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## **FROM APOLLO TO THE FUTURE, THE NASA CURATION MODEL FOR ENGAGING THE SAMPLE SCIENCE COMMUNITY MAXIMIZES SCIENCE ON EXTRATERRESTRIAL SAMPLES**

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The Astromaterials Acquisition and Curation Office at Johnson Space Center (JSC) has enjoyed a long-term partnership (50 years!) with a broad community of planetary sample scientists. This partnership has enabled the curators of planetary samples to plan for and enact evolving requirements for preservation of sample scientific integrity and for handling and long-term storage. The basis for this relationship is a standing peer review advisory committee composed of leading scientists who are recognized for achievements in sample analysis. The committee and its descendants have brought familiarity with the most relevant scientific investigations and the associated analytical and contamination challenges.

Beginning with Apollo, the review committee was charged with oversight of curatorial operations and with ensuring fair access to samples. As additional samples from other planetary bodies were acquired, the committee evolved, taking on new responsibilities, reflected in committee name changes. However, oversight of curatorial operations and fair allocation of samples remain basic responsibilities. Committee recommendations are sent to the NASA Headquarters Discipline Scientist for approval. To minimize conflict of interest and maximize fair access, the rules governing the make-up of the committee is structured. Systematic rotation of leadership and staggered terms of membership allow the committee to retain expertise while bringing in fresh ideas.

The first peer review committee was called the Lunar Sample Analysis and Planning Team (LSAPT) and was formalized in early 1968 with about 15 members. Their function was to review a) the equipment and procedures used in the new Lunar Receiving Laboratory (LRL); b) the proficiency and capability of the LRL staff; c) the sequence of sample analysis and allocation after quarantine release; and d) the findings of the Preliminary Examination Team

(PET) [1]. According to the LSAPT member Gerald Wasserburg, one of the first issues they faced was deciding whether to have most of the sample analyses performed in house at the LRL or to distribute samples to members of the scientific community [2]. LSAPT concluded that the major scientific investigations should be carried out externally to the LRL by scientists chosen for their expertise in specific disciplines. Further they recommended that the PET's basic characterization of samples be circulated to the broad scientific community. LSAPT set its own agenda, paid attention to facility details, closely monitored the move of samples from the LRL to the interim curatorial facility in 1973, and was active in inspecting curation facilities. Between 1975 and 1979, a Facility Subcommittee of LSAPT oversaw the design and construction of a permanent facility for preservation of lunar samples. The result was an outstanding facility still in use today.

In 1977, a separate peer review committee, the Meteorite Working Group (MWG), was formed to evaluate requests for new meteorites then being collected in Antarctica under what would in 1980 become a 3-agency agreement (National Science Foundation, NASA, Smithsonian Institution) [3]. By 1979, after lunar samples were moved into the new permanent facility, the vacated gloveboxes and laboratory were prepared for meteorite curation. Recognizing that LSAPT had been helpful in setting up the JSC curatorial facility for Antarctic meteorites, JSC recommended the review committee be given expanded duties, including advice on curation and analysis of materials from other planetary bodies and the name be changed to Lunar and Planetary Sample Team (LAPST) [4]. In 1993, LAPST was renamed the Curation and Analysis Planning Team for Extraterrestrial Materials (CAPTEM) to reflect additional functions. CAPTEM is chartered to be (1) a community-based, interdisciplinary forum for discussion and analysis of matters concerning the collection and curation of extraterrestrial samples, including planning future sample return missions and (2) a standing review panel, charged with evaluating proposals requesting allocation of all extraterrestrial samples contained in NASA collections [5].

Efficiency and flexibility are gained through use of subcommittees, both ad hoc and standing. Transition of the MWG to a subcommittee of CAPTEM was completed in 2017. Today subcommittees review allocation requests for lunar samples, Antarctic meteorites, cosmic dust, Stardust cometary samples, Genesis solar wind samples, and samples returned from asteroids. Other subcommittees address facilities, informatics, and micro-cratered substrates. Planetary samples have been sent to research teams in over 30 countries world-wide. The expertise in the care and fair distribution of astromaterials by NASA using this model spans generations of planetary sample scientists and is a valuable resource to be tapped for future sample returns - OSIRIS-REx, Hayabusa 2, and Mars 2020.

[1] LSAPT minutes 2/23/1968. [2] Marvin U. B. (2004) MAPS 39 supplement Oral history Gerald J. Wasserburg. [3] Marvin U. B. (2015) in 35 Seasons of U.S. Antarctic Meteorites, Righter et al. editors. [4] LAPST minutes 1/4/1979. [5] Current CAPTEM charter (excerpt).