# CURATORIAL NEWSLETTER

DATE: November 7, 1978 | NO. 21



Patrick Butler

PATRICK BUTLER, JR., LUNAR SAMPLE CURATOR


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## REQUESTS FOR SAMPLES

Please submit requests by December 5 for samples that will be needed January through March 1979. If any are needed by a certain time within this period, please include that information as well. Also, remember to include the scientific rationale for the request. An in-depth statement of rationale eases the burden on the PI's advocate and facilitates consideration of the request.

A copy of each request goes to a PI's advocate when it is received. A list of the client-PI's for each advocate on LSAPT is contained on pages 4 and 5 along with the address and telephone number of each member of LSAPT.

## EXPEDITED FILLING OF SAMPLE REQUESTS

Certain types of sample requests may be filled within several weeks of receipt. For a number of years this has been the case for thin sections in the Thin Section Library, the only restriction being that one reference section for each sample must be kept in the Library. Another long-standing case is the approval of transfer of a sample from one PI to another when the first PI agrees and the proposed study of the recipient PI involves no greater degradation of sample than that planned when the sample was originally issued. (A transfer form signed by the Curator is required for making a PI to PI transfer, however.)

Now it is possible to reissue with little delay some of the samples returned to the Curator after PI study. On receipt of a sample request that states that returned samples would be acceptable, the Curator will review availability of appropriate samples, communicate with the requesting PI about suitability, discuss the request by telephone with the PI's advocate and with the Vice-Chairman of LSAPT, and then issue the sample if everyone is in agreement. However, if there remains a question about the request, it will be held for consideration at the next LSAPT meeting.

## CATALOG

Enclosed is a copy of Catalog of Pristine Non-Mare Materials, Part 1, Non-Anorthosites. As stated in the introduction, the purpose of the catalog is to stimulate and facilitate formulation of research plans and sample requests. Part 2, Anorthosites, will be mailed to you within two weeks.

## LUNAR CORES

The opening and dissection of cores has been following the schedule given on page 4 of Newsletter 20, April 1978. Dissection of 14211 has been completed and the lower member (14210) of the double drive tube is underway. If no difficulties occur, dissection of the last Apollo 14 core, 14220, will be completed near the end of the year, several months ahead of schedule. Dissection of 76001 has been completed and a summary report is being prepared. The first dissection pass (of three) on 15011 has just been completed. As a consequence of this progress, it will be possible to make allocations from 14210, 14211, 14220, 15011, 76001 in January and February 1979. Sample requests are invited.

## CABINET ATMOSPHERES - SPECIFICATIONS

This section is a solicitation for comments on specifications. In preparation for activation of the new curatorial building, all procedures and environmental specifications are under review. From the standpoints of both economy and preservation of the lunar samples, aspects of the procedures relating to the atmosphere of the sample cabinets have been called into question. A LSAPT subcommittee, chaired by Robert Housley, will consider the matter in detail in December.

Presently a flow of $N_2$ gas passes through all storage and processing cabinets. Both $O_2$ and $H_2O$ are regularly monitored and are currently maintained below 20 and 50 ppm, respectively. This requires $N_2$ flow rates as high as 100 standard cubic feet per hour in some cabinets with a total annual cost in the order of $100K.

High $O_2$ levels generally indicate a leak which can be corrected. On the other hand, considerable $H_2O$ diffuses through the window seals of all cabinets and through the neoprene gloves in the processing cabinets. This dictates the high $N_2$ flow rates currently required.

As a result of the review in progress it is possible that the permissible concentrations of $O_2$ and $H_2O$ will be raised unless defensible scientific arguments are advanced by the scientific community for maintaining the

present (or more stringent) concentration limits. (The liquid nitrogen supplied contains less than 2 ppm $O_2$ and $H_2O$.)

It should be noted that 20 ppm corresponds to an $O_2$ partial pressure of $1.5 \times 10^{-2}$ torr. In thermodynamic equilibrium all Fe and Ni would be in plus 3 valence states, and elements such as S and P would be in oxidized form. At a flow rate of 100 SCH and 20 ppm concentration, about 80 mg of $O_2$ per hour flows through each cabinet. Therefore, the present existence of metals and sulfides in lunar samples depends on kinetic rather than thermodynamic factors and these kinetic factors are not simply related to the availability of $O_2$. It may be that no concentration limit on $O_2$ is actually justified.

Similarly, gas absorption studies indicate that $H_2O$ is reversibly absorbed and desorbed from lunar samples up to relative humidities of about 50% as long as the sample has not previously been outgassed above 150°C. However, all lunar fines samples already contain considerable terrestrial $H_2O$ that is not released until temperatures of about 300°C are reached.

Although there are good reasons to believe that the surfaces of grains in the lunar fines were in a highly reduced and dry state on the Moon, oxidation and hydration probably proceeded until arrested by slow solid state diffusion rates almost immediately after the samples were returned to Earth. It appears that further damage is only likely at relative humidities which permit liquid $H_2O$ to condense in pores or form as surface films.

It appears likely that the surfaces of lunar fines would also be reactive with such gases as $CO_2$, $Cl_2$, $F_2$, $SO_2$, $NO_2$ etc. The presence of large amounts of $O_2$ and $H_2O$ might actually suppress such reactions.

Advice and recommendations concerning environment control are strongly encouraged from all interested investigators, but must be based on defensible scientific considerations, not simply faith. Mention of possible chemical reactions and considerations of rate determining steps would be helpful if appropriate. Responses sent to the Curator will be forwarded to the LSAPT subcommittee when received. They will meet December 16.

## LUNAR SAMPLE ANALYSIS PLANNING TEAM (LSAPT)

The team met September 1-4, 1978 to consider and advise on sample requests and also on the procedures for operation of the new curatorial building (to be ready for use in April 1979). They recommended allocation of 278 samples in response to requests from 18 Principal Investigators. They also approved the Curator's choice of about 600 more samples to make a second 100 sets of Lunar Educational Disks, each disk containing six representative samples and accompanied by a narrated slide show on lunar science.

This was the first meeting for new member, Charles Hohenberg, and the last for retiring members, Kurt Marti and Ursula Marvin. We are grateful for their service on the team.

## ANTARCTIC METEORITES

The Meteorite Working Group met at the Lunar and Planetary Institute September 21-24. They approved 150 allocations in response to proposals from 53 investigators. The processing and allocations of the two carbonaceous chondrites collected in the 1977-1978 season were planned and have now been done. John Annexstad reached Antarctica last week and has now started the 1978-1979 season's search with the party headed by Bill Cassidy. Ursula Marvin will also be a member of the party.

## NORTHROP SERVICES, INC.

Graham Ryder and Marc Norman, authors of the enclosed catalog, joined the staff of Northrop Services, Inc. this summer. They compose the scientific support group and as such will be producing sample catalogs based on examination of samples in the Curatorial laboratories, on processing and observational data in the sample files, and on published studies. Ryder has had considerable experience in lunar studies gained over several years as a post-doctoral fellow in John Wood's group at the Smithsonian Astrophysical Observatory. Norman participated in studies of lunar samples as a student of L. A. Taylor at the University of Tennessee.

## NEUTRON FLUENCES

Please remember to include irradiation data in the history of samples returned to the Curator. There is a place for such values on the Sample History Information form.

## MAILING LIST

On request we will gladly add co-investigators, collaborators and other participants in lunar sample studies to our mailing list for the Newsletters, catalogs and sample information publications. Please survey those involved in your program and let us know who would like to get their own copies of these communications.

## LISTS

### LSAPT Advocates for PI's

| GROUP A | | | | GROUP B | |
|---|---|---|---|---|---|
| Marvin (retired) | McKay | Taylor | Moore | Van Schmus | Lipschutz |
| Adams | Albee | Bell | Clayton | Arnold | Anders |
| Brownlee | Bence | El Goresy | Des Marais | Kirsten | von Gunten |
| Burns | Drake | Goldstein | Epstein | Marti | Haskin |
| Buseck | Haggerty | Hays | Gibson | Meyer | Laul |
| Butler | Hollister | Huebner | Heymann | Murthy | Morgan |
| Keil | James | Lovering | Kaplan | Tatsumoto | Reed |
| Lofgren | Papike | Roedder | Rhodes | Tilton | Schmitt |
| McKay | Ringwood | Rutherford | Thode | Turner | Wanke |
| Phinney | Sclar | Smith, J.V. | | Wasserburg | Wasson |
| Reid | Taylor, L. | Weiblen | | | |
| Sato | Takeda | Weill | | | |
| Stoffler | Wood | Winzer | | | |

GROUP B (Cont'd)

| Hohenberg (tent.) | Meyer |
|---|---|
| Blanchard | Ahrens, L. |
| Geiss | Bhandari* |
| Nyquist | Blanford* |
| Pepin | Fireman |
| Perkins | Lal* |
| Reynolds | Philpotts |
| Schaeffer | Pillinger |
| Signer | Taylor, S. R. |
| Walker | Tombrello |

GROUP C

| Housley | Spetzler |
|---|---|
| Aronson | Ahrens |
| Banerjee-Hoffman | Brownlee |
| Burns | Comstock |
| Bussey | Gold |
| Dollfus | Hapke |
| Fuller | Hartung |
| Gose | Hörz |
| Horai | Housley |
| Larsen | Klein |
| Runcorn | Simmons |
| Spetzler | Tittman |
| Strangway | Uhlmann |

LSAPT MEMBERSHIP

Dr. Charles Hohenberg
Laboratory for Space Physics
Washington University
St. Louis, MO 63130
(314)-889-6225 (FTS: OPR 87-279-4110)

Dr. Robert M. Housley
Science Center, Rockwell Int'l
1049 Camino Dos Rios
Thousand Oaks, CA 91360
(809)-498-4545 (FTS: 87-798-2000)

Mr. Richard S. Johnston, Chairman
NASA-Johnson Space Center
SA/Space and Life Sciences Directorate
Houston, Texas 77058
(713)483-2251 (FTS: 87-525-2251)

Dr. Michael E. Lipschutz
Purdue University
Department of Chemistry
Lafayette, IN 47907
(317)749-2724 (FTS: 87-331-7000)

Dr. David S. McKay
NASA-Johnson Space Center
SN6/Geology Branch
Houston, Texas 77058
(713)483-5171 (FTS: 87-525-5171)

Dr. Charles Meyer, Jr.
NASA-Johnson Space Center
SN7/Geochemistry Branch
Houston, Texas 77058
(713)483-4715 (FTS: 87-525-4715)

Dr. Carleton B. Moore
Center for Meteorite Studies
Arizona State University
Tempe, Arizona 85281
(602)965-3576 (FTS: 87-766-3576)

Dr. James J. Papike
State University of New York
Dept. of Earth & Space Sciences
Stony Brook, New York 11794
(FTS: Dial direct) 87-516-246-4047

Dr. Hartmut Spetzler
University of Colorado
CIRES
Boulder, Colorado 80309
(303)492-8020 (FTS: 87-323-6516
ext. 8020)

Dr. Lawrence A. Taylor
University of Tennessee
Department of Geology
Knoxville, Tennessee 37916
(615)974-2366 (FTS: 87-855-2366)

Dr. W. Randy Van Schmus
University of Kansas
Department of Geology
Lawrence, Kansas 66004
Dial OPR: 87-752-2911
ask for (913)864-3676

## CONSORTIUM: STATUS

Groups of Principal Investigators are encouraged to work together in coordinated studies of given samples. Advantages of this mode are conservation of sample through sequential studies of the same material, getting information on documented and well-characterized sample, assurance that all appropriate analyses and studies are done, and that the results from the individual laboratories of the consortium members are published coherently.

During active consortium study of a sample, its members have exclusive rights to study it. Any non-consortium requests for the same sample must be reviewed and approved by the consortium leader as not infringing on any area of consortium study and as not using parts of the sample needed for the consortium studies. (Such requests commonly lead to the requester joining the consortium.)

To inform all PI's about samples actively studied by consortiums, we make an annual survey. The table below shows consortiums we know about. Please review the list and let us know of any additions or terminations.

| SAMPLE NO. | LEADER |
|---|---|
| 12013 | Albee/Wasserburg |
| 12023 | Pillinger (European Consortium) |
| 12054 | Hartung |
| 14006 | Nyquist |
| 14064 | Wood (Imbrium Consortium) |
| 14068 | Nyquist |
| 14073 | Wasserburg |
| 14082 | Wood (Imbrium Consortium) |
| 14083 | Wasserburg |
| 14171 | Nava |
| 14276 | Wasserburg |
| 14305 | Nava |
| 14311 | Albee |
| 14312 | Wood (Imbrium Consortium) |
| 14318 | Wood (Imbrium Consortium) |
| 14319 | Nava |
| 15205 | Albee |
| 15206 | Wasserburg |
| 15405 | Wood (Imbrium Consortium) |
| 15435 | Pillinger |
| 15445 | Nyquist |
| 15445 | Wood (Imbrium Consortium) |
| 15455 | Wood (Imbrium Consortium) |
| 15465 | Haskin |
| 15565 | Haskin |
| 15601 | Pillinger |
| 60002 | Heymann |
| 60003 | Heymann |
| 60018 | Haskin |
| 61195 | Nyquist |
| 66075 | Albee |
| 67435 | Keil |
| 67915 | Marti |
| 72417 | Wasserburg |
| 72435 | Wasserburg |
| 73215 | James |
| 73255 | James |