Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of

Amendment of Parts 1, 2, 15, 25, 27, 74, 78, 80, 87, 90, 97, and 101 of the Commission's Rules Regarding Implementation of the Final Acts of the World Radiocommunications Conference (Geneva, 2007) (WRC-07), Other Allocation Issues and Related Rule Updates	)	**ET Docket No. 12-338 (Proceeding Terminated)**
Amendment of Parts 2, 15, 80, 90, 97 and 101 of the Commission's Rules Regarding Implementation of the Final Acts of the World Radiocommunications Conference (Geneva, 2012) (WRC- 12), Other Allocation Issues, and Related Rule Updates	)	**ET Docket No. 15-99**
Petition for Rulemaking of Xanadoo Company and Spectrum Five LLC to Establish Rules Permitting Blanket Licensing of Two-Way Earth Stations With End-User Uplinks in the 24.75-25.05 GHz Band	)	**IB Docket 06-123**
Petition for Rulemaking of James E. Whedbee to Amend Parts 2 and 97 of the Commission's Rules to Create a Low Frequency Allocation for the Amateur Radio Service	)	
Petition for Rulemaking of ARRL to Amend Parts 2 and 97 of the Commission's Rules to Create a New Medium-Frequency Allocation for the Amateur Radio Service	)	

To the Commission:

Comments from James F. Hollander,
W5EST, Amateur Radio Extra Class Operator, B.S.E.E., J.D.

COMMENTER'S PROPOSED REVISIONS TO PROPOSED RULES

Italicized. FCC-proposed rule sections under its NPRM in this proceeding 15-99 are not reproduced here to extent commenter is not proposing revision to them. If FCC decides to embark on novel rulemaking requiring individual amateurs to give advance notice directly to utilities, commenter's proposed paragraph §97.303(g)(2) and proposed revisions at §97.15(c) and §97.313(k) are also offered as useful language.

§ 97.15 Station antenna structures.

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(c) Antennas used to transmit in the 2200 m and 630 m bands must not exceed 60.96 meters (200 feet) in height above ground level, *except that the advance notification provision of §97.303(g)(2) shall be applicable for 2200m operation in case such an antenna, if located a distance less than 1.0 kilometer from an electric power transmission line of 97.303(g)(1), has a height measuring between one tenth of such distance and the first said height*.

§ 97.303 Frequency sharing requirements.

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(g) In the 2200 m and 630 m bands:

(1) Power line carrier (PLC) systems are authorized in accordance with 47 CFR 15.113 to operate in the 9-490 kHz range on transmission lines that deliver electric power from generation plants to distribution substations. Amateur stations are restricted to use at permanent fixed *and fixed portable* locations. The transmitting antenna of amateur fixed stations must be located at a horizontal distance of least *0.1* km (*0.06214* mile) from *the nearest PLC-active electric power-energized segment of* any electric power transmission line. Electric power transmission lines do not include those electric lines which connect the distribution substation to the customer or house wiring.

(2) Advance notification provision for 2200 m operation.

(A) In case this paragraph (2) is applicable under a Part 97 section, a Part 97 station licensee lacking a Part 5 license for 2200 m operation shall notify, by 30-day advance written notice to a business office of the utility responsible for the electric power transmission line at hand, stating

(i) licensee's name, call sign and return address,

(ii) station maximum planned 2200 m EIRP,

(iii) location of permanent fixed premises or fixed portable premises applicable to antenna,

(iv) antenna horizontal distance from the electric power transmission line, and

(v) maximum planned height of antenna for 2200m operation.

(B) After the 30-day period elapses, 2200m station operations may proceed on the stated premises up to the stated EIRP with a transmitting antenna height up to the stated height, and with a transmitting antenna no closer than the stated antenna distance to the electric power transmission line, provided utility has not by U.S. mail to amateur's return address made adequate written objection within the 30-day period. Such utility objection must make statements of technological fact and engineering economy showing why and concluding that coexistence with the stated 2200m transmit station of a currently-active PLC on a power-energized segment of the transmission line cannot be accomplished without undue burden.

(C) If the station licensee persists, the parties shall then negotiate in good faith to reach an accommodation that does not involve disruption of the PLC system operation nor preclude the amateur operation.

(D) If no business office address of the utility is ascertainable with reasonable certainty by the amateur station licensee, the amateur's notice may instead be addressed to a business office address of an industry-operated entity of §90.35(g) that receives PLC system information.

§ 97.313 Transmitter power standards.

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(k) No station may transmit in the 2200 m band with an equivalent isotropically radiated power (EIRP) exceeding 1 W (0.61 W ERP). *Advance notification under §97.303(g)(2) shall be applicable for such 2200 m station, if its transmit antenna for 2200 m is located a fractional distance less than 1.0 kilometer from an electric power transmission line of 97.303(g)(1), in case the planned EIRP amount in the 2200 m band is between the first said 2200 m EIRP and the product of the square of that fractional distance times first said 2200 m EIRP.*

(l) No station may transmit in the 630 m band with an equivalent isotropically radiated power (EIRP) exceeding 5 W (3.049 W ERP). In Alaska, stations in the 630 m band located within 800 kilometers (497 miles) of the Russian Federation may not transmit with an EIRP exceeding 1 W (0.61 W ERP).

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JAMES HOLLANDER REPLY COMMENTS ABOUT 2200 M AND 630 M

SUMMARY

630 m stations would be limited to FCC's proposed 630 m EIRP limits and antenna height limit 200 feet and further have a 100 meter nearness limit to an electric power transmission line (PTL). This update is made because the record indicates no Power Line Carrier (PLC) system currently operating on 630m in the USA.

Regarding **2200 m stations** within 1 kilometer of a PTL, and subject to a 2200 m band antenna height limit of 200 feet and 2200 m EIRP not exceeding 1 watt, a 100 meter nearness limit to an electric power transmission line (PTL) applies to 2200 m also. I update the proposal of additional antenna height and EIRP provisions in my June 10 Comments by using them instead as thresholds to trigger an 2200 m advance-notice process with the local utility. This avoids unnecessarily imposing additional limits on 2200 m antennas and EIRP within the 1 kilometer distance swaths.

BACKGROUND

These comments support and concur with those of ARRL and generally dovetail with those of others too. Statements herein are to best of my knowledge and belief. To the extent not updated here, I reiterate my earlier-filed "Comments from James F. Hollander" of June 10, 2015, in this FCC proceeding 15-99 and invite rereading them as updated by these reply comments.

As noted June 10, Commenter James F. Hollander is an Amateur Extra Class amateur radio licensee since 2011. The amateur radio activities emphasize CW (Morse) contacts on lower HF bands using 3 watts down to milliwatts of RF power to antenna. Hollander is an active volunteer examiner for amateur radio license examinations under the ARRL VEC. He is a patent attorney, retired 2012 from the law department of a large semiconductor manufacturer based in Texas. Now in Little Rock, Arkansas, his residence apparently lies about 0.2 km from an electric power transmission line. He has monitored the 630 m band most days and nights since mid-2014 and has monitored 2200 m several days and nights since late April, 2015.

The ARRL comments filed August 31, 2015, have marshalled facts in the record and made reasonable conclusions in favor of: WRC EIRP limits, 1500 watt transmitter power output, 200' antenna. Existing FCC regulations at section §97.313(b) provide the 1.5 kW PEP transmitter power limit that would without change then complement ultimate FCC final rules changes approving the 2200 m and 630 m bands for the amateur service. The comments of F. Raab filed August 31, 2015, provide considerable information and technical analysis regarding PLC-PTL and amateur LF/MF transmitters. Still other commenters have made submissions in this proceeding including numerous important facts that deliver a more informed picture of these bands and operations and station distances from power transmission lines (PTLs) than was available earlier.

The record in this proceeding states no facts justifying a remarkable and unusual requirement of advance notice to utility being placed on individual amateurs with respect to either 630 m or 2200 m at this time. Let it be considered whether the emphasis on PLC set astride of a discussion about allocations to specifically the amateur service has not distracted attention from the plain fact that other much more powerful stations in other radio services exist and/or will exist on frequencies in the 9-490 KHz range of interest to PLC (not to mention lightning).

I searched the FCC rules in the various Parts of 47 C.F.R. using keywords “utility” and “notification”. I have found no instance of advance direct notification by an individual licensee to a utility being required of any FCC-regulated radio service for emissions in any band whatever, and certainly not 630 m or 2200 m. Consequently, FCC should not lightly embark on such regulatory novelty without compelling evidence when such evidence has not emerged.

630 METER PROPOSED RULE: ADVANCE NOTICE IS UNNECESSARY

The comments of ARRL and others in this proceeding have extensively described the high level of amateur interest and Part 5 experimental activity in the 630 m band.[1] Accordingly, I proceed directly to the question of advance notice to utilities. Although it would be rather debatable and novel rulemaking for FCC, some kind of advance notification mandate under FCC Part 97 regulation of 2200m or 630m amateurs might be tolerable regarding amateurs within 1 kilometer

[1] ARRL Comments to FCC 8-31-2015, pp. 26-27.

of a PTL provided that sufficient facts justify it. The question is: What and how broad should that mandate be? In reply, **for 630m no advance notification to utility should be required**.

Only 20 PLCs in the whole USA were situated somewhere in 450-490 KHz range as of 1999.[2] Unlike its statement regarding 2200m PLC, Utilities Telecom Council (UTC) makes no assertion whatever with respect to 630 m that even a single USA utility operates a PLC with a transmitter in the 472-479 kHz band.[3] Moreover, the relative lack of emphasis and specificity on 630 m in the 8-31-15 UTC submission supports an inference that FCC policy consideration of the topic of advance notice more properly lies elsewhere than for the 630 m band.[4] Utilities will continue to have flexibility to be able to operate PLC systems between 9-490 kHz given FCC approval of a 472-479 KHz amateur allocation. Amateurs need 472-479 KHz for experimentation along with 135.7-137.8 KHz because the equipment and propagation challenges are very different, the lightning static propagation distances differ for the two bands, and because the two bands probe the D-layer and other ionospheric regions at over three-times-different (2200/630) spatial scales.

Amateurs, by virtue of their technological knowledge and use of electric power by their stations, know the importance of reliable electric power from utilities generally, and in their own neighborhoods specifically. Amateurs have no interest in making the utility power less reliable that they themselves so frequently use. No comment in this proceeding, including that of UTC, has indicated what is unknown or insufficiently understood[5] about 472-479 KHz and PLC that leads to a conclusion against allocating 630 m privileges to amateurs under the conditions proposed. Indeed, the record is replete with information about operations of various stations in the 472-479 KHz band at various distances. The record includes expert technical analysis of F. Raab about transmitter location and PLC that points to the wisdom of allocating 630 m privileges to amateurs under the conditions proposed here. There is no unreasonable risk of interference given the importance of PLC systems. Even granting the premise that utilities are likely to need flexibility to expand existing systems, allocating 472-479 KHz for amateur use does not unreasonably discourage utilities from being able to use these frequencies for PLC systems--given that PLC systems have been virtually absent from the wider range 450-490 KHz and when protective equipment expansion today is more likely to use optical fiber technology than PLC.

Having amateurs within 1 kilometer contact their utility about 630 m plans, if it makes sense to do so, can be voluntary and subject to their local knowledge. The record does not support a need

[2] ARRL, *op. cit.*, p. 24 and n. 47.
[3] Utilities Telecom Council comments to FCC 8-31-2015.
[4] UTC, op. cit., p.1: "UTC is specifically concerned with the Commission's proposals for allowing amateur operations in the 135.7-137.8 kHz band…" See discussion in UTC pp. 1-3, 6-10 about 135.7-137.8 kHz band. Closing sentence, p. 10: "UTC…FCC…develop a coexistence mechanism for PLC systems and Amateur operations to share the 135.7-137.8 kHz band." On the other hand, UTC mention of 472-479 KHz occupies a single paragraph on p. 6 and a single sentence in the p. 9 Conclusion.
[5] UTC, op. cit., p.6, p.9.

for an FCC requirement. A new FCC regulation on this 630 m point is simply not necessary. Also, if a utility PLC near 630m in fact did exist and were audible in an amateur receiver, the amateur could voluntarily contact the utility as an act of neighborliness even if an FCC regulation does not require such contact.

RECENT ACTIVITY ON 2200 METERS: EVIDENCE OF USA AMATEURS INTEREST

Turning now to the subject of 2200 m that occupied most of the UTC comments 8-31-2015, I begin by describing some recent activity on 2200 m that indicates Part 5 transmission successes and amateur receptions evidencing amateur interest in this band. The prospect of a 2200 m amateur band is important and meaningful to the Amateur Service.[6] I accessed WSPR-mode data from the WSPR database (Weak Signal Propagation Reporter) in reaching this conclusion.[7]

Transmissions from Part 5 station WH2XND in Arizona August 30 through September 8, 2015, evidence 2200m interest as demonstrated by at least 446 successful receptions of the Arizona-based transmissions. The 446 receptions were accomplished by at least six USA amateurs spread from California and Washington in the west and all the way east to Pennsylvania, by at least two Canadian amateurs in British Columbia, and by four USA stations receiving under their Part 5 call signs and operated by dual-Part 5/Part 97 licensed USA amateurs holding Part 5 license grants. This only suggests some recent LF experimentation at 2200 m and the interest being shown by amateurs in 2200 m.

2200 m at long distance is not just a nighttime band. WH2XND was successfully received on 2200 m at WG2XXM 1383 kilometers away in Oklahoma numerous times not only at night but also likewise for hours during full sunlight daytime September 7, 2015, and for a shorter duration in full sunlight on September 8. All the 2200 m nighttime and daytime accomplishments add to interest in many topics including daytime and nighttime signal-to-noise ratio (SNR) behavior and relative variabilities, unusual pre-sunrise signal peaks and clustering of peaks, adequacy of current geophysical and space weather explanations and propagation predictions, and improvements in antennas and equipment at different stations.

2200 METERS: AGENCY POLICY CONSIDERATIONS

Setting up a transmitting station and an effective antenna on 2200 m at the full 1 watt EIRP or even a lower EIRP can be challenging. Probably the number of 2200 m amateur transmitters will be modest while nevertheless valuably adding to the 2200 m activity necessary to advance transmit/receive technology and band propagation knowledge at these lower power levels. Homebuilt equipment likely will predominate. The technical acumen of amateur 2200 m operators is likely to be worthy of the challenges and opportunities for advancing technology and knowledge of this band. The chances of commercially supplied equipment becoming available

[6] ARRL, *op. cit.*, p. 27, n. 53.

[7] http://wsprnet.org/drupal/wsprnet/spotquery ; "database" options access spots of or by stations.

for 2200 m are probably low, given a foreseeably limited number of 2200 m amateur radio operators transmitting.

The record suggests possibly a significant number of PLCs on 100-150 KHz now since more PLCs apparently existed on 100-150 KHz as of 1999 than on 450-490 KHz.[8] UTC asserts that over 50 USA utilities have PLC with transmitters said to operate in the 135.7-137.8 kHz band.[9] Accordingly**,** although an advance notification concept for 2200 m as described here and in the ARRL and UTC comments would be novel and debatable FCC rulemaking, amateur public-spiritedness under the circumstances perhaps could go the extra mile and tolerate it. The prospect of an FCC rule on individual amateur advance notification regarding 2200m direct to utility could be tolerable, even if of debatable wisdom, in at least some situations where the 2200m amateur station lies within one kilometer of a PTL. FCC should confine any such FCC rulemaking to 2200m regarding amateur advance notification to utility.

Suppose one amateur out of perhaps 10,000 USA amateurs commences planning for a 2200 m transmitting station. That amounts to roughly 80 amateurs for 2200 m scattered around the entire United States. The number of these 2200 m amateurs situated within 1 kilometer of a PTL would be fewer yet. Accordingly, an advance notice to a utility for 2200m from an amateur situated within 1 kilometer of PTL is manageable by any one utility in any one USA locality, and thus for the utility industry generally.[10]

With that said, *de minimis* 2200 m scenarios should not call for amateur time on advance notice paperwork, nor utility time considering an insignificant situation. UTC affirms that "Owing to the importance of these services, the underlying communications systems are designed, built and maintained to standards that far exceed those of commercial communications networks in terms of reliability and resiliency." [11] Any such active PLC indeed has to be reliable and resilient in the face of interference from lightning and other adverse weather processes compared to which amateur signals pale.[12] Probably any 2200m amateurs within 1 km of PTL will do a low-EIRP setup far below 1 watt, for instance, with a self-limiting modest backyard antenna inherently imposing steeply reduced radiation efficiency. Consequently, if FCC decides to adopt an amateur advance-notice rule, then FCC should craft it in an intelligently limited way that would involve amateurs and utilities only on more attention-worthy situations and thereby promote a high quality of agency rulemaking.[13]

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[8] ARRL, *op. cit.*, p. 16 n. 33, p. 24, p.24 n. 47.
[9] Utilities Telecom Council comments to FCC 8-31-2015, p. 3.
[10] Both ARRL at pp. 15-20, 31, 32 n.59, and 37 and UTC p. 8-10 countenance possibility of some notice procedure.
[11] UTC, *op. cit.,* p. 2.
[12] J. Hollander Comments to FCC 6-10-2015, pp. 6-7.
[13] The following regulations offer information or models for comparison: 47 C.F.R. §§1.1403(b) & 1.1420 utility, cable ; 10.250 CMS provider, customer; 15.113 PLC, industry-operated entity; 17.7 antennas, FAA; 90.35(g) industry-operated entity; 90.674 cellular/non-cellular interference; 90.675 public safety/CII, ESMR, cellular; 97.207(g) space station. http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title47/47tab_02.tpl

2200 METER PROPOSED RULE: INCLUDE ADVANCE NOTICE THRESHOLDS

In particular, I urge that if FCC ventures into this advance-notice course of rulemaking any new **Part 97 rule regarding amateur advance-notice to utility be limited to 2200 m power using 2200m antenna within 1 km of PTL**. Further, such **notice should be required only (A) if 2200m EIRP exceeds fractional X distance-squared in watts referenced to 1 kilometer – OR – (B) if 2200m antenna height exceeds the multiplication product of 200 feet times fractional distance X in km.** For a fractional distance X km less than 1 km this notice rule would mean that at least X-squared (X^2) watts 2200 m EIRP must be involved to trigger an advance notice requirement. Or X-fraction of 200 feet would be needed for an antenna to trigger an advance notice requirement prior to 2200 m operation. In all other cases than specified in requirements (A) and (B) specifically limited to 2200m, no FCC-mandated advance notice by an amateur to utility should be required.

To facilitate the unusual cases calling for advance notice to utility, a well-recognized amateur organization such as ARRL could post a form letter on its web site for amateurs to use. The amateur could fill in and send the letter to the utility responsible for the PTL, and if the utility or its address were not ascertainable with reasonable certainty, then the letter could be sent or copied to the Utilities Telecom Council (UTC) as the pertinent industry-operated entity. In this way, an advance notice procedure as countenanced in the ARRL comments and UTC comments would be more likely understandable and minimally inconvenient to all concerned because of the sensible EIRP and antenna height thresholds proposed here for triggering such advance notice.

On 2200m an advance notice to utility under the specified circumstances would only be required of a licensed Part 97 amateur who lacks a Part 5 license for frequencies including the contemplated 2200m amateur band. The record indicates no instances of Part 5 interference to PLC-PTL.

Suppose, under hypothetical final rules providing for an advance notice process as specified here, an amateur has already gone through advance notice process for amateur's permanent fixed station regarding a given 2200 m EIRP, antenna height and distance less than 1 kilometer from PTL of a utility. Then no further notice is required under the here-proposed rule language for the amateur to move or install the antenna or an additional antenna at the same distance or farther distance away from PTL, or shorten any such antenna, or 2200m operate whatever such antenna system already within the notice process limits with the same EIRP or less EIRP. Further notice would be technologically a waste of time and therefore is unnecessary as a rulemaking matter.

On the other hand, suppose a 2200 m fixed portable station is to be temporarily set up at a location such as for a simulated emergency test or the annual amateur radio Field Day exercise.[14] Then the proposed rule here would contemplate an advance notice process by amateur with the

[14] §97.303(g)(1) per revision. Comments of John H. Davis 8-31-2015, pp. 4-5; and Hollander, *op. cit*., p. 3.

applicable utility in certain cases. Such a case involves an antenna of the 2200 m fixed portable station lying within 1 kilometer of a same or different PTL on other than the permanent fixed station premises and exceeding antenna height threshold or 2200m EIRP threshold. Another case requiring advance notice applies to the 2200 m permanent fixed station premises if a subsequent antenna with transmitter exceeds the EIRP, or a subsequent antenna exceeds the antenna height, that an earlier notice process for it covered or such antenna lies nearer than the earlier-noticed distance to the same PTL. Since an advance notice process does represent inconvenience for the amateur, this process can circumscribe permanent fixed and fixed portable amateur operations to relatively fewer and more deliberately planned instances to be encouraged.

In this way, minimizing the number of amateur situations for which amateurs would be required to give 2200m advance-notice letters to utilities avoids unnecessary paperwork consideration by utility personnel who can be doing more vital infrastructure tasks. Unenergized PTLs, and energized PTLs lacking activated PLC, should impose no restriction on amateurs. Activated PLC should offer utility no reason to resist the amateur's notice letter if the PLC is operating in the range 100-150 KHz but not in the 135.7-137.8 KHz 2200 m band. Indeed, even if the PLC is operating in the proposed 2200m amateur band, activated PLC should offer utility no reason to resist the amateur's notice letter when the PLC would encounter no significant amateur interference compared to interference from adverse weather or when the PLC is reprogrammable or otherwise adjustable to mitigate any issue.

OTHER SITUATIONS AND COMMENTS

Suppose an amateur is intending to go to some expense to install 2200 m transmitter and receiver equipment and antennas for transmit and receive, and the local utility does not have PLC already active in the amateur band. It's all right for amateur to voluntarily and diplomatically inform the utility of the amateur station presence. Utility might not know an amateur station on 2200 m will exist nearby without being notified. An amateur organization's form letter can help the amateur use well-styled language on this topic too. But no new FCC regulation is needed.

These comments allow for Part 97 2200/630m operation with a transmitting antenna at less than the 0.3 kilometer mentioned in the F. Raab technical submission in this proceeding. These comments are fully consistent with that F. Raab technical submission. One of its conclusions states that *no harmful interference to a PLC system is expected for an amateur station with an EIRP of 5 watts* at 300 m to a PTL.[15] The record indicates no PLC on 630 m that would be vulnerable to interference in the first place. On 2200 m, closer distances to PTL than 0.3 kilometer are quite appropriate for 2200 m advance notice thresholds because of the additional EIRP down-scaling and antenna height down-scaling defining those thresholds.

[15] F. Raab. Interference to power-line communications by amateur LF/MF transmitters, RN15-30, Revision A, 8-24-2015 submitted to FCC 8-31-2015, Abstract and pp. 9-10.

Advance-notice thresholds are provided here for stations at distances as close as 100 meters from the nearest PTL. A 100 meter (0.1 kilometer) distance nearness limit is proposed for both bands here, football-field size. A station at 100 meter distance would be required to give advance notice to the utility if its 2200m EIRP is more than 10 milliwatts or its antenna is more than 20 feet tall. The 10 milliwatts EIRP at 100 meter distance is *one five-hundredth (1/500) of the radiated power* --over 26 dB lower--than the 5 watts concluded by the Raab submission for 300 meter distance. 100 mW EIRP is one one-hundredth (1/100) the power–20dB lower—than the 1 watt concluded by the Raab submission for 100 meters distance.[16] The power for advance notice purposes here is consistent with both a square-law referenced to 1 kilometer and a cube-law referenced to 300 meters. Cube of one-third, $(1/3)^3$, means 1/27 watt or 38mW, while advance notice would be triggered at only 10 milliwatts (0.01 watt) as proposed here.

CONCLUSION

Commenter urges FCC to speedily finalize all of the FCC's proposed Part 97 rules, most preferably in a way consistent with the ARRL comments and commenter's proposed Part 97 revisions prior to reaching the matter of advance notice to utilities. If FCC decides to embark on novel rulemaking requiring amateurs to give advance notice to utilities regarding this topic, commenter's proposed paragraph §97.303(g)(2) and proposed revisions at §97.15(c) and §97.313(k) as shown at the beginning hereinabove are also offered as useful language. The time and efforts of all concerned are most appreciated.

Respectfully submitted,
(signed) /James F. Hollander/
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[16] F. Raab, *op. cit.*, pp. 9-10.