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To: Not Confidential
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I hope this letter will be correctly taken as constructively intended & helpfully informative. And: obviously I'm not asking that you publish a letter of the present length! Most of what follows is just useful background info, meshed with an unfortunately-too-late referee report.

About a quarter-century ago, I noticed that the 4 most famous non-contiguous sites in ancient Egypt (Giza, Amarna, Thebes, Aswan) happened to be situated at latitudes remarkably close to unit-fractions of a circle ($1/n$, where n is an integer): 1/12, 1/13, 1/14, 1/15. (Summary at www.dioi.org/cot.htm#dthc.) Your cover-cited & illustrated 2007 Feb-Mar article (pp.24-26) implies [comparing to VD's "ancient astronauts", etc] that this is a crank idea. Well, cranks are cementalities who make up their minds before investigating the evidence. (And who, when evidence doesn't cooperate, persist with their ideas anyway. The tragic folly of their lives is examined at, e.g., *DIO 10* [www.dioi.org/vols/wa0.pdf] p.83 [2000]. Also at *DIO 9.3* ‡A [www.dioi.org/vols/w93.pdf] p.120 [1999].)

Examining the latitude articles of DR and your author John Wall, we may ask: which of the two most closely reflects this criterion? Which of us simply picked the most significant distinct ancient Egyptian places? (Also the best known, as you can easily confirm at any social get-together.) On the other hand, which of us deliberately selected sites (almost regardless of relative import) that fell upon his theory's parallels?

Wall p.24 (emph & caps added): Rawlins "noted that 30° [was] one twelfth of a circle. *He then **LOOKED FOR** sites at latitudes of one thirteenth, one fourteenth and one fifteenth of the Earth's circumference*." Talk about "uninformed speculation"! That is not how it happened, as is clear from the original paper, if not from common sense about which ancient Egyptian regions would 1st come into any informed person's thoughts. After realizing that the Giza pyramids were close to where refraction (of polestar-light) would put them if latitude = 1/6 of a semicircle were intended, I resorted to the best possible scientific test for whether the theory has strength: is the idea fruitful? *Did other key ancient Egyptian places fall upon unit-fraction latitudes?* To find out, *I simply applied the same theory to the other top Egyptian site*: I checked the latitude of Thebes. (I didn't just divide 360° by an integer and then start . . . fishing about at the resultant latitude.) When Thebes proved a hit at a 1/7 of a semicircle, I naturally next tried Amarna (where the national capital was temporarily moved by Akhenaten): 1/13 of a circle. The next best-known area was obviously Aswan-1st Cataract, at ancient Egypt's southern bound.[1] There was no intent just to select 4 regions that fit a pre-conceived theory. (On biased sampling, see www.dioi.org/mot.htm#ttmx.) The selection criterion was strictly: what separate regions 1st came to mind?

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I try to hold self and colleagues to high standards of scholarship, sanity, & ethics; so, I hope you will understand my objecting to a gratuitious wrong . . . .

[1] It is only right to acknowledge that when I first tested the unit-fraction theory, Syene-Elephantine inevitably came to mind before Biga (Senmet) Island. (Though, either Biga or Elephantine will satisfy Wall's $\pm 5'$ bracket.) Syene was a major "klima" for ancient Greek geographers (Eratosthenes, Hipparchos, Ptolemy) and thus had figured in my work on Greek astronomy-geography, e.g., DR1985 n.6. Yet Biga is unique: legendary Nile-source & Osiris-tomb. (Plutarch *Moralia* ["Isis&Osiris"] 359B: αβατον = forbidden, chaste, inaccessible.) But I presumably knew (before final refined Aswan-region selection) that Biga's latitude was closer to 360°/15 than Elephantine's was. (This haztory is provided because it could be held to lower somewhat the very highest odds computed below. If there are 2 viable options near Aswan, we can halve the odds to merely 3 million-to-1?) Others must judge if the choice was justified. Note: the SSolst app.noon Sun was overhead in Aswan-Elephantine (24°05′N) in the early 4th millennium BC; but, by c.3000BC it was overhead in Biga-Philae (24°01′N). This could of course provide an explanation for the Biga temple's placement, quite independent of the unit-fraction theory. Yet another possibility: strong-deep Nile-turbulence at Biga might've seemed as demiurgic from the nadir as the SSolst-noon Sun from the zenith. [Yet another unsettled question is whether the Greco-Roman Biga temple was at the same place as pharaonic-era Osiris shrines. (The pre-inundation latitude range of Biga Island was from 24°00′58″ to 24°01′43″. Biga formerly included hills that have since become isolated as separate islands — e.g., Agikila, now bearing Philae's monuments.)]

Given Egypt's well-known proclivity for unit-fractions (from Rhind Papyrus to Ptolemy's *Almajest*) and its surveyors' virtually certain use of the celestial pole for pyramid orientation, my unit-fraction discovery was obviously startling, true or no. On the evidence of your article, it would almost seem that your magazine would have preferred that I keep this finding secret. (Had you made the discovery, would you have just thrown it away?)

Instead, it was published (after highly expert refereeing) as a short preface to a series of detailed technical analyses, which constituted one of the invited lectures for "Longitude Zero Symposium 1984" — the centenary celebration of establishment of the Greenwich Meridian, held at the National Maritime Museum (*Vistas in Astronomy 28*:255-268 [1985]). In this paper [henceforth called DR1985] I cautiously used, with respect to the Egypt hypotheses, such expressions as "not disconfirmed" (instead of claiming confirmation in a textless case), wondering aloud if this speculative theory's 4 close hits were *all* accidental, leaning (perhaps wrongly, I grant) to the side of supposing not.

The theory that the builders of the Great Pyramid were able surveyors who used celestial means for its orientation is not even controversial. (The only candidates for the job: star[s] or [less likely] the Sun.) This, despite a total lack of attestation. (See *ISIS 93.3*:500-502 [2003] or www.dioi.org/cot.htm#rcrs for DR's comments to the History of Science Society upon this and similar points.) Note that later in DR1985 (see p.260), I produce more new evidence of ancient Egyptian latitude accuracy. This also-startling correlation (www.dioi.org/cot.htm#agss) would probably interest your readers (but will they ever have access to it?):

The most-discussed geographical work in history was the *Geography* of (Hellenic) Egyptian C.Ptolemy, c.160AD. (This famous compendium's text-establishment [representing 2 centuries of successive scholars' labor] was brought to completion by *DIO* just last December: see www.dioi.org/gad.htm.) In the *Geography*, the 3 Old Kingdom sites, Memphis, Giza (Babylon-Cairo), and On (Heliopolis) are the only nest of sites (of 8000 in the work) that are entirely accurate, to the work's precision (1/12 of a degree). But Ptolemy did not realize that On and Heliopolis are simply an ancient Egyptian name and a Greek name for the same place. So he confusedly lists both; but the position of On [Oniou, Iunu] is correct, while that of Heliopolis is off by an amount remarkably close to an error ($-16'$) characteristic of solar observations made with the non-symmetric vertical gnomon so dear to semi-competent ancient Greek astrologers. (Same error is found in Ptolemy's *Geography* for Alexandria & [his home temple] Canopus, also Thebes, Elephantine, 1st Cataract; as well as Rome, Marseilles, etc.) So the *Geography*'s data are consistent with the possibility that very early Egyptian latitudes were more accurate than those of late classical antiquity, a theory which is also consistent with the surveying skill that indisputably went into creating the Great Pyramid. Of course, as with the unit-fraction theory, consistency does not prove truth, since alternate explanations are obviously possible here. But it is a provocative coincidence that **the best celestially-mapped** region in the *Geography* happens to occur around the site of antiquity's **best celestially-oriented** extant building, Khufu's tomb.

The Great Pyramid itself obviously suggests that its construction was connected to an interest in geometry, numerology, and symmetry. And astronomy. (At least for orientation. Whether also for location is our question.) Clearly the Giza surveyors recognized some fractions of a circle; without the right angle (1/4 of a circle), they could hardly have built the pyramids. And some pyramids' squaring may have been checked against rhombic distortion by using diagonals: 1/8 of a circle. The obliquity (maximum solar declination) in the 28th century BC was always very near or equal to 1/15 of a circle, a figure later commonly used in Greek astronomy, though by-then obsolete. (Obliquity $23°43'$ by Hipparchos' time; $23°26'$ today. Downward trend perhaps anciently detected: Plutarch *Moralia* ["Obsolescence of Oracles"] 411A.) So, is it unreasonable to tentatively theorize that Egyptians might have intended (and-or later noticed) that at Giza the celestial pole (almost certainly used to orient the structure N-S) is 1/12 of a circle above the horizon?

Wall makes the excellent point that some of DR1985's monuments are from different eras.[2] A few possibilities & speculations: Were later placings triggered by awareness of Giza's latitude? (Non-speculation: ancients knew Babylon-Giza was right on 30°. See Ptolemy's *Geography* 4.5.54.) Was a numerological tradition preserved down the ages? (As were pharaonic mummies & Babylonian eclipse-records.) Hardly an outré speculation, for a culture ruled by & suffused with tradition. Was some other now-unsuspected mechanism at work? Or: is the DR1985 theory pure fantasy?

I don't know. And neither does Wall or anyone else at this point. (Your article's header and text suggest my having proposed that placing the pyramids at unit-fraction latitudes was to "show-off" knowledge of Earth-sphericity. DR1985 does not suggest anything like that.) While mentioning a hieroglyph theory, Wall's main source says (B&M 1980 p.123) that Amarna was "built on virgin soil, not tarnished by an earlier presence of people and their gods, but the exact reasons for [Akhenaten's] choice of the [site] . . . are not known." (Wall opens his article with: "Why were [ancient Egyptian] pyramids, temples, and tombs sited in particular locations? It's a simple question, but one that has few definite answers." In the present context, wouldn't "no definite answers" have been more accurate?)

To counter the nutty-to-him idea that Egyptians knew the Earth was round, Wall guesses that a civilization's sacred art can usefully reveal its scientists' cosmology. So, did Leonardo suppose Michelangelo's Sistine Chapel to be a

[2]Note: all four estimated dates are given explicitly in DR1985. As for the dates' effect on the math of Table 1: for hypothetical solar-placement [Karnak & Biga], expected-latitude C is comfortably insensitive to choice of date, while the dates of Khufu & Amarna [hypothetical Thuban-placement] are well enough established for the purpose at hand.

representation of the physical universe?

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I'm glad you're not over-selling Egyptian wisdom, but what gives some amongst you such surety that ancient Egyptians (who could, according to your p.7, handle serious engineering feats) were so dumb that even their smartest surveyors and navigators were blind to typical evidences (see, e.g., Aristotle or the Shaw citation below) that the Earth is round? — evidence noticed even by sub-engineer ancient sailors and soldiers (see, e.g., Homer & Aeschylos, respectively) long before 280-130BC astronomers such as Aristarchos, Aristyllos, Archimedes, Eratosthenes, Hipparchos. (Not to mention earlier Greeks such as Timocharis & Dikaearchos, c.300BC.)

If we had definite proof that the Egyptians thought the Earth was flat, fine. But we don't, so we are forced to induce the truth from clues and circumstances. We'll make mistakes along the way, occasionally going too far out-on-a-limb. But that's the way knowledge advances. It doesn't help to have smug "truth-possessors" (*DIO 1.1* p.3 n.1) scoffing at truth-seeking explorers unless for strong cause. (DR has done his own share of scoffing, so he can hardly damn [scoff at?] what is often an educational venture. But discrimination in target-choice is advisable. And, since we are doing stats hereabouts: with all sorts of wild[3] Egyptian-wisdom theories flying about these days, whatever caused your magazine to zero-in on DR's article for trashing? — an article which was completely non-commercial, technically competent, ably refereed, reputably published, and non-arrogantly qualified as speculative.)

Nile trade involved huge latitude-shifts. E.g., N.shore of Nile Delta→Meroë = over 14° or c.1000 mi N-S. Such a southward trip would bring into view bright stars (e.g., α Phe, which [at magn 2.4] is as prominent as some of the Big Dipper's stars) and star-groups then never visible in Lower Egypt. While both Dippers were circumpolar (stars always above horizon) for Lower Egypt in 2600BC, α UMi (our Polaris) was not so at Biga, and 3 stars of 7 (for each Dipper) were not for Meroë. All these stellar phenomena are obviously incompatible with a flat Earth. (Especially as each constellation's size & shape remained constant throughout a long Nile trip, despite serious differences in culmination-altitude.) So, as DR1985 states, it is not unreasonable to point out (was this self-evident notion actually novel with DR1985?!) that a long, navigable north-south-river-centered country such as Egypt would be first to be ***routinely*** confronted with unsubtle evidence for a round Earth. Note . . . that this argument's force is independent of the rest of the round-Earth theory . . . — and is less speculative.

Now to an analysis of Wall's article . . . .

- The Great Pyramid is not "a little over three and a half kilometres away" from 30°N. Wall got that figure (same arithmetic: p.25) by multiplying 1.852 km/nmi times the 2′ (2 nmi) difference between 30°N and 29°58′N, the latter being Wall's erroneous latitude for the Great Pyramid . . . . (We use "nmi" for nautical mile [c.1.15 mi], 1 arcmin on the Earth's surface.) The actual distance is more than a km less.

- Excepting Khufu, all of Wall's eight latitudes (selected for nearness to an integral number of degrees, m°) are simply copied out of the Gazetteer of Baines&Málek. In my experience, gazetteers' data are commonly subject to errors of ordmag a mile. (Sometimes worse. Note, e.g., a -3° typo for the Valley of the Kings' latitude in the B&M [1980] Gazetteer.) Which is why for decades I used to measure directly by interpolation off maps when engaged in this sort of work. It would have been wiser and more scrupulous for Wall to have consulted maps, e.g., Google's. But, then, Wall's seven non-DR sites are largely so lacking in locatable significant early monuments (and are cited to eras from which we have no evidence of surveying ability) that little of value to his analysis could be gleaned thusly — so Wall "should have known better" than to plunge ahead after finding himself mired in mush. (By contrast, all four of DR1985's sites are precisely closeup-locatable to 1″ via Google — even the now-underwater place of the Biga temple.)

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[3] *DIO 13.1*'s inside front cover [see p.2 of enclosed copy or at www.dioi.org/vols/wd1.pdf] jokes that nonsense-writing on the Great Pyramid has now created a larger-than-Khufu refuse-pile we call "The Greater Pyramid" — and remarks the oddity that (obsessed with slightly brighter Thuban) The Greater Pyramid failed to notice the star most convenient for orienting the Great Pyramid, namely 10i Draconis. (On 10i Dra, see D.Rawlins & K.Pickering *Nature 412*:699 [2001/8/16].) Of easily visible stars (i.e., brighter than 5th magnitude), 10i Dra was nearest to the N.celestial pole from c.2627BC for more than 9 centuries; and, for another 2 centuries, no star nearer the pole was brighter. Of greater potential import: in c.2612BC, 10i Dra was at Right Ascension (RA) 6^h, ideally convenient for permitting orientatation of the Great Pyramid (via bisection of a ∩-semicircle arc-path [of merely 1° radius] around the North Celestial Pole) during a single Winter Solstice night. If this was indeed near Khufu's date, then (due to precession) said RA-convenience had badly degraded to 7^h by Khafre's time, and to 8^h by Menkure's — which might help explain why the latter's orientation was inferior to that of Khufu & Khafre. (K&K's orientations may have been [for like reason?] non-independent: see *DIO 13.1* p.3.) Yet I haven't seen 10i Dra mentioned previously for these distinctions. If your group knows of any earlier citation, please enlighten us, so that *DIO* may broadcast proper credit.

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the largely excellent p.5 map . . . where I am . . . gratified to see Khufu's date as c.2600 BC, the conventional value — and agreeable with that astronomically double-induced by *DIO* in *Nature 412*:699 [2001/8/16] and *DIO 13.1* [2003] (www.dioi.org/vols/wd1.pdf) pp.2-3.

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. . . . (Wall is evidently an electrical engineer living in southern England, dedicated to opposing mystical nonsense on ancient Egypt, member of a "Hall-of-Ma'at". . . .)

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As to statistics: Each of the 4 sites in DR1985 might fall near a unit-fraction latitude. The hypothetical ancient location-by-numerology would be affected by atmospheric refraction, negatively for the polestar method, positively for the solar method. If for net visual and instrumental error we allow $\pm 1'$, this creates — for every unit-fraction — two bands (one stellar, one solar), each $2'$ wide: a total of $4'$ of play. So, for 4 potential unit-fraction latitudes, we have a total of $16'$ of hit-space in a range of about $450'$, Egypt's latitude-length (c.$7°1/2$ from north Delta to the Aswan area). What then are the superficial odds that, if we choose the 4 leading distinct (no overlap) ancient Egyptian sites, each will fall into one of the 4'-wide hit-spaces? Answer: one in $(450'/16')\cdot(450'/12')\cdot(450'/8')\cdot(450'/4')$ = something under 7 million. And, formally, this is on the low side, since all the hits are in fact within $0'.8$, with an average discrepancy of barely $0'.5$. (Table 1's rms = $33''$ — vs Table 2's $144''$.) Not that I would rigidly insist on exactly such odds, since one could divide the 7 million by several ameliorating factors. (Example cited at fn 1: the choice between Biga & Elephantine. Also, the hypothesis being tested was to some extent sculpted by incoming data, e.g., allowing either of two different celestial methods.) But none of these factors' introduction will come anywhere near reducing the odds to statistical insignificance. Carrying this approach to the limit: if we ignore Giza (skeptically scoffing that it merely triggered the unit-fraction theory) and then just compute the simple odds against my initial surprise-findings that Karnak & Amarna unambiguously fit the theory, the chance probability is nonetheless one in $(450'/16')\cdot(450'/12')$ — odds of over 1000-to-1.

I have never believed that the ancient-Egypt community was required to accept the theory. (It was a potential contribution, not a decree.) The fits could just be a huge coincidence. But, then again, they might be a glimpse — a glint (to quote Carter&Mace 1 [1923] p.96) — of lost brilliance.[7] Isn't that one of the grails we share a wish for?

Background-history on the sole previous denigration of DR1985. In the 2001/8/16 *Nature*, . . . telegenic archaeologist Kate Spence (author), along with dim historian-politician Owen Gingerich (referee), launched the 1st published attack upon the unit-fraction theory. Both are intensely motivated. It happens that my journal *DIO* has repeatedly revealed O.Gingerich-promoted scholarship as miscomputed or otherwise botched. (Over a dozen examples listed at *DIO 4.1* [www.dioi.org/vols/w41.pdf] ‡4 §A p.48 [1994], under Gingerich [*JHA* #2 Editor], Swerdlow, Evans,

[7] More statistics: what are the odds that a 1921 J.Wall would've joined many others at the time to portray learned wildcatter H.Carter as a kook-fanatic? Skepticism of the new is sometimes based upon one's rock-surety of an absolute impediment (e.g., lack of known effecting mechanism) — which later turns out to be illusory, as in, e.g. the cases of Bessel-Clark, Darwin, Carter-Carnarvon, & Wegener. I'm certainly not immune to the very same trap: see enclosed *DIO 13.1* [2003] ‡2 §§A2-A3 [p.12].

Jones, and perhaps Hughes. More recently: the infamous OG-ultrahyped Farnese-globe farce [*JHA 36*:167-196 (2005 May)] of Louisiana-State-Baton-Rouge's B.Schaefer, multiply-undone by *DIO* Editor D.Duke's 2006 Feb paper: *JHA 37*:87-100 [www.csit.fsu.edu/~dduke/farnese4.pdf].) As for the once-rampant (if shakily-speculated) Spence-Gingerich star-method for pyramid-orientation (2000/11/16 *Nature* cover + Gingerich preface-promo + Spence paper): though I would not necessarily classify it as borderline-crank, it is infected by a serious sph trig error, a *DIO* discovery which started this Egyptian-chronology "revolutionary" theory's decline in acceptance. (Outside the playing-scholars-on-TV circle, at any rate.) For its pros&cons, see *DIO 13.1* [www.dioi.org/vols/wd1.pdf] pp.2-11 [2003]. The Spence-Gingerich theory's ultimate fate and prime beneficiary may be identical: The Greater Pyramid. (And so may the DR1985 unit-fraction theory's.)

. . . why [was the ***AE*** paper] written and published without consulting able astronomers? — advice which does ***not*** refer to the politicians & pop-writers whom too many publishers seem prone to confuse with genuine scientists. (A point tragicomically typified by Spence's mystical astro-guru Gingerich, a mirrorless smearer of the sanity of those who cannot appreciate his special historical insights, e.g., the praiseworthiness of data-faking: see *DIO 11.3* [www.dioi.org/vols/wb3.pdf] pp.70ff [2002] and *ISIS* [2003] *loc cit*.)

When properly carried-out, the think-up-an-alternately-wacky-theory ploy (Wall's approach) has long been an effective technique for debunking cranks. Its use's history includes[8] Shaw (*Everybody's Political What's What* 1944 pp.344-345) & Russell (*Sat. Rev.* 1956/8/11). Also *DIO*'s co-inspirer RRNewton. (*Nature 239*:511-512 [1972/10/27], spoofing archaeoastronomy. RRN used to joke that the field's prime solid achievement was: the creation of a word containing 4 consecutive vowels.) Even DR, e.g., *DIO 6.1* ‡5 (1996) [pp.49-50], *DIO 9.3* Fig.6 caption (1999) [p.116].

A few afterward after-words and clarifying tables:

To help gauge the degree of my crankitude, I recommend you check the brand of scholars who have appreciated *DIO* and-or have joined *DIO*'s several boards: see www.dioi.org/quotes.html, who.html, & pri.htm.

(Other items may also be of interest, e.g., www.dioi.org/mot.htm#twsc & epi.htm#hhzd.)

I note that Wall neglected to reference the *DIO* website (where the unit-fraction theory and others on ancient Egypt are available), though he presumably knows of it. Hope you'll rectify the omission: www.dioi.org.

For comparison of major ancient Egyptian sites' latitudes to unit-fractions of a circle, Table 1 lists sites, unit-fractions $1/n$, $360^\circ/n$, refraction-corrected theory-predictions (C), real latitudes (O), celestial body hypothetically used (star or Sun), and reality-vs-theory differences, simple (O$-1/n$) and refined (O$-$C or Observed-minus-Calculated). The refined C for Giza and Amarna are consistent with having been based upon polestar[9] altitudes (Thuban being the obvious choice); those for Karnak & Biga, upon averaging summer&winter solsticial noon-Sun zenith distances. (The obvious solar method is preserved at *Almajest* 1.12.) Partly for convenience of calculation, all data are listed over-precisely in arcsec, corresponding to a precision of c.100 feet. Adopting the Google values as close enough to the truth, each O agrees to about $0'.1$ with the corresponding value stated in DR1985, when it required dedicated and delicately discriminatory effort to elicit all four figures accurately, out of a motley mix of maps.) In Table 1, we see that, for all 4 cases, the refraction-corrected (i.e., observable) values C agree with O to well within $1'$, which is comparable to the mean error in the best naked-eye star catalogs of history, those achieved by, e.g., Wm. of Kassel, Tycho, & Hevelius. (DR is editor, correlator, and calculator of the Tycho star catalog's standard modern edition: *DIO* vol.3: www.dioi.org/vols/w30.pdf.) Compared to the values (C) computed from the DR1985 theory, the root-mean-square discrepancy of the four Egyptian sites' real latitudes (O) happens to be tiny: $33''$, barely 1/2 an arcmin.

Latitude is not measured from the Equator with a meter stick. Its ancient determination required celestial observations, which are affected by atmospheric refraction — a non-trivial effect not tabulated until the 16th century AD: Tycho. (The altered-argument format for computing refraction, DR1985 eq.1, is an original invention, 1st published by DR: *Publ. Astr. Soc. Pac.* 1982 Apr eqs.8&8a, now commonly adopted in pocket-calculator astronomy manuals.)

Wall did not correct his latitudes for the effect of refraction upon hypothetical ancient attempts at hitting on integral-degree latitudes, so I have done this . . . in Table 2 (again taking appropriate discrepancies as based on the star Thuban, others as from solar placements), listing the integral-degree latitudes m° — along with relevant associated

[8] The Shaw passage (which also relates — very educationally — to the Earth's shape) is from memory; and my recollection of the Russell comment was recently confirmed via www.update.uu/si/edu/~fbendz, which supplied the place of origin. Not having checked either, I cannot absolutely vouch for the accuracy of the source-locations. But the contents are what matter.

[9] The star Thuban (11α Dra) was within $0^\circ.1$ of the celestial pole near 2800BC. (An accidental event which may have helped launch ancient Egyptian celestial-based surveying.) This was no longer true by 2600BC (about when 10i Dra became Egypt's best polestar for the next 9 centuries); but, for all Table 1's eras, Thuban (not 10i Dra) ***would have been at a convenient Right Ascension*** (c.12^h) for latitude-determination through observation of upper & lower culminations of its D-semicircle path during a single night near the Winter Solstice. (Contrast to fn 3.)
[Note: In case chronologists ever shift Khufu's date seriously backward, it should be kept in mind that Thuban was usable for highly precise N-S orientation (performing an entire $\cup$-semicircle during a WSolst night) for ordmag a decade either side of 2799BC, when RA = 18^h passed rapidly through it. (Thuban was not useful for latitude during these very few years; so this hypothetical scenario would be rather contra the unit-fraction theory.)]

Table 1: Ancient Egypt: Major Monuments

Site	$1/n$	$360°/n$	RefrCorr(C)	RealLat(O)	RealLongtd	CelestBody	O$-1/n$	O$-$C
Khufu	1/12	30°00′00″	29°58′19″	29°58′45″	31°08′03″	Thuban	− 75″	+26″
Amarna	1/13	27°41′32″	27°39′30″	27°38′59″	30°59′11″	Thuban	−153″	−31″
Karnak	1/14	25°42′51″	25°43′27″	25°43′05″	32°39′31″	Sun	+ 14″	−22″
Biga	1/15	24°00′00″	24°00′32″	24°01′20″	32°53′13″	Sun	+ 80″	+48″
RMS Discrep							94″	33″

Table 2: Ancient Egypt: Mostly Secondary Sites

Site	$m°$	RefrCorr(C)	WallLat(O)	CelestBody	O$-m°$	O$-$C
Sais	31°	30°58′23″	30°58′	Thuban	−120″	− 23″
Giza	30°	29°58′19″	29°58′[*sick*]	Thuban	−120″	− 19″
Herakleopolis Magna	29°	29°00′41″	29°05′	Sun	+300″	+259″
Zawyet el-Amwat	28°	28°00′39″	28°03′	Sun	+180″	+141″
El Badari	27°	27°00′38″	27°00′	Sun	0″	− 38″
Koptos	26°	26°00′36″	26°00′	Sun	0″	− 36″
Edfu	25°	24°57′55″	24°59′	Thuban	− 60″	+ 65″
Elephantine	24°	24°00′32″	24°05′	Sun	+300″	+268″
Root-Mean-Square Discrepancy					175″	144″

data, as in Table 1. . . .

. . . the closest fits in Table 2 are for the 1st two sites, which are 2′ south of an integral latitude value. Wall's sampling evidently used a bracket of ±5′ around each latitude degree. For each latitude-degree-interval, this allows 11 possible hits out of 60, giving Wall access to over 18% of a Gazetteer containing the better part of 1000 entries: over 70 sites fall into his allowed spaces. . . .

If I were asked to question DR1985, here's how some arguments might go [with variably-worthwhile potential comments & rejoinders following in brackets]:

- At Giza, why indicate possible significance in 0′.5 latitude agreement with theory, when the Great Pyramid's suggestively accurate orientation (DR-argument's initial basis) is nonetheless off by 2′.6? [Latitude likely from Thuban; orientation, from nearby 10i Dra (difference explained at *DIO 13.1* [www.dioi.org/vols/wd1.pdf] p.2), a dimmer star — near the limit of what can be seen 12^h (180°) apart between one Winter Solstice night's twilight bounds. The method of using each star is: bisecting its 12^h semicircle arc-path. I.e., anyone who disbelieves ancient Egyptian surveyors' ability to determine latitude ("pole-height" in Greek: εξαρμα του πολου) is claiming in effect that, though it's obvious they could vertically bisect a ∩-semicircle or ∪-semicircle polestar-arc to find the pole's azimuth = north (for Giza orientation), they were unable to horizontally bisect a C-semicircle or D-semicircle to find the pole's height = latitude.]

- The Giza monuments are oriented to the cardinal points. But no temples at Thebes & Amarna are oriented N-S, a point in Wall's favor. [DR1985 used Giza celestial-based orientation to suggest surveyors' celestial-based latitude placements. But there's no requirement to repeat the suggestion, since Giza's monuments pre-dated Thebes'.] Though this is hardly a solid disproof (in the context of high odds), still, it's only fair to agree that the lack of N-S orientations at Thebes & Amarna does weaken the case for the general unit-fraction theory.

- The 4 agreements of DR1985 could be nothing but a remarkable coincidence.
  [That possibility was clear from the original DR1985 article. I've never rejected it.]

After you've absorbed all the foregoing material (checking as you will with competent experts) and after I receive your thoughts as well, we can design an equitable, merciful, & compact way to patch up the situation. Good luck.