A How-to-Commit-Navigational-Suicide 101: That Darned L-Word

A1 The uncontrollable urge, of “Navigation Foundation” [NavFou] President Tom Davies (Rear-Admiral USN), to exonerate dubious explorers via equally dubious scholarship, is here examined in a little-known 1988 incarnation1 prior to his far-better-publicized [1989/12/11-press-conference-launched National Geogr Soc-funded $250,000 whitewash of NGS’ fave polar explorer, R.Peary. A failed, amateurishly refereed attempt to snow scientists & public with Unimpeachable Expertise, resulting in a NavFou report which NGS still refuses (http://tierneylab.blogs.nytimes.com/2009/09/07/who-was-first-at-the-north-pole/) to disavow. [NatGeoHistory 2020/1 p.87 dumps 1989 NF verdict, saying NGS undid Peary; NGM 1988/9.] Verdict unanimously roboback-endorsed by the NavFou’s tractable windowdressing 7-man Board of Directors. When Davies died in 1991 Jan, none of his Board’s seven would replace him at the 1991/4/19 US Naval Inst debate. See DIO 1.1 ¶4 End-Note C, 1991, for details of the NF Peary report’s ultimate collapse.) In a lecture at the Fels Planetarium (Franklin Inst, Philadelphia) on Wednesday, 1984/10/17, Adm.Davies revealed to the world the fruit of his years1 of research into the Amerigo Vespucci controversy, illustrating his points with a score of slides, as well as the planetarium’s reproduction2 of the sky for the evening of the 1499/8/23 Moon-Mars observation he was using to test Vespucci. [We here focus on examining “DVD” (www.dioi.org/dvd.pdf), final to-NGS 1988/9/18 edit of Davies’ Vespucci apologia, referring also to the 1984/10/17 version, “DVC” (www.dioi.org/dvc.pdf, whose added markings aren’t DR’s).] The math of both papers is the same, with but 2 minor corrections noted below: fn 59.) In this and subsequent platform effusions and distributed material, Davies attempted to defend Vespucci against longstanding “derogatory statements” & “denigrations”. (DVC 6 & DVD 13: §D7 here. And DVC 7 remarks that D.Leite “spends many pages running down Vespucci” [quoting Leite: “a fatuous person not capable of innovative thinking, amateur astronomer, navigator only average, cosmographer who repeated concepts of others, false discoverer who appropriated the glory of others” (similar to §3 §A1)]. Davies’ all-too-evident [rather religious] distaste for skeptics here is prototypical of his current hagiographic Peary reports.)3 Davies’ astronomical-navigational computations contended that Vespucci’s purported tropical observation of Mars’ lunar distance on

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1 This according to a scholar at the US Naval Observatory (1989/12/2), who also stated (1989/11/30) that he was the USNO astronomer who had recommended Davies to NGS in 1988 for the Peary investigation, largely on the basis of impressions formed from occasional long conversations at him; in fact (since Davises doesn’t publish in serious science journals), the only written paper of Davies that had actually crossed his desk was the one here under review. (The USNO astronomer never got around to checking its calculations.) He assumed Davies had the sort of time on his hands to dig into a problem thoroughly, [and thought] that the Vespucci paper demonstrated this virtue. NB: Davies analysed Vespucci much longer than he did Peary. He circulated his Vespucci paper long after its initial presentation, though his 7-man board presumably saw it. [After Davies’ 1991 Jan death, none of the Unmagnificent Seven would sub for him at the 1991/4/19 US Naval Inst debate on Peary’s Pole claim.]

2 This use of the Fels Planetarium is mentioned at DVC 1&8. The current Ass’t Director says (1990/2/27) that lunar parallax was not part of the planetarium’s 1984 capabilities.

3 NG 2: “Peary . . . mercilessly pilloried by a vociferous minority”. (Reviewers have universally noted that Herbert’s 1989 book Noose of Laurels is exceedingly jemile regarding Peary’s sins. DR’s
1998/8/3 proves the observer was at longitude c.37° 75 W. Thus, Davies says that his math vindicates Vespucci’s controversial claim to have reached Brazil in 1499, not to mention Vespucci’s priority in devising the historically crucial astronomical longitude-determination method known as “lunar-differences”. "I believe . . . our use of modern computer methods have [sic] shown Vespucci to be a credible navigator & innovator . . . . this application of Archeo[sic]-astronomical methods is a ‘first’." A2

However, when Davies’ work is corrected for various extraordinary astronomical-math hówlers (one of them spectacular both for its size and for what it reveals of his NGS-advertized Expertise), his calculations prove instead that Vespucci was at least 27° or 1600 nautical miles west of Brazil, deducing that Vespucci’s longitude details below 75° longitude of Liberia 3 (Africa). Since I made this little item public (1989/12/11), Davies has been asked by reporters 6 about his longtime former (pre-Peary) pet “historical detective story” (DVC 10) project; but he refuses [like §3 [B13] to answer press questions. One isn’t accustomed to [seeing US Admirals departing] under fire.

1973 book Peary at the North Pole: Fact or Fiction? was appraised similarly, e.g., by geographer Wm.Warntz in the 1975/3 Annuals Assoc Amer Geo. Geogr Dir 65:1799, “Rawlins’ dismissal of the final Peary claim does not thereby mean that he does not understand Peary’s overall importance and his many earlier contributions. He notes and appreciates them. He writes with compassion and awe of the physical suffering endured. He recognizes Peary’s many virtues no less than his extraordinary frailties.”

NGD 60: “on a personal note, we [the NF] cannot but hope that this marks the end of a long process of vilification of a courageous American explorer”. As the Wash Post headlined it (1989/12/12), in a Nixonian echo: the NF deems Peary “Not a Fake”. And, on the Vespucci observation (which even Vespucci’s defender Stein calls “fictional”): fn 47, Davies concludes that it probably “could not have been faked” (DVC 7; conditional satisfied at DVC 11). Davies goes so far as to justify the naming of the New World for Vespucci by stating (DVC 10): “even the erroneous Longitude of 1499 was enough to raise doubts that the new lands were off China.” (See also DVC 11. Davies knows better at DVC 14. He still believes Vespucci eventually recognized that this was a new world.) But in fact the very 1500/7/18 letter under discussion states (right in the sentence following that quoted by Davies at DVC 8, describing fresh water — which he supposes refers to the Amazon mouth): “it was my intention to see whether I could sail round a point of land, which Ptolomey [in his crude delineation of China] calls the Cape of Cattegat [Geogr Div 7:3.3]: the Chinese anchorage, Kattigara: Κεπτήτρα όρος 2συν;” (which is near the Great Bay [Geogr Div 7:2.7]: Μεγαλου κολπου). Ptolemy makes Kattigara at latitude 8°1/2 north of the Equator & longitude 177° east of his prime meridian, the “Fortunate Isles” which [DIO in 2008 discovered to be the Cape Verde Islands: www.dioi.org/vols/wnth1b.pdf, DIO 22 p.8]. “(Great Bay) is the Gulf of Tannah or the Gulf of the Ho Chi Minh City:Suong Nam public remains uncertain north in Ptolemy’s Handy Tables: Honigmann 1929 [fn 30] p.206. Wrongly south in his Geogr Div, distorting maps for 1000y, eliminating the Pacific.” Ptolemy’s prime source (Marinos) made [eastern China’s] longitude nearer 15° east (Geogr Div 1.1.1) or 9° west of the [Fortunate Isles], still in poor agreement (discrepancy of nearly 7°) with respect to Vespucci’s stated longitude, 9°1/2 west of Cadiz (Γαδειρα) [which Ptolemy maps about 5°3 east of the [Fortunate Isles] [Geogr Div 2.4.16 & 8.4.5].

"Ft 47, DVC11: 1499/8/23 moonrise earlier computed by Pohl (1944) & (correctly) by Stein (1950). The Vespucci ‘observation’ is here treated as having been made near the terrestrial Equator, as he reported — and as Davies’ analysis assumes."


Davies will say only that the paper is in his private files and wasn’t (as initially reported) delivered to the SocHistDisc on 1989/11/16. (Davies protests he was abroad at that time.) But he has repeatedly refused to answer the Wash Post’s queries as to where he did deliver his Vespucci paper. Davies’ artful selective responsiveness could impart the false impression that his Vespucci analysis was never presented in public. But the paper was given publicly (and the printed text distributed), repeatedly. (On 1990/2/27, the Ass’t Director of the Fels Planetarium confirmed that Davies had indeed delivered his Vespucci paper there. DVC 11 itself refers to the 1984/10/17 presentation as a “lecture.”) And this point is far less important than the following fact: [a] The paper was submitted by Davies to National Geographic for publication. [b] According to delightfully enthusiastic NGS Senior Associate Ed Joe Judge (1989/12/11 morning), publication of Davies’ Vespucci researches was being quite seriously considered as late as 1989/12/11 — right up until DR revealed the paper’s ephemical implications [at a press conference later] that day, at NGS. (See Wash Post 1989/12/12 & Times Wash 1990/2/22.) [c] Judge’s preening 1989/12/11 expansiveness also included the information that Davies’ Vespucci paper was the direct cause of Davies’ happy selection (by Judge, who refused to share that supreme credit with the US Naval Observatory) as NGS’ Peary investigator (§A3). (Judge & Davies both reside in fashionable Potomac, MD.) My two favorite Joe Judge statements are neatly juxtaposed by Kelly (Wash Times 1990/2/22): “this [Vespucci] article . . . so impressed . . . Judge that he saw to it Mr.Davies was brought in to oversee the [NGS] Peary project. . . . Mr.Judge dismisses the Vespucci [analysis’] dubiousness. ‘What the hell has that to do with Peary?’ he asks.” (And see §A3.) The precious range-finding invention (DIO 5.5 fnn 64/65) latitude signboard for entertainers in Ptolemy’s Handy Tables: Honigmann 1929 [fn 30] p.206. Wrongly south in his Geogr Div, distorting maps for 1000y, eliminating the Pacific.) Ptolemy’s prime source (Marinos) made [eastern China’s] longitude nearer 15° east (Geogr Div 1.1.1) or 9° west of the [Fortunate Isles], still in poor agreement (discrepancy of nearly 7°) with respect to Vespucci’s stated longitude, 9°1/2 west of Cadiz (Γαδειρα) [which Ptolemy maps about 5°3 east of the [Fortunate Isles] [Geogr Div 2.4.16 & 8.4.5].

8 See Christian Sci Mon 1989/3/27 (emph added). "Davies is not bothered by Peary’s lack of longitudinal readings. ‘There are several ways to stay on the meridian. Some are better than others,’ he says, noting that he’s ‘not yet sure which method Peary used.’ I ask that genuine navigation experts not bothered by Peary’s lack of longitudinal readings. ‘There are several ways to stay on the meridian. Some are better than others,’ he says, noting that he’s ‘not yet sure which method Peary used.’ I ask that genuine navigation experts considering such a task to be difficult and dangerous."

9 A nautical mile is very nearly one arcminute (1/60 of a degree) of great-circle distance on the Earth. An international nautical mile (1852 meters) is c.15% larger than a statute mile.

10 After Bowditch’s 1802 creation of a rapid method of calculation, the lunar-dimensions method’s formulas and tables were carried in the standard Bowditch Navigator (published since 1868 by the US Navy) until 2014. See Bowditch 1903 pp.128, 288-332 which provides the method of the US Navy’s W.Chaureen, with extensive auxiliary tables; history of method briefly noted at Bowditch 1958 pp.44-45, 53-54. (Due to improvement of portable timepieces throughout the 19th century, the lunar-dimensions method became, in this century, useful only in case of general shipboard instrument failure.)

11 The only lunar observations where parallax’s effect on celestial longitude may be skipped are: [a] Observations taken such that the ecliptic is parallel to the horizon. (I believe that it has not previously been pointed out that Hipparchus used this technique for his observations of −1274/5 and −1267/7. See Almanac 5.3.8.5. The only drawback to such a technique is that parallax’s first-time-differential is usually near an extremum at the time of null parallax.) [b] Lunar eclipses, where the Universal Time [UT] of mid-eclipse is virtually independent of location, though the Moon’s toponcentric coordinates are nonetheless affected by parallax.
that the Moon’s distance is of planetary magnitude. Since such an arrangement would place the lunar orbit almost completely under the Sun’s gravitational domination, the Moon must be a planet—a planet whose orbit nonetheless manages to appear geocentric, doubtless due to extraordinary (and also previously unknown) perturbation terms contained somewhere else in the Davies-New-Astronomy: a remarkably fruitful & revolutionary universal-physics, which is about to provide us lots of other equally enlightening gems, below.

B Davies’ Modern-Science Discovers the Simultaneous Worldwide Lunar Appulse!

B1 At Philadelphia’s Fels Planetarium, on 1984/10/17, Adm.Tom Davies announced a remarkable revelation regarding Amerigo Vespucci (the Florentine merchant-banker after whom America is named). Vespucci, too, posed (§A1) as an expert on exploration and navigational astronomy, convincing Spanish royalty sufficiently that he was appointed Chief Pilot of Spain from 1508 to his death in 1512. He was undoubtedly a gifted storyteller, at least some of whose alleged explorations are now almost universally regarded as nonevents. But Tom Davies’ highly-expert, state-of-the-art, astronomical-computer-ephemeris-based analysis convincingly vindicated Vespucci as to both his truthfulness (below: §B2) and his supposed pioneer understanding of the important method of lunar distances (§D7). The final version (DVD) of Davies’ paper is “Amerigo Vespucci & the Determination of Longitude”.

B2 Davies quotes (DVD 7-8), analyses, & certifies (§§C&D here) Vespucci’s alleged sight (§longitude-computation): a supposed 1499/8/23 observation (near the terrestrial and celestial equators) of a conjunction (or “appulse”) of Mars with the Moon. Throughout, Davies’ impressive refrain-accmpaniment (repeated no less than 4 times: at DVD 1, 6, 10, 13; all 4 passages quoted here) is that he will use “the tools of modern science” (DVD 1, emph added) and US Naval Observatory celestial computer ephemeris-programs to test Vespucci’s observed conjunction. “It is this phenomenon [the conjunction] that Vespucci used to ascertain his longitude in the New World. Using information available only four centuries later, we have the opportunity to test his veracity” (DVD 6, emph added).

B3 Davies’ entire paper’s crucial math basis (a Nobel-Prize-winning discovery, if true!—DVD 6 [www.dioi.org/dvd.pdf, p.6], emph added): “Determination of longitude by lunar distances is based upon the fact that a celestial event, a conjunction of the Moon and a planet or star, represents an event readily observable SIMULTANEOUSLY at widely separated points on the earth. The ‘Local Time’ of the event at each of the two points will differ by an amount equal to their difference in longitude measured in hours rather than degrees. Since the earth rotates 15 degrees per hour, these hours of time difference are directly convertible to longitudinal distance in degrees.” (See also DVC 3.)

B4 A classic example (in case of Dangerously-Little-Knowledge. [Which sadly UNDOES Davies’ earnest try at adding to knowledge—if unlike DID 22’s [3’s zoo of subtractors, I recently gave the Davies analysis to one of the world’s best known and most respected astronomers, Charles Kowal (Chiron’s discoverer; now at Space Telescope Science Institute). His amusingly incredulous appraisal of this keystone paragraph: it’s based on an error “any freshman astromony student wouldn’t make” (Washt Post 1989/12/12; see also Wash Times 1990/2/22). Kowal independently also finds that Vespucci’s 1499/8/23 “observation”, correctly computed, puts him near Africa (§G4), not Brazil. As is self-evident to [any positional astronomer] a conjunction of the Moon with another celestial object (planet or star—or the Sun, as in a solar eclipse) will in general NOT occur “simultaneously” at widely separated points on the earth.” If such a fantasy were in fact able to [materialize], then solar eclipses would be seen the same way and at the same time for all observers (who could see the eclipse at all), the world over! [The same elementary confusion of use of solar & lunar eclipses in an establishment attack on DR occurred as recently as late 2016 in Isis, History of science Society’s flagship journal: www.dioi.org/vols/wm0.pdf, DIO 22 [1]]

Most of us, from professional astronomers to highschoolers, have heretofore believed otherwise. But it seems we all have to catch up to Davies’ revolutionary New-Astronomy: solar eclipses are henceforth to be seen simultaneously & at the same magnitude all over the entire sunward side of the Earth. Thus, the Moon’s solar-eclipse shadow does not move over the Earth’s surface—and it has no locale. (Understand: this is the [NPS-quarter-million-dollar-remunerated] Expert—demonstrably innocent of the behavior of the best known shadow in astronomy, the solar-eclipse umbra—who on 1989/12/11 assured the public that his Navigation Foundation has competently analysed [on NGS grounds] the shadows and spatial relations in Peary’s photos and thus concluded that he got to the Pole.)

B5 Davies’ elementary §B3-mangling of the lunar distances method is the novel navigational principle that he applies to the computer-generated places adopted in both his detailed analyses (DVC & DVD) of Vespucci’s observations. But, as any astronomer reading Davies’ epochal New Astronomy (§B3-§B6) has by now astutely noticed, both the Davies procedure (§B3) and his analysis (given below: §D4) omit the most elementary correction characteristic of the lunar distances method, namely: LUNAR PARALLAX. And, Davies’ bad luck: the observation he is examining and computing was allegedly made at the horizon & in the tropics [those 2 circumstances combining] to virtually maximize the effect of parallax on the Moon’s apparent east-west ecliptical motion, that motion being the entire basis of time & longitude measurement via the lunar distances method. A Navigator pretending to expertise in historical longitude-determination methods, while innocent of when to apply lunar parallax, is akin to a purported Shakespeare authority who never heard of Hamlet. [See www.dioi.org/sha.htm, for DIO’s 2014 take on the Shakespeare-authorship flap.]

B6 Davies prefaces his monumental discovery of widespread simultaneous lunar conjunctons (by exhibiting (a la Vespucci: fn 30) his classical scholarship, showing that the Davies-New-Astronomy is implicitly assented to by Ptolemy (DVD 6): “It seems likely that [Vespucci] knew of the phenomenon of the so-called ‘lunar parallax’ of a conjunction of the Moon and Spica at Rome and the same celestial event observed at Alexandria”.... (Any-
one who had ever opened the Almajest would know that it is divided into 13 “Books”, not “Volumes”). It happens that DR has published at least 4 scholarly analyses discussing this very [Almajest] chapter (Publ Astr Soc Pacific 94:359, 1982, end of App.A; Isis 73:259, 1982, n.17; Vistas in Astronomy 28:255, 1985, §3: Amer J Physics 55:235, 1987, n.14). So, when I read Davies’ citation of it, I knew instantly that Peary was not the only US Admiral who faked when he pleased. Yes, Alm.73 contains observations of lunar conjunctions with Spica, two (not one) from Alexandria and one from Rome. The catch is that the Alexandria observations of Moon-Spica conjunctions were in 294 BC & 283 BC (by Timochares), while the Rome observation of a Moon-Spica conjunction was in 98 AD (by Menelaos)—— almost 4 centuries later. This large time-interval is the heart and basis of Ptolemy’s entire discussion here (his demonstration, by lunar-conjunction data from different centuries, of the reality of precession, a very gradual phenomenon). It cannot possibly be missed by anyone reading the source Davies cites.

B7 I have (Amer J Phys 55:235, 1987, §II.4) criticized Ptolemy for being the only astronomer in history who claimed he had observed the same celestial event on 2 widely separated occasions (37º apart). But now we have a new champion in the scholarly pretense department: an expert who has discovered that “the same celestial event” was seen from 2 different terrestrial places at times nearly 400 years apart! (Back in §B3–B4, Davies contracted events, separated by hours [In 15], to simultaneity — now he’s compacting whole centuries! Is it unfeeling to pull the magic carpet out from underneath such delightfully accelerating science fiction. . . ?)

B8 A particularly suspicious type of reader just might entertain for a fleeting moment the notion that Davies didn’t actually read the Ptolemy passage he expands so confidently unto a famous chapter entailing the source from the Ptolemaic creation works the source of scholarship: [§] [§D3&L]. Naturally rejecting the idea of a Davies hoax, we turn to other, permissible explanations. According to special relativity, two events 400º apart in one frame can only be simultaneous in some other frame (moving relative to the first) if the events’ rest-distance apart exceeds 400 light years. So, either: [a] Light takes about 4 centuries or more to travel the 1055 mi from Rome to Alexandria, which establishes light’s speed as less than 3 mi/yr (a snail is faster — and so is Davies’ newly-discovered Incontinental Drift, as we’ll see below: §G7); or [b] Davies (who has training in physics, so he cannot be taken lightly) has: shattered 4-dimensional light cones, debunked Einstein & Minkowski, and revolutionized our theories of physical causality.

[16] Davies (who obviously did his navigation at sea out of standard cookbook-style Navy tables, with uneven comprehension) is as innocent of precession as of parallel. In his first Vespucci paper, we find (DVC 2-3): “we must divert again for a discussion of navigation and navigational methods of the 15th century. . . . The navigators of the northern hemisphere have always had an easy way of determining their Latitude roughly. The star called Polaris lies less than a degree from the point in the sky around which the celestial sphere (or sky) appears to rotate. Measuring its altitude above the horizon, which gives Latitude, was done by various means from the earliest times.” Polaris or α UMI is indeed now within a degree of the true north celestial pole, but, its coordinates change due to precession. In fact, Polaris was 3º4. From the true pole in 1499 AD. Ptolemy notes (Geog.Dr 1.7.4) that Hipparchos (c.130 BC) found it 12º2’ distant from the pole. (The bright star then nearest the pole was at declination 82º+-: Kochab or θ UMI, more than half again closer to the Pole than α UMI.) Incidentally, Davies cites both these astronomers (at DVC 3) as if he has read them (though “their wording was somewhat obscure”, he knowingly judges); however, he gives the wrong century for both (also DVC 3), and we are now learning independently here (§B6) that Davies is not quite the Ptolemaic scholar he poses as.


B9 How often does a single paper augur discoveries in so many fields at once? (And more’s to come below.) It must be added that, had Davies consulted the chapter he cites (Alm 7.3) in either of the only two scholarly editions of the Almajest (K.Maniutti 1912-3 or G.Toomer 1984), he would have found this chapter festooned with footnotes (catch irony of fn 19 here) discussing ancient astronomers’ calculations of lunar parallax. Indeed, by chance, Toomer (as he tells the reader in his n.77 to Alm 7.3) chooses the 283 BC Moon-Spica conjunction as the example he uses to illustrate (in great detail: Toomer 1984 App.A pp.652-653 Examples 9-10) just how the ancients computed the numerous lunar parallaxes that appear in the Alm’s text. B10 The obvious reason one must include parallax in any computation of the Moon’s observable non-zenith celestial position is that the Moon is so close to us: its mean distance from the Earth’s center is only 60.3 Earth radii (ER). Thus, when seen near the horizon, the Moon’s apparent position is lower (on the average) by 1/60.3 radians or 57.3 arcmin or 57'/60.3 degrees (57 arcmin or 57'). So, for tropical moonrise, the observed (topocentric) celestial longitude will be roughly 1º higher than the celestial longitude given by an accurate ephemeris (geocentric). For tropical moonset, lower by same. This will seriously affect conclusions regarding time or the observer’s longitude (deduced via lunar distances): since the Moon’s mean celestial motion takes it about a degree every 2 hours, Adm.Davies’ “glaring error” (to quote the 1989/6 National Geographic on DR) in his deduced geographical longitude (caused by his omitting lunar parallax in a tropical moonrise observation like Vespucci’s) must be very roughly 2 hours or 30º! — which is the difference between Brazil and Africa. It is also comparable to the size of the error (45º of longitude) Davies asserts Vespucci made (due to poor tables), which Davies claims (DVD 10) to have “vastly” improved! (In truth, if Davies’ speculative §C8 reconstruction of Vespucci’s math is correct for parallax etc., the resulting longitude is by chance much nearer Brazil than is Davies’ own modern-calculated longitude, similarly corrected. . . )

[19] Davies & National Geographic perversely condemn DR’s Peary at the North Pole: Fact or Fiction (Washington 1973) for not being a scholarly work (e.g., not having a normal footnote system). This despite the fact that all the book’s professional reviews agreed that its evidence was convincing.

[20] Similar Davies innocence interprets oversurely the Vespucci §C2 statement, that he was “corroborating with calculations from the Alphonsine Tables”, as merely referring to a 9º longitude shift from Regiomontanus’ meridian to Cadiz (a simple addition, hardly worth mention as plural and noteworthy “calculations”, especially since Regiomontanus’ own tables show about this time-difference between Spain and Nürnberg). Davies indicates (DVD 9) that, in order to check on this easy matter of the 90m difference, he has consulted “several variants” of the Alphonsine Tables. But did he not then notice that these include substantial tables for computing the vital longitudinal & latitudinal lunar parallax (cited Delambre Histoire de l’Astronomie du Moyen Age 1819 p 255-256)?” The Vespucci §C2 passage (presumably taken from elsewhere, given his calculation’s innocence) makes much more sense if the reference is to parallaxic corrections, which everyone (well, almost) knows are required when using lunar conjunction observations. A knowledgeable navigator would have realized that possibility.

[21] “Celestial longitude” is not the same as geographical longitude. Here, the former is virtually the position measured along the great-circle ecliptic’s 360 degrees, the approximate path of the Moon’s motion at earth, which is the “clock” (see fn 22) being used by the lunar distances method.

In geocentric angular motion, the Moon is by far our fastest long-term celestial neighbor, with a mean sidereal motion (movement in celestial longitude, against the stellar background) of 360 degrees per sidereal month (27 1/3 days) or 13º 2/day or 33’/hour. Since the Moon’s mean diameter is barely 31’, a rule of thumb is that the Moon’s average geocentric motion is: its own diameter every hour. However, this average is seriously affected by the eccentricity and perturbations of the lunar orbit as well as by parallax; thus, for reliable investigations, one must compute precise absolute positions and use differential methods only with great care.
B11 I might add that, 2 millennia ago, the best ancient Greek astronomers, by competent use of lunar observations (lunar eclipses, where parallax doesn’t affect the time of the event) mapped longitudes to an accuracy of roughly a half degree.23 This is about 60 times better accuracy than that of Adm. Davies’ impressively attired “modern methodology” calculation.

B12 I will also remark that over 5 years ago (Queen’s Quarterly 1984/12), I playfully criticized most modern astrologers for computing horoscopes without including lunar parallax—especially since its omission will foul up the loveliest of all celestial conjunctions (conjunctions being astrologers’ meat), specifically: solar eclipses. (I also added that some few 20th-century astrologers do include it: G. Noonan & G. Allen alias D. Bradley. So even these mystics, like astrologer C. Ptolemy, are way ahead of a certain Admiral.)24 But I did not expect ever to encounter such a catastrophe in the work of a purported expert in navigation—much less in the output of one who has made so much (§9) of his special experience & skills in questions involving the L-word. (And Davies can hardly be excused as a novice: when he first announced his vindication of Vespucci, Davies was 70 years old.)

B13 Was Davies later apprised of his “Colossal error” (to quote a 1989 Davies attack upon a seemingly vulnerable quarry)?25 Well, when DR asked to see this DVD paper, a possessor of it stated (1989/11/13) that the reason he can’t send DR a xerox is because Davies, when he heard DR was interested, had specifically asked that DR not be given a copy. Davies’ excuse?—he hadn’t finished the paper yet. (No hint that the paper was grandly miscomputed.) Question: was Davies worried about finishing the paper?—or about the paper finishing him?

C Vespucci’s Alleged Observation & Calculation

C1 Vespucci’s report, taken from his contemporary Strozzi’s copy of a supposed26 1500/7/18 Vespucci letter27 to L. di Medici, is quoted by Davies (DVD 7-8):

C2 “As to longitude, . . . I was put to great pains to ascertain the east-west distance that I had covered [since leaving Cadiz 1499/5/16]. . . . I found nothing better . . . than to . . . take observations at night of the conjunction of one planet with another, and especially

B14 By such means was made the proportion: if 24 hours equals 360 degrees, what do 5 and one half hours equal? I found that I had come 82 and one half degrees. So much I computed to be the longitude from the meridian of the city of Cadiz.”

C3 It is true that 15 times 5 1/2 equals 82 1/2, but little else is clear about this passage. Davies notes (DVD 8): “At a latitude near the Equator a longitude of eighty two and a half degrees west of Cadiz [whose actual longitude is 6°18′W of Greenwich —DR] would have put Vespucci in the Pacific Ocean; this fact has been cited as one reason to believe that he knew nothing of navigation and faked the entire story.”

C4 Davies is “not bothered” (to quote his equally blasé attitude regarding Peary’s peculiar first-time 1909 lack of observations for longitude; fn 8) by several gross errors in the Vespucci report: [a] Was Vespucci so inept at dead-reckoning that he did not know he had actually traveled (since departing Cadiz) barely 30° or 1800 miles of longitude west instead of 82°1/2 or nearly 5000 miles?! (Note that the 1494 Treaty of Tordesillas division of new lands created a Line of Demarcation between Portuguese and Spanish claims: Spain got anything west of 370 leagues west of Cape Verde [the same “Fortunate Isles” zero-point which Marinos-Ptolemy had used: see fn 3 above]; Portugal, anything east. This Line was at approximately 50°W longitude by the modern Greenwich convention. Vespucci’s alleged trip was Spanish, thus his claim that Brazil was at c.90°W happily pushed his “discovery” so far across the Tordesillas Line of Demarcation that a Spanish claim to it seemed unarguable.) The exaggeration of the supposed distance to Brazil was by a factor of nearly three! I see that Davies does not mention that Vespucci also alleges wildly exaggerated attainments in latitude—claiming28 that, on his 3rd reputed voyage, he had probably


24See fn 57 for another suspected Navigation Foundation descent to the level of astrologistic expertise in astronomical calculation.

25National Public Radio 1989/2/1. Davies was referring to DR’s 1988 belief that the chronometer serial numbers on Peary’s Betelgeux Document were azimuths. Davies failed to note that DR’s computed position for Peary did not depend upon this secondary matter (the computation being accurate, though the basis was false), nor that the same interpretation had been made by leading scientists of the American Geographical Society and the Carnegie Institute. Scientifically speaking, the “Colossalness” of this DR error is trifling beside Davies’ incomparably amateurish miscalculation of Vespucci’s lunar position due to omitting parallax—an error which, to my knowledge at least, has been made by no reputable astronomer since the Big Bang.

26Original now lost. The official Hakluyt Society collection of Vespucci’s output omits the letter on which Davies’ entire paper is founded, stating that it is one of “three spurious letters now so universally held to be forgeries, that they need not occupy our time” (Markham 1894 p.iii). (DVC 6 calls the letter’s genuineness “unquestioned.”) Reminds one of the prime issue raised by Mengchen’s unstoppable Bathful Hoax (as well as Peary’s Pole prank): is some misinformation unkillable? H. Wagner’s 1917 opus (which I have not seen in the original), on the Vespucci lunar distances question, suggested that the reason for disbelieving in the authenticity of the 1500/7/18 Vespucci letter (supposedly written from Seville) was that a different Vespucci account said he was not back in Spain from the trip until 1500 Sept. See A. Wedemeyer’s review at Annalen der Hydrographie und Maritimen Meteorologie 46:196; 1918. (DVC 4 says there is archival evidence that Hojeda returned in 1500 June. And J. Hitt tells me [1990/3/1] that there is said to be similar proof that someone with a name similar to Vespucci’s sailed with Hojeda.) For another problem noted in this review, see fn 31.

27Slightly misdated as 1500/7/15 at DVD 11 but correctly dated elsewhere by Davies.

28DVD’s Fig.6 caption notes this correctly. However, Davies’ 1988/9/18 memo on the Regiomontanus tables says: “Note: Regio’s time is at [Prussian] Königsberg, Longitude E 14°-30′.” (Actual Königsberg: 54°42′N, 20°29′E.) This odd confusion arose because Johannes Müller (Regiomontanus) would sign his works (e.g., bottom of last page of Der Deutsche Kalendar des Johannes Regiomontan—same year and computational base as his Ephemerides): “M. Johan von kungsperg.” But this has nothing to do with the meridian or the publication-place (which was in fact Nürnberg [fn 50]) of the Regiomontanus tables—rather it signifies that he was born (1436 AD) at the other Königs (in Franconia: 50°05′N, 10°34′E). In ancient times, one’s native town was commonly attached to one’s name. (By the way, how Davies arrived at a longitude of 14°1/2 E is a mystery. Perhaps he couldn’t find this tiny town on a map but assumed that Frankfort was in or near Franconia and so used it, but then got the wrong Frankfort, an-der-Oder at 14°32′E instead of am-Main at 8°41′E.) Since Davies has sneered at DR’s minor (& not original) 1988 chronometer-number error as akin to confusing someone’s license-plate number with scientific data, I may as well point out a funnier, [original], and absolutely unique aspect of Davies’ 1988 misplacing of Regio’s meridian. It is well known (first sentence of his entry in Annalen der Hydrographie und Maritimen Meteorologie 46:196; 1918. (DVC 4 says there is archival evidence that Hojeda returned in 1500 June. And J. Hitt tells me [1990/3/1] that there is said to be similar proof that someone with a name similar to Vespucci’s sailed with Hojeda.) For another problem noted in this review, see fn 31.

29Text at Markham 1894 p.45. The attached Vespucci statement that he was thus only 17°1/2 from the Antarctic Circle (23°1/2 in radius around the terrestrial S.Pole) would put him nearby at latitude 49°S. The implicit Vespucci value of the obliquity in these statements appears to be 22 1/2. Another Vespucci text quoted here (in following) makes the obliquity 23°. The correct value in 1499 was 23°30′.
reached 50°S. But latitude (unlike longitude) is so easy to determine astronomically that there can be no Davies-rehab by "modern" recomputation of celestial data. In a similarly Münchhausenesque vein, Vespucci claims on his supposed 1st voyage to have gone along an American coast (starting at 23°N) 30 870 leagues31 to the NW — over 3000 miles! (I use Vespucci’s 3.6 mi leagues: see fn 31. Markham 1894 p.xxvi comments: "Such a course and distance would have taken him right across the continent of North America into British Columbia.") [b] Off the coast of Brazil on 1499/8/23, the Moon rose about 2 1/3 hours after sunset (not 1 1/2).32 [c] It is impossible for the Moon to have moved nearly 4° 1/2 in the reported 4° 1/2 time interval between the 2 reported observations (19:30 to 24:00). It is incredible to me that anyone who had regularly performed lunar observations, as Vespucci claims he had (§C2), could make such mistakes. It is widely suspected that Vespucci was an unreliable reporter and that the first of his supposed 4 journeys to the new world was invented. Apologists’ current preferred defense is to reject as unauthentic the formerly glorious Vespucci accounts (written to Soderini) on which this journey was based, while retaining the Medici accounts. Markham accepted the Soderini accounts as real, while rejecting some of the Medici letters: fn 48. The main point to keep in mind is: when it comes to Vespucci, nothing is firmly established as authentic.33 I recommend the observation of Harvard’s S.Morison European Discovery of America: the Southern Voyages Oxford 1974 p.309: “Let it be remembered that Vespucci lived until 1512 and thus had plenty of time to dissociate himself from the Soderini and the Medici printed letters, had he chosen to do so.” On p.308, Morison comments: “you cannot convince anyone who has the Vespuccian faith.” UFologists, Pearyites & Cookieites, [Strats & Oxfordians] are no different. Morison generously credits Vespucci with 3 journeys (albeit in a trivial rôle), but also regards him as a repeatedly exposed “Liar”: p.297. And pp.294-295: “We regard all the pretentious apparatus of celestial navigation in Vespucci’s writings as so much dust thrown in the eyes of important Spaniards and leading Florentines. . . . It would weary the reader to pick out every inaccurate statement made by our genial faker. His distances are palpably wrong . . . .” His claim to have used lunar distances to find longitude is fantastic.34

C7 Davies claims to have passed over the 2° (midnight) alleged 1498/8/23 observation (supposing it was due to a scribal error) since he thinks he can make the 1st observation fit Vespucci’s purported [South America] location.

30 Text at Markham 1894 p.17: “the Tropic of Cancer . . . where the Pole is 23° above the horizon, on the verge of the second climate [klima].” (The last reference is to the ancient expression for the latitude where the longest day of the year was 13.5 hrs; some ancients called this the second klima: see E.Hönigmann Die Sieben Klimate und die Πόλος Εσπερίας Heidelberg 1929 e.g., pp.52, 184, 189, 229 where it states that Vespucci’s 3.6 mi leagues was an error of his classical education, though it was a mere smattering — some correct and incorrect Vespucci references to the classics are provided.) The text continues (ident): “We departed from this [23°N] port. . . . and we navigated along the coast, always in sight of land, until we had run along it a distance of 870 leagues, always toward the North-West . . . .” (Note that a voyage along a visible coast leaves no room for mistaken distance due to current or wind.)

31 Leagues are commonly taken to equal 3 miles. But the supposed Vespucci 1500/7/18 letter equates 1 degree with 16 2/3 leagues — which makes a Vespucci league equal to exactly 3.6 naut mi (something over 4 statute mi). Wagner in 1897 brought forth yet another ground for rejecting the 1500/7/18 letter: in 1503 Vespucci called 1 degree equal to 21-22 leagues: see Wedemeyer’s review, cited in fn 26.

32 For various independent reasons, one suspects that the author of this letter computed indoors rather than observed outdoors. It is possible that he calculated, from Regiomontanus’ tables, the lunar elongation (angular distance from the Sun) for the wrong (1499/8/22-23) Nürnberg midnight. (The time of Moon-Mars conjunction predicted in Regiomontanus’ aspect-tables is the following midnight: 1499/8/23-24; DVD Fig.2) Division by 15 for an approximate sunset-to-moonrise time-difference would yield about 1.6 hrs, virtually the amount reported in the alleged Vespucci letter (1 1/2 hrs). When dealing with midnight events, such 1-day computing errors are commonplace.

33 See fn 39. Jack Hitt of Harper’s Magazine, in an upcoming story (for Esquire), suggests that the Vespucci letters were severely re-written by successive later hands, for publication-sales purposes.

34 On 1499/8/23, at longitude 37°34' W (near the Earth’s Equator), the refracted upper limb of the Sun disappeared below the sealevel sea-horizon at 18:03 LMT, exactly the value Davies gives at DVC 8. Curiously, he later needlessly rounded this to 18:00 (DVD 10; §D4). It is perhaps unkind to sully this lone credit by mentioning that it is sheer luck, but that is the case. Davies shows no awareness of the fact that “mean time” was a mere abstraction in Vespucci’s era — which was long before the ubiquity of reliable day-round chronometers (much less portable ones). Thus, since well before Ptolemy, astronomers’ & navigators’ time of day was apparent time, not mean. And, since a celestial body’s motion is a function of mean time (actually dynamical time), a correction (“the Equation of Time”) had to be applied to apparent time before entering astronomical ephemerides (based on mean time). But, since the EoT never exceeds about 20’, it was a serious problem only for the Moon’s rapidly changing position. (Ptolemy never bothers with the EoT for any other celestial body.) Davies’ good luck in this instance is that, at the time of the 1499 conjunction, Aped the time-difference would yield about 1.6 hrs, virtually the amount reported in the alleged Vespucci letter (1 1/2 hrs). Thus, Davies’ indiscriminate melding of Mean-Time & Apparent-Time data in DVD Fig.3 (virtually identical to DVC slide 15) does no damage. Note, however, that this makes four corrections here which were neglected by Davies — even aside from the several others (E) which were bungled. (Are we supposed to accept unquestioningly that Davies’ 1989/12/11 Peary analysis handles all necessary corrections accurately?)

Here we find yet another difficulty with Davies’ apology-exercise: by the time Vespucci was writing his 1500/7/18 letter recounting his math, he was back in Europe where an astronaut (or sailor — or anyone) could have told him that the predicted 1499/8/23 Moon-Mars conjunction in fact took place some hours before the Regiomontanus aspect-table’s predicted time (which was Nürnberg midnight). Generalizing this point: someone knowledgeable in astronomical matters (as Vespucci pretends to be) would have tested the lunar distances method at home (thus at known longitudes), to see how well it worked. Once this point is realized, we see that no one living about 1500 could have used the method of lunar distances in the way Vespucci claims, for the simple reason that the lunar ephemerides were demonstrably inadequate. When we land someone such as Vespucci for “inventing” the lunar distance method, we are inevitably committing an injustice, because: [a] the idea of checking time by lunar conjunctions is self-evident, not an “invention” — while [b] anyone claiming to use the method effectively in 1499 cannot have been an outdoor astronomer or he would have known from repeated observational experience that the required ephemerides were so inaccurate as to render effective use of the method impossible. Why heap praise upon a phony of that ilk? Rather, let us reserve our admiration for the genuine, competent pioneers who first made possible effective on-the-spot use of the method, scientists such as F. Mayer & Bowditch. (The time of Moon-Mars conjunction predicted in Regiomontanus’ aspect-tables is the following midnight: 1499/8/23-24; DVD Fig.2) Division by 15 for an approximate sunset-to-moonrise time-difference would yield about 1.6 hrs, virtually the amount reported in the alleged Vespucci letter (1 1/2 hrs). When dealing with midnight events, such 1-day computing errors are commonplace.
outdoor observations of the same conjunction. Correcting (both observations) for such matters as lunar parallaxes, deduction of a longitude accurate to ordnag a degree might be possible — but only after returning from the journey, not during it.

C9 Since this longitude (actually in the Pacific Ocean — near the Galapagos Islands!) was impossible for a Brazil journey, critical historians have not been kind to Vespucci. Moreover, even Vespucci’s associate J. Stein (who places Vespucci in Aruba on 1499/8/23) brings forth (1950 p.351) a provocative coincidence: 5 1/2 earlier, Columbus, from observing (at Saona Isle) the pre-dawn lunar eclipse of 1494/9/15 (other details below: fn 50), had celestially deduced precisely the same longitude as Vespucci later pseudo-celestially found! — 5 1/2 (or 82 1/2). (And in 1500 AD, this was the only available Columbus astronomically-based longitude. Columbus’ 1504 longitude-estimate obviously hadn’t occurred yet.) Specifically, Saona (18°07’N, 68°42’W) was placed (by Columbus’ 1494 eclipse-based calculation) just 82 1/2 west of Cape St. Vincent (37°01’N, 8°59’W; near Cadiz which is at 36°31’N, 6°18’W). Note the coincidences that Saona is just north of Aruba (where Stein induces that Vespucci’s nonastronomical writings put him), only about 6° east of it, while Cadiz (6°3 W) is only 11° east of Cape St. Vincent (9°0 W), both places being in the west Iberian peninsula. Thus, the Vespucci 5 1/2 longitude “deduction” is a virtual replication of Columbus’ result. (Note that, though his result was poor, Columbus’ chosen astronomical method for finding his longitude at sea was fairly reliable: fn 15, fn 50. Vespucci’s was not: fn 36.) Even the sympathetic Stein (1950 p.351) concludes that longitude 82 1/2 must therefore be a “presupposed value”. Which would require that Vespucci (or someone) did not compute to it but from it. The implications are too obvious to belabor here.

C10 Noting the striking equality of the degrees and hours (both 5 1/2) in Vespucci’s report, it is credible to suppose32 that Vespucci merely equated hours of lunar motion with degrees of rotation as appears on the surface — if he computed at all. I suspect that the whole 1499 report may be merely a muddled33 appropriation of another’s calculation. (I remark at fn 20 that the letter’s reference to corrections from the Alphonsine Tables suggests that the hypothetical original computer perhaps took account of lunar parallaxes. If so, he must have been a sufficiently knowledgeable astronomer that he could not have committed the blunders & innocences so evident in the Vespucci rendition.)

C11 It is known that Vespucci transposed events from one journey to another: see [§C11 or] Roy Geogr Soc President C.Markham Letters of Amerigo Vespucci (Hakluyt Society, London 1894 p.xxvii). Markham adds:34 “The investigation of Vespucci’s statements contained in the first and second [of his 4 alleged] voyages destroys all confidence in his unsupported word . . . .” Markham’s conclusion is (p.xxv): “The first voyage appears, both from internal and external evidence, to be imaginary. The second voyage is the first [1499] of [Alonzo de] Hojedo inaccurately told, while two or three incidents of the Hojedo voyage are transferred to the imaginary first voyage.” We note that the 1498/9/23 “observation” under review was reported from Vespucci’s account of his alleged second voyage.

C12 If Vespucci wrongly supposed that the Moon moved 1°/hr, then the 2 “observations” are in perfect geocentric accord — and, additionally, the striking juxtaposition of 5 1/2 and 82 1/2 is also explained; this simply & immediately yields the result: 82 1/2 longitude.

D Admiral Rehab’s “Surprising Correlation”

D1 But Davies’ and my respective speculations on Vespucci’s math are not our prime concern here. Let us look at Adm.Davies’ own incomparable math, where there is fortunately no doubt of the author’s intent or identity.

D2 Davies states that he has vindicated Vespucci’s honesty and his presence in S.America. Davies does so as follows, starting with his customary invocation of Modern-Methodology, which is intended to lend science’s authority to his remarkable adventures (DVD 10-14; DR emphases added here & there):

D3 “Precision in dealing with the positions of celestial bodies at any time, the tabulation of which is the essence of an Almanac, is a relatively recent development. The first modern theory of the Moon, compiled by Brown in 1919, is still the definitive theory. The Jet Propulsion Laboratory has now completed a new numerical integration of all available data on the bodies for any desired time with remarkable precision. Using [these] data and the excellent computer model developed by Dr.Lerry Doggett of the US Naval Observatory, we can plot the positions of the Moon and Mars for the 23rd of August, 1499, with great confidence. Figure 3 shows a plot of the Celestial Longitude for these bodies, with the times indicated occurring at 20h06m, indicated by the intersections of the two curves. From this evidence we can determine for ourselves what Vespucci’s real longitude must have been, regardless of his calculations. [DVD 10]

D4 “Using modern data on the relative positions of the Sun and the Moon, we can calculate a more accurate time of moonrise. On the 23rd of August, 1499, at latitudes near Vespucci’s letters that has struck nearly all the students who have examined them, is their extraordinary

32 See Las Casas at, e.g., Markham 1894 p.81. And see ibid p.xviii. See also fn 57.

33 Anyone possessing the knowledge to compute the event for the moment of its occurrence would hardly do this work by finding curve-intersections: inaccurate, and the introduction of lunar parallax into such a procedure is cumbersome. Such a computation is best done directly for the event’s time.

34 E.Brown & H.Hedrick Discovery of South America 1984 pp.99-102 suggests this might not be meaningful but notes at the same time that: [a] no Vespucci account is definitely genuine, and [b] the fonnness of his alleged voyages suggests “a deliberate analogy with Columbus.” Markham also notes (p.xx): “The feature in
the equator sunset was at 18h 00m [see fn 34] Local Mean Time. A comparison of the Right Ascensions of the Moon and Sun indicates that the Moon rose 2h 05m later, at 20h 05m. The lunar distance at moonrise reported by Vespucci (taken as 1.25 degree) results in the conjunction being about 2h 30m earlier, at 17h 35m local time. Thus the difference in time of the conjunction between Vespucci’s location and at the modern standard meridian (20h 06m §D31) calculates as 2h 31m, or 37.75 degrees of longitude. Although vastly better than Vespucci’s 82.5 degrees, there are enough approximations in these calculations that we must consider this only a probable value. . . . [DVD 10-11]

D5  There are a number of significant landmarks in Vespucci’s recitation which match well with the details of the voyage shown in Fig.4 [NE coast of Brazil]. The coast at their landing... . . . covered with treacherous... good quarter of the coast today... . . . the sea water was fresh within 25 leagues of the coast: Figure 5 is an Isoline chart of the area showing this phenomenon... . . . Continuing south and eastward... encountered an ocean current... . . . so strong that they could not make headway against it, and so finally reversed course and headed back to the west and north. At the farthest east point Vespucci estimated latitude as 4 to 6 degrees south of the Equator. The Sailing Directions for South America (1952) describes the Tidal Currents inshore (out to 10 miles) as running west (at ebb) up to 4 to 5 knots. Farther out they would have encountered the west-running South Equatorial current. [DVD 11-12]

D6  ‘...there is such a surprising correlation of the data that it is hard to believe that these details of geography and astronomy could have been fabricated by someone with no knowledge of even the existence of that coastline. [DVD 12]

D7  “What conclusions can be drawn from this use of our modern data and methods of analysis? The literature includes several earlier but incomplete analyses of this incident: while such distinguished critics as the astronomers... 49 and astronomical... there have been others who have said that his grossly inaccurate longitude was the result of errors in the Almanac used. I believe none have calculated his actual location as I have done above.44 From this analysis I draw the following conclusions: 1) Vespucci understood and attempted to apply the method of lunar distances to the determination of longitude well before the 1514 [discovery] date ascribed to Johannes Werner, 2) the location of Vespucci on the 23rd of August, 1499, has been reasonably established as on the northern coast of South America, somewhere in the modern state of Ceara (in Brazil). The [Davies] calculations are in accord with the [Vespucci] recitation of the geographical details of the voyage. [DVD 13]

D8  “...these conclusions do not necessarily exonerate Vespucci from the charges of [skeptical contemporary] de las Casas, but demonstrate a strong probability that the 1499 voyage was carried out as recited in the 1500 letter. Consequently, they also build credibility for Vespucci’s other writings and support an evaluation of Vespucci as an insightful practitioner of the art of navigation; perhaps one of the earliest nautical astronomers to grapple with the realities of navigating the ‘Ocean Sea.’” [DVD 13-14]

D9  It is always of interest when an analyst, though hugely miscomputing, nonetheless finds perfect agreement with his prejudices. We next examine the Davies errors that led him to the felicitous harmony (§D7 conclusion) which he has proudly announced as his discovery. Given the slight uncertainty of Vespucci’s purported latitude,48 we will compute (below) for the terrestrial equator (as does Davies’ calculation: §D4) without explicitly stating otherwise. (Testing shows that varying the observer’s geographical latitude ±5° varies the solution’s longitude by less than 1°. trivial in the context of this problem; thus, the equatorial assumption is a valid and useful approximation for our search.)
novice would instantly discern, Mars was obviously proceeding in retrograde: rearward. But Rear-Admiral Davies’ Fig.3 shows51 Mars’ motion as direct (forward: positive slope) not rearward (negative slope). By contrast, the Retro-Admiral’s Fig.6 has Mars moving rearward at the very same time: negative slope. (Navigation Floundering?)52 Or, given the manipulation of velocities possible under Lorentz transformation, do we have here yet another hint of the Davies paper’s curiously-undeclared relation to relativistic math?53 By meisyballying in the usual direction (the direction that will get Vespucci westward to S. America, where he “belongs”), Davies finds a too-high conjunction-time from his graph. Were the graph’s lines (NB: Davies’ shadow-lines are his basis for supporting Peary) drawn & read correctly, he would find about 20:02. The 4° difference between this and the time Davies deduces (2006: DVD 10) from Fig.3 provides yet another 1° of westward error.

due to scarcity of historical Mars data and to the fact that the Regiomontanus tables were published in 1474, thus the 1499 places represent “a 25-year extrapolation, with consequent accumulating errors.” Lacking access to Regiomontanus’ entire tables, I have not checked the matter directly, but I doubt that the error in the difference between the lunar & Martian mean celestial longitudes grew appreciably in just 25°, since the mean synodic positions of the Moon and Mars were both so well known. I have already cited above the probable cause of Regiomontanus’ large Mars errors for 1499/8/23: §E2. For a discussion of his precession, see Wagner 1918 pp.157f. Precession errors would of course not affect times of conjunction.) Note that Ptolemy’s mean synodic Mars tables (probably based on ones issued at the outset of Cleopatra’s reign) are still — in 1989 AD! — off by only 0°.4. Incidentally, Ptolemy unfailingly included lunar parallax in his work: see Abn 2.10-13 for math analyses, plus pages of tables for its computation. So it appears that even astrologer Ptolemy (whose “observations” were fictional and whose tables were simply appropriated from prior observing scientists: Rawlins Amer J Physics 1987/3) was, as a conceptual astronomer, superior to Davies. There is some suggestion that Vespucci or his source computed with parallax (above: fn 20). There is no doubt that Regiomontanus accounted for parallax, as the most cursory Davies comparison of Oppolzer’s well-known Canon with Regiomontanus’s Contri, in a later chapter comparing the two, notes was 9° for Nürnberg, which is at 49°27′N, 11°04′E. Morison Admiral of the Ocean Sea (unabridged 2-vol edition) 1492:1251, 262-3 n35 correctly remarks that Regiomontanus’ tables were really issued for workers of horoscopes, not navigators. Regiomontanus invented a still-popular astrological house-division system. (I see that Davies’ caption to DVD Fig.2 confuses houses with zodiacal signs.)

We note that Regiomontanus tabulates not just conjunctions but all five of the aspects astrologers live by: conjunction, square, quintile, trine, & opposition. We might say that the phenomena of fusing humane knowledge into one table, like Fig.2 of DVD.) None of the others would be of serious navigational use to a sailor of 1500 AD, except for those occasional Mars conjunctions which were near enough to a lunar node to result in visible lunar eclipses — which Regiomontanus does tabulate. Columbus says he used Regiomontanus’ predicted lunar eclipses for longitude-determination. The Regiomontanus ephemerides’ error for the 1494/14-15 eclipse (of Oct) seen by Columbus at Saona (18°27′N, 68°42′W) was 6°.25 (7:45 N=6.52 UT actual). Columbus used this table, not the 1504/2/29 lunar eclipse in Jamaica. (Both for longitude and for impressing the natives. Vespucci’s astronomy is like a cross-section of the earth’s surface which impressed the natives. Back home [fn 12].) On this occasion, Regiomontanus’ error was +27°2′ (13° Nürnberg Apparent Time = 1:02 UT predicted vs. 0:35 UT actual). These mistakes caused westward errors in Columbus’ deduced longitudes: 5° (1494) and 7° (1504) — though both his eclipse-based longitudes’ total westward errors are far larger. I note that the rms lunar-eclipse-time error of Hipparcos’ well-known 146 BC lunar tables was 16′, an error later reduced by him to just 10′ [www.doi.org/vols/w/11.pdf, Dio 1.1 [6 eq.32]. The accuracy of Regiomontanus’ eclipse predictions appears to be not quite as good as Hipparcos’.

51 The original diagram, DVC slide 15, correctly has Mars in retrograde motion. Note also lunar position disagreements (e.g., at 14 hrs) between DVC slide 15 and DVD Fig.3.

52 The ephemerides to check 1492-3 lunar conjunctions with planets, finding six: 1492/8/7 Jupiter, 1492/9/19 Venus, 1492/9/24 Venus, 1492/9/30 Jupiter, 1493/2/15 Jupiter, 1943/2/26 Saturn. Only one of these is correct: 1492/9/24 Saturn. Davies’ memo consistently confused Jupiter for Saturn and vice-versa — an error which suggests Davies didn’t know that Saturn is more distant than Jupiter, since Regiomontanus’ aspect-tables exhibit the phenomena in columns, one for each planet, ranked in order of decreasing distance (sample aspect-table at right side of DVD Fig.2). The alleged 1492/9/19 conjunction with Venus (only 5 days before Davies lists another Venus conjunction — some trick!) is really a lunar sextile-aspect. . . .

E3 Davies’ Fig.3 provides 1499/8/23 ecliptical longitudes of Moon and Mars graphed vs. “Greenwich Mean Time” or Universal Time. But Earth’s gradual spin-deceleration renders UT not apt for celestial mechanics, thus ephemerides are computed with terrestrial dynamical time (TDT) or (a few years ago) Ephermeris Time. (The difference between TDT and ET is trivial in this context, so I will speak of the traditional ET below.) On close examination, I found that my own ephemeris program gave positions in neat accord with Davies’ Fig.3 if I used ET where he speaks of UT. But ET was less than ET by several minutes in 1499 AD. So I checked with the writer (the astronomer Davies cites: §D3) of the Naval Observatory program Davies uses and was told (1989/11/30) by him that indeed his program was for ET or TDT, not GMT (or UT). (I make the ET —5° difference to be +4°. Most specialists in this area would call it about the same or even a little higher.) So we have yet another Davies error of innocence. Again: 1° westerly mistake.

E4 Using the Sun-Moon Right Ascension-difference (cited §D4), Davies also miscomputes the time of moonrise, presumably54 by consulting the lunar Right Ascension for a time previous to the event. We recall that Davies speculates-reconstructs Vespucci’s supposed contemporaneous time-sight pair as 07:00 local time (DVD 9: §C8); had Davies used this time to compute the Sun-Moon Right Ascension difference from the Greenwich time positions given him by the Naval Observatory, he would have found this Right Ascension difference to be 14°05′ — just as required for his stated result [§D4] that the equatorial moonrise-sunset difference equals 2°05′. But this hypothesis requires that Davies forgot to convert Greenwich time to local time when performing the computation. (Traces of a possible occurrence of the same Nav-Fou-Snafu55 glimmer through in the “patently absurd”56 1906/2/27 Cape Hecla pseudosolution [fn 54] of the Peary Betegelux Document, 1987/3).
**F Westward Lo: the Judge’s Fudges**

**F1** I am in awe of Davies’ amazing precision: a quarter of a degree or 15 mi! Though he makes a formal remark at §D4 that his 37°3/4 W longitude result is only “probable”, he nowhere correspondingly rounds his computed longitude even to whole degrees: 38°. One of the obvious follies of this paper is its unwillingness to tell the non-specialist reader frankly (what is obvious to an astronomer): since the observational basis is obviously uncertain by ordmag 10° (e.g., §E6), the deduced result, even if it were correctly computed, must be uncertain by roughly ±5° of longitude or 300 miles. (Davies, hired by National Geographic to act as its allegedly neutral judge, overseeing its investigation of its very own Peary hoax, has gotten Peary to within ordmag 1 mi of the Pole! As a knowledgeable science-newsman has already commented: sounds like a classic case of high-precision-low-accuracy.59 Indeed, we notice that the DVD analysis of Vespucci carries this ideal to extremes: Davies’ nominal precision is a quarter-degree, while his accuracy is roughly 30°: about a hundred times more worse. In fact, since DVD 10 puts Vespucci at “37.75° W longitude, the formal factor is 3000!”

**F2** Was systematic fudgery at work in Davies’ Vespucci analysis? Consider: whereas Davies did not think to correct for parallax, ET—UT, or differential refraction, he did find 4 numbers (§E2 & §E4—§E6) which produced his final Vespucci longitude (37°3/4). And it is remarkable that [a] had he computed these 4 numbers correctly, Vespucci would have been placed by Davies’ math at a point out in the Atlantic Ocean, hundreds of miles east of Brazil (this independently of the massive parallax gaffe, note); but, by a felicitous coincidence (one chance in 2°) Davies’ 4 errors in every single case shift Vespucci west of his later solution. DVC 8 has a priori a1 h error would explain DVC 1’s 1 h22m figure almost exactly. However, the easternmost point in South America (near João Pessoa, Brazil) is at longitude 35°W! Davies wrote DVD (which recognizes that the correct figure is over 2h: §E8—§E6) which produced his final Vespucci longitude (37°3/4). And it is remarkable that [a] had he computed these 4 numbers correctly, Vespucci would have been placed by Davies’ math at a point out in the Atlantic Ocean, hundreds of miles east of Brazil (this independently of the massive parallax gaffe, note); but, by a felicitous coincidence (one chance in 2° or 16, a priori) Davies’ 4 errors in every single case shift Vespucci west of his later solution. DVC 8 has a priori a1 h error would explain DVC 1’s 1 h22m figure almost exactly. However, the easternmost point in South America (near João Pessoa, Brazil) is at longitude 35°W!

**F3** Momentarily forgetting parallax, ET—UT, and differential refraction (since Davies did): even dropping his arbitrary rounding-up of 1° + 1°25 (§C8, §E6), Davies’ accumulated errors (the math in all cases easily done correctly by a scrupulous analyst) nonetheless come to: 1°1/4 2° + 2° = 7° — a total of about 400 miles. (Including the effect of Davies’ odd §C8 decision to round the Moon-Mars 1°+ gap upward would roughly

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58 Thus he is tacitly assuming that the observation was well clear of the horizon, though in fact that would entail a more eastward position than he wishes — and would eliminate the only correction I could find that would help Davies’ push west (§E7). See below: §G2—§G3.

59 Nor does Davies admit that his first (1984/10/17, Fels Planetarium) version of the solution had Vespucci at longitude 47°+ 1°W, that is, 9°1/2 (over 500 mi) to the west of his later solution. DVD 8 has moonrise at 19:33 LMT, 32° earlier than 20:05 (DVD 10; §E2) and has the moon (moving at 0.48/hr) taking 2.6 hrs to go 1°1/4, which is 6° more than 2.5 hrs (DVD 10; §E5). The net difference is 32° + 6° = 38°, which exactly equals the 9°1/2 longitude difference just noted here. Otherwise, the calculations (and the hilarious underlying astronomy) of the 2 Davies papers on Vespucci are identical.

60 Compare to the attitude of Stein in fn 47; see also §G2.
double this.) And thus the actual baselessness of his attempted “vindication” of Vespucci would (and should) have been obvious even to author Davies. (And nobody hired him to vindicate Vespucci. Now, imagine the outcome of siccing a Davies onto a case where his wealthy employers desperately seek a legend’s exonation — and you’ve just visualized the Davies-NGS report on Peary’s Pole claim.)

F4  The systematic westward errors of Davies’ analysis of Vespucci’s observations remind one that Davies is now using Peary’s 1909/4 photos to “prove” he was then right at the North Pole, as Peary claimed. (Result announced at National Geographic: 1989/12/11.) Lots of little arbitrary factors enter into that analysis, too. If Davies’ errors always got Vespucci further west until he’s where he’s “supposed to be,” then: do manipulations in the “Navigation Foundation” analysis of the 1909 photos get Peary further north until he too is where he ought to be?

F5  Let us next perform a rough differential summing-up of the effects of correcting Davies’ extensive series of creative miscompositions of Vespucci’s moonrise “observation”. We have 7 Davies errors: 3 cases of a nonspecialist’s ignorance, and 4 cases of easily-known nudging of Vespucci westward by clumsy miscalculation or arbitrary roundings. The 7 error-corrections here: [a] parallax (2° western: §E1); [b] retro-retrograde Mars-flourdation and graph-misreading (1° eastern: §E2); [c] ET—UT correction (1° eastern: §E3); [d] miscorrected moonrise-time (4° eastern: §E4); [e] overudge rounding of lunar speed for time elapsed since conjunction (2° eastern: §E5); [f] up-rounding of 1° to 1°1/4 (roughly 5° eastern: §E6); [g] differential refraction (5° western if Moon on horizon, much less otherwise: §E7, §G2—§G3). Adding up all but [f] (for which I mercifully opted at §E6 to compute largely with Davies’ dubious up-rounding), we find a required total eastward longitude shift of 24° + 1° + 1° + 4° + 2° − 5°, which comes to about 27°. This moves our Retro-Admiral’s impressively computed longitude solution from 37°3/4 W to about 11°W — quite close to the correct result, directly (nondifferentially) computed (§G1). (The foregoing breakdown of errors shows that differential methods — of the sort Davies tries — can work,45 but only if cautiously & competently handled.)

G  The “Davies Movement” & Admiral Rehab’s New Kissmology

G1  Taking Davies’ version of the celestial situation Vespucci describes (the Moon-Mars ecliptical longitude difference = 1°15′), the 1499/8/23 location on the Earth’s Equator computes as: 10°45′W (LMT 20:17).62 So this is the actual solution to Davies’ problem as he himself posed it (not the first time he’s required such assistance: see fn 14 & fn 57) — roughly 27° or about sixteen hundred miles distant from the Vespucci (Brazil) location Davies has deduced.

G2  And note that, realistically, it is improbable (as Davies implicitly agrees: §E7) that such an observation would be made with the Moon just clearing (lower limb touching) the horizon; if the Moon is instead assumed to be a few degrees up, then the solution is moved eastward both from [a] the rotation60 (of the observer along the terrestrial Equator) required to raise the event’s altitude and from [b] the attendant sharp decrease of differential refraction. Repeating the same problem (1499/8/23, Equator, 1°15′ visible Moon-Mars ecliptical longitude difference), but asking that the lower limb of the Moon be seen not on the horizon but at an apparent altitude of 1°, the deduced geographical longitude of

Vespucci is 8°W (20:22 LMT); for 2° up, 6°W (20:26); for 3° up, 4°W (20:30); for 4° up, 3°W (20:34). (Naturally, one computes the longitudes & times more exactly than displayed here, but the precision is meaningless in the context of a naked-eye report: §F1. So I round to the nearest degree of longitude and minute of time.)

G3  For comparison, we repeat these same solutions but using a Moon-Mars ecliptical longitude difference of just 1° (much nearer the sense of the Vespucci letter in question) instead of Davies’ overinflated 1°1/4 (discussed §E6). For the Moon’s lower limb on the horizon, the computed geographical location is 3°W (20:16 LMT); for that limb to be 1° up, 1°W (20:21); for 2° up, 1°E (20:25); for 3° up, 3°E (20:29); for 4° up, 4°E (20:34). These are the more realistic of the various solutions given here.

G4  Any likely member of the foregoing families of solutions would put Vespucci well into Africa’s Gulf of Guinea (also astronomer Kowal’s solution), roughly 2000 mi east of Brazil. Even the most generous (to Davies) of our calculated geographical positions (0°N, 11°W: §G1), puts Vespucci well into African longitudes (just south of Liberia) — way east of the westernmost point of Africa (Dakar, Senegal: 17°1/2 W). But since the easternmost point of S.America (Brazil) is at 35°N (as noted: §F2), there is no chance that the purported Vespucci observation (which Davies’ 14 pp DVD paper has carefully “proved” was Brazilian) could have been made as far west as S.America now resides. In fact, if we put Vespucci at Davies’ location (37°45′W tropical), the observed Moon-Mars ecliptical longitude difference49 at moonrise would be 2°10′ — roughly a degree larger than Vespucci’s reportedly observed value (“1 degree and several minutes”). Thus, a skeptical type might say that the report is altered, faked, or so inaccurate as to be worthless. But we will instead follow mentor Davies — to see where trust in Vespucci will transport us.

G5  Thus we know that if the Vespucci observation happened and if he was off a coast (both of which propositions Davies accepts) then that coast was simply Africa — unless something very exciting has happened since 1499!

G6  Note that Davies is extremely convincing and [Melvillianly] persistent in his detailed comparison (§D5—§D6) of Vespucci’s account to the eastern part of the north coast of Brazil. A moment’s reflection reveals the glorious resolution of our seeming contradiction: Davies’ resurrected-Vespucci is definitely off the hump of Brazil, but Vespucci’s astronomical observation places him in the Gulf of Guinea, which is the familiar big indentation or bend in the coast of west Africa — the very part where Brazil’s hump used to be, before continental drift removed it.

G7  And so Rear-Adm.Davies has led us to the door of a much more revolutionary realization than anyone expected to come out of his heretofore unjustly neglected rehab of Vespucci. According to National Geographic’s Atlas of the World (1981 pp.22-23), S.America’s hump & Africa’s bend were originally together (125 million years ago) as a seam in the single continent of Gondwana — but, before Davies, it was generally thought that the 2 present continents had separated over 55 million years ago. How inspirational that National Geographic’s own Admiral Rehab has now (in his piped pursuit of the Great White Wash) ineluctably proved that Brazil was kissing up to Africa less than 500 years ago! The astonishing kissmological ramifications of this sensational revelation include the discovery that continental drift must be proceeding 100,000 times faster than anyone realized before. . . . With a tectonic speed of at least 1600 miles in 500 years, the newly-revealed “Davies Movement” must be over 3 mi/yr. However, we learned previously (§B8) that 3 mi/yr somewhat exceeds the new Davies value for the speed of light; since Einstein says nothing can travel faster than light; well, that’s it for Einstein — whose Relativity-humbuggery has now twice been sent to the bottom by Admiral Rehab’s crafty torpedoes.

G8  The “Davies Movement” goes faster than light; thus, the bowels of the Earth are a lot more active than previously supposed. Hark!: a bold new world of tachyonic geophysics

45One might expect agreement to ordm 1° using the methods given. The precise agreement here (to the exact degree) with direct calculation is slightly lucky. E.g., the correct equatorial 1499/8/23 moonrise was not 20:21 LMT (Brazil) but nearer 20:17 LMT (Africa), which would affect the differential method by 1° of longitude. This small shift was obscured by rounding (of all data to whole degrees), during the differential method’s addition process: §F5.

46Moon: geocentric 13°34′1″ (celestial longitude), −4°42′ (celestial latitude); topocentric unretracted 14°32′, −5°03′; topocentric refracted 14°03′, −4°51′. Mars: geocentric 13°08′, −4°54′; topocentric refracted: 12°48′, −4°46′.

47This approach is assisted by the fact that differential parallax is null at the horizon.
beckons. How pathetically blind of lesser scientists not to have noticed any of this — until the Navigation Foundation’s insightful President faced them with irrefutable proof: proof that “will hold water with any scientist anywhere” (quoting Davies’ pre-publication reference to his 1989/12/11 Peary report for NGS: *Baltomag* 1989/7 p.86).

**G9** Many of the greatest geniuses of science are modestly unaware of their brilliance. Happily, the discoverer of the “Davies Movement” is not in the dark on this subject, either. As our Retro-Admiral Rehab has often reminded us (§B12), his clear superiority on navigational matters is based on “experience” (gruff, deep-voiced military-authoritative 1989/2/1 putdown) and “familiarity with normal practices of navigation” (NG App.A, e.g., p.2: emph added). As one may see even from Davies’ first published paper (*US Naval Inst Proc* 1937/2: an unwarranted attack upon mathematician E. Willis), from his youthful, pre-Nobelist period: he has long been aware that mere professors are not nearly as smart as he is. (Martin Gardner’s delightful history of pseudoscience, *Fads & Fallacies*, is filled with equally gifted entertainers of this stripe.) Davies’ attitude — which has directly led to the unique recognition bestowed upon him in this paper — is exemplified by an exasperated anonymous’ legendary sneer:

> “People who think they know everything are needlessly annoying to those of us who do.”

**Partial Bibliography:**


NGD T.Davies *National Geographic* 177.1:44; 1990/1.


**Afterword [2017]:**

*None of the foregoing should detract from our appreciation of Tom Davies’ considerable contribution to the US’ historic Antarctic expedition seven decades ago.*

We see from §4 §K1 here that, during the last decade, National Geographic has evidently gotten saner on the Peary case, as hope-predicted at the end of *DIO* 9.3 (1999) fn 70. The foregoing 1990 paper is published here less with NGS in mind than with the thought of enlightening those who still kitty-litter the internet with chauvinistic bile on the Peary-N.Pole ex-controversy, oblivious to serious scientists’ rejection of Peary’s claim, e.g., www.dioi.org/EMS-facts.pdf, CalTech’s Standish (fn 41). On the 100th anniversary of Peary’s claim, the *NYTimes* Science page reported (see internet citation at §A1 above), that NGS officially still held with the NavFou report! (though no longer publicly defending its 1909 N.Pole embarrassment: §4 §K1) — so the *NYT* writer found it irresistible to spoof an oft-repeated 1909/12/30 (*Independent* magazine) comment on Cookites’ impenetrable loyalty — “There will be a ‘Cook party’ to the end of time” — by observing that:

> There will be a Peary party too.

When Davies 1st (1989/2/1) attacked DR in repetitiously abusive terms (“nonsense” & “ridiculous”: NG App.A pp.2, 6, 7, 12, 14), DR: [a] responded with gratitude for the few items where Davies was correct, [b] agreed strong words were in order for DR’s BetDoc errors, [c] sent NF prov & con evidential material on Peary, & [d] suggested mutual cooperation (in the NGS’ continuing Peary investigation) in order to create a memorable monument of scientific probity & belief-adjustment: 1989/2/1. Also: 2/23 letter to Davies congratulating him & NGS Chief G.Grosvenor 2 on the correctness of their contention (against DR) that the BetDoc was mislabelled by Mrs.Peary. But NGS declined the involvement of DR or even its own 1988/9 NGM author Herbert; & DR simply got further abuse from both Grosvenor (*BM* 1989/7 pp.49, 84) & Davies: NG republication (as App.A) of original 1989/2/1 attacks, adding fresh & quite baseless ones (e.g., “patently absurd”; irony: fn 55). Such aggressive behavior invites brutal counter-punches. DR instead here jovially nominates Adm.Rehab for a gaggle of Nobel Prizes.