‡8   Royal Cometians

Reputability, Reform, & Higher Selfpublication

Texts for the Day

Donald Yeomans (Jet Propulsion Lab), closing an article cataloging some remarkably funny Dubious Achievement Awards related to Halley's Comet, offers a champagne toast (Yeomans 1983 p.10):

> Interspersed among the many important scientific results that are sure to come from the planned work on comet Halley, may the coming return also offer a wee bit of the lunacy and unabashed fun that has accompanied comet Halley's past apparitions.

John Bortle (W.R.Brooks Observatory) also asks of the 1986 Halley return: "What kinds of silliness will we see this time?" (Bortle 1985 p.110) — evidently expecting most of the folly to be generated by non-scientists. Yeomans' article presages otherwise, and his paper is as amusing as some of those reviewed below — with these crucial differences: [a] Yeomans' humor is intentional, [b] the unfortunates he writes of are long dead, while the menu of court-jester buffoonery set out in what follows here is entirely due to prominent astronomers still alive & powerful, some of them genuine contributors to our knowledge from time to time.

Thanks to the international efforts of numerous brilliant, hardworking, largely non-celebrity astronomers, the apparition of 1986 indeed brought us wondrous harvests of data and even a closeup view of the Comet's very nucleus. It also fulfilled Yeomans' & Bortle's wish for some zaniness, as the following will attest; though, whether the central (Royal Astronomical Society) act of zanity was funny or tragic, the reader must decide. I regard it as both.

A   Cometose Populace

A1   I doubt that even 1% of the public saw Comet Halley outdoors during its 1985-1986 flyby.[1] But almost everyone heard about it — and was forthwith rigorously bored by a nonstop orgy of commercial promotion. A shame, since the unadorned event was magical — if a trifle stealthy.

A2   The cause of the Comet's aggravating visual elusiveness was not just faintness: it also seldom came near any other celestial object bright enough for nonastronomers to use for locating Halley with binoculars. And now to the secret that escaped more citizens than the comet itself, namely: some wellknown astronomers also had difficulty in locating Comet Halley, often misleading layfolk, a point amusingly illustrated by the hitherto unremarked though nationally televised misadventures of Carl Sagan (Cornell University and Hollywood — in some order or other) and Dr.Squareza[2] (president of a major university), both eminently

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[1] But most of us saw Comet Halley's heart on television and then in magazines. Indeed, it's only fair that the worst apparition in 2 millennia was visited upon the only generation of terrestrials so far who could see the affair electronically. Any other arrangement would have given us 2 acquaintanceships and another era none.

[2] A pseudonym was substituted (for Squareza's name), after completion of this article, when Squareza's star plummetted (1990). Nonetheless, his overwhelmingly impressive vita includes contacts with: NAS, NRC, NASA, IAU, History of Science Soc., Cosmos Club, National Geographic, UNESCO, Kuwait Univ, Univ Colombo (Sri Lanka), US Armed Forces Inst, US Information Agency, arms dealer Adnan Khashoggi, Freedoms Foundation (Valley Forge Award); several other appearances on Koppel's *Nightline*, including hosting one of its lengthy "Town Meeting" shows; also a bank directorship, and on boards of directors of: Business Council International Understanding, & Linda Pollen Inst Medical Crisis Counseling. Why hadn't Squareza seen Halley? Probably busy with Very Important

Reputable establishmentarians, businessmen-salesmen, & aggressively loud opponents of (academically unfashionable) pseudoscience. As purported authorities on Comet Halley, these eminent personages were invited onto the 1985/12/5 edition of ABC-TV's *Nightline* by their friend, host Ted Koppel. At the conclusion of the show's half-hour, Koppel made the understandable error of asking both gentlemen the one question viewers most wanted to hear: where *in the outdoor sky* these days should the public look for The Comet? Sagan exhibited remarkable inventiveness in avoiding the question at length, but when Koppel finally put on a last-minute press, the spectacle got even funnier.

Koppel: Dr.Sagan, give those of us who want to take a look — give us a real quick crash course on how *and where* to look. [emph added]

Sagan: Well, the basic point is that the Comet is nothing as spectacular as it was in 1910 or will be in 2061 — and 2134 if you can hang on for that. That will be the best one. What you have to do is to get away from the air pollution and the light pollution of cities and look at a time when the Moon is new or has set. You also have to know what part of the sky it's in. It does not streak across the sky of course; it rises & sets with the stars. If you have a pair of binoculars — maybe 7x50s, something like that — that is absolutely all the instrumentation you need, although it is a naked eye object. You can see it without the binoculars; binoculars would help. [DR: Recall the one good line in the film *Nashville*? A d.j. muses aloud: ask a lawyer for the time, and a half hour later you'll know every detail of a watch's mechanics, but you still won't know what time it is.]

Koppel: We're down to 20 seconds. Where [is the Comet] right now? If I walked outside [in Washington] right now —

Squareza: "Southwest. Southwest above the horizon about $1^h 1/2$ to 2^h after sunset [i.e., about 6 to 6:30 PM], close to the constellation Aquarius, right above Jupiter."

Sagan: "That's right."

A3   Of course, anyone gullible enough to try following these impressively precise & authoritative directions, on that cold December night, would never find the Comet — not before being frozen as stiff as the entrails of an indoor astronomer, surprise-sandbagged on nationwide TV by an outdoor question like Koppel's. These instructions' entire value is their unambiguous demonstration that: [1] neither Sagan nor Squareza yet had any practical acquaintance with finding the comet in the real sky (though countless amateurs had been tracking it for weeks); and, much more important and telling, [2] both men were afraid to admit that they honestly just didn't know where Halley was, a comedy only enhanced by Sagan's that's-right bit of H.C.Andersenian pretense that he too had known all along where to see the Comet — now that Squareza had already confidently told him its location . . . . The most depressing aspect is the bottom line: at least one of these top educators (of youth & the larger public) risked faking knowledgeability simply because he didn't think he'd get caught.

A4   On 1985/12/5, Comet Halley was in central Pisces, and the nearest bright star was Algenib in the Great Square of Pegasus. At the time of day specified (§A2), the Comet was not in the south*west*, but rather was somewhat *east* of south. And it was not above Jupiter

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Phonecalls. (VIP Squareza is the sole astronomer quoted, hyperpuffing *JHA* Editor-for-Life's *Stellar Astronomy*, in EfL's self-published 1986/2 *JHA* full page ad for the book.) [Since learning of the disinterestedly impecunious American University board of trustees' almost irrepressible passion (described as "objectionable and indecent" by the *Wash Post*: 1990/11/10) to golden-parachute their departing friend Squareza with over $1,000,000, I've decided after all to supply sources for readers interested in the offbeat Squareza saga: former AU President and habitual strange phonecaller. The calls taped by police (1990) were made by him from his AU President's office phone. (See *Wash Post* 1990/4/27, *Chronicle of Higher Education* 1990/5/2; additional bio info: any recent *Who's Who in America*.) According to *Time* (1990/12/17), the board's largesse was finally scaled down (after public outcry), but a "compassionate" AU will next year restore Squareza to full professorship. Plus an AU telephone. (I'd like to see a little more compassion [a] to less well-connected phone-harrassers, and-or [b] to the victims of such calls, e.g., discouraging offenders in some more effective way than by swiftly returning Squareza — the most prominent example ever, among such offenders — at $70,000/year, to the university he advertised so . . . differently.)]

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but roughly 1/2 a right angle to the left of it.

A5   For any question regarding the motion of Comet Halley, Koppel should have interviewed an unblowdried but truly knowledgeable dynamical scientist such as Yeomans of JPL — whose own canned appearance earlier on the same *Nightline* revealed him to be perfectly capable of communicating at the popular level. (And if *Nightline* didn't know any better, Sagan & co. should themselves have suggested this, without prompting. But the temptation of self-publicity can easily overwhelm the better self.)

A6   I would like to think that the foregoing account of *Nightline*'s literal disaster will encourage popular emcees to seek the advice of working scientists (not cocktail [or pot or pol] party royalty) when choosing figures to appear on their shows. To see the same Expert-Scientist faces again & again on Carson, Koppel, etc.: it betrays [an Olbermannesque] lack of originality and-or the effect of influence.

A7   *Nightline*'s Catastrophe-of-the-Reputables is particularly ironic in light of the fact that Sagan and Squareza have both been among the figurehead Fellows of an orthodox celebrity Committee, CSICOP (best pronounced "Sick Cop"), organized in 1975 to police[3] the excesses of the Disreputable pseudoscientist clan (astrologers *et ilk*): their fumblings, deceits, and above all *their detachment from empirical reality*.

A8   Incidentally, neither Sagan (despite his years of ostentatious liberal posing *vis-à-vis* Velikovsky's right-to-be-heard) nor Squareza offered a word of on-the-record comment regarding the most ghastly contretemps, ever, in Reputable Science's eternal conflict with pseudoscience, when [a] their very own CSICOP's biggest and most expensive pioneer experiment[4] backfired in 1977 (coming out in favor of the astrologer!) and [b] CSICOP then tried to cover up the fact: with statistical finagling initially, then censorship — finally reacting to attempts at open reporting via threats, background-snoopery, & whistleblower-ejection from CSICOP without specification of charges. (Again, no comment whatever from civil-righteous[5] Sagan, who was specifically informed by telegram of all of it. See Rawlins 1981S; preprints distributed nationally by publisher. This article's sudden unexpected appearance & circulation actually panicked brave CSICOP into calling off its scheduled 1981 annual pressconference at the very last minute. See also Pinch & Collins 1984. None of the US science periodicals that had previously covered CSICOP's activities ever reported a word on the scandal, so CSICOP's startlingly atypical shyness of reporters was successful here, as the science press cooperatively permitted the lying-lowlife atop CSICOP to slink away without the slightest public censure. What sort of lessons does such a spectacle teach?) At this crucial-experiment juncture, the upshot of the public silence of CSICOP Fellow Sagan and CSICOP Consultant Squareza was the effective destruction of CSICOP as a credible empirical-test opponent of witchdoctory, a lamentable waste, since such testing exploits the only inherent advantage science possesses[6] in a contest with irrationality.

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[3] Largely via its often enlightening if not always trustworthy journal, *Skeptical Inquirer* (abbrev: *SkInq*).

[4] A rashly conceived & rushly published challenge-experiment (fallaciously testing neoastrologer Gauquelin's nonexistent Mars Effect on a European sample not independently pre-checked), carried out in 1975-1977 by three instances of the same brand of Eminent Scholar encountered elsewhere here. Facts: [a] The astrologer won this test. [b] A strong anti-astrology outcome naturally ensued when proper design was introduced in a later (1978) Mars Effect experiment upon a US sample. [c] This 2nd test was entirely calculated by DR. (Paid for by CSICOP cheques to him. Note: DR deliberately had no rôle in choosing the sample.) I see that p.42 of a 1990/3 paper published at *QJRAS 31.1*:31 does not mention item [a] at all — and then seriously misreports items [b] & [c]. Regarding item [b], it is computationally demonstrated at p.28 of the very Rawlins paper (*SkInq 4.2*:26; 1979) cited by *QJRAS* as being inconclusive, that: the astrological claim under investigation was disconfirmed with a probability-strength of c.10000-to-1. As for item [c], the *QJRAS* 1990/3 paper p.42 cites an "investigation by Kurtz, Zelen, & Abell" plus an "analysis of the same data by Rawlins". As noted above (& clearly stated at p.23 of the very Kurtz-Zelen-Abell *SkInq* article cited by the *QJRAS* paper), DR did all the astronomical calculations for KZ&A. (DR also performed all worthwhile statistical tests on this sample prior to KZ&A, and the results are printed in his *SkInq* analysis.) For a detailed history of CSICOP's strange behavior in this affair, see "sTARBABY" (Rawlins 1981S).

[5] Credit to Luce-era *Time* magazinese.

[6] I.e., contact with truth & reality. Without this groundrock, conflicts become merely: one side's propaganda vs. another's. Which seems to be just fine with CSICOP's sort of scholar.

B   The Awful Emptiness of Interaural Space

B1   On 1986/4/14, I attended a lecture at Johns Hopkins University given by Christopher Walker (Dep't. W. Asiatic Antiquities, British Museum) on Babylonian records of Halley's Comet. During his presentation, Walker referred to *the leading British expert on Comet Halley* as: David Hughes. Hughes' résumé: University of Sheffield Physics Dep't.; genuinely gifted writer and occasional *MonNotRAS*, *JHA*, & television expositor on Comet Halley; appointed co-investigator with the wonderful Giotto space mission to the Comet; sometime Councillor & Editor (*QJRAS*) and now (since 1988/3/11) a Vice-President of London's Royal Astronomical Society (RAS). (Hughes has also been Vice President of the even more entertaining Brit. Astr. Assoc.) If Walker's above-cited superlative assessment of Hughes' prominence is correct (and the foregoing list of credits is compelling evidence that British astronomy agrees with him), then Great Britain's notorious Brain Drain has gone kiloskulls beyond what anyone has heretofore realized.

B2   In mid-1980, Hughes was made sole Editor of the *QJRAS*. He soon distinguished himself there by improving the efficiency of the operation: saving postage by not replying to various contributors he was publishing or not publishing, letting the page proofs arrive suddenly as a surprise for the publishees — and just letting the other scholars dangle indefinitely. In some cases, he also improved refereeing, finding it took alot less time & bother (& RAS funds) just to accept slander about the author's person rather than going through the tedious formality of traditional refereeing: if Hughes declared a potential contributor Not Reputable (and Hughes possesses a razor-sharp eye for reliable classification: §E1-§E5), this was sufficient grounds for nonrefereeing, trashcanning, and total noncommunication,[7] including not replying to polite queries regarding papers' fates — as well as not even replying to inquiry regarding previous nonreplies! (RAS' own G.Darwin Lecturer, O Gingerich, wrote Hughes 1982/4/5 that he was "somewhat scandalized by the refereeing standards for the *QJRAS*".)[8] It is known (1983/10/21) to his admiring RAS Council that in one of the occasional cases where *QJRAS* refereeing of a paper occurred, Hughes secretly appointed, as its sole referee, the most committed public opponent of the author's viewpoint — an incident which triggered Council's explicit expression (1983/11/11: §C4) of complete confidence in his Editorship. Council's approval of Hughes' procedure has now been more clearly and grandly expressed by his 1988 Council-sponsored exaltation to RAS Vice-Presidency. (Upon learning of this event, DR concluded his two decades of association with the RAS.)

B3   A frequent contributor to the prestigious journal, *Nature*, Hughes has published there an amusing paper (Hughes 1976) attempting to identify & date the Star of Bethlehem. With the same purposes, he soon thereafter published a book (Hughes 1979) under the inspirational title: *The Star of Bethlehem, an Astronomer's Confirmation* — the subtitle evidently designed to harvest the reliably lucrative The-Bible-Was-Right market, in the fashion of the previous year's *God and the Astronomers* (produced by the Director of NASA's Goddard Institute for Space Studies, Jastrow 1978; see especially pp.14 & 116!).

B4   The hilarious positional astronomy in Hughes' Xmas Star book I have reviewed elsewhere (Rawlins 1984A p.977).[9] Some of the astronomy involved is so freshman-basic, that its rearrangement by a prominent astronomer may be unprecedented.

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[7] Which, on one amusing 1981 occasion, entailed his virtually running out of the BAA meeting-room to avoid conversing with an amiable but déclassé scholar.

[8] All that upset OG was *QJRAS* publication of papers by his 2nd least favorite scholar, R.Newton. Shortly after this complaint, Hughes banned R.Newton from *QJRAS* and allied himself with OG & the *JHA* crowd (& began contributing his highly Reputable scholarship to *JHA*, elevating that extremely handsome journal's prestige in the manner shown here in §G2); so OG's opinion has doubtless since been altered — though Hughes' academic standards obviously have not.

[9] Curiously, this review was undertaken at Hughes' own insistence: in a letter of 1982/2/22 he criticised a skeptical Xmas Star manuscript of mine (précised at *idem*; full text in a future *DIO*) for not taking note of his works. Strangely enough, he has not since thanked me for taking his advice. I forgive him. See also the reviews (of Hughes 1979) written by David Clark (*Observatory 100*:82; 1980/6) and by Virginia Trimble (in an issue of *Archaeoastronomy* appearing at about the same time).

B5   Hughes sagely recognizes one of the major percs of being an editor: your journal can quick-disseminate your output when no other publication will. His recent amazing Halley's Comet paper (Hughes 1985, actually mailed out in 1986) was self-published in the very last issue of the *QJRAS* for which he was top Editor. This truly historic study of the geometry of all known Halley apparitions brought Hughes' natural cometic gifts to their fullest flower.

B6   As an elected RAS Fellow for a decade, I repeatedly — starting in early 1983 — suggested (details below: §C4) that the RAS separate itself from Hughes' original approaches to elementary astronomy & to the equally elementary rights of unrefereed *QJRAS* contributors. Whether there was any substance to the eventual seemingly[10] reform-minded 1983/11/11 Council decision establishing a new 3-man *QJRAS* Editorial Board (to supervise the journal), the reader may judge from the following items: [1] G.Cole, Hughes' now-reigning successor as *QJRAS* Top Editor, was on the Ed.Board threesome that expertly oversaw publication of Hughes' fateful *QJRAS* paper on Comet Halley (Hughes 1985, analysed below: §B-§E). [2] On 1988/3/11, Hughes was elevated to the office of Vice-President of the RAS, when, as usual, the entire slate nominated by the RAS Council was elected without a single exception. (All 14 candidates: ballots mailed out 1988/2/9. Democracy in action.) As ultra-Brit Col.Blimp so pithily put it (in a classic David Low cartoon, sent to Council at this time): "Gad, sir, reforms are all right as long as they don't change anything." [Original cartoon viewable at www.dioi.org/imm.htm#dgsb.]

B7   RAS Editor Hughes' 1985 paper is unique, in its own wonderful way, throughout the entire literature produced by professional astronomers in this millennium. (As for the previous millennium: see §C1.) The paper's title is: "The Position of Earth at Previous Apparitions of Halley's Comet", and its aim is to classify Halley apparitions (an idea taken from Bortle & Morris 1984, with acknowledgement: Hughes 1985 p.515), with the evident hope of explaining spatially the unusual faintness of the then-occurring 1986 appearance (roughly 2 magnitudes dimmer than any other on record). For all 31 encounters from 240 BC through 2061 AD, Hughes maps on a circle-diagram (Hughes 1985 p.514 Fig.1) a variable j which well characterizes apparitions, since j = Earth longitude minus Comet Halley longitude, at the moment of Comet perihelion (both longitudes heliocentric).

B8   Having completed all his computations and resulting charts, Hughes is then perplexed to find (in his Fig.1) dim 1986's j appearing in the same group (Hughes' "Class E") with the j of 66 AD, 374, 837, & 1759, all of these being excellent spectacles, most of them among the very best — especially that of 837, which was probably the most beautiful & inspiring Halley apparition that has ever or will ever occur.

B9   Bortle's brief but appreciative description rates this precious event the best comet display in recorded history. Due to the moving Comet-orbit node's chance proximity to Earth's orbit at that time, combined with Halley's happening to arrive there just about when the Earth was passing, the 837 AD approach was almost[11] perfect: the Comet only 5 million km away at closest approach, with a brilliance rivalling Venus', and (Bortle 1985 p.104): moving with "enormous velocity, crossing 60° of sky in 24 hours. . . . while the tail — which pointed from south to north when the comet was at its nearest — spanned most[12] of the vault of the heavens." The timing was seriously flawed in but one respect: all of humanity wasn't alive to see it. My view of envy is usually Mencken's.[13] But the 837 AD Halley display evokes longing and regret at missing it, in any astronomer of imagination.

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[10] DR had already been through a Reform charade at RAS, when the written 1977/12/12 promise of then RAS Sec'y J.Shakeshaft (that the *QJRAS* would henceforth acknowledge all submissions) was regularly broken subsequently. I have been privately apprising Council of *QJRAS* strangeness for a decade, with the sole issue being: my consistent instruction in the elementary reality that private suasion is fruitless.

[11] Of course, one doesn't want the approach to be *too* perfect. The Tunguska reindeer who had the best view of the comet that hit Siberia in 1908 might have expressed some thoughts on a perfect encounter, had any survived it.

[12] Bortle (*loc cit*) quotes a Chinese record of 837/4/13, describing the tail as 120° long.

[13] "A Blind Spot", *The Vintage Mencken*, ed. A.Cooke, NYC 1956: "the fact that some . . . ass or other has been elected President . . . or appointed a professor at Harvard . . . is as meaningless to me as the latest piece of bogus news from eastern Europe."

B10   Since the j values of Hughes' five "Class E" apparitions are bunched together (in a span less than 45° wide), even though their visibility was wildly different, the paper concludes (Hughes 1985 p.519) that Class E is "rather a mixed bag".[14] The only mixed bag here is interaural, not interplanetary.

B11   The j value for 66 AD especially confounded Hughes' analysis. For, though that apparition was in fact a 1st magnitude visual spectacle, it looks (in Hughes' memorable Fig.1) distinctly *worse* than the inobtrusive 1986 visit: at Halley perihelion time, Earth is much closer to Halley aphelion (i.e., j is far nearer 180° in Fig.1 & Table 1) in 66 AD than in 1986. (The worst possible apparition's j would be near 180°. Just a trifle less.)

C   The Doubly-Epochal Hughes Screwup

C1   The instant I saw this seeming paradox, I knew precisely the cause of it; and a (purely hypothetical) alert *QJRAS* referee would have had the same immediate response: Hughes has simply taken his Comet Halley longitudes from a source (Yeomans & Kiang 1981 p.643) using the ecliptic for epoch 1950.0, while taking his Earth longitudes from a source (Tuckerman 1962&64) using the ecliptic for epoch-of-date![15] Not a mixed bag, but mixed precessions. The only comparably cockeyed recipe, in the purportedly serious astronomical literature of the last 2000[y], is Ptolemy's mixing of nonprecessing solar orbit (*Almajest* 3) with precessing planet orbits (*Almajest* 9), but the visible effect was minuscule by comparison to Hughes' far superior canard.

C2   Thus, for each of the 30 Comet Halley apparitions examined by Hughes, the j value he displays[16] (Fig.1 & Table 1; also our Table A below) and uses for his analyses, is too low by an amount equal to the precession from its date to 1950.0. Since the 2 epochs can be almost 2200[y] apart, the attendant absolute errors range as high as about 30° (240 BC). For each apparition (1986 back to −239), the correct j & the Hughes value (and their difference) are provided in Table A here (at the end of this section), where the correct results are properly given only to 1° precision since: [a] this precision is fully adequate for classification-purposes, and [b] the computed perihelion-times (upon which the entire classification-scheme is based) do not agree with observations better than similarly crude precision (ordmag 1[d]: Yeomans & Kiang 1981 p.642 Table 5 middle column). The Hughes-minus-real differences[17] are also given to 1° precision.

C3   An incompetent scientist could not possibly become a leading officer of the RAS; thus, our explanation of the gross discrepancies listed in the last column of Table A is inescapable: Hughes has made the astonishingly clever & original discovery that: [a] the Comet moves in inertial space, while [b] the Earth moves on a Riemann surface[18] — a conformal remapping of the Earth's inertial-frame motion. Gratefully acknowledging that this represents Hughes' conception of a wholly novel type of celestial behavior, we will henceforth commemorate his immortal discovery with the apt title: the Hughes Transformation. And, noting the pseudo-helical[19] aspect of Hughes' newly revealed aethereal-torque

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[14] Hughes goes on to propose that the position of the descending node is crucial, which it is for the close encounters. But this is virtually irrelevant to the cause of 1986 Halley dimness — and that should have been immediately obvious to an astronomer with even moderate gifts in spatial relations.

[15] For the respective adopted ecliptic-epochs, see Yeomans & Kiang 1981 pp.640&642 and Tuckerman 1962&64 1:3 n.1.

[16] Hughes' Fig.1 (& text for Class C at p.516) includes a 31st apparition (2061 AD) but no corresponding data are provided in his Table 1 or Figs.3-4.

[17] The occasional apparent discrepancy of 1° in Table A's last column (*vis-à-vis* the 2 middle columns' difference) is due to rounding.

[18] Hughes' ingenious conception of the Earth's orbital plane can be usefully approximated by a 26000-fold Riemann surface, corresponding to the function $w = z^{1-1/26000}$.

[19] A lesser scientist might see the situation as merely: the 1950.0 ecliptic and the (noninertial) ecliptic-of-date frames rotate (slowly in time) with respect to each other.

space-warp, we may conveniently abbreviate it as simply: the Hughes Screwup.[20]

C4   This is a VicePresident of (& longtime Editor of the house journal of) the venerable Royal Astronomical Society of London, whose Council (on which Hughes has sat & on which he retains numerous faithful friends & promoters) fortunately ignored a series of explicit DR warnings (e.g., 1983/2/9, 10/21, 12/19) regarding *QJRAS* Editor Hughes' demonstrated capacity for disaster. E.g., I wrote the RAS (2/9) that, given the potential for "tragic mistakes" appearing in the *QJRAS*, due to the Editor's incurable noninterest in normal refereeing, "I am advising you to replace David Hughes (of the R.A.S. Council . . .) as *QJRAS* Editor." (See also §B2.) Council responded with the following statement (1983/11/17 letter to DR, signed by the RAS' then-Sec'y — later Pres. — Rodney Davies): in its meeting of 1983/11/11, "Council expressed their full confidence in the Quarterly Journal editorship of Dr David Hughes". And a good thing: had it not been for RAS Pres. Davies' admirably impervious sponsorship, the *QJRAS* could not have presented to the world the invaluable Hughes Screwup.

Table A

Perih Date	Actual j	Hughes' j	Diff
+1986/02/09	195°	195°.53	+01°
+1910/04/20	265°	264°	−01°
+1835/11/16	110°	108°	−02°
+1759/03/13	230°	227°	−03°
+1682/09/15	052°	048°	−04°
+1607/10/27	094°	099°.55	+06°
+1531/08/26	043°	037°.54	−05°
+1456/06/09	329°	323°.27	−06°
+1378/11/10	120°	112°.72	−07°
+1301/10/25	105°	096°.22	−08°
+1222/09/28	078°	068°.83	−09°
+1145/04/18	282°	271°.35	−10°
+1066/03/20	254°	242°.69	−12°
+0989/09/05	057°	044°.80	−13°
+0912/07/18	011°	357°.26	−14°
+0837/02/28	236°	220°.99	−15°
+0760/05/20	316°	299°.97	−16°
+0684/10/02	087°	069°.92	−17°
+0607/03/15	252°	234°.09	−18°
+0530/09/27	082°	062°.76	−19°
+0451/06/28	354°	333°.83	−20°
+0374/02/16	227°	206°.08	−21°
+0295/04/20	289°	267°.16	−22°
+0218/05/17	316°	292°.85	−23°
+0141/03/22	263°	238°.56	−24°
+0066/01/25	208°	182°.87	−25°
−0011/10/10	100°	073°.51	−27°
−0086/08/06	036°	008°.24	−27°
−0163/11/12	134°	105°.93	−29°
−0239/05/25	327°	297°.15	−30°

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[20] Hughes 1987 cites Hughes 1985 without correction; thus, we confirm that in his sage retrospective opinion, the proper means of computing the problem is via the Hughes Transformation.

D   The Sun Never Rises on the British Umpire

D1   British refereeing procedures' remarkability is hardly restricted to any single incident or person. E.g., the RAS referee form has a portion for confidential remarks by referees. So, not only is the referee's identity confidential (an inverted, ascientific egregiosity in itself, though now docilely accepted as the norm in modern science journaldom) — but even his report may be secret and in various instances has been entirely so. The *J.Brit.Astr.Assoc.* says it does not send referee reports at all "a course forced upon us by the unreasonable behavior of many authors" (BAA Sec'y S.Dunlop, 1982/8/18). Heavens, why should anyone get unreasonable about British astronomy's streamlined starchamber refereeing procedures?

D2   Though I understand that not all RAS Councillors were entirely comfortable with the 1983/11/11 Council course of inaction (§C4), I shall nonetheless list here every person then on the RAS Council, so as to encourage any Councillor who wishes to go on record as having dissented (in whatever degree from the majority's masochistic inclinations) to do so by writing *DIO*. (I won't camp by the mailbox.) The RAS Council at the time (*QJRAS 24*:371): P.Charles, G.Cole,[21] Kenneth Creer, M.Edmunds, R.Fosbury, P.Fowler, D.Heggie, David Hughes, A.King, Pamela Rothwell, A.Roy, I.Williams.

E   Classification Fiasco

E1   The learned RAS Council's laboriously considered decision has made it possible for us to be entertained here by the outré spectacle of an appointed, explicitly vouched-for (§C4) official of the Royal Astronomical Society (writing in the RAS' most widely read journal, a journal whose quality is triply fail-safe ensured through its governance by a special Council-appointed watchdog editorial troika: §B6) finding his critical *j* data by subtracting ecliptic-of-1950.0 longitudes (Comet) from ecliptic-of-date longitudes (Earth), both data impressively provided to $0°.01$ precision — and all accomplished without the faintest awareness of the required precession correction: for 66 AD, merely *twenty six degrees*, an amount thousands of times larger than the precision displayed. Naturally, this spectacular gaffe guts the entire paper as it relates to classifying the then-imminent 1986 apparition — for which the article was published in the first place. (I.e., the various apparition classes are unreliably clustered[22] in Fig.1, rendering it impossible for Hughes to find the simple coherent key explaining 1986's dimshow — a solution to be presented below: §E6.)

E2   The episode is the sort of elementary debacle one customarily associates with a Historian of science or perhaps a lowgrade astrologer.[23] But I have never encountered a paper appearing in a supposedly Reputable astronomical periodical (and certainly not by a scholar who is of all things himself an internationally eminent arbiter of Reputability) which evidenced such pop-occultist-level innocence. (Indeed, it is only fair to add that no serious modern technical astrologer is ignorant of precession, though this hardly excuses the tropical majority's omitting it from horoscopes — unless they privately share my belief that astrological computations are irrelevant since all astrology is pure taurus anyway. See Rawlins 1984A pp.974-975.)

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[21] Subsequent top *QJRAS* Editor (& see §B6).

[22] E.g., Hughes' tight Class A is neatly packed into only $16°1/2$ of the ecliptic in his Fig.1. But in the corrected Table A here, we see the same set of *j* values diffused over more than $40°$ — and, moreover, this (& the original) "Class A" space is polluted by the intrusion of -11's apparition, which Hughes' Fig.1 had put into his Class B. (His other misfiled *j* are cited in §E7.)

[23] For sunsign astrology (the sort that's in newspapers), "signs" are off for the same reason and by the same amount, for which folly astrologers have been incessantly and justly lampooned by centuries of professional astronomers. See, e.g., R.Culver & P.Ianna's informed & (deliberately) amusing *Gemini Syndrome* Tucson 1979 Chap.6.

E3   Understand that, to anyone with the slightest experience in positional astronomy (and this paper deals with little else), the very *first* thought upon encountering Hughes' Class E paradox would be: has precession been properly accounted for? Obviously, Royal Astronomical Society Vice President & Giotto co-investigator Hughes, politically prominent in British astronomical officialdom for over a decade, has no practical familiarity with such chapter one material.[24] This is further evident from his Fig.4 (Hughes 1985 p.518), an illustration presented with no indicated source, but actually based on Yeomans' ephemerides (also used by Bortle 1985, with credit at his p.98); Fig.4 maps Comet Halley's path in R.A. & Decl. for 21 of the 29 recorded pre-1986 apparitions (modernly skipping only 1835 & 1910, ephemerides not provided by Yeomans: Bortle 1985 p.98). The caption to Hughes' Fig.4 fails to inform the reader whether the 21 Comet tracks shown are Equator & Equinox (E&E) of 1950.0 or E&E-of-date.[25] (The former is the case, which severely limits the diagram's value for gauging terrestrial views of the ancient apparitions shown.)[26] Hughes is simply unaware that such things matter . . . . (Which is exactly why the classification-math of Hughes 1985 pulled off the incomparable §B8 achievement of putting history's best and worst Halley apparitions into the very same "Class E"!)

E4   Do they ever matter. The resulting error for the crucial 66 AD apparition (§B11) is virtually a zodiac sign, i.e., precession for 2 millennia — and is, incredibly, *identical to modern astrologers' most infamous and perpetually ridiculed expression of astronomical innocence* (fn 23). As noted above, Hughes' precessional pratfall here was about $26°$. At 66 AD Halley perihelion, Earth was $208°$ ahead of the Comet, not $182°.87$ (i.e., less than $3°$ from aphelion, which would make it by far the worst apparition of the lot) as on Hughes 1985 p.515 Table 1 (& mapped there in Fig.1 at p.514). And note that this table's data are largely[27] just sloppy interpolations from Tuckerman 1962&64, with, additionally, systematic ignoring of the fact that the Tuckerman dates are for 16^h UT, not 0^h ET, the time standard for Yeomans & Kiang 1981: in antiquity, the Earth-longitude difference is over 3/4 of a degree, which applies slightly against the $26°$ main (precessional) error for 66 AD, leaving a total *j* error nearer $25°$. Incidentally, after writing the foregoing, my presumably complete amazement at Hughes' scrupulousness was then still further stretched, when I found that *all* of the required (nonHughes) transformations he ignores are explicitly & accurately noted on p.640 of his main source, Yeomans & Kiang 1981.

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[24] For similar Hughesiana, see material cited at §B4.

[25] This is where good refereeing comes in. I well remember inadvertently omitting such information for a position datum in the very first paper I ever submitted to a professional journal. Right away, alert *P.A.S.P.* editor Kimball Hansen asked me to specify the E&E epoch.

[26] The same criticism applies to Bortle 1985, but E&E 1950.0 is clearly stated there. Some other small criticisms of this valuable & readable paper: [a] the brightest & most northerly part of the -163 return has occurred before the start of its table on p.99, [b] the greatest Halley near-approach to Earth is misdated on p.104 as 837/4/9 (actual date 837/4/11), and [c] throughout, negative years are wrongly equated to BC years (perhaps due to editorial alterations by the magazine), a calendaric matter which Hughes deals with correctly.

[27] Hughes 1985 p.513 notes no exceptions, but Tuckerman 1962&64 ends at 1649/12/31, so Hughes' Earth-longitudes for the apparitions of 1682, 1759, 1835, 1910 were computed in some uncited fashion and expressed only to $0°.1$ precision (Table I: p.515). The computations are correct for 0 hrs (midnight), which is (unlike earlier Table I Earth-longitude data) consistent with Yeomans & Kiang 1981. Unfortunately, Hughes has some other problems hereabouts (even aside from the obvious fact that consistency of hour does not entail consistency of coordinate system). First, his 1986 Earth-longitude ($140°.85$) is inconsistent with the perihelion time he gives: 1986/2/9.66. (For this time, one finds $140°37'$.) Perhaps Hughes used a different Yeomans perihelion time. Yeomans' 1983 *Comet Halley Handbook* p.1 makes it 1986/2/9.45175 or 11 AM. Hughes' Earth-longitude is correct for about 1986/2/9.9 (or 10 PM), so perhaps there was a half-day or factor-of-2 confusion here somewhere. In any case, there is no question that Hughes made a huge error for the 1607 apparition, since he failed to note that his main source for Earth-longitude data retained the Julian calendar even after 1582 (as stated at Tuckerman 1962&64 2:1), which is inconsistent by 10 days with Yeomans & Kiang 1981 (who state at p.642 that they follow normal convention: Gregorian dates after 1582). The error caused in Earth-longitude is almost exactly $+10°$, that is: 1000 times the precision. Combined with Hughes' usual errors in precession ($-4°3/4$ here) and epoch-hour ($+2°/3$ here), the net 1607 error in *j* is about $+6°$: (Table A), which infects the 1607 data in both Fig.1 and Table I (but not Fig.4 which is entirely based on Yeomans' highly competent work). Below, we will encounter a much more fruitful 10 day Gregorian-Julian calendaric Hughesian mangling: §G.

E5   Once Hughes' enormous omission is corrected for, the 1986 Earth position in his Fig.1 is *thoroughly isolated* (the very result Hughes 1985 vainly sought), only 15° from Halley's aphelion: $j = 195°$. (The nearest competitor is the 66 AD position, over 13° more distant from the aphelion: $j = 208°$.) So 1986 is the sole member of a separate "Class F": F as in fiasco.

E6   Thus, the problem that so mystified Hughes is suddenly resolved into a simple principle (perhaps novel): if the Earth's longitude at Halley perihelion-time is within roughly 15°-20° of the Halley aphelion longitude (a span covering only about 1/10 of the zodiac), then the apparition will end up in Class Fiasco. As just noted: strangely, of history's 30 recorded encounters, there is only one[28] where this is the case, namely, the unfortunate instance of 1986. (However, things can be worse: indeed, if j were near 180°, the Comet would probably not even be noticed by an unsophisticated civilization.)

E7   In addition, a comparison of Table A to Hughes' Fig.1 or Table 1 will show that some discrepancies are so large that they have caused Hughes to put apparitions into the wrong class, according to his own classification-bounds: the j for −86 is about in Hughes' Class B not his Class C; 684 is nearer Class A than Class B; −11 is actually within Hughes' Class A not Class B; the great 837 apparition is within his Class D not Class E; and 295 is nearer Class C than Class D.

E8   Soon after the arrival (in my mailbox) of the *QJRAS* issue containing Hughes 1985, I wrote (1986/2/28, not in confidence) to a number of fellow scholars about this latest of Hughes' contributions to hysterical astronomy. For several years, I looked at each subsequent *QJRAS* but found no printed correction. What does this tell us? [1] No other of over 2000 RAS Fellows, all of whom receive the *QJRAS*, has read the Hughes paper? (Then why publish the *QJRAS*?) [2] They, presumably including the cream of British astronomy, have read it but have not understood the exceedingly simple astronomy any better than Hughes? [3] Some among them have noticed the Hughes Screwup but cannot write the RAS about it, having since been frozen by astonished incredulity or disabled by unremitting seizures of violent mirth? [4] Complaints have been received, but the *QJRAS* has been hesitant about printing them?

E9   It might seem that I should have sent a letter of correction directly to the *QJRAS*. However, given the quality and integrity of the top editorship of that journal, and given its record of frequent nonresponse, this course looked to be just a waste of time & postage — commodities Hughes is himself wisely parsimonious with, as is already clear from my earlier (§B2) admiration of his economies. In any case, if a correction is ever[29] made in *QJRAS*, I will be surprised if DR (who first revealed the full glory of the Hughes Screwup & solved the very problem Hughes poses) is permitted to write the note. (Similar case: ‡6 fn 15.) To test the point, I am sending a copy of this issue of *DIO* to the RAS, expressing here the request that a very brief, purely technical version (preferably written by *QJRAS*), of the foregoing correction and simple solution, be published in the *QJRAS* correspondence section (*with the corrected*[30] *Fig.1*, i.e., DR's Table A here, above), assented to by DR in writing, and including a reference (with address) to *DIO*'s supplemental *J.HA*, for those *QJRAS* readers who wish full details.

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[28] Rather less — but not significantly so — than the chance expectation of 30/10 = 3. See the comments of Yeomans & Kiang 1981 p.644, on pre-240 BC apparitions.

[29] The *QJRAS* may simply do nothing at all. Which will tell observers the obvious: that (in a case where embarrassment might attach to itself) it would rather print a false comet classification than a correct one. Since the paper was published a few years ago, the RAS may resort to a statute-of-limitations alibi. Comments: [a] There is no such statute in science. [b] The *JHA*'s Editor-for-Life, highly esteemed at RAS, expended about 1/4 of the 1987 *JHA*'s regular pages, while printing a patently fallacious & pathetically vain attack upon 2 publications of years past, one of which the *JHA* leadership had been seething about for over a decade.

[30] In addition to the novel spatial data (discussed elsewhere here) provided by Fig.1 of Hughes 1985, one also notes that the same figure has Halley brighter just before perihelion than after!

F   Perihelion-Crossed Lovers & Horoscopic Inversion

F1   Mention of Halley perihelion reminds me how refreshingly little astrological garbage surfaced during the Halley rush of '86. That dearth is entirely an accident of astrologers' nonacquaintance with the history of the constellations (including even the sole asterism invented by their very own patron saint, C.Ptolemy). Said innocence protected them (until revelation here, at this safe temporal remove) from an odd little item that would surely have elated (the astrological wing of) astronomy's prostitutes, though all it illustrates is history's abundance of coincidences.

F2   Of all the places in the sky the Halley heliocentric perihelion could have ended up, it fell by chance into the tiny asterism Antinoüs, part of the constellation Aquila. I have related elsewhere (Rawlins 1984A) the sad tale of Antinoüs: the emperor Hadrian's boyfriend, who drowned in the Nile in 130 AD — but was commemorated in the sky when Ptolemy named (*Almajest* 7.5) the 6 most southern stars in Aquila after Antinoüs. (This followed Hadrian's visit to Ptolemy's temple: Rawlins 1984A p.973. Some 20th century star guides still exhibit this minor constellation, shrunk by now to merely the east end of its former self. But the IAU constellation list no longer recognizes Antinoüs; thus, the youth Hadrian sought so assiduously to immortalize seems — barring celestial affirmative-action — certain now to fade into oblivion, outside the realm of the classicists.)

F3   It is possible that there is some connection between Ptolemy's cooperation with Hadrian's desires and his own purely homosexual rules for pairing lovers (details in Rawlins 1977 p.69 & Rawlins 1984A p.974), rules which are now universally used by astrologers (innocent of their invert origin) to advise heterosexuals on forming love-matches. But I think it more likely that placing Antinoüs in the sky was merely symptomatic of Ptolemy's politically expedient pandering (e.g., astrology, geocentricity, & other popular superstition; see Rawlins 1984A & Rawlins 1987 — and here at §B3!), which is the single feature of his intellect that ensured him an immortality that will certainly outlive Antinoüs'.

F4   The *a priori* odds were well over 1 in 1000 against the Halley Comet perihelion being in Antinoüs. (There are $360^2/\pi = 41253$ square degrees in the sky. And modern Antinoüs covers only ordmag 10 of them.) Since comets are traditionally[31] held to be bad omens, one can imagine astrologers' glee at relating Halley's 1986 perihelion, in the sole homosexual constellation, to the fact that 1986 was the blackest year in the twentieth century for homosexuals, due to AIDS, which contracted mass hype at the same time the Comet did.

F5   I can picture the wisdom-of-the-ancient-astromancer gush: did not the whorey bores of yore reveal that comets are bringers of hideous plagues? Of course, *all* recent Halley heliocentric perihelions have been in Antinoüs: 1910,[32] 1835, etc. Also, the AIDS plague probably entered the US in 1979,[33] not 1986.

G   In Which Toppe British Cometian Slays Fraudulent Frog First

G1   Though he lived over 85^y, Edmond Halley's only observations of his now-famous Comet occurred entirely within one span of about 3 weeks in 1682 — the same year he married. (A coincidence hardly of the malevolence comets are famous for.) But orthodox history has heretofore recorded that foreigners observed the 1682 return before Halley & other Britons.

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[31] Though, see Christopher Marlowe ["Shakespeare"] *Henry VI Part 1*, Act 1, Scene 1, where comets are importuned to sweep away the evil stars connected to Henry V's death.

[32] Moore 1973 p.74 suggests that those veterans who think they remember Comet Halley actually saw another comet of 1910, since Halley "showed at its best from the southern hemisphere." However, according to Bortle 1985 p.110, Comet Halley reached its peak declination at about 20° northern declination, where it was ordmag 100 times brighter than at any 1910 position south of the celestial equator.

[33] Perhaps via Haiti. If so, then the 1979 culprit was not a dim comet but a brilliant President, who cleverly foresaw that a lax immigration policy would help assure his 1980 reelection . . . .

G2   Or so it seemed, until Britain's leading cometian turned his inimitable analytical mentality to this problem, during a paper (Hughes & Drummond 1984, on Halley's 1682 data) appearing in the world's most consciously prestigious astronomical-history periodical: Editor-for-Life (EfL) Michael Hoskin's extremely handsome *Journal for the History of Astronomy* (*JHA*). In this paper, Hughes announced (Hughes & Drummond 1984 pp.189-190) his epochal finding: prior astronomers (e.g., S.Vsekhsvyatskii; see also Bortle 1985 pp.107-109) are mistaken in asserting that the 1682 Comet Halley return was first observed by the French (in Paris) on 1682/8/26. Hughes correctly points out (*ibid*, p.189) that Greenwich astronomers observed the Comet on 1682/8/17. Since 8/17 is 9^d before 8/26, Hughes concludes that the British saw the Comet 9^d ahead of the French.

G3   Hughes also notes (*ibid*, pp.196 and 190) that Halley made the last British observation, on 1682/9/10, and that the last French observation was 1682/9/22 (same date in Bortle 1985 p.107).[34] That would seem to be 12^d later than the British. The mean of 9^d and 12^d is about 10^d.

G4   Paradox: why were the British observers about 10^d *better* than the French at the start of Comet Halley's 1682 apparition, while perversely being about 10^d *worse* than the French (a contrast Hughes does not draw attention to) at the apparition's end? (Anyone with an astronomical-geographical sense of spatial relations can see immediately that this is an absurdity and thus that the 2 nearly equal discrepancies must have some common unremarked source.)

G5   Obvious resolution: France (Catholic) adopted Pope Gregory XIII's superior calendar in 1582, while Britain (Protestant) did so only in 1752 (persisting with the Julian calendar until then). So in 1682 the French and British calendars differed by 10^d. And, after converting (to Julian) the French dates of observation of the Comet, we have: 8/16 and 9/12. Since British astronomers' time range of observation was (according to Hughes' own data, quoted above: §G2-§G3) 8/17 to 9/10, we see that the conventional account is correct: French astronomers saw the comet a little before their British counterparts at the start — and (slightly aided by France's more southerly latitude) saw it a bit later than the British at the end.

G6   I would have sent a correcting note on this to the extremely handsome *JHA* for publication. But, some years ago, I mailed the *JHA* a similar letter (regarding another *JHA* article's foulup), which the Editor-for-Life tried initially to ignore (his own subsequent written boast, incredibly: 1983/3/3 letter noted at ‡6 fn 15). When this proved impossible, EfL then angrily cut correspondence.[35] Therefore, I am unable to send the above correction to the Editor-for-Life (or to unresponsive author Hughes). Still, I'll go through the formality of imparting this *DIO* to some atop *JHA* officialdom, vainly expressing here a request for the printing of DR's (not Hughes') correction, namely: printing in *JHA* the exact *DIO* text given above, running from §G2 (starting at "In this paper") through §G5, including appended bibliographical information (required by the text's short citations), as well as provision of *DIO*'s name & address. The *JHA* Editor-for-Life has here: DR's published, unilateral, unconditional permission to print this correction *verbatim*, thus obviating any *JHA* concern regarding defilement by communication with DR. It will be entertaining to see how *JHA* excuses itself from publishing this brief material.

G7   The *JHA* calendaric messup is particularly peculiar because:
[1] Bernard Yallop of the grand Royal Greenwich Observatory seems to have taken an admirable amount of trouble & expert care to warn Hughes of just this 10^d calendaric difference[36] in another context in the very same paper (Hughes & Drummond 1984 p.196;

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see also p.189, 1st line: "O.S." [Old Style = Julian calendar]).
[2] The *JHA*'s own maternally-proprietary Editor-for-Life Michael Hoskin (Churchill College, Cambridge U) & Assoc.Ed. O Gingerich (Harvard) clearly regard themselves as authorities on the Gregorian calendar's adoption. EfL co-organized the 1982 conference (at the Vatican Observatory) celebrating its 400th anniversary (& co-edited the resulting published proceedings, Coyne, Hoskin, & Pedersen 1983), while OG published the world's largest astronomy magazine's celebratory history of the Gregorian calendar reform (*Sky&Telescope* 64:530-3). (If our ultimo Hist.sci experts can do anything right, that domain ought to include assisting mere astronomers with calendaric history. But: did either of *JHA*'s ruling editors actually read Hughes & Drummond 1984 before publishing it?)

G8   However, the *JHA* Editor-for-Life's attitude toward refereeing is legendary (‡1 §D4). Thus, the Editor-for-Life has evidently come to believe that high quality *JHA* refereeing is not crucial — since no critic of that extremely handsome journal will dare say anything publicly, no matter how hysterical *JHA* astronomy gets. Right as usual, Governor.[37]

G9   Small wonder that several world class scholars, all of whom have in the past had papers accepted at *JHA*, will no longer send manuscripts there.

H   The Brightest Apparition: Halley Himself

H1   Halley had a sense of humor, as is evident even from some of his superficially staid published papers. So I expect he'd see the foregoing in the perspective of human variability. His own work is one of the pinnacles of the glorious British astronomical tradition, so let us conclude here with a remembrance of the circumstances & significance of his most felicitous gamble. I quote from a 1985 November article by one of my brightest & best friends (B.Rawlins 1985 p.7):

> Until Halley's announcement, it was generally[38] presumed that comets only appeared once and never returned. Knowing that (born in 1656) he likely would not live to see its fulfillment, Halley published the 1758 prediction as part of his 1705 *Synopsis of Cometary Astronomy*, a work largely given over to advancing the mathematical treatment of comets' orbits.
>
> The undeniable visual vindication of Halley's genius and daring indeed occurred in 1758, 16 years after his death (1742). On that year's Xmas[39] Day the comet was seen again on Earth — beginning one of its [brightest] apparitions of the 2nd millennium AD. The resighting[40] marked the first predicted return of the first comet subject to longterm prediction. How recently such powers have been the province of man is brought home by the realization that the 1986 return of Halley's Comet, though about the 30th on record, is only the 4th predicted one.

H2   Halley was one of the less gifted observers among Britains's Astronomers Royal; but he was an able, inventive, and bold theorist. The import of Halley's subsuming comets under the umbrella of Newton's gravitational mathematics cannot be overemphasized. Nothing

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[34] Note typo: 1682/9/30 magnitude at Bortle 1985 p.109 should read 3.9.

[35] This tantrum occurred just before the erring *JHA* author courageously recanted. But EfL kept hiding from communication, which punitively killed an upcoming unrelated paper, Rawlins 1999, previously multiply-refereed & accepted in toto by *JHA*: ‡6 fn 15 & ‡1 fn 25.

[36] Recall that we found the same 10 day calendaric error in the 1607 j value in Hughes 1985: fn 27. One has to admire a prominent scholar whose ingenuity achieves a coherence of his separate confused papers into one gloriously

seamless mass-cohughesion.

[37] Credit: Hedley Lamarr, *Blazing Saddles* (M.Brooks).

[38] A wise early dissenter from this conventional view was Seneca, in the 1st century AD. See Yeomans 1983 p.2.

[39] Ironic in that Halley was notoriously heterodox about religion. And: was Halley so chauvinistic as to plead his Englishness as part of his immortality, as appears in a now famous passage which first appeared in a posthumous work? (Often quoted, e.g., Yeomans & Kiang 1981 p.633.) The even-more-frequently-quoted alleged desire of Mark Twain (1835-1910) to die at Halley's 1910 return (Twain having been born in 1835, the previous appearance-year) was also posthumous thus comparably unverifiable: merely his biographer's recollection of a supposed 1909 Twain remark (A.Paine *Mark Twain: a Biography* 1912 p.1511; reprinted without source on a beautiful 36 cent aerogramme, released by USPS in 1985).

[40] By Johann Palitzsch. See *S&T 73.1*:4-5, 476 (1987/1) and *79.5*:548 (1990/5).

else in Newton's lifetime contributed so powerfully to scholarly realization that gravitation was universal. When 1st broached, the Newtonian conception was not alone in explaining the relatively tame orbits of the 6 known planets (one-directional, near-planar, near-circular, non-intersecting). But only it could also extend, without the slightest ad hoc amendment, to encompass even the wildly noncircular, tilted, overlapping orbits typical of comets. (See Roger Cotes' discussion, written while gravitation was still controversial, in his 1713 preface to the 2nd edition of Newton's *Principia*: Cajori 1934 pp.xxviii-xxx.)

H3   It is the Comet's critical role in the history of civilization that makes me especially glad to have seen Halley on 16 occasions (1985/11/17-1986/5/5), many of them with my wife Barbara and friends. (Including, on 1986/1/8, my old schoolmate & advisor, Baltimore attorney David Eaton and his daughter Caroline, then 5, who will be — as we cautiously told her — the only one of us left to see it return in 2061 AD, when she will be 80.) The Comet was not overwhelming visually. But, scientifically and historically, it certainly was.

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