse and sunset Earth-measure methods via the Pharos, the azimuths would be different since land beyond the point 202 stades away (where the Pharos flame became invisible: Rawlins 2008Q) would render clean settings of the Sun's disk impossible, so viewing sunsets from the Pharos would be at more northerly azimuths. Strabo 2.2.2 is chronologically valuable in its implicit suggestion (perhaps contra the nonetheless intriguing and original analysis of Taisbak 1974) that Poseidonios was indeed the 1st prominent adopter of the much smaller circumference 180000 stades cited to him at Strabo *loc cit*.

[22] Hardly restricted to just Table 1. See, e.g., fn 24 and especially Rawlins 1996C §M.

[23] The closeness of Diller's fit is definitely known to the Muffia-*JHA* community, which has been directly questioned about it by, e.g., H.Thurston and DR. The only publications accepting Diller's success and his recovery of the long-lost Hipparchan $23^\circ 2/3$ obliquity have been the *ArchiveHistExactSci* (Nadal & Brunet 1984 p.231 & n.17); also *Isis* (Thurston 2002S p.67 & n.18), which is the only publication to take note of *DIO 4.2*'s Table 1 — but neither journal was then controlled by either the Muffia or the *JHA* pack. And all three authors were non-historians: two astronomers and a mathematician. But it should be noted that the publications occurred due to the openness of two historians: Olaf Pedersen and Margaret Rossiter, respectively — to the credit of both. (As asked elsewhere here: is it

E4 Is it really this easy for a few rebel scholars to cripple (into freewill-deprived zombiedom) a whole community, merely by inadvertently manipulating that community's lethal mixture of [A] historical bigotry (the inertia of which tends to produce embarrassing non-priority in discovery-making), plus [B] the resultant sociological bigotry of embarrassing (thus silent) careerist cooperation in academically-outwitted power-genius archons' vindictive exilings?[24] May bigots' turf-possessiveness be succinctly summed up as: Pigotry?

E5 Readers can examine this matter (bluntly condensed at www.dioi.org/cot.htm#tdps) carefully for themselves and then opt for which view to go with, on Diller's grand discovery: Occam's Razor? Or Muffia theology?[25] I have friends who claim (2009) the Neugebauer Muffia's bad side is dead. Reply: **not until the truth of the Hipparchos-Strabo-Diller discovery is faced**. Rigid, cohesive Muffia ducking of it *for most of a century* is part of what academe's ever-tolerated-as-normal archonal-vanity shunning-rages inevitably lead to. And, as of 2009, Muffia-triggered shunning is as undead as ever in the history of astronomy zoo. For discussion of the mechanics & parallels of shunning's **automatic** instant-community-braindeath on central issues of its own field, see *DIO 1.2* §H2 [1991] (www.dioi.org/vols/w13.pdf pp.124-125); *DIO 4.3* ‡15 §G9 [1994] (www.dioi.org/vols/w43.pdf); & *DIO 14* ‡2's Epilog [2008] on sorority dominatrices.[26]

E6 Sadly, an apostolic succession of modern cultists has outrageously defied common sense — and (needlessly) risked degrading still further their reputations *vis-à-vis* balanced scholarship — by fighting the obvious for ***four-fifths of a century, now***, 1934-2015 (a span whose very magnitude has thus far only intensified the amorally unrepentant culprits' never-confess determination to throw worse reputation after bad), even though their methods for doing so have run the gamut from [1] Babylonianly claiming a more historical theory than Diller's (Neugebauer 1975 p.305 & p.734 n.14), to [2] a contentless argument that Neugebauer's authority meant more than Diller's math (top Muffioso to DR by phone c.2000), to [3] randomwalkingly or vaudevillianly (§K2) reversing field by jettisoning[27] Neugebauer's theory (after our Table 1 [originally 1994, augm. 2002] had made it a failed joke among neutrals) and now instead shifting to trashing the very same universally-understood coherent data-base (middle column of above Table 1: Neugebauer 1975 p.1313) upon which Neugebauer's authority on the issue had been founded and accepted for decades. This final stoat-squirm (above, p.2) occurred in a curiously semi-Muffiose-theology apologia-paper Jones 2002E (frequently called "MuJHA" here to accent its cult-think roots). The new 2002 tactic: outside the beautifully consistent Table 1 (whose klimata were clearly published by Hipparchos as a whole at a single time), find some sort of inconsistency elsewhere in other numbers of Hipparchos (who was glorious or notorious for varying his parameters throughout his career: §F1) — which can then be used to engender doubts of Diller's [a] deduced obliquity (eq.2); & [b] data-base (Table 1: middle col.). MuJHA uses a two-prong attack. Prong [a]: At p.16 mis-taking a calculation for an observation. Reverse at p.17 (§F here). Prong [b]: More such confusion at MuJHA n.9. (§I below).

E7 Putative *JHA* refs for MuJHA missed the stark contradiction between §E6's prongs [a]&[b] (such embarrasments inevitably issue from chauvinist lastditch banzai-determination tryanythingitis): the $\epsilon = 23^\circ 51' 20''$ (eq.5) MuJHA pp.16-17 proposes in §F1's prong [a], is inconsistent with that which would be produced by prong [b]'s proposed data-set-alteration. (Awful numerical details at §§I3&J.) We now examine the §E6 [a]&[b] prongs of Jones' indiscriminate creativity (which he's very fortunately corrected in DR's work as well: see *DIO 11.2*'s cover), a classic Muffia vision of ancients as semi-empirical number-jugglers (Neugebauer 1975 pp.642-644; *DIO* 1.1 ‡1 fn 24), contra *Almajest* 1.12's description of ϵ's capture being via the outdoor transit circle presumed in Rawlins 1982G.

F Jones' Subtraction from the Sum of Human Knowledge

F1 MuJHA's initial knowledge-subtractive (fn 55) attempt to undergut Diller 1934 was above-cited prong [a] (§E6). Diller had been 1st to discover that Hipparchos' ultimately adopted obliquity was the lost value $23^\circ 2/3$, which is accurate (much better than the values MuJHA urges for H, implicitly&explicitly) and has since been validated in various ways (summarized at *DIO 5* §D3). MuJHA pp.15&17 notes that Ptolemy ascribes to Hipparchos the Eratosthenes value[28] $\epsilon_{\rm E} = 23^\circ 51' 20''$ (eq.5). As §J5 notes, this is of little weight since we know (see the MuJHA author's own Hipparchos entry in the *Encyclopedia of Astronomy and Astrophysics* 2000) that Hipparchos repeatedly changed parameters.

F2 To "prove" *to a precision of a few arcsec* $\epsilon_{\rm E}$'s origin, Jones 2002E p.16 riggorously rounds L from $\arctan(3/5) = 30^\circ 58'$ *to a precision of whole* ***degrees***, 31°, in order to get the precise answer he is "straightforwardly" (p.15) seeking below at eq.7. Via Strabo 1.4.2, he "confirms" (p.16) $L = 21700$ stades for Alexandria without noting that not just 31° but $30^\circ 58'$ and (Rawlins 1982G) $31^\circ 04'$ (the only L of the three which is independently relatable to Eratosthenes: Rawlins 1982G) are also consistent with 21700 stades: i.e., no confirmation. When he subtracts the traditional Alexandria→Syene 5000 stades

$$31^\circ - 5000\ \text{stades}/(700\ \text{stades/degree}) \doteq 23^\circ 51' 26'' \qquad (7)$$

he gets close to eq.5 instead of the $23^\circ 49'$ (like eqs.16&17) which he **would** have gotten without that arbitrary 31° rounding. Compare via Occam's Razor to an unjuggled solution (Rawlins 1982G) which ***simultaneously*** solves precisely for three Eratosthenean data: [1] eq.5's $23^\circ 51'$, [2] $L = 31^\circ 04'$ (not 31°), & [3] $Z_{\rm s} = 7^\circ 1/5$. Jones 2002E pp.15-16 baselessly says Strabo's *supposed* (vs §F4) Alexandria "equinox-shadow-ratio" 3:5 & its implicit $L = 30^\circ 58'$ were Eratosthenes'. A key misimpression (§F3): $L = 31^\circ$ is said (p.16) to be "derived from the equinoctial shadow" though standard ancient measure of L got it via ***solstice***[29] (not equinox) data. The method is attractively simple (*Almajest* 1.12): just halve the sum of S.Solst & W.Solst app.noon zenith distances Z. But the process also automatically produces the obliquity ϵ, if one just halves the very same two Zs' difference. See eq.8. Therefore, unless an ancient astronomer deemed subtraction more challenging than addition, he would find ϵ as part of finding L, so (don't miss Jones 2002E p.15's curious phrase "might suggest"): why compute ***already-known*** (via eq.8) obliquity ϵ through the more laborious long-division required (above: eq.7) by the MuJHA p.16 method?[30]

coincidental that the 2002 *JHA* anti-crimethought exercise appeared instantly after the *Isis* paper [citing *DIO 4.2* p.56 Table 1] was circulating among cultists for refereeing? See www.dioi.org/biv.htm#txpv.)

[24] For one of the most flagrant deadbrain-kissing non-citation performances ever accomplished in the Ptolemy controversy, see at *DIO 8* p.2 [1998] the details of the deliberate, systematic behavior (where the osculation factor trumped even the shun-factor: www.dioi.org/fff.htm#msnc) which helped earn super-cowerer J.Evans his advancement into Assoc. Editorship of the *Journal for the History of Astronomy*. (Evans has recently tried silkpursing a handy establishment goon by publishing his output at *JHA 38*:199-206 [2007], without realizing that the paper's proposal lacks statistical significance [www.dioi.org/aeg.htm] or, indeed, perceiving that the paper is statistical at all.)

[25] From www.dioi.org/mot.htm#gddb: "There is no agnostic so ready to embrace doubt as a believer when faced with . . . evidence . . . inconveniently-inconsistent with his undislodgeably-sacred tenets."

[26] At www.dioi.org/vols/we0.pdf p.31. Two pregnant questions are naturally suggested by the outré spectacle of Muffiosi shunning (& thus trying to suppress public gratitude for) Diller's greatest discovery: [i] Why do observers so rarely note that shunners are customarily less brilliant *and* ***by-definition*** *less brave* than shunnees? (See, e.g., p.2 fn 1; or www.dioi.org/sno.htm#hvtv.) [ii] And why, in such situations, can one count on all but the best of the "science press" to undeviatingly, fawningly trust & promote the former, not the latter? — while censoring all mention of their gurus' censorial behavior.

[27] If this indicates that denigrating a DR-associated achievement has higher Muffia priority than worshipping Muffia-godpop Neugebauer, that's some progress. But such little-steps (see 1998 note at *DIO 1.2*) haven't taken us far in the last decade. Except backwards, via Muffiosi's very littleness?

[28] Hipparchos may've used eq.5 at some point in his long career. But not when computing Table 1.

[29] Solstices are used to find L because measuring equinoctial $s_{\rm e}/g$ is vitiated by non-parallelness of instrumental & real equators. Which, among other reasons, is why all known observers before non-observer Ptolemy fixed their calendars by solstices, whose times are not affected by equatorial mis-set (or refraction or parallax). And even Ptolemy knew to find L by solstice observations; *Almajest* 1.12. The superiority of solstitial data (vs equinoctial) is well explained at R.Newton 1977 pp.81f.

[30] Whatever may be the merit of MuJHA's try (our eq.7) at relating ϵ, 5000 stades, & an (inexplicably)

F3 MuJHA's non-refereed history is revealed by two slips.[31] (At *literally* [§F2] chapter-one-*Almajest* sophistication.) Ancient astronomers' "equinoctial" ratio s_e/g (horizontal shadow length s, divided by vertical gnomon height g) isn't "derived from the *equinoctial* shadow" (MuJHA p.16 emph added) but from *solstitial* observations (*Almajest* 1.12):

$$\text{latitude } L = (Z_w + Z_s)/2 \qquad \text{obliquity } \epsilon = (Z_w - Z_s)/2 \tag{8}$$

With g standardized at 60 (*Almajest* 2.6; evidently 120[32] in Pytheas' day: eq.10), the equinoctial equation is:

$$s_e/g = \tan L = \tan[(Z_w + Z_s)/2] \tag{9}$$

where Z_w & Z_s are the Winter Solstice & Summer Solstice local apparent noon zenith distances, resp, which are found via, e.g., transit circle (*Almajest* 1.12). Or perhaps by gnomon, the sort of *observation* analysed in eq.10 (which MuJHA p.17 centrally and inexplicably is sure is a calculation). Thus, all ancient "equinoctial observations" of s_e/g (e.g., Vitruvius, Pliny, Ptolemy: see Rawlins 1985G pp.262-264 & *Almajest* 2.6) are neither equinoctial nor raw observations — but are instead calculations, performed in several steps (eqs.8→9) from raw *solstitial* observations. In short, finding **equinoctial** s_e/g involves a multi-step (eqs.8&9) calculational processing of two observations, while **solstitial** s_s/g is just read directly off a gnomon (Pytheas) or a transit circle (*Almajest* 1.12). (The R.Newton discussion cited at fn 29 well clarifies similar problems.)

F4 MuJHA's prong [b] 2nd try at gutting Diller 1934 is an argument for E's obliquity having been used by Hipparchos: contra §F3, Jones claims that Pytheas' famous S.Solst. solar altitude (c.300 BC) shadow/gnomon[33] ratio s_s/g at Massalia[34] (modern Marseilles)

$$s_s/g = \frac{41\frac{4}{5}}{120} \doteq \tan 19^\circ 12' = \tan Z_s \qquad [\ddagger 2 \text{ eq.1}] \tag{10}$$

whole-degree-rounded L, the chronological order of finding these data is unlikely to have been as suggested. Jones 2002E p.16's pure speculation, that Eratosthenes' Alexandria $L = 31^\circ$, is as unsupported as is the same page's connexion of our eq.11 to him. By contrast, Rawlins 1982G p.264 used Eratosthenian data with expected solar-semi-diameter errors *in a coherent argument* to show that his Alexandria $L = 31^\circ 04' = 21750$ stades, which accounts for the unusually precise stades' 10s-place ending of Strabo 2.5.24, as well as Hipparchos' Alexandria $L = 31^\circ 05' = 21760$ stades (explaining the also-exceptional stades' 10s-place ending of Strabo 2.5.39, as well as *GD* 4.5.76's Pharos L), which is merely Eratosthenes' L processed through Hipparchos' usual $5'$ rounding. (See similar E→H rounding of $4'$ to $5'$ at §H3.) These 2 Strabo passages are thus consistent with central site Rhodos' L being 25500 stades (city) for Eratosthenes & 25400 stades (klima) for Hipparchos.

[31] One key error is at p.15 line 6 [detected in 2002 by Thurston], confirmed by another at p.16 line 4. These are noted at *DIO 11.1* p.26 n.1 & www.dioi.org/cot.htm#ucmf. If one repeatedly chooses (though legitimate journals exist in the field) to publish in a forum which one knows perfectly well has a long record of slapdash (see www.dioi.org/qqq.htm#hhwc!) to non-existent refereeing (and whose Editor-for-Life strikes hate-objects from His list of those scholars whom He might choose as His referees [***an offense which alone destroys a journal's claim to having a reliable&honest refereeing process***] even when He knows [*DIO 6* ‡3 §I1] they are competent), one cannot be surprised when misunderstandings pass into print unapprehended. It is also disappointing to find an attack on DR in a journal from which appreciative citation of his work has been strictly barred for many years, even while *DIO*'s fair-debate doors are always open: www.dioi.org/deb.htm. This, again, is the kind of improvidently-unanticipated destruction of communication inevitably created by fawning on semi-numerate archons who atone for their own inductive sterility by such creativity as shunnings.

[32] If Pytheas used a gnomon based upon 120 as a unit (as are the sine tables of *Almajest* 1.11) then did tangent tables already exist c.300 BC, allowing instant conversion of s/g to Z, as in eq.10?

[33] Question: why do classicists persist (as in the LCL version of this passage) in translating the Greek for ancient scientists' γνομον ("gnomon") as "index", when it is important that modern scientists analysing ancients' work understand what instrument was being used?

[34] Strabo 1.4.4 (& 2.1.12), 2.5.8&41. Some of the Strabo report has Hipparchos placing Massalia and Byzantion on the same $15^h1/4$ klima. While Massalia is close to the implied 43° parallel, Byzantion

was not an observation! (Zenith distance Z is the complement of altitude h.) Though, almost everybody else has realized it was an observation, as MuJHA n.11 creditably notes. MuJHA claims it was instead just a calculation, because (?!) it was presented in such precise form. Jones adjacently claims that 2 other gnomon ratios, both equinoctial (Alexandria 3:5, Carthage 7:11), are *empirical* because of roundness, i.e., *because the* s_e *and* g *are smallish integers*. (Definitely an original argument.) But in truth, neither is empirical, as has been serially pointed out over several decades by (Jones-uncited) findings of Honigmann, Neugebauer, & DR. (See, e.g., Neugebauer 1975 p.336 n.29 and Rawlins 1985G pp.263-264 & n.17.)

$$\text{Alexandria } L = \arctan[s_e/g] = \arctan[3/5] = 30^\circ 58' \doteq 21700 \text{ stades} \tag{11}$$

$$\text{Carthage } L = \arctan[s_e/g] = \arctan[7/11] = 32^\circ 28' \doteq 22700 \text{ stades} \tag{12}$$

Eq.11's 100 stade difference vs Strabo's 21800 stades for Alexandria (Neugebauer 1975 p.1313) is one of the three bases for Jones 2002E n.9's proposed 100 stade shift of all the klimata. But such a shift would maintain Strabo's L-differences, yet the difference between eqs.11&12 is 1000 stades, contradicting the difference at Strabo 2.5.38 (900 stades). (I.e., why does Jones 2002E use the Alexandria discrepancy between eq.11 & Strabo's L, while ignoring the corresponding Carthage non-discrepancy?) Carthage's 7:11 ratio is obviously ***non***-empirical, since 32° 1/2 is waaaaay (over 4°!) too far south of actual Carthage, fatefully distorting maps of the N.Africa coastline for the next millennium. And the explanation for this ancient disaster is the very same as for Alexandria's ***true Strabo ms reading***, namely 7:5. (Not 3:5, as MuJHA n.10 scrupulously notes.) Thus it is not the g/s_e ratio but is the *longest/shortest-day ratio* M/m for the Alexandria klima where $M = 14^h$ — just as the 7/11 ratio for Carthage is not the s_e/g ratio but the m/M ratio for the $M \doteq 14^h2/3$ klima around actual Carthage ($L = 36^\circ 51'$N, not 32° 1/2 which is the arctan of $s_e/g = 7/11$: eq.12), as 1st revealed by DR.[35]

is 2° south of it. So, for purposes of testing the reality of eq.10 (& ‡2 eq.5), we may ignore Byzantion (Hipparchos' native area) entirely. But then: if we are reduced to Marseilles (Pytheas' native city: §G1), wouldn't MuJHA's p.17 sph trig be *Pytheas*' calculation? In c.300 BC?! (Note: the later *Almajest* 2.6's *calculated* S.Solst s_s/g for Marseilles does not equal the Pytheas s_s/g: fn 38.) MuJHA's author isn't really asserting such a thing. (DR speculation: If Hipparchos claimed he measured [Strabo 1.4.4] the Byzantion latitude, he may have been referring not to vertical instrument work but to calculation from an observation [badly corrupted by e.g., refraction, dip, etc] of ortive amplitude arctan (2/3) = 33° 41′ [which is anciently listed for Byzantion: see Rawlins 1991W §K2], though this latitude can also be explained by computing via Neugebauer 1975 p.37 eq.5a with $\epsilon = 24^\circ$ for $M = 15^h1/4$.) In any case, MuJHA is correct that Byzantion was a klima for Hipparchos and Ptolemy, but that does not mean that eq.10 was unreal, especially since it does not quite agree with a latitude calculated by eq.4, so that it appears that Hipparchos merely used the *proximity* of the L corresponding to eq.15 (motivated by tradition or cataloging priorities) to name the $15^h1/4$ klima. (Did he treat Pytheas' s_s/g as a valued heritage [perhaps famous for its obvious precision] from the earliest days of observational transit-work astronomy? — evidently *the oldest surviving transit [vertical instrument] raw observation*, presumably prior even to those of Timocharis & Aristyllos.) For convenience, ancients casually merged-confused Syene city with the nearby $13^h1/2$ klima (eq.17). Hipparchos similarly used (fn 55) the *proximity* of α UMi's *NPD* (not its exact value) to indicate the position of the $12^h3/4$ Cinnamon klima. (Are we to suppose that Hipparchos could count on real stars being ***exactly*** on a Z which agreed with indoor klima computations of M?!) Or are we to suppose that immortal (stellar) astronomer Hipparchos just indoor-*computed* (by eq.4) the Z of such major **stars** as α UMi (2nd magnitude present-day Polaris)?

[35] See sources cited at fn 43, which remarks that these identical ancient confusions occur in the same identical paragraph: Strabo 2.5.38. (Analogous to the provocative coincidence pointed out in Rawlins 1996C §I15 at n.119.) Note that the Carthage m:M theory's implicit L (38° to 37° 1/2, via eq.4, depending on the ϵ preferred by the ancient computer) fits Carthage's real L ($36^\circ 51'$) 4 to 6 times better than the s_e/g theory's 32° 1/2. Computing with eq.4 for Carthage's actual L ($36^\circ 51'$) & any anciently adopted ϵ, $M = 14^h.6$; and the nearest klima in the typical ancient tables reproduced at Neugebauer 1975 pp.722&732 would be $14^h2/3$, which is the M corresponding to M:m = 11:7, the very Carthage ratio left us by Strabo 2.5.38.

G Empirical Pytheas

G1 The precision of Pytheas' 41 4/5 (eq.10) is about 1/600 of the gnomon's height, which MuJHA thinks is unrealistic for early work. But this precision is (‡2 eq.2) just ordmag $1'$, which is suspiciously consistent with ***careful outdoor measurement***,[36] NB: Strabo 7.3.1 regards Pytheas as an expert. He also reports (Strabo 2.5.8) Pytheas *was a Massalia native*, obviously enhancing odds that eq.10 is a real 1st-hand observation, and *that this observation was* **oft repeated** *to get it just right*. So there is no reason to follow MuJHA's p.17 rejection of Diller's unquestionably-calculated[37] ***fourteen*** perfect fits to eq.4, just on the basis of MuJHA's infirm *speculation*[38] that a ***reality-accordant*** reading (s_s in eq.10) was actually non-real and thus also calculated. The MuJHA roundness arguments are curiously perverse. Highly rounded s_e/g ratios (Alexandria & Carthage) are obviously not directly empirical (and in these cases aren't even s_e/g ! : §F4), because in the real world, an outdoor eq.9 measurement of s_e/g will probably be as unround as eq.10 (Massalia). Summing up: MuJHA is simultaneously taking equinoctial s_e/g as directly empirical and solstitial s_s/g as non-empirical when (§F3 & eq.9) the reverse is true. So by 2 independent criteria, MuJHA's 3 assessments of the Strabo s/g data's reality are all inverted.

G2 Returning to MuJHA p.17's fundamental Pytheas-Massalia theory, we see that Jones' argument is two-step: Massalia L is computed via eq.4 using $M = 15^\mathrm{h}1/4$ and the Eratosthenes obliquity (eq.5) which MuJHA is proposing for Hipparchos,

$$\text{Massalia } L = \arctan\frac{-\cos(7\tfrac{1}{2}\cdot 15\tfrac{1}{4})}{\tan 23^\circ 51'20''} = 43^\circ 01'24''\text{N} \tag{13}$$

Then, we subtract that same obliquity, and arrive at a S.Solst Z_s which is supposed to explain the "calculated" Pytheas s_s/g of eq.10 but doesn't:

$$s_\mathrm{s}/g \doteq \tan[43^\circ 01'24'' - 23^\circ 51'20''] \doteq 41.713/120 \neq (41\ 4/5)/120 \tag{14}$$

a failure which leads (§J5) to Jones 2002E's p.17 plea — *not necessary for ANY of Diller-DR's FOURTEEN hits* (Table 2) — that we tolerate Slight-Miscalculation (§J5) in the CENTRAL attempted hit of Jones 2002E's concoction. Just one more unexplained inconsistency.

[36] The experiment requires the gnomon's verticality checked by plumb-bob, an art preceding Pytheas by 1000s of years. Some gauge ancients' solar-data accuracy by reference to their star observations. But the Sun is immensely brighter & easier to place. The S.Solstices of Kallippus (−329/6/28 1/4) & Hipparchos (–134/6/26 1/4) were both accurate within $1^\mathrm{d}/4$ rounding precision (see Archimedes at *Almajest* 3.1), but such success requires $1'$ accuracy since it is done by equal altitudes. (Raw human ocular accuracy is to c.$1'/3$: Rawlins 1985G. As ancient scientists were aware: *DIO 14* ‡2.)

[37] I.e., agreeing with math not reality, *obviously the normal situation for klimata*: fn 34.

[38] Based without justification upon claimed (§F4) significance of the eq.10 ratio's precision. But how would Pytheas calculate Z_s (thereby giving him his s_e/g via tangent) by subtracting obliquity ϵ from L (MuJHA p.17 middle equation), when he didn't know ϵ without using eq.8, which requires one already to have determined Z_s, the equivalent (via arctan) of the very item supposedly being sought (s_s/g)! So MuJHA has to speculate that 41 4/5 is Hipparchos' calculation, via eq.4 using eq.5's obliquity. Yet Strabo (1.4.5 & 2.5.41) ascribes 41 4/5 to Pytheas, not Hipparchos. MuJHA proceeds according to his beliefs that 41 4/5 is a klima calculation (for which there is no evidence) and that the klima's $L = 43^\circ 01'$ — though we multiply demonstrate elsewhere (§H) here that the L upon which MuJHA bases his argument is actually $L = 43^\circ 04'$, which underguts his whole case for eq.5's involvement in the origin of Pytheas' 41 4/5. (See, e.g., eq.16.) Note that, if using Eratosthenes' obliquity (eq.5) for $M = 15^\mathrm{h}1/4$, MuJHA's hypothetical calculator would have (via eq.4) gotten not 41 4/5 but the *Almajest* 2.6 value, 41 2/3 (eq.14). MuJHA p.17 realizes this; so, does MuJHA then responsively dispense with the thus-contradicted (and Strabo 1.4.4-contradicted) theory that 41 4/5 was calculated, and accept instead that Diller-DR's theory fits better and lots more often? No, he concludes (MuJHA p.17) that his own hypothesized (central-to-countering-Diller) "calculator" must've screwed up. A stark example of the effect of cultism upon judgement. (Since there is no evidence for eq.4's existence in Pytheas' day, the MuJHA-hypothesized calculation must be alleged to have occurred far later, which much diminishes any excuse for imprecision.) Notably, Jones 2002E convinced not one among even his friends on the committee for the $1000 *DIO* van der Waerden Award.

G3 MuJHA p.17: "I believe we have to regard the shadow ratio [(41 4/5)/120] as the more trustworthy datum" backed up by "the closeness [!] of the agreement between text and recomputation for $\epsilon = 23^\circ 51'20''$ " — this, though Diller-DR's 14 fits (Tables 1&2) are all within their precision (100 stades) while MuJHA's ***foundation*** datum doesn't fit within its (standard ancient fractional representations of s: 2/3, 3/4, 4/5, 5/6, etc). Moreover, even if we accept this dubious claim, that would just mean that both the fourteen data and the lone datum were calculated; so why (except to satisfy cult-straitjacket theology) rank a SINGLE mysteriously-presumed (§F4) and admittedly botched (eq.14; §§G2&J5) calculation as superior[39] to FOURTEEN Strabo klimata (several *redundantly*[40] established) which perfectly satisfy (14-for-14) the whole problem at hand, as Table 2 illustrates.

G4 Yet, Jones astonishingly deems his nonfitting "shadow ratio" (eqs.13&14, doubly-misinterpreting eq.10 as eq.5-based and calculated) to be "the more trustworthy datum". Instead of citing *DIO*'s 1994 table and display-comparing his own, Jones deliberately omits to provide readers ***either***, since such would instantly reveal the vacuity of his paper.

H New Implications of Marseilles Latitude 43°04'

H1 We now produce new, independent, & fruitful evidence for eq.10's 41 4/5 being anciently taken as an accurate placement of Massalia. At *Almajest* 2.6, the original ms reading for Massalia's latitude is not $43^\circ 01'$ (as recently emended[41] and used for MuJHA p.17's mathematical development). No, the actual reading is $43^\circ 04'$. Remember that $43^\circ 01'$ is just an indoor ***klima*** calculation (eq.13) for the $15^\mathrm{h}1/4$ klima, via **sph trig**, having no mathematical relation[42] whatever to *empirical* eq.10.

H2 We next reveal that Massalia's *Almajest* 2.6 latitude $L = 43^\circ 04'$ was in truth elicited by an ancient computation (Eratosthenes'?) with Pytheas' empirical outdoor ***transit*** datum 41 4/5, as we see from the simple **arithmetic** of standard transit-reduction, using[43] eqs.5&10, which produces a perfect hit upon this (previously unexplained?) latitude:

$$\arctan[(41\ 4/5)/120] + 23^\circ 51'20'' \doteq 43^\circ 04' \tag{15}$$

H3 The fact that $43^\circ 04'$ is the correct reading is confirmed by the *GD* latitudes for Marseilles (*GD* 2.10.8) and Byzantion (*GD* 3.11.5): both indisputably $43^\circ 1/12$, which (in a work whose degree-angles are all Hipparchanly rounded [as also at fn 30] to the nearest $1^\circ/12$) is consistent with empirical eq.15's $43^\circ 04'$, not with calculated eq.13's $43^\circ 01'$.

[39] Though MuJHA's author is (in non-math respects) superior to B.Schaefer as a scholar of ancient astronomy, the attraction to an ultra-shaky basis for an attack on a Muffia-upsetting DR-related achievement is similar to Schaefer's blindered attraction (Schaefer 2001) to depending upon the *least* reliable test (low altitude atmospheric extinction) of all those available for determining the authorship of the Ancient Star Catalog. (Schaefer 2001 was also published in the DR-banishing *JHA*.)

[40] See the vertical arrows of Neugebauer 1975 p.1313 Fig.291, each of which is (except the Equator-to-Meroë arrow) based upon an explicit statement in Strabo. (Ignore the Eratosthenes arrows on the right, and keep in mind that said Neugebauer chart's Alexandria, Carthage, & Meroë aren't klimata.) It is obvious at a glance that most of the L values of the dozen Hipparchos-Strabo klimata-latitudes are comfortably over-determined (about doubly, on average).

[41] Our thanks to Toomer 1984 p.86 n.43 for fairly and helpfully pointing out the original's δ (the Greek math symbol for 4) even while arguing against it in favor of α (Greek math for 1), since the latter explains the *Almajest* 2.6 shadow ratios *but only if one rounds to the nearest 1°/12*. (This step also crucial at fn 56.) That is, both $L = 43^\circ 01'$ and the eq.5 obliquity must be so rounded: to 43° & 23°5/6, resp, before the *Almajest* 2.6 shadow data can be recovered. The original $43^\circ 04'$ is properly maintained in the *Almajest* editions of Heiberg, Manitius, & Taliaferro.

[42] Syene [eq.17] & Massalia are among the very few *cities* associated with klimata in *Almajest* 2.6; both cities are a few miles from "their" klimata. See fn 34 for further discussion.

[43] Neugebauer 1975 p.336 rightly backs Honigmann in preferring the 5:7 Alexandria ratio. (The original ms' ratio, not the Vitruvius-Ptolemy 3:5 ratio later substituted. See LCL's Strabo 1:510, & Rawlins 1985G p.263&266 on *GD* Pharos' L vs Alexandria's.) He (*idem*) uses round $\epsilon = 24^\circ$ (not eq.5) to develop Pytheas' L, thereby missing our eq.15 & getting accurate $L = 43^\circ 12'$ only by chance cancellation of $16'$ errors (ϵ & *ssd*). (Note: *Almajest* 2.6's three s/g are consistent with $L = 43^\circ 01'$.)

I Inconsistencies' Inconsistencies & Hipparchos' Circuli

I1 Thus, MuJHA p.17's attempt to connect Hipparchos to $23^\circ 51' 20''$ fails both because eq.15 could as easily be (say) Eratosthenes' as Hipparchos' and because MuJHA's eq.13 relation of L & ϵ now (revised here to accord with mss-based eq.15) leads to obliquity:

$$\epsilon = \arctan \frac{-\cos[(15^{\rm h}1/4)(15^\circ/1^{\rm h})/2]}{\tan 43^\circ 04'} = 23^\circ 49' 25'' \qquad (16)$$

which is not Eratosthenes' obliquity. (Such inconsistencies inevitably result from bringing in scraps of disparate data from all over the place to try splatter-strafing solid work — instead of recognizing the merit of a coherent solution to an inter-related [***and uniformly unitized***: §I2] data-pool, such as the Hipparchos-Strabo klimata.) From prong [b] (§E6): in trying to weaken the Diller achievement, MuJHA states (p.17 [bracket added])

> A.Diller and D.Rawlins have derived a value for the obliquity, $23^\circ 40'$, that yields a close fit to Strabo's stade figures (which are expressed in round hundreds of stades, thus to a precision of $1^\circ/7$). Unfortunately [?], there are some inconsistencies[44] in the numbers reported by Strabo, and one may well suspect that one or two modest changes in the intervals, through either scribal error or deliberate tampering, could[45] have introduced systematic errors which would affect the value of the obliquity best fitting the data.

Jones' "untamper" riffs-off Rawlins 1985G p.263's solution to Pliny's circuli.[46] Note Jones' implicit acceptance of Diller's general thesis (sph trig), which is never made explicit. As for "one or two modest changes in the intervals": any Jones alteration besides uniform shift of all data would produce a trepidation-level-hilariously choppy M-vs-L curve. So when MuJHA gets around to specifics, all he can do is agree (MuJHA n.9) with the reliable, long-accepted Neugebauer 1975 p.1313 rendition, except for injecting an odd anti-Diller escape-ploy (n.9): "restoration" by shifting the whole set down 100 stades, to "undo" a dreamed-up ancient tamperer's hypothetical addition of 100 stades onto the set.[47]

[44] The Strabo Hipparchos klimata data are given mostly as intervals rather than as absolute values, which is why Diller 1934 refers to them as garbled. And there's been some very obvious reconstruction (to which Jones 2002E n.9 agrees), but the work of decades of scholars (embodied in Neugebauer 1975 p.1313's valuable & crystal-clear Fig.291) has succeeded in establishing these klimata beyond any reasonable doubt (outside Meroë: fn 40). It is thus retrograde scholarship (fnn 47&55) to try tearing down one of the grander cumulative achievements of classicism.

[45] Translation: if a long-archon-loathed theory has the surprise 1994-2009 effrontery to ultimately fit a set of decades-long-established data, we "have to" (§G3) now reject the offending data, instead of *heaven-forbid* doubting archonal judgement! When one side doesn't want to admit it's lost a dispute to another side, a common tactic for the former is just: do or try whatever it takes to pretend that its cult is not totally defeated, by going for a standard the-controversy-continues sham; see, e.g., *DIO 4.3* p.105 n.1; *DIO 7.1* ‡4 p.24 fn 21. In criminal court, we often see a flagrantly guilty client's lawyer desperately scatter-arguing for all but the obvious solution to the crime, trying to blame it on anyone but the client, insisting that the police didn't consider one or another of a retinue of red-herring suspects. It's smart rhetoric and good theatre; but it's not serious or unbiased investigation. (See also §K.)

[46] On 2009/8/18 ($25^{\rm y}$ after the Greenwich Centenary lecture resulting in Rawlins 1985G), it dawned on super-swift DR that the circuli (fnn 47&50) may be Hipparchan: [a] the ϵ is his (eq.4); [b] one of the scheme's two bases is Rhodos (fn 50); [c] the Rhodos entry is not only mis-written (restoration: www.dioi.org/cot.htm#ypsv), but its restored fraction, 77/105, should've been rendered as 11/15 (*idem*). This suggests bungling by two closely successive and-or insufficiently collaborative hands, early in the scheme's history, similar to the Hipparchos-school slip found at Rawlins 1991W eqs.23&24.

[47] Jones' 100-stade-shift proposal suspiciously — and invalidly — mimicks (***uncited***) Rawlins 1985G's valid restoration of the "circuli" of Pliny 6.39.211-218; the key distinction: while Evans 1987 & Jones 2002E (for huge *JHA* political advancement) replaced order with chaos (fn 55), DR's circuli-restoration did the reverse. (As in other cases, e.g., the *DIO 9.1* ‡3 continued-fraction decipherment of ancient yearlength mss.) The $M\&L$ pairs found in Pliny were not consistent (fn 50) via eq.4 for any Hipparchan ϵ. As shown at Rawlins 1985G p.263, an ancient dabbler had noted that the original scheme didn't give $M = 12^{\rm h}$ for the Equator ($L = 0^\circ$); so he "corrected" it by altering an integral constant: changing the 358 in fn 50 to 360. The original is restored at DR *loc cit*, which finds not only that the L are now in extremely close agreement with pure sph trig calculation, but that the original scheme used Diller's Hipparchan obliquity (eq.2): see Fig.1.

I2 For Hipparchos' klimata, which are expressed by Strabo ***entirely in stades***, Jones 2002E n.9 justifies the need for his proposed 100 ***stade*** shift via three ***non-stade*** data:
[A] The star α UMi is stated by Marinos (*GD* 1.7.4) to have been placed at north polar distance $NPD = 12^\circ 2/5$ from the pole, which (by eq.4) for Diller's proposed Hipparchan obliquity $23^\circ 2/3$ (eq.2) corresponds to 8700 stades, not Table 1's 8800. The Catch: Hipparchos used more than one obliquity (see discussion at §F1), the other one being (Rawlins 1982C pp.367-368 & eq.27) $\epsilon_{\rm H1} = 23^\circ 11/12$ (eq.6), which, if we compute with it (eq.4) for the Cinnamon klima's $M = 12^{\rm h}3/4$ yields $L \doteq 8700$ stades — thereby providing one simple and quite plausible explanation of the discrepancy. (For another, see fn 55.)
[B] Strabo 2.5.36 puts Syene at $L = \epsilon$ & $M = 13^{\rm h}1/2$, a common ancient confusion. If taken as precise, both statements were false (§B3), but Jones 2002E n.9 notes that if both are forced to be consistent, then $L \doteq 16700$ stades, 100 stades below Table 1's Syene klima. Catches: [i] If we demand both Strabo statements' consistency, then (by eq.4):

$$\text{Syene} \quad L = \epsilon = \arctan\sqrt{-\cos(7.5 \cdot 13.5)} \doteq 23^\circ 49' 50'' \qquad (17)$$

but that is not consistent with the MuJHA prong [a] argument (discussed here at §F1) which claims that Hipparchos' ϵ was eq.5 = $23^\circ 51' 20''$. (And both these values are contradicted by MuJHA's 100 stade-shift argument of §I3, which [implicitly: §I3] finds $\epsilon = 23^\circ 47'$.) [ii] As with all of MuJHA's justifications for his 100 stade-shift), *none of the Strabo data MuJHA cites against Diller-DR are given* ***in stades*** *by Strabo*, whereas ***all*** the values accepted & used by Neugebauer 1975 pp.305 & 1313 and fitted by Diller 1934 (& our Table 1 or *DIO 4.2* p.56) are given *explicitly in stades by Strabo*, an obvious indication that Table 1 is based on a coherent, one-source data-set.
[C] Jones 2002E p.16's 31° Alexandria latitude, derived from Strabo 2.5.38's $s_{\rm e}/g = 3{:}5$ for that city, would by eq.1 equal 21700 stades, though (as just above at [B] item [ii]) this is not so stated by Strabo. Since this disagrees by 100 stades with Strabo's 21800 stades for Alexandria (Neugebauer 1975 p.1313), Jones claims another hit for his 100 stade-shift. Catch: Ratio 3:5 is just *a modern alteration of the actual text*'s 7:5, which ***isn't a shadow/gnomon ratio but a longest-shortest day ratio*** (§F4 or Neugebauer 1975 p.336 n.29). Informed of this, Jones now (2009 April) brushes off the whole issue as minor.

I3 Jones 2002E p.17: this 100 stade shift would "affect the value of the obliquity best fitting the data". (Yes, and it would produce [§J3] a much worse rms than Diller-DR, thereby ruling-out the proposed shift.) How genuine & (Schaefer 2002) "premiere" is a journal that would carelessly-lazily publish such deliberate trashing of a precise & epochal discovery, ***without bothering to test said fit***? And without asking Jones if he even knew how to run such a least-squares test? (*JHA* attitude: if an author is an archon, why referee him?) For Jones' eq.5 ϵ & 100 stade shift, ***8 of 13 klimata fail***, a worse score than Neugebauer's! *Thus Jones produces no table* & ***never tells anyone where to find DR's***. Jones repels unwelcome evidence as amusingly as the kook Doc-Cook Society (see *DIO 9.3* §C7): e.g., if he rejects the data which Diller-DR have fit, then: *why can't he cite the best-fit table*? If the Strabo data-set (Table 1) is altered by Jones' mere 100 stades (less than $9'$), *no choice of obliquity* can satisfy it. ***That's how hard it is to thread a curve through these data. Yet Diller-DR's solution produces a flawless fit to them.*** For Jones 2002E n.9's 100 stade-shifted klimata data-set, the best fit is for $\epsilon = 23^\circ.778$ or $23^\circ 46'.7$, a figure *nowhere stated* by Jones 2002E (perhaps because this prong [b] ϵ contradicts prong [a]'s eqs.5&7: §E7). After all, $\epsilon = 23^\circ 46'.7$ is: [i] unround; [ii] "has disappeared entirely from the tradition and is not attested" (selectively echoing Neugebauer 1975 p.734's attack on Diller 1934); & [iii] has (unlike Diller's eq.2: §J5) no independent support. And even this best-fitting ϵ value is ruled out statistically (§J3), and will (if used in eq.4) nonetheless fail for four klimata of the

fourteen that Diller-DR solves all fourteen of. If we try the Eratosthenes obliquity (eq.5) of Jones 2002E's prong [a] attack and compute via eq.4, the results disagree with about 60% of §I1 prong [b]'s proposed 100 stade-shifted klimata data-set. These unevadable items provide independent *validation of the untampered original data-set* of Table 1, upon which Diller-DR's solution is founded. Conversely, if we hold at $\epsilon = 23^\circ 51' 20''$ & look for the best-fitting A, it's 158 stades (not Jones' 100): impossibly far from the unrestrained best fit we are about to locate (eq.18) in ϵ-A space. But $A = 158$ stades would anciently round to $A = 200$ stades, which fails for 5 out of 13 matches. Probability P (eq.19): 10^{-4} for 158 stades; ordmag 10^{-9} for 200 stades.

J Testing MuJHA by Math (& Unnoticed Klima) Instead of Guess

J1 But these are trifling odds compared to those against adopting Jones' 2 prongs simultaneously (§I3): $\epsilon = 23^\circ 51' 20''$ (prong [a]) & $A = 100$ stades (prong [b]). For this remote position in ϵ-A space, $P < 10^{-13}$ (eq.19), i.e., odds of tens of trillions-to-1 against.

J2 But even were Strabo's data infected by the Jones shift, the truth would be recoverable: [1] the mis-shift could be detected by least-squares analysis (§J3) and corrected-for; [2] the L-vs-M curve would still (see Fig.1 & caption) show **a suspicious tendency to track the sort of curve produced by sph trig with a Hipparchan & accurate obliquity**. Which vindicates Diller, though this important point is (*ungenerously*: www.dioi.org/biv.htm#ncmf) left unstated by *JHA*; so how is MuJHA a refutation of Diller's ***essential discovery***[48] of Hipparchan-era sph trig? That Diller has made this discovery is known to *JHA*, Jones, & the Muffia. But all have chosen to leave it publicly unexpressed in explicit terms. (See comment [2] at §I1.) A near-century of collective shame is just too awful to openly confess.

J3 We next carry the previous discussion to its logical conclusion. It is obvious (§J2) from the shape of the Hipparchos-Strabo data's L-vs-M curve that it was generated from sph trig calculations. Jones agrees that sph trig was known to Hipparchos and (n.7) dumps Neugebauer's folly because it (unlike sph trig) "failed to show how Hipparchus could have found a sequence matching so accurately the theoretically correct latitudes". (Which Diller 1934 had done, heretofore to Muffiosi's arbitrary non-pleasure.) We run a least-squares fit (no roundings) of the function, $\arctan[-\cos(15M/2)/\tan\epsilon] + A$, upon the M&L data of Table 1, to check the fit of eq.4 simultaneously with Jones' 100-stades-shift proposal, thus treating obliquity ϵ (eq.2) AND Jones fudge-factor A as unknowns. Formal results:

$$\epsilon = 23^\circ 37'.6 \pm 3'.2 \qquad \text{and} \qquad A = -28 \pm 44 \text{ stades} \tag{18}$$

Jones 2002E n.9[49] haggle-adduces disparate Hipparchan data (having nothing to do with Table 1's coherent data-set) to come up with his $A = 100$ stades (which is c.9′). But the foregoing best-solution equation shows that Jones' +100 stades is statistically ruled out, since his A (like even the most helpful ϵ [§I3] adjusted for it) is several standard deviations distant from the A & ϵ (eq.18) which minimize the residual-sum, with probability $P \doteq$ 1/70. I.e., *we can find A mathematically*.[50] (A non-fictional *JHA* referee would have known that and tested for A.) By contrast, Diller's solution ($\epsilon = 23^\circ 2/3$ and $A = 0$) easily falls within 1 standard deviation (sd) for both variables. (Probability P exceeds 2/3.) I.e., Diller is again vindicated. Doubly. On the nose.[51] ***But who will be the 1st Muffioso — after over 80y of bigotry, ungenerosity, & even viciousness***[52] ***— to own up to this?***

J4 Under the 2-dimensional elliptical-cross-section Gaussian surface representing the probability density pd of any point on the ϵ-A plane, probability[53] P is the integrated volume exterior to the locus of points whose pd equals that of the point in question:

$$P = e^{-\frac{S-S_\mathrm{m}}{2\sigma^2}} = e^{-(N-2)D/2} = e^{-FD/2} \tag{19}$$

where S = square-residuals sum there; S_m = best-fit S; σ = single-datum standard deviation; sums' relative difference $D = (S - S_\mathrm{m})/S_\mathrm{m} = S/S_\mathrm{m} - 1$; N = no. of data; F = degrees of freedom (= N minus the number of unknowns, that being 2 in this case). For the Princetitute 4-dimensional case (fn 7): $P = (1 + FD/2)e^{-FD/2} = 10^{-518}$.

J5 A general observation: the MuJHA paper (which never remotely approaches supplanting Diller's well-founded improvement of our knowledge of antiquity by arriving at a comparably coherent vision: fn 55) omits mentioning any of the five then-known[54] published post-1934 confirmations (now *seven*: *DIO 5* §D3) of Diller's ϵ and data-fit.

[48] Were MuJHA's hypothetical data-set actually in Strabo, an uncommitted explorer-scholar would test statistically and would soon find (eq.18) that removing A =100 stades would produce a data-set neatly fitting L values calculated via eq.4. I.e., math-analysis cures corrupt data better than guessing-around. See, e.g., the restored Pliny circuli (fn 50), which (before Rawlins 1985G) had been universally regarded as useless. (A view time-warply echoed at Jones 2002E n.11. Neugebauer 1975 p.748 even fantastically treats the circuli as "a telling illustration for the absence of any scientific organization in antiquity".) Yet, by minimal reconstruction, Rawlins 1985G has shown that the Pliny circuli are a clever, unexpectedly precise linear fit to a sph trig klimata table based on Diller's ϵ (eq.2) and are thus one of more than a half-dozen post-1934 findings (§J5) that back up his $23^\circ 2/3$. (See *DIO 5* §D3.)

[49] Jones 2002E n.9 credits Muffia-don Neugebauer with reconstructions actually 1st published in Diller 1934 (cited in MuJHA's previous endnote). Again: alert refereeing would've spotted that.

[50] The DR solution (fn 47) of Pliny's "circuli" klimata can be similarly grounded in mathematical analysis rather than speculation. If one computes obliquity ϵ for each of Pliny's firm klimata from the data he gives, the mean is $24^\circ 07' \pm 5'$, disagreeing with Hipparchan ϵ. But, after shift-restoring (Rawlins 1985G p.263) the M by -1° or -4^m (an amount explained at fn 47), we find the corresponding mean for the reconstructed data is $23^\circ 37' \pm 2'$, statistically consistent with the now-thoroughly-established (fn 48) Hipparchan ϵ of eq.2 — and fitting this ϵ with far less scatter. (Shifting Pliny's M by a few more negative time-min can still show comparably small scatter, but the resulting low ϵ values are ruled out by the histories of both Greek astronomy & the Earth's actual obliquity.) Moreover, the Rawlins 1985G reconstruction of the original ancient scheme ends up placing Rhodos at $14^\mathrm{h}1/2$, the traditional Rhodos klima M. The DR reconstruction also allows us to recover (Rawlins 1985G p.263) the circuli's origin: using eqs.2&4, we find for Pliny's Alexandria klima ($M = 13^\mathrm{h}56^\mathrm{m}$) tan $L = 34^\mathrm{p}17'$; and for his Rhodos klima ($M = 14^\mathrm{h}1/2$) tan $L = 44^\mathrm{p}00'$. Continued-fraction analysis (or mere familiarlity with fractions' sexagesimal expressions) would produce ratio-representations of, resp, 4/7 and 11/15. The product of the denominators explains the blatantly obvious common denominator (105) of the rest of the scheme. These are the details behind the statement at Rawlins 1985G p.263 that the circuli's original linear equation (tan $L = [30M - 358]/105$) arose historically when an ancient mathematician just drew (on a graph of M-vs-tan L) a straight line through the two points representing the key ancient klimata: Alexandria and Rhodos. Linearity only worked because the scheme was fit by its ancient inventor to a *much narrower* (Mediterranean) range of L than Table 1's: see Fig.1. The very enormity of Table 1's range is what allowed the discernment (fn 51) of an undeniably precise sph trig signal.

[51] The Diller-DR solution is superior *even to the best-fit solution* (eq.18), which fails for one klima: the L for $14^\mathrm{h}1/4$ is a non-match. By contrast: though the Diller solution ($\epsilon = 23^\circ 2/3$ & $A = 0$ stades) produces a *mean*-residual that's barely larger (than the best-fit's), not one of the 14 residuals exceeds 50 stades after *DIO*'s 5′ rounding of all computed L prior to their conversion to stades (see Table 2). ***NB: BOTH of Table 2's rounding-steps are anciently normal thus non-arbitrary: 5′ & 100 stades***.

[52] Check out Neugebauer 1975 p.734 n.14. Pure Muffiosity. And by now merely an especially precious larf-reminder of the reliability of establishment exilings of ideas and persons. The former academic crime is longterm-worse than the latter; but, following exile-decree, a shunned scholar's fertility may produce unanticipated ideas, the blanket (knee)jerk-condemnation of which can monotonically evolve into requiring an unexpectedly laborious and complex fear&smear campaign, to maintain perpetual suppression of a heretic — in order that a debate-fleeing cower-operator mogul's decree sticks. See fn 56, Rawlins 1991W §§D4&H2, and www.dioi.org/cot.htm#vskc.

[53] The matrix relating ϵ&A's stdevs & correlation to σ is diagonalized by similarity transformation (50° rotation) ensuring separation of variables. One new variable's sd is 10 times the other's, but normalization creates isotropic pd, simply integrable via standard cartesian→polar transformation to yield eq.19. (Details: www.dioi.org/biv.htm.) The proposed process (applicable to all such Gaussian bivariate problems) is valid because the exterior volume's fraction of the whole is unaltered by the transformations. The rightmost form of eq.19 also equals normalized pd, for any number of unknowns.

[54] Some sources are cited (n.1), though key evidence discussed here is not. Arguments of Diller 1934 & Rawlins 1982C for Hipparchos' sph trig & $\epsilon = 23^\circ 2/3$ are cited at MuJHA n.8, but there's no mention of $23^\circ 2/3$'s additional confirmation by Nadal & Brunet 1984, or of the later 1994 sudden-surprise end-of-controversy exactness of *DIO 4.2* Table 1's fit. Likewise, if MuJHA is going to [a] cite

Since Hipparchos changed (§F1) adopted parameters (e.g., ϵ, solar&lunar elements: Rawlins 1982C pp.367f & Rawlins 1991W §§K-R) as his researches progressed, the tactic of bringing a nakedly-alone, extraneous, incoherent Hipparchos datum against a member of a coherent data-set (Table 1) is pointless except (fn 45) as a lawyeresque ploy to join & prop-up the shunning of Diller's discovery. Since MuJHA's theories are non-exclusive (*DIO 11.1* p.26 n.1) using them (e.g., §G1) to down Diller's coherent[55] success is (informatively) gratuitous. MuJHA can't match Table 2's 14-fold match with anything like, & *the prime datum brought against Diller's obliquity doesn't even fit*, so (§G2) MuJHA p.17 alibis: "tiny errors in [H's] calculation . . . might result from [trig] imprecisions". Wouldn't real reffing note that the Diller-DR Table 1 asked for no such leniency for its then-**dozen** perfect H-trig-calculation fits of eqs.4&2 to Table 1? Does Occam's Razor mean *any*thing anymore? (Further at MuJHA p.17: for $\epsilon = 23^\circ 51' 20^\circ$ [*sic*], the resultant $M = 15^{\text{h}}1/4$ klima's $L = 30100$ stades, differing by 200 stades [not MuJHA's 100] vs Table 1.)

J6 MuJHA doesn't cite *DIO* at all. Now, since the newly-discovered and very strongest case (here at Table 1) for Diller's matches was published at *DIO 4.2* p.56 Table 1 (a table in which 15^{y} of determined, evidently-unanimous Muffia opposition has found no errors), and since the 2002 MuJHA paper's timing suggests that it was concocted specifically to counter omertà-breaking 2002 Hist.Sci.Soc citation (fn 23) of said table, it is inexcusable that MuJHA did not cite[56] the ultra-tight-fit new table, or at the very least: the info that DR's adducing (Table 2) standard ancient $1^\circ/12$ rounding (fn 41) upped Diller's score; it now yields his match (§B) to ***all*** 13 klimata. Caketop-cherry: check contenders' L for [2009 ed's] previously unremarked 14^{th} klima, that at $M = 12^{\text{h}}$, ***the Equator***: Jones, 100 stades; Neugebauer, 1500 stades; Diller-DR, 0 stades. Jones $P < 10^{-16}$; Diller-DR $P = 0.76$. [For the 2015 edition, several earlier analyses are re-edited to include the Equator klima.]

Rawlins 1982C (MuJHA n.8) while flouting the undetailed Pliny-circuli confirmation of $23^\circ 2/3$ at Rawlins 1982C p.368 (ignoring its eq.28's extra evidence for $23^\circ 2/3$), and [b] scoff at Pliny's precise circuli as "crude" (MuJHA n.11, thereby sneering at Longitude Zero-refereed Rawlins 1985G), then competent *JHA* refereeing would require citation of Rawlins 1985G pp.262-263 where the circuli are found (fn 50) consistent with a cleverly&accurately derived linear fit to a klimata table computed by sph trig via **23°2/3**. Cornered again (as at §I1), Authoritative-in-His-Own-Mind Jones can only effect required degradation of a lovely DR fit by decreeing as unreliable THE DATA, not his own pre-judgement. Jones 2002E's implicit proposal: putatively-corrupt Strabo data (constant-shifted, wrong obliquity) just happened ***by accident*** to arrange themselves in precisely ***perfect*** accord (read Fig.1's caption carefully to see how precise!) with: correct obliquity, correct sph trig math, standard degree-rounding & stade-rounding, and without fudging any of the long agreed-to Strabo data. Jones' unfunniest crankprank since his Winter Equinox (Rawlins 1991W §B4).

[55] Hipparchos' observed α UMi *NPD* $= 12^\circ 2/5$, Jones converts to 8700 stades. *But neither Hipparchos nor Strabo did so*. MuJHA complains that a *star*'s 8700 doesn't equal the Cinnamon *klima*'s 8800 (Strabo 2.5.7&35). (He thinks Hipparchos believed each klima had a bright star's *NPD* sitting right on it?!) *This* is what co-triggers MuJHA n.9 to *urge lowering all Strabo L by 100 stades*? When MuJHA appeared, DR phoned Jones to stress (§I3): *no ϵ satisfies this hypothetical new set*. Unlike Diller's $23^\circ 2/3$ (fn 54) Jones' best-fit ϵ values lack independent confirmation & exhibit no typical ancient rounding. In R.Newton's phrase: "a subtraction from the sum of human knowledge" (fn 44). Sad to find in the work of one who, despite erratic judgement (prior Jones Muffiose mess: Rawlins 1991W), has made *additions* to said sum (e.g., *DIO 11.1* ‡1 §D1, *DIO 11.2* ‡2 p.30, Rawlins 2008S fn 23 & p.58, *DIO 9.1* p.2); as has *JHA* (‡1 §E1; www.dioi.org/fff.htm#cskv); & Evans (www.dioi.org/cot.htm#gjne, ggg.htm#vppp). MuJHA yields nought but chaotic (e.g., §E6 item [c]) *muddying of others' achievements*. Was this its cultish destructive aim? **Unrefereed** Jones 2002E ***deems worthless all DR refereed finds touched-on***: $L = 31^\circ 04'$ (§F2), circuli (fn 54), klimata (fn 44), refereed by *Isis* (1982), Greenwich (1985), & *Isis* (2002), resp. *DIO 1.2* §H2 [g]'s 1991 prediction of Muffia DR-credit-denial tactic: "Publish a wild speculation (unattested method or inferior fit) which the *JHA* can then pretend is a viable alternative explanation of whatever DR has solved." *DIO 11.1* p.26 n.1: Strabo's 8800 stades precisely fits (eqs.2&4 here) Diller's klimata scheme (Table 2), *though unnoticed by Diller*. Textbook fruitfulness. Yet MuJHA n.9 tries adducing 8800 *against* the Neugebauer-Diller data-set (above & §I2: $8700 \neq 8800$) while following Neugebauer 1975 pp.305 & 335 n.23 in nonciting attested 8800's ***exact confirmation of Diller***. Though DR was 1^{st} to publish the 8800 match to Diller, 8800's possible relation to $12^{\text{h}}3/4$ was initially pondered by Neugebauer 1975 p.335 n.23.

[56] Curious practice: try refuting a discovery (Diller 1934) that's been updated with a remarkably better confirmatory 1994 hit-score (*DIO 4.2* p.56 Table 1, or Table 1 here) *without citing the update*. Likewise, *JHA* Assoc.Ed Evans 1998 cited Rawlins 1982C, but not the revealing later *DIO* update's new clincher-evidence at Rawlins 1994L §C. (Our comments: ‡1 fnn 2&7, & www.dioi.org/vols/w80.pdf, p.2.) But, then, few (if any) *JHA* papers have ever cited *DIO* except to attack it, since Editor-for-Life M.Hoskin's rage at the sight or mention of DR's name is well known. (This, though *DIO*'s board is patently more scientifically qualified than Hoskin's.) Among said rage's more transparent playings-out: *DIO 6* ‡3 §G2. (Outré? No, just everyday *JHA* sanity&integrity. As here at fn 24 & ‡1 fn 7.) Compare to *DIO*'s hugely different citation-record, error-admissions, self-criticisms, and approach to dissent: *ibid* §B3, Rawlins 1991W §C11 [d], *DIO 11.1* ‡2 preface ("Gratitude to Opposites"), *DIO 11.2* cover, & above at ‡1 fn 10 & §C2. In a careerist world, does anyone even care whether journals are honest? ***Except to steer clear of the danger of being associated with those that are***.

K Xerxes' Eternity-Squared — & How Purple Cows Got That Way

K1 Jones 2002E resembles a try-anything-even-if-it-contradicts-yesterday's-dodge routine, of an anti-Occam brand already spoofed at *DIO 2.3* ‡8 §C31. And the next Muffioso into the lists to degrade Diller will offer a different joke-defense, casting Jones' aside (just as he dumped Neugebauer's), but the rigidly prescribed common thread will be: Diller hasn't established[57] anything. Xerxes' "Immortal Ten Thousand" army faked eternalness by replacing each slain soldier with another, so we should admire the Muffia's "Immortal Ten Thousand" degrade-brigade as granting to Xerxes' eternal-life idea its own eternal life. (See perverse analogy at www.dioi.org/epi.htm#dvnv.) And so we observe (yet again) a familiar cardiac-Xerxesure at the spectacle of anti-imperial rebellion and heresy being Taken-Seriously (*Isis*: Thurston 2002S in this instance), leading to (yet again) a serial stoat-wriggle attempt to rescue (yet again) an exalted sacred cow from the jaws of the mundane spring-trap of mere evidence (*DIO 11.3* ‡6 preface). But the Diller case is (like archonal cows' heads) too big & too visible for escape. (And is invaluably unambiguous: Table 1 can show even 8^{y}old kids [see *DIO 4.2* pp.55-57] exactly how honest the evidence-ducking & debate-averse Muffia is.) I.e., bigfat data-trapped sacred cows just can't make or fake it as wriggle-out mink. They can only turn purple trying.

K2 Runnin-round like Chickens with — B-But, their Heads Are Enormously *ON*! Given frantic Browner-motion Muffia inconsistencies (§E6) *vis-à-vis* Strabo's klimata, we're not trying hard to resist recalling yet again the old vaudeville-comic rape-defense routine (already vainly thrown at ineducable historians-of-astronomy back in 1991's *DIO 1.2* §I9): But I don't even know the girl; & I was nowhere near Judy that night; anyway, she consented.

K3 Every reader should consult FOR HIMSELF the stark truth of the state of the florid-visaged history-of-ancient-astronomy community's purple-cowards, as revealed by its forums' predictable (and predicted) totalitarian revulsion at our 1994 *DIO 4.2* p.56 Table 1. The table is so devastating to said clique's insultingly stolid pretense (that Diller's finding cannot be Received by Accepted Society), that *DIO* is for the 3^{rd} time publishing[58]

[57] No one's demanding 100% assent, but the Muffia deliberately, cohesively ducks owning that Diller's discovery has ***ANY*** merit. Why would a cult risk its putative reputation for integrity by continuing such transparent (and transparently grabby: p.2 fn 4) dodges in such an ultimately farcical crusade?

[58] Original shirt-unstuffer 1994 publication [augmented 2002]: online at www.dioi.org/vols/w42.pdf. (Republications in 2009, with Meroë resolved: *DIO 5* Table 0 at www.dioi.org/vols/w50.pdf; detailed table and odds: www.dioi.org/biv.htm.) Don't blame DR's sardonic style for the field's pathology. Princetituter & Muffia godpop Neugebauer's possessive shunning and Babylonianist abuses of Diller 1934 had been going on since before DR was born (indeed, for 45^{y} before DR ever contacted Diller): privately since 1934, and at Neugebauer 1975 p.734 n.14, calling the discovery "absurd", not to be "taken seriously". Such (yet-continuing) slanderous attacks on non-Muffia scholarship have never caused a ripple of public or fiscal disapproval in hist.astron circles. Yet our wee suggestion that mayhap *DIO* is not *always* wrong and the slanderers not *always* right (see, e.g., satire at www.dioi.org/det.htm#mhrr) is regarded as shun-worthily horrific.

it in-full here at Table 1. (Bolstered by Table 2 & Fig.1, as well as by $L = 0^\circ$, & eq.3's fresh discovery of the Meroë klima's actual ancient value.) The long-overdue detailed *DIO* counter-attack against Muffiosi's 75^y shun-trashing of Diller is also appropriately *in-full*.

K4 It is notable that all three of the scholars who have gone into print to repel Diller's discovery are historians who have served time at the Princetitute. As we asked at *DIO 4.3* ‡14 regarding the now-mercifully-dead Ancient Star Catalog controversy: "To yet continue stubbornly flying in the face of [in the present instance a long-accumulating multiplicity of consistent evidences: Diller 1934 → *DIO 5* §D3 [1]-[7] → Table 2 here] is to carry unfalsifiability to kook dimensions — and to raise the question of whether it is worth discussing historical issues at all. (Of course, one may easily understand why certain moguls might wish to render reason and competence irrelevant to the evolution of ideas in [the hist.astron] field.) For, if even the most logically & evidentially one-sided controversies are to be decreed [see NCS at *DIO 2.3* ‡8 §§C20&C25] as indefinitely irresolvable, then — why investigate anything?" When this quote was applied to a few Velikovskians at *DIO 7.1* ‡5 fn 40, no objection was made by historians. But, can they show equanimity when the same principle is found applicable to eminent personages of their own profession?

K5 Final thought: if MuJHA represents the best that the Muffia-defense team can muster against Diller's truth (and, pathetically enough, it is), then the issue is no longer a legitimate controversy (even for those afflicted by the numeracy-gauging delusion that it ever was) — and Aubrey Diller's ghost can rest content on his honestly & creatively earned laurels.

References

Almajest. Compiled Ptolemy c.160 AD. Eds: Manitius 1912-3; Toomer 1984.
Aubrey Diller 1934. Klio *27*:258.
J.Evans 1987. JHA *18*:155 & 233.
J.Evans 1998. *History & Practice of Ancient Astronomy*, Oxford U.
GD = Geographical Directory. Ptolemy c.160 AD. B&J. Complete eds: Nobbe; S&G.
Hipparchos. *Commentary on Aratos & Eudoxos* c.130 BC. Ed: Manitius, Leipzig 1894.
Ernst Honigmann 1929. *Sieben Klimata und die* Πολεις Επισημοι, Heidelberg U.
Alexander Jones 2002E. JHA *33.1*:15. ("MuJHA 2002")
Alexander Jones & Dennis Duke 2005. Centaurus *47*:226.
Karl Manitius 1912-3, Ed. *Handbuch der Astronomie* [*Almajest*], Leipzig.
R.Nadal & J.Brunet 1984. ArchiveHistExactSci *29*:201.
O.Neugebauer 1975. *History of Ancient Mathematical Astronomy* (*HAMA*), NYC.
R.Newton 1977. *Crime of Claudius Ptolemy*, Johns Hopkins U.
C.Nobbe 1843-5. *Claudii Ptolemaii Geographia*, Leipzig. Repr 1966, pref A.Diller.
Pliny the Elder. *Natural History* 77 AD. Ed: H.Rackham, LCL 1938-62.
D.Rawlins 1982C. Publications of the Astronomical Society of the Pacific *94*:359.
D.Rawlins 1982G. Isis *73*:259.
D.Rawlins 1982N. ArchiveHistExactSci *26*:211.
D.Rawlins 1985G. Vistas in Astronomy *28*:255.
D.Rawlins 1991H. DIO *1.1* ‡6.
D.Rawlins 1991W. DIO&Journal for Hysterical Astronomy *1.2-3* ‡9.
D.Rawlins 1994L. DIO *4.1* ‡3.
D.Rawlins 1996C. DIO&Journal for Hysterical Astronomy *6* ‡1.
D.Rawlins 2008Q. DIO *14* ‡1.
D.Rawlins 2008S. DIO *14* ‡3.
B.Schaefer 2001. JHA *32*:1.
B.Schaefer 2002. Sky&Tel *103.2*:38.
Strabo. *Geography* c.20 AD. Ed: Horace Jones, LCL 1917-1932.
S&G = A.Stückelberger & G.Graßhoff 2006. *Ptolemaios Handbuch Geographie*, U.Bern.
C.Taisbak 1974. Centaurus *18*:253.
Hugh Thurston 2002S. Isis *93.1*:58.
Gerald Toomer 1984, Ed. *Ptolemy's Almagest*, NYC.

‡4 Scrawlins

A Light & Dark

A1 How did FDR & Bush 2 differ? FDR was crippled *below* the neck. And heart.

A2 How do academic pols resemble Bach's 250 cantatas? Herd one, herd 'em all.

A3 By Their Fruits Ye Shall Know Them. Jimmy Cagney became immortal for realizing that if Newton could get famous for discovering gravity in an apple, he could strike it big by discovering levity[1] in a grapefruit.

A4 B.Rawlins (§E1) on the "health-bill" ripoff (Congress' latest annual trillion-dollar kickback-feeding): Why the surprise? The whole history of medicine began with leeches.[2]

A5 Born Lyres' Pure Bull. Astrology was evidently born in Mesopotamia. Obviously under the sign of Taurus. Its professional practitioners are born under the constellation Lyra. And you thought horoscopes were worthless? If astronomy is the oldest science and prostitution the oldest profession, the prostitution of astronomy is superlative-squared. (DR *Skeptical Inquirer 2.1*:62-83 [1977], *Queen's Quarterly 91.4* p.969 [1984], *DIO 8* ‡5 fn 62.) Horoscopes ask birth-times to the minute, but longtime world's most famous astrologer Jeane Dixon cut 14^y from her bio: *SkInq op cit* pp.63-64, 71, 73. (Jeane swore she'd either marry millionaire Jimmy Dixon or join a convent. She was whole-hog or nun.)

A6 In 1980, lots of simmering-volcano-Mt.St.Hell neighbors ignored scientists' warnings & got lavingly roasted. Could the dolts have been IQ-jumpstarted by bullhorn-replays of planet-Bluto's *Animal House* food-fight casus-belli-alert? "I'm a ZIT! — ***GET*** it?" (The absolute acne of truly bad "humor"? Ahh, maybe wait out the page before deciding.)

A7 California is the US' prime home for astrologers, psychics, *et ilk*. Did cultural insanity help produce a state in such ghastly shape that most educated persons permanently crossing its border are leaving, not arriving? Is California what Yogi Berra actually had in mind when he said of a restaurant: "nobody goes there anymore; it's too crowded."[3]

A8 Making God's Point: Model-T[4] Goes Model-A. The Roman Empire's join-us-or-else co-prosperity-sphere mob-operation (§B2) killed millions for profit, resulting in passing deification for the founding mass-murderers, capos Big Julie & Little Augie Caesar. Enforcement by public torture-murder-to-get-the-point-across: crucifixion. A millennium later, to repel Constantinople-gobbling Islam, Roman-ia's Christian protector Vlad Tepes (the historical Dracula) copied Rome but upped volume by streamlining the old-fashioned-way: dispensing with the cross-bar, sharpening the post, & rectally popsicling[5] the victims. By thousands. Proto-Henry-Ford assembly-line progress: from crucifixion to goosifixion. If Jesus suffered for our sins, Christian-goosified Moslem victims suffered far worse. [While Ford's Model-A failed vs his Model-T, Vlad's upgrade was indeed an upward step.]

A9 Question: What do you call [1] a regular hexahedron, [2] JFK's least fave neighbor nation, [3] a 1920s-fash painter? Answer: [1] Cube, [2] Cuber, [3] Cubist.

A10 What's the difference between a believer in god & a believer in SantaClaus? Answer: One is 365 times crazier than the other.

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[1] Cagney's mashing a grapefruit onto Mae Clarke's face (*Public Enemy* 1931) is actually funny only in the overacting. The sadistically contemptuous treatment of women it pioneered in too many films of the era is now rightly seen as one of the greater historical embarrassments of a male-run industry.

[2] The one item **sure** to be in a health bill is its whole purpose: an anti-opt-out (fn 23) mandate. Obama (costliest prez ever) winklessly jokes: cut medical costs by *public* gov't force **making** us buy insurance from his *private*-profit-cartel owner. Laws forcing big employers to "cover" (i.e., ***deduct from salary***) employees' insurance *already have most of the US on mandate*. Has that lowered cost?

[3] Note that the US press acts as if it is totally coincidental that California [a] is the greatest budget-disaster state, and [b] has the greatest illegal immigration. In the face of California's pathetic fate (Mickey Mouse's *Fantasia* Dukas-nightmare), it nonetheless remains unalterable selectively-scofflaw press-media mythology that exploiting desperate cheap-labor illegals is good-for-the-economy.

[4] Roman crucifixion used a T not a cross, but early Christians' handy symbol (two thonged perpendicular sticks) evolved into a cross — both choices for simplicity & mechanical stability.

[5] See R.Florescu & R.McNally *Dracula . . . His Life & His Times* NYC 1989 pp.104-105.

B Some Lives Are More Prezious Than Others

B1 Is it coincidental that the 1st time in US history when the Prez & VicePrez effectively authorize torture, coincides with the 1st time US warlords are realizing what's unsettlingly new about starting war? It's not just our cannonfodder-underling soldiers that are at risk, as in the old days. This time, ***WE RULERS*** could get killed, too; e.g., by an imported-nuke,[6] So, the more torture, the greater the chance of interdicting such hitherto-unheard-of insolence.

B2 Mobster Out-Truths "Free Press" [7] **— Courtbiz vs Warbiz.** How many newspaper readers doubletake when, on one page, reading of the court system spending decades of lawyers' fees on the trial&appeal&appeal&appeal of a serial rape-murderer of children, the expense justified by the US' wuvable reverence-for-the-sanctity-of-life, which abhors the horror of possibly executing even a single person unjustly? — while the opposite page has the latest body count for the latest US war: thousands of innocent people killed for the crime of being-in-the-way. How often does the US establishment's "Mainstream" (fn 14) press[8] point out the contrast between establishments' ostentatious[9] projected concern about a "culture of life" (Libs, lawyers, & centrists against snuffing criminals; and Romans & fundies against foetus[10]-snuffing)? — versus the taken-for-granted right of the US military to kill[11] foreigners whenever their non-cooperation becomes inconvenient for cartels' access to their natural resources. The spectacle constitutes a bigoted demotion of whole classes of humans, by a nation that incessantly and censorially preaches domestic anti-racism. (For the non-rich, anyway: *DIO 8* ‡5 §I2.) *DIO 4.2* ‡8 fnn 8&23 earlier touched upon such revealingly dis-proportionate concern. (Which could readily be deemed murderous racism in many of its apparitions: e.g., *DIO 4.3* ‡13 fnn 14&19 [1994], www.dioi.org/pro.htm/#hbsa.) To point out the contradiction[12] between *ultra-profitable* courtroom over-over-overdone hyperfine-ritual allegedly to save innocent life, versus *ultra-profitable* cartel massacres of clusters of innocent "foreigners", is one of the most dangerous heresies in the eyes of the rulership, which is precisely why that rulership's Free*snicker*Press has expunged it from discussion for decades. (DR directly asked a longtime editor of a major US newspaper about this, face-to-face, in 2008. No answer.) But it's easy to show how succinctly a genuinely free press could drive home establishments' chasmic hypocrisy here. E.g., if we look at the Roman church's history of selective encouragement of holy wars (the several Crusades, the Armada, Mussolini's attack[13] on Coptic Ethiopia, Hitler's assault on the atheist USSR [most lethal of all battles throughout human history: over 30 million dead in this theatre alone], and the US' massive bombing of non-Christian Vietnam), it's hard to take very seriously the Vatican's culture-of-life propaganda against population control. Two eye-openers on the larger point at issue here: [a] From *DIO 4.2* (‡9 §A1): "if you want to get the Church upset about [the Vietnam war], then: have US airplanes drop condoms on Vietnam instead of bombs." (Try finding anywhere, in the "Mainstream"[14] media, such a dangerously elucidating contrast. Or our next item.) [b] The neatest comment on capital-punishment-opposition vs war-promotion comes from one not known as a logician, but: has anyone put it better? Gangster Louis "Lepke" Buchalter was tried&fried in 1941&1944, resp. (He was the last wealthy citizen to be executed in the US. Though one suspects that he was bankrupt by chair-time.) He'd ordered so many murders that his outfit had became notorious as "Murder Inc". During WW2, while he was in Leavenworth prison, he met men jailed for being wartime conscientious objectors,[15] and rightly asked them:

So, let me get this straight. I'm in here for *killing people*.

And you guys are in here for ***NOT*** *killing people*?

B3 Butcher Lincoln. Some months before the 1862/9/17 Battle of Antietam, Abraham Lincoln for days sporadically spent hours alone weeping at the death of one youth: his young son Willie, who had died February in the White House of typhoid fever. Question: Is there a credible record (any record?) that, following the September wounding & death of tens of thousands of youths at Antietam, Lincoln shed as many tears? — Any[16] tears? After Cold Harbor, his hireling — "Butcher"[17] Grant — did.

B4 We know the trendresult of freemarket capitalism is monotonic wealth-concentration. (Vis-à-vis entropy, this is the anti-twin of physicists' heat-death nightmare.) An organism can't function robustly if all blood is in the palm. A restorative confiscatory-redistribution not just of income but of wealth would help. (When the richest 2% own perhaps most of it, this might be a wiser source of Stimulus money than the middle class' future. Obama&co act like the idea never even occurred to them.) But there've been no provident Solons for millennia. Instead, the French Revolution, Stalin, and D.MacArthur (Japan) indicate: only hideous bloodletting gets it done (too often net-counter-productively), since all establishments (incl. academe: above p.2; or www.dioi.org/err.htm#blgg) can&will use ***ANY*** means to hold onto power&riches. Will world greed-death equilibrium arrive (whether or not secularly stable) when all but rulers are unlanded peons and-or "terrorists"?

[6] The irony here is that the ease of a nuke getting into the US is greatly enhanced by the machinations of the rulership itself (Obama & other white Republicans) to cheat Labor out of decent wages by mega-immigration and "free trade".

[7] Note analogy to equally outrageous-but-undeniably-true headline at *DIO 4.2* p.55.

[8] Try recalling the last US war opposed at its start by the press or any major church. It helps to be over 100^{y} old. When pope JP2 (*DIO 4.2* ‡9 §§H7&H8) discouraged invading Iraq, he didn't excommunicate Catholic soldiers. Being busy ejecting saintly J.Gramick for her work with homosexuals.

[9] The "Mainstream" (§G7) media & the justice system can find zero time to publicly debate their own hypocrisy on the present point, instead meticulously devoting eons of their obscenely expensive time to arguing the fine points of even the most obvious evidential pseudo-controversies, and whether an endless succession of rapists, torturers, murderers (starring in its exhaustive examinations of the pros&cons of case after case) did or didn't know-right-from-wrong. (See *DIO 4.2* ‡9 §F, which obviously was itself insufficiently cynical as to how nutty courtrooms had become.) A neat way to put shrinks on the public dole. And to guarantee maximum recycling of career criminals back out onto the streets (in everyone's neighborhoods except the posh ones, where reside those who're milking the system by such theatre), so they'll be back in court as soon as possible, for more court profit.
See "Criminals aren't just for breakfast anymore" at *DIO 4.2* ‡9 §O2.

[10] See *DIO 4.2* ‡9 §D: "Split-Second: Life's Start as the Most Murderous Moment" on god as the ultimate mass-snuffer of "unborn" humans. (Précis below at fn 29.)

[11] But notice §E15.

[12] So readers won't miss DR's take: if crime trials are part of a war on crime, then the occasional courtroom justice-miscarriage is parallel to collateral damage in conventional wars. (And far more justifiable, since so numerically minuscule by comparison.) The aim here is to emphasize that the establishment's concern-for-life is but a mask for enriching the clan of defense lawyers so aptly called "criminal". See fn 9 & *DIO 6* ‡4 §C7.

[13] Mussolini's 1935 invasion of Ethiopia devastatingly resembles the US' present Afghanistan occupation, in the screaming contrast (rigorously press-uncited) of modern weaponry vs ragged, primitive, tank-less, airplane-less *resistance fighters* (always so described, when the USSR was invading the same area in 1979), who routinely are projectively accused in US media of drug-trafficking, despite [1] no sign of the big armaments such wealth buys; [2] US stooges' involvement in the same trade. (Baltimore: #1 heroin city, an Afghan-prez brother's home; 1/2 its murders now execution-style.) Given Afghaneighbor Pakistan's fragile US-puppet gov't, its burgeoning religious fanaticism, & its nuke, let's hope Obama's War is actually aimed at muzzling said bomb. But the propaganda used to justify invasions is oft insultingly illogical, and their short-term lethal acts' putative gains can escalate long-term mass-enragement (rather than lead to stable solution): classic tarbaby. And, naturally, the US media will not even mention population-control anymore (more wages of melti-culturalism's PC), without which the invaders' alleged aim of socially uplifting the invadees is mathematically doomed.

[14] See §E13. One almost admires the press' skill here. What could ***be*** more glaring ethical contradictions than items[a]&[b]? Yet media magicians — by dark arts we used to think were the province of theologian-"educators" — manage to lifetime-hynotize 99% of the public into ignoring both.

[15] Lepke perhaps also encountered non-conscientious hood→boxer→diver→celeb Rocky Graziano (who went to Leavenworth for being AWOL); on whom, see *DIO 14* ‡2 fn 73.

[16] Similar sense of proportion at fn 7 or *DIO 4.2* ‡8 fn 23.

[17] Mary Lincoln's term for U.S.Grant, who never caused a single death in the War Between the States without her husband's permission — nay, aggressive encouragement.

C Occasional DIO Prescience?

DR thought[18] OSimpson wouldn't get off (1st time around). But otherwise *DIO* commentary scored some hits outside scientific history. (For vindications inside: www.dioi.org/vin.htm.)

C1 Our opposition to mammograms was published in 1992 (*DIO 2.1* ‡1 §A8 [b]). In 2009 Nov, the dam broke and the severe risk-benefit balance we discussed is now (partially) out in public. What will distant-future commentators say of a mass program (much driven by patients' you-never-know fears, doctors' fears of malpractice suits, & perhaps researchers' wish for a national data-base) expensive in time, aggravation, pain, terror, with little if any net gain other than to medbiz income? (See fn 23.)

C2 The same *DIO* section condemned as lunacy Reagan's theory that trillions in national debt would be paid off by the re-stimulated economy. How long will the media continue to be in awe of Reagan? — who [a] hyper-accelerated the US' already glaring rich-vs-poor gulf; & [b] started us down the road to ever-deeper, vicious-circle debt-addiction, which could end in a sudden war of desperation, or a slomo foreclosure-sale (who's funding stimulus-paybacks?) akin to the under-rated, *DIO*liciously tasteless 1979 farce-film, *Americathon*.

C3 In 1998, we urged (*DIO 8* ‡5 §C) a reconstructive "Gospel According to Judas". In 2006, the National Geographic Society revealed a long-secret 1970s find of a "Gospel of Judas" papyrus in Egypt. One of the books soon growing out of that was J.Archer & F.Moloney *Gospel According to Judas* 2007. None of this related to our interpretation of Jesus as a fiscally canny typical cult-guru, privately enjoying the percs of wealth to the point of disillusioning idealist Judas, who (John 11.1-12.9) told Jesus that the funds might better be spent on the poor instead of Jesus' needs of the flesh. (See www.dioi.org/rel.htm#thbp.)

C4 On 2006/11/30, *DIO* posted (www.dioi.org/pro.htm#cppj) the charge that the Dembos' pacifist pose (which yet cons some of the Left) was a fake, predicting that 2008 would bring as phony a Choice as Johnson "versus" Goldwater in 1964, when the War candidate was for war, and the Peace candidate was for war. (The issue [as also at §B2] is separate from that of the war's wisdom. The point here is simply the "bipartisan" truth behind the pretense that US elections still mean much, on the most important issues.) [Added 2011: 1864 fake war-choice had Lincoln "vs" own General (!) McClellan of Peace Party Dems.]

C5 *DIO 8* (‡5 fn 22) [1998] suggested the identity of Deep Throat. On 2009/10/17, *DIO* 1st learned of ongoing detailed expert research indicating that Mark Felt's sole source was indeed our nominee. We await further developments.

C6 The following was posted at www.dioi.org/pre.htm on 2007/1/20 (2^y to the day before Obama's swearing-in) under the header, "Hilla the Hun Against the World":
"While some are regarding it as a celeb-joke, an argument can be made that spectacularly wealthy and greedy world-rule-dreaming mega-forces are behind [the Obama candidacy's challenge to Hillary], since who else would care to push a neophyte whose sole standout-qualification is that he *looks* as international as any other Miss Universe."[19]

[18] See *DIO 4.2* ‡9 §F3 & *DIO 6* †4 §C5.

[19] It took Maureen Dowd over 2^y to catch up to *DIO* on the "Miss Universe" recognition: *International Herald Tribune* 2009/10/12 p.9. What is disappointing, about the Dembo "base" that Trickledown Obama suckered for the nomination, is how ineducable it remains. (How does the Left think Obama got backed by more money than all other candidates? The tooth fairy left it under his pillow? Actually, much of the Left still believes his campaign's deliberate deceit: that most of his funding came from average folk.) What's-left-of-the-left is so dazzled by Historic Justice in electing a "black" prez (the rich's C.Thomas-ploy, which reliably kryptonitizes Dembos), it's in-denial on the realities (§E7) right before its nose. The above 2007 posting is enlightening only in that it shows that anyone of the slightest common sense could have seen way before 2009/1/20 that these betrayals were cynically planned not just from Day-One but (like the US' Iraq occupation) from Day-Minus-One. *What does Obama have to do* before the Dembo base realizes it was snookered? (Dumbos act inversely ineducable: branding him socialist, though he's a GOP dream-come-true. But this may be just theatre to keep pushing centrism rightward.) Pre-election: Obama used ambiguities & kept-press hype to convince hopeful college kids he was the peace-option and the populist, & promoted universal medical coverage (so who'd need insurance companies?) somehow mandate-less. Post-election: keeps Bush "Defense" Sec'y; expands

D Two Unjustly Neglected Nobels

D1 And the Nobel Prize for Chemistry goes to . . . Barry Bonds.
(Bonds isn't smiling. He's not quite into every kind of needling.)[20]

D2 The Nobel Prize for Physiology goes to PC[21] for its epochal discovery that the human brain is the only living organ in the entire universe with 0% genetic determination.

E Defynitions

E1 Barbara Rawlins = only princess ever to marry her court jester.

E2 White House = ultimate Oscar. (Worse: www.dioi.org/pro.htm#wzfp and #cqcv.)

E3 Jesus' post-crucifixion non-public circulation = Resurrectile Disfunction.

E4 IINO (antiself-pronounced: I-no) = Independent-in-name-only, calls self Independent but, TV-zombied: votes just for Dumbos&Dembos. (Talk about ***wasting*** your vote.)

E5 "Bank" = as prefix to "Robbery", has lately gone from objective to adjectival.

E6 Middle class = only domestic fiscal blood left for rich-owned-gov't's fangs to suck.

E7 Obama = pathological lawyer: [1] help poor by bailing his fatcat owners, AudaciouslyHoping for trickledown; [2] decrease troops by increasing them; [3] lower[22] health costs by IRS-forcing[23] insurance-purchase from a cartel greedy-rich enough to afford him.

war; antiRobinHood-bails not nationalizes the big banks that elected&own him; and now (fn 2) seeks mandated non-universal coverage. Leftists keep alibiing him and Hoping he'll turn out as dreamed, talking of holding-him-to-his-promises (how?); and (*Nation*) fearing attacking him could result in losing the power (?!) the Left has gained through him, delusionally thinking he owes-them since they elected him (when he knows he was elected by his media's paid shepherds, not the American sheeple they brainwashed). All a replay of a David Low cartoon c.1937 when England yet hoped Mussolini was OK & so kept caving to him (even while warning him to behave), & tolerating ANYthing, to preserve the dream that anti-reds Hit&Muss (Low's perfect abbrev) were net-pluses (Liddell-Hart *Hist2WW* 1970 p.8), despite crashing waves of counter-data. Low, having in mind the same what-DOES-it-take question as above, draws Muss as stock-villain in a stage melodrama, snarlingly leaning against Brit hero, who wags a finger: "Benito Mussolini, have a care! You have ruined the woman I love, killed my aged mother, sunk the British fleet and set fire to the Empire — but BEWARE! Do not go TOO FAR!"

[20] Rather than avoiding drugs, many pro **and amateur** athletes push drug-testing-limits' tolerances. Is sport's highest art now a delicate druggling-act? Shrubya's best moment was State-of-the-Union-condemning athletics' luring kids into steroids. (Far happier result than disastrous pre-State-of-Union-speech showboating by NASA [1986] & ABC [2006] to fake security of Shuttle & Baghdad, resp.)

[21] The capitalist West's 0th Commandment outranks all others in import and in persistence of propaganda and youth-"education": all races are of precisely equal mean intelligence. (See *DIO 4.2* ‡9 fn 40 & www.dioi.org/bes.htm#jfrv.) So, why does this essentially scientific claim require such rigorous and editorially-100% one-sided press-propping? Rephrasing Franklin on established religion: any belief requiring incessant promo&censorial protection must have a weak case. PC argumentation on this is just *alibiing* (as for astrology, hypnotism, god, ESP, DemParty-is-dovish, Shakespeare as author, etc): OK, so the evidence looks bad for us superficially, but here's why our orthodoxy hasn't been absolutely proved wrong. The tactics may be lawyer-clever, but they don't constitute a positive case.

[22] Medicare already covers ED medication. How smart is banning taxmoney for the poor's abortions but paying for fertility-mechanics? Who can't afford abortions (or pills) can't afford kids; so 100 times as much taxmoney will support them & the endless cycle: *DIO 1.1* ‡2 §D3 & fn 7; *DIO 8* ‡5 §E7.

[23] Candidate Obama promised non-mandated universal health coverage but, as prez, flipped to his insurance-cartel funders' dream: the very reverse. Talkshowblab on a (mini) "public option" diverted from this bait&switch bill's proposed kill of a far more basic option, the only one that can freemarket-curb medbiz' cancerous growth: the Pascalian (*DIO 8* ‡5 §L) risk-benefit option to simply **OPT-OUT**. (Medbiz' fear that this option is getting popular is ***the*** cause of its "health-bill": fn 2.) What's the chance you'll steadily spend even 1/3 of ordmag $10000/yr, the US' bankrupting annual health-extravagance/citizen: *DIO 4.3* ‡13 §§G3-5. (Proposed $950/yr fine for cartel-dodgers: lowball-prank.) Multiplying by roughly 100^y: lifetime cost/citizen = ordmag a *million* in taxes. If free to choose, most of us would keep the million in exchange for [a] maintaining a healthy lifestyle, & [b] signing away rights to extreme intervention. Why decree that irrational or illegal? Except for gov't-enforced enrichment

E8 Voting Dumbo or Dembo = seeking ***an advantageous relationship*** with con-men.
E9 "Modern art" = an antique. (But newer than the other "Emperor's New Clothes".)
E10 "Progressive" 12-Tone music = regressive music, 29 times[24] less free than tonal.
E11 Woody Shakespeare = Christopher Marlowe.[25]
E12 Evidence for ESP = fraud and-or bad statistics. Always.[26]
E13 "Mainstream" Press (§G7) = media owned by 1% of 1% of 1% of the public.
E14 "Fringe" Press = media owned by the other 99.9999% of the public.
E15 Bunnyrabbit religion = kill[27] us (§A8) or we take you over by sheer numbers.
E16 Montezuma's Real Revenge = Border-Dysentery.
E17 California = "sanctuary-state" portside open scar in the US' *Titanic*.
E18 "Affirmative Action" = rich-owned-media-promoted divide&conquer enragement (of the lowers&middles) about every inequity-grievance but the big one: rich-vs-poor.
E19 999 = number of theories[28] the press has entertained throughout its pseudosearch to explain its eternal pseudomystery of ethnic groups' intractable differing success-histories.
E20 Prothonotary = Ultimately, Soviet-spy Alger Hiss' 2nd-least-favorite warbler.
E21 Christian = worships Satan's & thus evil's creator. Which segues smoothly to:

F Religion & Atheism

F1 Do popular religions fight human cloning because they resent the competition?
F2 I'm outraged at Danish newspaper-publication of Moslem-insulting cartoons. The European press should be ashamed of itself — for not publishing said cartoons continuously&prominently *throughout the last 30 years*, to stimulate Moslem immigrants into revealing their hothead-intolerance (too-often violent, even murderous) early enough to warn Europe that its own tragic internal combine of cheap-labor-exploiting Christian capitalists and bleeding-heart socialists was about to import a virulent religious cancer into Europe, and so risk poisoning (perhaps indefinitely) the most civilized region of the world.
F3 Organized Religion as Celebrity-Philosophy. Celeb-obsession & churches are pop-culture substitutes for reality. Media commentators justly laugh at celebrities who're famous for being famous. Why not a parallel observation that mass-religion is believed-in primarily ***for*** being believed-in? (See www.dioi.org/rel.htm#mjsj.) What other evidence is there?

of the medbiz which (while capable of grand scientific miracles) funds pols' campaigns and has wasted a massive fraction of net national medical costs upon minimally-useful, counterproductive, or dangerous passing-fads (see Shaw's *Doctor's Dilemma*), e.g., radical mastectomies, radium treatments, tonsillectomies, HRT, hysterectomies, CTscans, mammograms, over-radiation in general, etc.

[24] Because 7^{12} is about 28.9 times bigger than 12!: simple math, unmentioned in any musicologist's discussion of what purports to be mathematical music. And, ah, where's the connexion (of an arbitrary permutation-straitjacket) to music's uplifting humanity? In Vienna's Zentral Friedhof, 12-toner A.Schönberg is wisely planted far from the honored grave-grove of Beethoven, Schubert, & Brahms.

[25] See [www.dioi.org/sha.htm], and the Marlovian cases of, e.g., C.Hoffman, S.Blumenfeld, R.Barber; & see Woody Allen's 1976 film *The Front*. When promoting 90%-invented Shakespeare "biographies", the Shakespeare industry has parallels to that of professional Babylon&Ptolemy-astronomy hustlers: non-citation and-or insult of opponents replaces logical argument; non-mention that many eminent experts disbelieve the Industry view (e.g., Hawthorne, H.James, Whitman, & Twain knew businessman Shakespeare was a front); hilariously glass-house ritual-claims that all skeptical induction is speculation. (Analogously mirrorless Muffia: www.dioi.org/thr.htm#xjhb.)

[26] ESP is as ridiculous as seeing with your nose or hearing with your tongue, but most ESP-brained hopefuls know little stats and (*DIO 2.1* ‡1 §F3) even less of the acting & magic tricks con-men use.

[27] *DIO 4.3* ‡13 fn 8: "Question: how can there be peaceful multi-culturalism where 2 or 3 cults are competing to outmultiply everybody else?" See also *DIO 8* ‡5 §O2.

[28] Back in the analog-disk (pre-CD) era, Steve Martin used to tell the following story: when he played records on his phonograph, they didn't sound right, so he rose to stereophonic. Still sounded bad, so he went to quad. No luck, so on to octophonic. Failure after failure led finally to milliphonic: 1000 speakers. Still bad. Finally, he caught on: it was the needle. (See also *DIO 2.3* ‡8 §C25.)

F4 When people differ, they can communicate on realities; but not on faith. (As apologists actually emphasize, to evade empirical testing.) Mass-faith is maintained by insular indoctrination, a robotically inculcated bar to communication: *a divider of people*. Which suggests why popular religions are ever busy at mind-control, anti-alienthink censorship, bunnyrabbitting, intolerance. And war (§A8) with its attendant agonies, home-wreckage, death. But empathize with their problem: how many religions win out by logical suasion?
F5 Nun Dare Call It Teasin'? It's common in convents to find crucifixion-icons on a wall of every room: a skin-tight nearly-naked young guy nailed to a cross.
Question: if, in every room of a monastary, monks hung on their walls an image of a slim young topless female suffering agonizing&fatal torture-bondage, what would we think?
F6 When I was about age 8^y, a saintly great-aunt earnestly explained to me how proud I should be to be a Protestant and — better yet! — an Episcopalian. My reaction was reasonable (so much so that it still mystifies me as to why it was evidently quite unusual): hey, if god is fair,[29] then why should I get a better break than others, in religious heritage? (Contradiction in your faith in your native faith's merit; & see www.dioi.org/mot.htm#dlsb.)
F7 Pascal's Casino, Where You're Gambling With Your Life! Revealingly, eternal-heaven-as-reward for finite terrestrial good-deeds has *exactly* the same insultingly conmanesque "Guaranteed" payoff-vs-investment ratio as ***something-for-nothing***, namely: ∞. You're born into a 100^y life; so, the rulership pushes pop-religion, with Pascal as mathematical enforcer-croupier (*DIO 8* ‡5 §L), asking you to believe in the wildcat gamble that, if you sacrifice-invest that unique gift (dash your ONE chance to have a free and fun life), you can multiply your 100^y "winnings" ***infinitely***. (See Sam Spade at *DIO 4.3* ‡13 fn 28.)
F8 The "Problem-of-Motion" vs the "First-Eviller"? — Some responsibility-chains are more equal than others. Has it been noticed that Christians' two fave theological arguments ***contradict each other***? The rise and curious persistence of evil (in a universe allegedly due to & governed by an all-powerful, everything-creating, ***and*** all-good Christian god) is a "paradox", i.e., what non-bigots would call a contradiction. For which god's lawyers, "theologians", have long been handsomely paid to create get-him-off sinuous apologia, supposedly explaining-away this classic "Problem"-of-Evil (*DIO 8* ‡5 fnn 51&52). Irony: the reasoning here (*EVADE responsibility-recession-to-origin*) is the very opposite of the revered Aquinas First-Mover argument (*Summa Contra Gentiles* 1.13.3-32) for the Existence of god (*INSIST-ON responsibility-recession-to-origin*): every motion is caused by a mover, so there must be a "First-Mover" or (*ibid* 33) "First-Cause", namely, god.
F9 If heaven exists, Beethoven, Berlioz, Wagner, Liszt, Tchaikovski, Brahms, Dvoř̂ák, Mahler, Nielsen, Elgar, Rachmaninov, Strauss, Bax, Sibelius, VaughanWilliams, Martinu, Shostakovich, Barber are creating ennobling music there. So *why's it not sent to Earth* which sorely needs spiritual uplift? Were there a god such precious brains would never die.
F10 The God of False Appearances. Death is the ultimate proof that there is no god, so pop-religion's hucksters have no other option than to claim that you never *really* die; it just *looks like* you decay&die. Likewise, Jesus was divine, but like other divinities (e.g., Rome's Caesars; our 2001-2009 Divine-Flounder legacy-prez) *looked like* a regular human. Jesus planned his entire degrading nabbed→tried→whupped→nailed finale; it only *looks like* he couldn't dodge the bunco squad this time. (Planned sacrifice needn't look ambiguous, e.g., Brünnhilde's Immolation; USSR army 1941-1945; both sides' 9/11 heroes.) The world is ruled by an all-good & all-potent god; it only *looks like* it's ruled by visible greedy&corrupt humans, while god&heaven are (**pointlessly**) invisible and so *look like* they don't exist at all. Exactly why god has gotten so deeply into the (we-used-to-regard-as-satanic) realm of creating false appearances is left for silver-tongued&pocketed theologians to deal with — by going 1000s of years straight without getting straight about such obvious points.

[29] Likewise, it's unfair that I exist at all, when almost every potential-human sperm-egg pair vanishes (as each conception wipes out zillions of other pair-permutations) without merging into a zygote (much less a grown person), making nature (or god, if you must) by far the greatest of all abortioners: thus, the universe's top mass-murderer according to anti-abortioners' own reasoning. See *DIO 4.2* ‡9 §D6.

G Shorts

G1 Girth-Wisdom. Ever heard of an enormously fat person getting shot in a duel?
G2 Dueling academics' fear of cult or math mis-steps has 2 phases: [a] timidity ere risking slips occasionally attending exploration; [b] post-error shame. Fear #1 can cost discoveries; #2, integrity. (See ‡1 fnn 2&7; ‡3 §E4, fnn 12&45; www.dioi.org/biv.htm#tcfh.)
G3 Needlessly-Divisive PC At War With Itself. [a] To PCers, "native American" implies: realer (North) American than a US-born WASP. [b] But in such also-laboriously-multisyllabic stroking-terms as "Italian-American", "Serbian-American", etc, the 2nd word implies that, though a descendant of immigrants, one is equal to a US-born WASP. But: aren't these two ethnic-politics evergreens actually rather forked-tongue-contradictory?
G4 Morally-Superior? Or Navigationally-Challenged? Whites&blacks have been slavers throughout history. Yet the central implicit thesis of white-guilt-flogging, all-is-race-hate "historians" is that blacks couldn't have shipped sardine-crowded slaves to the Americas in chains&filth, just as profitably&cruelly as whites did. But this view is *itself* flagrantly racist. The unfaced sole reason blacks didn't ship slaves here is that, at that time: blacks didn't know how to navigate ships across the Atlantic.
G5 Civil Rights & Civility Rights. When civil-rights "progress" is Mediumly boasted of, it is invariably, narrowly measured **entirely** in terms of ethnic-diversity stats achieved, but never in terms of whether general society[30] has *thereby* improved in net civility, culture, safety, drugfree schools, happiness, intellectual diversity, and ***free speech***: *DIO 4.2* ‡9 §G.
G6 Gov't by 535 Messalinas. OK, so it's hollerin'-good-showbiz for TV 'snews spat-show-host&curtus-interruptus-compulsive powerdrool Chris Matthews to sell big elections as races: Dembo-vs-Dumbo, neck&neck-down-to-the-wire (so don't waste vote on "spoilers") by-a-nose-again&again, etc. But: why does he keep mispronouncing "whoresrace"?
G7 Cheerleading championships are cheating their fans if they don't even invite the best-coordinated rahrah team ever: the Mainstream Press (§B2). Dazzling routines include: Forget-Single-Payer, Obama-Is-Change, Non-Billionaire-Owned-Candidates-Are-Spoilers, US-Invasion-Equals-Just-War, Mexican-Invasion-Equals-Just-Peachy.[31]

H Life

H1 If aging and getting-mature were the same, DR would live forever.
H2 An infinite line is one whose *beginning and end cannot be experienced*. Thus, we will most fully enjoy existence (and eschew fear of non-existence) if we realize (*DIO 8* ‡5 fn 53): each human's life fortunately has the very same property.
H3 The Underappreciated Reality of Serial Resurrection. Desperate religious folk so fixate on hope for a non-existent miracle of post-death resurrection that they miss savouring a wondrous genuine&reliable joy: whenever one wakes from sleep, the event becomes one more miraculous re-coming into existence, one of tens of thousands of resurrections most of us are granted, by the unfathomable accident of possessing conscious life.
H4 Life's five mystical highs: total solar eclipses, sex, chocolate, music, *induction*.
H5 Among the wisdoms that come with age: the realization that making others happier & brighter is not only a social good but one of the most refined of pleasurable achievements.
H6 No matter the lowness of attacks on one who is striving for the ideals of truth and fairness, he knows that the issue of a good, humble, and wise mind endures; and his theorist's intelligence can firmly envision that high ultimate reality, regardless of base passing politics. So, other than sympathy for those in the dark of ignorance, the hopelessness of mediocrity, and-or the prison of prejudice, he has no cause for any intellectual state but happiness.

[30] Johnny Carson's eulogy for Abe Lincoln: "without whom, we would not have the dunk-stuff."
[31] See *DIO 4.3* ‡13 §F1. The US, whose power made English the world language, now has a lower percentage of English-speaking inhabitants than Denmark, Holland, Sweden, etc. The media responsible for this transformational achievement are so modest, they never even mention it.

DIO

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