Antarctic Meteorite Newsletter

Volume 20, Number 2 July 1997

A periodical issued by the Meteorite Working Group to inform scientists of the basic characteristics of specimens recovered in the Antarctic.

Edited by Cecilia Satterwhite and Marilyn Lindstrom, Code SN2, NASA Johnson Space Center, Houston, Texas 77058

Curator's Comments

by Marilyn Lindstrom

New Meteorites

This newsletter announces the availability of 116 new meteorites from the 1994-1996 collections. Most notable among the new meteorites are 4 special chondrites (GRO95551, PRE95410, 411, 412), 2 carbonaceous chondrites (GRA95229 and PRE95404), and 1 achondrite (eucrite GRO95633). Also included is a redescription of Lodranite GRA95209.

Changes in Phone and E-mail

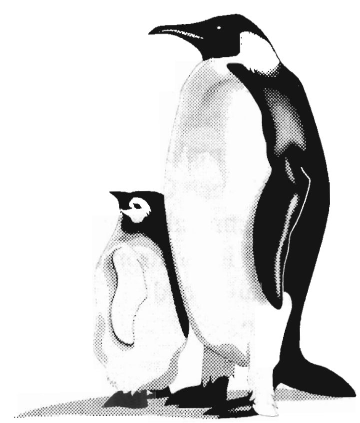
Please note that our area code and e-mail are changing. Our area code has changed to 281 (from 713). JSC is in the process of changing over our e-mail system. Our new addresses are listed on p. 11. At this date Judy has already transitioned, but Marilyn and Cecilia are still at the old addresses. Our web site will have the current information.

http://www-curator.jsc.nasa.gov/curator/antmet/phonenos.htm

ALH84001 Dominates MPL Work

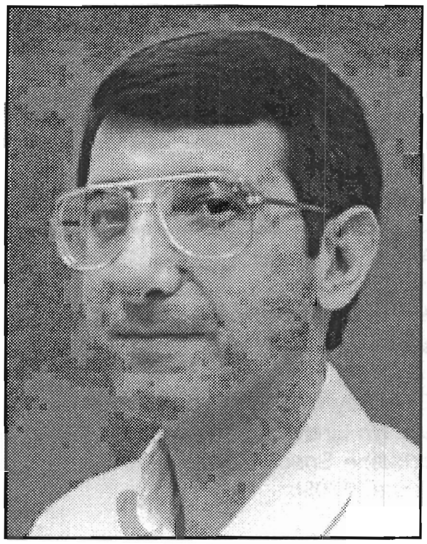
Since the announcement of possible evidence for life in martian meteorite ALH84001 last summer, work related to that sample has dominated efforts by the curation staff. Between extra panel meetings, organic contamination control, and lots of allocations to new PIs, we've all been working at a feverish pace. The ALH84001 curation story will be told in gory detail next month when we publish a special newsletter. Meanwhile, the rest of the meteorite world doesn't stop and neither do we. There was a regular MWG meeting with allocations in March, and 390 new meteorites arriving from Antarctica in April. We've tried to do some of everything, with allocations the first priority, but we are behind our usual schedule. We apologize for any delays caused by the ALH84001 feeding frenzy. As a special onetime offer, because this newsletter is late, we'll relax **the sample request deadline** for this newsletter to **August 29**. We expect to be back to our normal routine this fall and then will again expect everyone else to be prompt as usual.

Inside this Issue



Sample Request Deadline August 22, 1997

MWG Meets September 5-6, 1997



Farewell to a Superb Curator

Gooding Leaves NASA

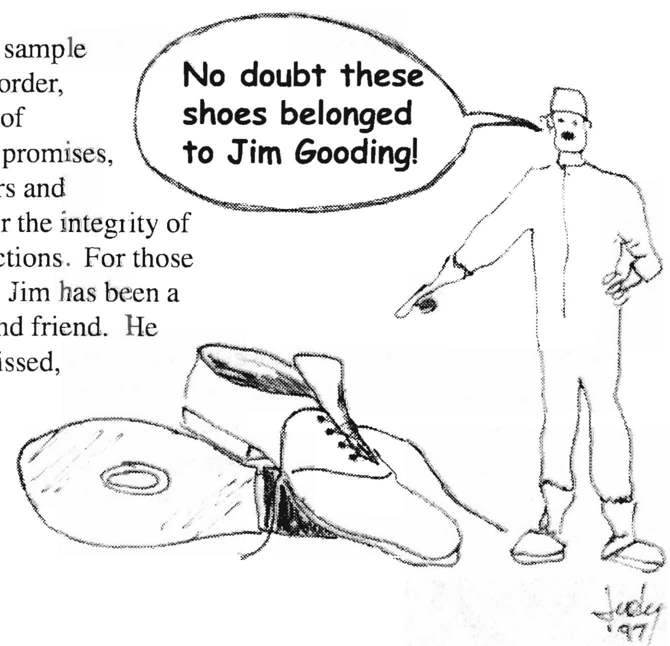
With characteristic calm and courtesy, Jim Gooding announced that he was leaving NASA on August 15th to take a research management position with Enron Corporation of Houston.

All facets of JSC sample curation have been enriched by Jim's expertise-cosmic dust, meteorites, lunar samples. He joined the curation team in 1981 as a curator for cosmic dust particles and subsequently served as meteorite curator, lunar sample curator and, since 1991, Branch Chief. He encouraged technical innovation and leadership in electronic means of communication and documentation.

Gooding's highly-respected knowledge of meteorites and Martian alteration products made him an effective spokesperson for sample science in planning Mars sample return missions, especially future sample curation.

Jim departs with sample curation in good order, leaving a legacy of honesty, keeping promises, serving customers and highest regard for the integrity of the sample collections. For those of us in curation, Jim has been a leader, advisor and friend. He will be greatly missed, and the shoes he leaves behind are bigger than those belonging to Shaq O'Neal.

The curatorial team wishes Jim much success and happiness in his new career. Enron has a winner!



The Antarctic Meteorite Location and Mapping Project (AMLAMP)

Announces the

Updated AMLAMP Explanatory Text

John Schutt

The AMLAMP Explanatory Text was originally published as LPI Technical Report 89-02. An update was issued as LPI Technical Report 93-07. Numerous new meteorite collection sites have been visited and many of the previously known sites have been re-visited resulting in the recovery of a significant number of additional meteorites. The Explanatory Text has been updated again and is now available over the World Wide Web. Sections on new meteorite collection sites and numerous maps, airphotos, and tables have been added. However, at this time the site is basic and very much a work in progress with portions being updated or added on occasion. Any comments on how to improve the site will be appreciated. I can be reached by email at *schutt@curate.jsc.nasa.gov.*

The AMLAMP Web site address is:
http://cass.jsc.nasa.gov/research/amlamp/intro/welcome.html

New Meteorites

From 1994-1996 Collections

Pages 4-13 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 20(1), February 1997. Specimens of special petrologic type (carbonaceous chondrite, unequilibrated ordinary chondrite, achondrite, etc.) are represented by separate descriptions unless they are paired with previously described meteorites. However, some specimens of non-special petrologic type are listed only as single line entries in Table 1. For convenience, new specimens of special petrological type are also recast in Table 2.

Macroscopic descriptions of stony meteorites were performed at NASA/JSC. These descriptions summarize hand-specimen features observed during inital examination. Classification is based on microscopic petrography and reconnaissance-level electron microprobe analyses using polished sections prepared from a small chip of each meteorite. For each stony meteorite the sample number assigned to the preliminary examination section is included. In some cases, however, a single microscopic description was based on thin sections of several specimens believed to be members of a single fall.

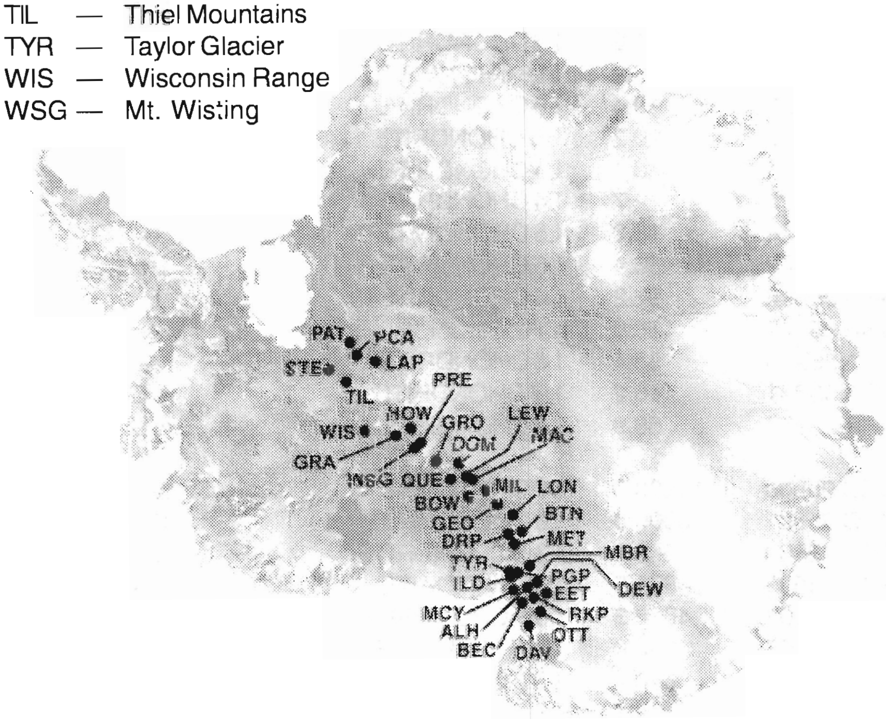
Meteorite descriptions contained in this issue were contributed by the following individuals:

Kathleen McBride, Cecilia Satterwhite
Antarctic Meteorite Laboratory
NASA Johnson Space Center
Houston, Texas

Brian Mason and Tim McCoy
Department of Mineral Sciences
U.S. National Museum of Natural History
Smithsonian Institution
Washington, D.C.

Antarctic Meteorite Locations

ALH — Allan Hills
BEC — Beckett Nunatak
BOW — Bowden Neve
BTN — Bates Nunataks
DAV — David Glacier
DEW — Mt. DeWitt
DOM — Dominion Range
DRP — Derrick Peak
EET — Elephant Moraine
GEO — Geologists Range
GRA — Graves Nunataks
GRO — Grosvenor Mountains
HOW — Mt. Howe
ILD — Inland Forts
LAP — LaPaz Ice Field
LEW — Lewis Cliff
LON — Lonewolf Nunataks
MAC — MacAlpine Hills
MBR — Mount Baldr
MCY — MacKay Glacier
MET — Meteorite Hills
MIL — Miller Range
OTT — Outpost Nunatak
PAT — Patuxent Range
PCA — Pecora Escarpment
PGP — Purgatory Peak
PRE — Mt. Prestrud
QUE — Queen Alexandria Range
RKP — Reckling Peak
STE — Stewart Hills
TIL — Thiel Mountains
TYR — Taylor Glacier
WIS — Wisconsin Range
WSG — Mt. Wisting



Information on the U.S. Collection of Antarctic Meteorites

Number of meteorites:	8252
Number of meteorites classified:	7648

Table 1: List of Newly Classified Antarctic Meteorites**

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 94410 ~	2.4	H5 CHONDRITE	B/C	A		
QUE 94425 ~	25.8	L5 CHONDRITE	B	B		
QUE 94756 ~	3.7	L5 CHONDRITE	Be	A/B		
ALH 95100 ~	19.3	L6 CHONDRITE	A/B	B		
ALH 95101 ~	12.2	L6 CHONDRITE	A/B	A		
ALH 95102 ~	7.0	L6 CHONDRITE	B	A		
ALH 95103 ~	12.9	L6 CHONDRITE	B	A		
ALH 95104 ~	1.5	H5 CHONDRITE	B/C	B		
ALH 95105 ~	1.1	H5 CHONDRITE	Be	A		
ALH 95106 ~	1.4	H5 CHONDRITE	B/Ce	B/C		
ALH 95107 ~	26.2	L6 CHONDRITE	A/B	B		
ALH 95108 ~	8.7	H6 CHONDRITE	B	B		
ALH 95109 ~	20.3	L6 CHONDRITE	B	A/B		
GRA 95213	372.8	H5 CHONDRITE	A/B	A	19	17
GRA 95214	204.5	H5 CHONDRITE	B/C	A	18	16
GRA 95215	320.6	H4 CHONDRITE	B	A	19	8-23
GRA 95216	129.1	L5 CHONDRITE	B	B	24	20
GRA 95217	134.0	L5 CHONDRITE	B	A	23	19
GRA 95218	79.1	H5 CHONDRITE	B	A	18	16
GRA 95219	100.8	H5 CHONDRITE	B/C	B/C	19	16
GRA 95220	55.8	L6 CHONDRITE	A/B	A	26	22
GRA 95221	14.9	LL6 CHONDRITE	A	A	32	26
GRA 95222	19.4	L6 CHONDRITE	B	A	26	22
GRA 95223	20.2	H5 CHONDRITE	B	A	19	16
GRA 95224	3.1	L4 CHONDRITE	A/B	A	24	21-24
GRA 95225	2.7	L4 CHONDRITE	A/B	A	24	21-24
GRA 95226	16.6	L5 CHONDRITE	B	B	26	22
GRA 95227	36.4	L5 CHONDRITE	Be	B	26	22
GRA 95228	52.2	L6 CHONDRITE	B	A/B	25	21
GRA 95229	128.9	CR2 CHONDRITE	A	A/B	1-31	2-4
GRA 95230	53.4	L6 CHONDRITE	A	A/B	24	20
GRA 95231	16.2	H4 CHONDRITE	A/B	A	18	16-22
GRA 95232	68.9	L4 CHONDRITE	A/B	A/B	24	19-22
GRO 95500	10000.0	L6 CHONDRITE	B/C	A/B	23	20
GRO 95501	8000.0	L6 CHONDRITE	Be	A	23	20
GRO 95502	5362.7	L3.5 CHONDRITE	B	A	2-24	1-27
GRO 95503 ~	4801.5	L6 CHONDRITE	A/Be	B		
GRO 95504	4018.3	L3.5 CHONDRITE	A/B	A	2-22	9-23
GRO 95507	1000.0	H6 CHONDRITE	B/C	A	19	16
GRO 95512	840.4	L3.5 CHONDRITE	B	A	3-21	8-28
GRO 95514	846.4	L6 CHONDRITE	Ae	A/B	25	21
GRO 95518	1342.4	H4 CHONDRITE	B/Ce	B	19	15-23
GRO 95527	400.8	H4 CHONDRITE	B	A	18	17-20
GRO 95536 ~	331.2	L3 CHONDRITE	A/B	A		
GRO 95537	258.9	H5 CHONDRITE	B/Ce	B/C	19	17
GRO 95538	353.3	H5 CHONDRITE	B	B	19	17

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
GRO 95539 ~	269.8	L3 CHONDRITE	B	A		
GRO 95540	255.1	L5 CHONDRITE	A	A	25	21
GRO 95541	265.2	H4 CHONDRITE	B/C	C	19	7-24
GRO 95542 ~	276.7	L3 CHONDRITE	A/B	A		
GRO 95543	222.9	L6 CHONDRITE	A/B	A/B	25	21
GRO 95546	200.8	L3.8 CHONDRITE	B/Ce	A	9-25	12-27
GRO 95547	281.5	H6 CHONDRITE	C	B	19	17
GRO 95548	229.6	L6 CHONDRITE	Be	C	25	21
GRO 95549	180.3	L5 CHONDRITE	B	A/B	26	22
GRO 95550 ~	170.0	L3 CHONDRITE	A/B	A/B		
GRO 95551	213.4	CHONDRITE (ANOMALOUS)	C	A	1-2	1
GRO 95552	182.0	LL4 CHONDRITE	A	A	29	24
GRO 95553	215.7	L6 CHONDRITE	A	B	25	21
GRO 95554	201.9	H6 CHONDRITE	A/B	A	19	17
GRO 95556	169.8	LL6 CHONDRITE	A/B	B/C	32	26
GRO 95557	199.1	LL5 CHONDRITE	A/B	A/B	29	24
GRO 95558 ~	202.4	L3 CHONDRITE	A	A		
GRO 95559	202.2	H4 CHONDRITE	B/C	A	19	16-19
GRO 95560 ~	233.7	H6 CHONDRITE	B/C	A/B		
GRO 95561 ~	236.3	H6 CHONDRITE	B/C	A/B		
GRO 95562 ~	260.5	L6 CHONDRITE	A	A		
GRO 95563 ~	209.4	L6 CHONDRITE	B/C	A		
GRO 95564 ~	264.2	L6 CHONDRITE	A	A		
GRO 95567 ~	154.5	L6 CHONDRITE	A/B	A/B		
GRO 95568 ~	139.7	L6 CHONDRITE	B/C	A		
GRO 95569 ~	46.6	L6 CHONDRITE	B	A/B		
GRO 95570 ~	146.2	H6 CHONDRITE	C	A		
GRO 95573 ~	89.6	H6 CHONDRITE	B	A		
GRO 95576 ~	53.4	L6 CHONDRITE	A/B	A		
GRO 95578 ~	16.1	L6 CHONDRITE	B/C	A		
GRO 95582 ~	8.6	L6 CHONDRITE	B	A		
GRO 95583 ~	108.2	L6 CHONDRITE	B	A		
GRO 95585 ~	88.6	L6 CHONDRITE	A/B	A		
GRO 95587 ~	117.7	H6 CHONDRITE	B/C	A		
GRO 95588 ~	111.2	L6 CHONDRITE	Be	A		
GRO 95589 ~	127.8	L6 CHONDRITE	Be	A/B		
GRO 95591 ~	111.2	L6 CHONDRITE	B	A		
GRO 95592	86.4	H5 CHONDRITE	B/C	A	19	17
GRO 95593 ~	12.8	L6 CHONDRITE	A	A		
GRO 95594 ~	77.3	L6 CHONDRITE	B	A		
GRO 95595 ~	148.1	L6 CHONDRITE	B	A		
GRO 95597 ~	76.9	L6 CHONDRITE	A	A		
GRO 95601 ~	156.2	H6 CHONDRITE	B	A		
GRO 95603 ~	43.1	L6 CHONDRITE	A/B	A		
GRO 95604 ~	153.2	L6 CHONDRITE	A/B	A		
GRO 95605 ~	29.2	L6 CHONDRITE	B	A		
GRO 95606 ~	15.8	L6 CHONDRITE	B	A		
GRO 95607 ~	71.4	L6 CHONDRITE	B/C	A		
GRO 95609	32.6	H6 CHONDRITE	B/C	A	19	17
GRO 95610	25.1	L5 CHONDRITE	Ce	A	25	21
GRO 95633	58.1	EUCRITE (BRECCIATED)	B	A/B		32-57

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
PRE 95401	186.5	L3.4 CHONDRITE	A/B	B	1-32	4-18
PRE 95402	236.3	H5 CHONDRITE	B	A/B	19	17
PRE 95403 ~	199.1	L6 CHONDRITE	B/C	B		
PRE 95404	39.5	CV3 CHONDRITE	A	B	1-41	7-21
PRE 95405	31.9	H5 CHONDRITE	B	A	18	16
PRE 95406 ~	72.4	L6 CHONDRITE	B	B		
PRE 95407	45.2	H5 CHONDRITE	B	A	18	16
PRE 95408 ~	48.6	L6 CHONDRITE	A	A		
PRE 95409 ~	33.2	L6 CHONDRITE	B	B		
PRE 95410 ~	41.7	R CHON. (CARLISLE LAKES)	A/B	A		
PRE 95411	43.7	R CHON. (CARLISLE LAKES)	A/B	A	1-41	15-29
PRE 95412 ~	14.6	R CHON. (CARLISLE LAKES)	A/B	A		
PRE 95415 ~	82.5	L6 CHONDRITE	B/C	A		
PRE 95416 ~	23.7	L6 CHONDRITE	A/B	B		
WSG 95301 ~	250.2	L6 CHONDRITE	A/B	A		
WSG 95302 ~	236.2	L6 CHONDRITE	A/Be	A		
WSG 95305 ~	39.2	L6 CHONDRITE	A/B	A		
WSG 95306 ~	11.2	L6 CHONDRITE	B	B		
MET 96501	4939.3	L6 CHONDRITE	Be	B	25	21

**Notes to Tables 1 and 2:

"Weathering" Categories:

A: Minor rustiness; rust haloes on metal particles and rust stains along fractures are minor.
B: Moderate rustiness; large rust haloes occur on metal particles and rust stains on internal fractures are extensive.
C: Severe rustiness; metal particles have been mostly stained by rust throughout.
e: Evaporite minerals visible to the naked eye.

"Fracturing" Categories:

A: Minor cracks; few or no cracks are conspicuous to the naked eye and no cracks penetrate the entire specimen.
B: Moderate cracks; several cracks extend across exterior surfaces and the specimen can be readily broken along the cracks.
C: Severe cracks; specimen readily crumbles along cracks that are both extensive and abundant.

~Classified by using refractive indices.

Table 2: Newly Classified Specimens Listed By Type **

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
		Achondrites				
GRO 95633	58.1	EUCRITE (BRECCIATED)	B	A/B		32-57
		Carbonaceous Chondrites				
GRA 95229	128.9	CR2 CHONDRITE	A	A/B	1-31	2-4
PRE 95404	39.5	CV3 CHONDRITE	A	B	1-41	7-21
		Chondrites - Type 3				
PRE 95410 ~	41.7	R CHON. (CARLISLE LAKES)	A/B	A		
PRE 95411	43.7	R CHON. (CARLISLE LAKES)	A/B	A	1-41	15-29
PRE 95412 ~	14.6	R CHON. (CARLISLE LAKES)	A/B	A		
GRO 95551	213.4	CHONDRITE (ANOMALOUS)	C	A	1-2	1
GRO 95536 ~	331.2	L3 CHONDRITE	A/B	A		
GRO 95539 ~	269.8	L3 CHONDRITE	B	A		
GRO 95542 ~	276.7	L3 CHONDRITE	A/B	A		
GRO 95550 ~	170.0	L3 CHONDRITE	A/B	A/B		
GRO 95558 ~	202.4	L3 CHONDRITE	A	A		
PRE 95401	186.5	L3.4 CHONDRITE	A/B	B	1-32	4-18
GRO 95502	5362.7	L3.5 CHONDRITE	B	A	2-24	1-27
GRO 95504	4018.3	L3.5 CHONDRITE	A/B	A	2-22	9-23
GRO 95512	840.4	L3.5 CHONDRITE	B	A	3-21	8-28
GRO 95546	200.8	L3.8 CHONDRITE	B/Ce	A	9-25	12-27

~Classified by using refractive indices.

Table 3: Tentative Pairings for New Specimens

Table 3 summarizes possible pairings of the new specimens with each other and with previously classified specimens, based on descriptive data in this newsletter issue. Readers who desire a more comprehensive review of the meteorite pairings in the U.S. Antarctic collection should refer to the compilation provided by Dr. E.R. D. Scott, as published in issue 9(2) (June 1986). Possible pairings were updated in *Meteoritical Bulletin* No. 79, *Meteoritics* **31**, 100-112 (1996).

R CHONDRITE (CARLISLE LAKES)

PRE 95411 and PRE 95412 with PRE 95410

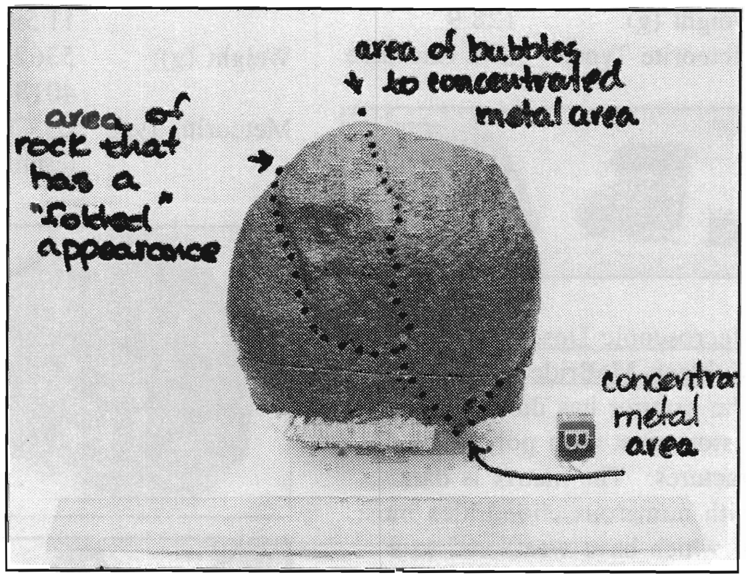
L3 CHONDRITES

GRO 95504, GRO 95505, GRO 95512, GRO 95536, GRO 95539, GRO 95542, GRO 95544, GRO 95545, GRO 95550, and GRO 95558 with GRO 95502

Petrographic Descriptions

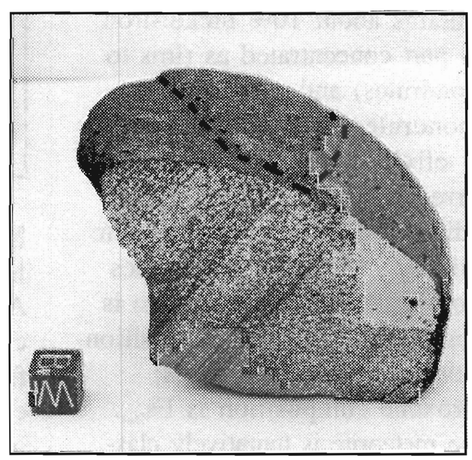
Revised Hand Sample Description of GRA95209

Kathleen McBride and Tim McCoy



We have re-examined the main mass of GRA 95209 (,0). The initial description contained a number of features not previously noted in lodranites (e.g., chondrules, clasts) and subsequent cutting of the specimen has added to the unusual nature of this specimen. The majority of GRA 95209 is a medium-grained, metal-rich, brown-stained rock. Subsamples ,21 and ,13 sample this material. Breaking the specimen for the initial description was difficult. This undoubtedly results from a fine network of metal stringers, giving the broken surface a "pin cushion" appearance. Despite the initial description, chondrules are clearly not present in either thin section or hand sample, although the exterior of the hand sample does display round weathering halos composed of carbonates and/or terrestrial iron oxides.

The broken surface of the hand sample exhibits several areas up to 8 mm in maximum dimension which are distinctly greener than the host. These are the areas originally described as clasts. They are not clasts in the classic sense (rock fragments from another source), but rather are areas enriched in mafic silicates relative to the host. During recent allocations, this material was sampled as split ,19.

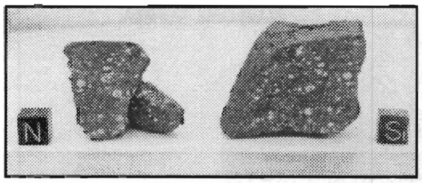


The most interesting feature of the broken surface of the specimen was a small area (<1 cm2) bordering the fusion crust which was enriched in metal. Coupled with that was the observation that radiating away from the concentrated metal area was a series of ablation pits on the fusion crust (NASA Photo S97-07939). It was originally thought that these ablations pits defined a series of veins which cross cut the meteorite. This prompted the curatorial facility to remove an ~1 cm thick slice parallel to the broken surface. The results of this cutting are clearly seen in NASA Photo S97-07944. Rather than revealing a vein-like structure, the cutting revealed an area of metal 2 x 3 cm on a side. The outline of the ablation pits suggests that these may outline a very large (20 vol.% of the mass) metal particle within GRA 95209. The only other known instance of a large metal particle within an acapulcoite-lodranite is in Monument Draw, where a large metal vein was observed by McCoy et al. (1996). Proposals will be considered by the Meteorite Working Group for study of both the silicate matrix and the metallic particle.

The curatorial facility has prepared thin sections of the host, mafic-rich area, and metal-rich area for distribution. Most of these features can be seen in NASA photo S96-13074.

New Meteorites

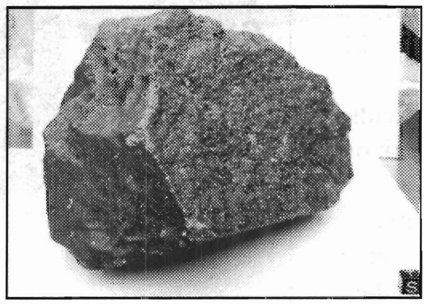
Sample No.: **GRA95229**
Location: Graves Nunatak
Dimensions (cm): 5.0x3.0x3.5
Weight (g): 128.9
Meteorite Type: CR2 Chondrite

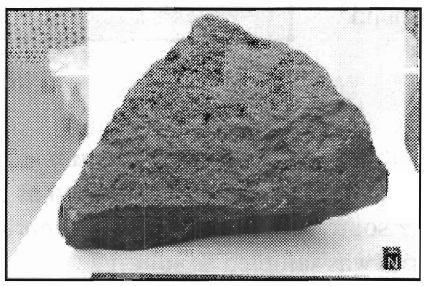


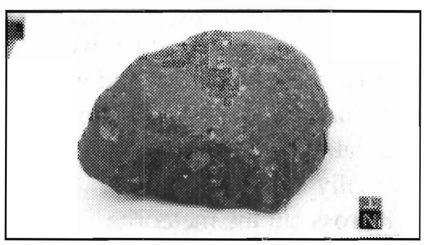
Macroscopic Description: Kathleen McBride
The exterior has dull black fusion crust with polygonal fractures. The matrix is dark with numerous chondrules most of which have weathered to a yellowish color.

Thin Section (,2) Description: Brian Mason
The section shows a close packed aggregate of chondrules (up to 2 mm across) and chondrule fragments in a small amount of black matrix which contains about 10% nickel-iron (in part concentrated as rims to chondrules) and a little troilite. Chondrule types include granular olivine, olivine-pyroxene and barred olivine. Weathering is indicated by pervasive limonitic staining. Microprobe analyses show that most of the olivine is close to Mg_2SiO_4 in composition, with a few iron-rich grains; pyroxene composition is Fs_{2-4}. The meteorite is tentatively classified as a C2 chondrite of the Renazzo subtype, although the amount of matrix is unusually low.

Sample No.: **GRO95502; GRO95504; GRO95512**
Location: Grosvenor Mountains
Dimensions (cm): 13.0x13.5x17.0; 19.0x13.0x14.0; 11.5x7.0x8.0
Weight (g): 5362.7; 4018.3; 840.4
Meteorite Type: L3 Chondrites (estimated L3.5)







Macroscopic Description: Kathleen McBride
All three of these ordinary chondrites have a brown/black fusion crusted exterior with chondrules/clasts visible. The interiors reveal a brownish black matrix with abundant chondrules that range in size from mm to 1 cm. All three have minor metal and some rusty areas.

Thin Section (GRO95502,2; GRO95504;2; GRO95512,2) Description: Brian Mason
The sections are so similar that a single description will suffice; the meteorites are probably paired. The sections show numerous chondrules and chondrule fragments, up to 3.2 mm across, in a black matrix containing small amounts of nickel-iron and troilite The chondrules are mainly granular and porphyritic olivine and olivine-pyroxene, with a few radiating and cryptocrystalline pyroxene. Microprobe analyses show olivine and pyroxene of variable compositions: olivine, Fa_{2-24}, mean Fa_{14}; pyroxene, Fs_{1-28}. The meteorites are classified as L3 chondrites (estimated L3.5). They are very similar to GRO95505, 95544, 95545, and the possibility of pairing should be considered.

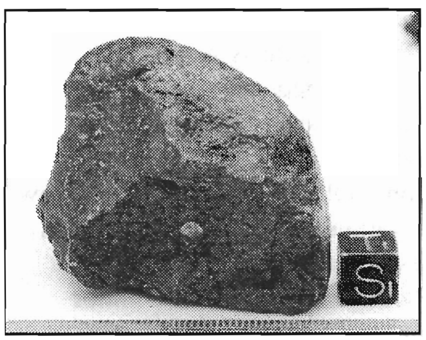
Sample No.: **GRO95546**
Location: Grosvenor Mountains
Dimensions (cm): 7.0x3.0x4.0
Weight (g): 200.54
Meteorite Type: L3 Chondrite (estimated L3.8)

Macroscopic Description: Kathleen McBride
The exterior of this ordinary chondrite has some patches of black fusion crust. Most of the fusion crust has weathered away. Iridescent oxidation halos and some evaporites are present on the exterior surface. The interior is gray with light chondrules ~ 1 mm in size. Rust is abundant especially around the edges and forms an oxidation rind. Some metal is visible.

Thin Section (,2) Description: Brian Mason

The section shows an aggregate of chondrules, chondrule fragments and silicate grains with minor amounts of nickel-iron and troilite. Minor weathering is indicated by some limonitic staining around metal grains. Microprobe analyses show olivine and pyroxene of variable compositions: olivine, Fa_{9-25}, mean Fa_{19}; pyroxene, Fs_{12-27}. The meteorite is classified as an L3 chondrite (estimated L3.8).

Sample No.:	**GRO95551**
Location:	Grosvenor Mountains
Dimensions (cm):	6.5x4.0x4.0
Weight (g):	213.389
Meteorite Type:	Chondrite (Anomalous)



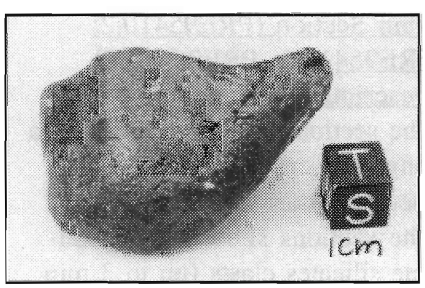
Macroscopic Description: Kathleen McBride

The exterior of this unusual meteorite has thin patches of black fusion crust. Most of the surface has a rusty brown melted appearance with exposed clasts. The clasts are large, rounded and greenish-white with coarse crystalline textures. The interior is rusty and heavily weathered. A variety of inclusions are visible, some are black, very fine-grained and angular. There are a number of rounded objects less then 2-3 mm that could be chondrules. One large clast is greenish-yellow in color, others are rusty. This metorite was very coherent and difficult to break.

Thin Section (,2,11,13,15) Description: Brian Mason

The sections show a breccia of two types of clasts, chondritic and achondritic. The chondritic clasts range up to 15+ mm, and consist of a variety of chondrules and chondrule fragments (up to 1.8 mm across) in a matrix of nickel-iron with minor troilite. Microprobe analyses of the chondrules gave the following compositions: olivine, Fa_{1-2}; pyroxene, Fs_1, with a few more iron-rich grains. The nickel-iron contains no silicon. The achondritic clasts are up to 11 mm across and consist of highly-shocked enstatite (or clinoenstatite). GRO 95551,15 contains a fine-grained carbonaceous clast, 3.6 mm across. The meteorite is anomalous, and resembles Bencubbin (Geochim. Cosmochim. Acta, v.42, p.507, 1978) and Weatherford (Geochim, Cosmochim, Acta, v.32, p.661, 1968).

Sample No.:	**GRO95633**
Location:	Grosvenor Mountains
Dimensions (cm):	4.7x2.5x3.0
Weight (g):	58.10
Meteorite Type:	Eucrite (brecciated)



Macroscopic Description: Cecilia E. Satterwhite

95% of the exterior of this achondrite is covered by shiny, black fusion crust. The fusion crust appears glassy in some areas. The interior reveals a complex breccia consisting of a wide variety of clasts in a light gray matrix. The largest clasts are fine grained dark gray melts. There is one large white (plagioclase) clast and several coarse grained yellow-green mineral clasts. Some areas are mottled with black and white patches. Some oxidation is scattered in the interior but is heavier along the edges.

Thin Section (,3) Description: Brian Mason

The section shows a microbreccia of plagioclase clasts (up to 1.8 mm) and basaltic fragments in a groundmass of comminuted plagioclase and dark brown glass. A few metal grains are present, surrounded by brown limonitic staining. Plagioclase composition is fairly uniform, An_{91-92}; pyroxene composition in a basaltic clast ranges from Wo_5Fs_{32} to Wo_2Fs_{57}. The meteorite is a brecciated eucrite.

Sample No.:	**PRE95401**
Location:	Mount Prestrud
Dimensions (cm):	5.5x4.5x3.5
Weight (g):	186.53
Meteorite Type:	L3 Chondrite (estimated L3.4)

Macroscopic Description: Kathleen McBride

The exterior of this ordinary chondrite has thin weathered brown/black fusion crust, rusty in areas with some fractures present. The interior reveals a medium gray crystalline matrix with numerous light colored chondrules and irregularly shaped inclusions. The sample is rusty in areas and metal grains are present.

Thin Section (,2) Description:
Brian Mason
The section shows numerous chondrules and chondrule fragments, up to 1.8 mm across, in a black matrix containing small amounts of nickel-iron and troilite. The chondrules are mainly granular and porphritic olivine and olivine-pyroxene, with a few radiating and cryptocrystalline pyroxene. Microprobe analyses show olivine and pyroxene of variable composition; olivine, Fa_{1-32}, mean Fa_{14}; pyroxene, Fs_{4-18}. The meteorite is classified as an L3 chondrite (estimated L3.4).

Sample No.:	**PRE95404**
Location:	Mount Prestrud
Dimensions (cm):	5.0x2.0x2.0
Weight (g):	39.523
Meteorite Type:	CV3 Chondrite

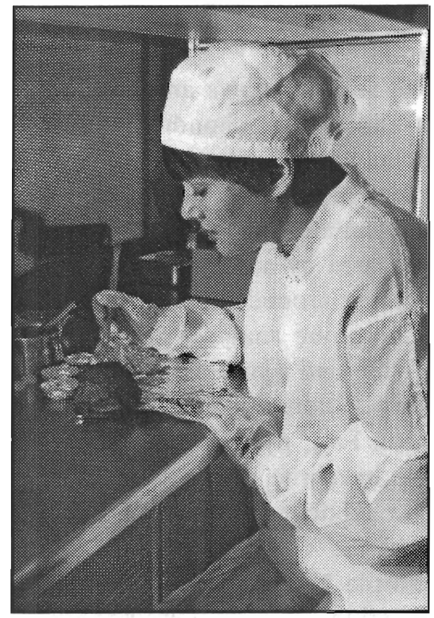
Macroscopic Description:
Kathleen McBride
Fifty percent of the exterior of this carbonaceous chondrite has dull brown/black fusion crust. It has a rough texture and polygonal fractures. The interior reveals a gray crystalline matrix with metal grains present. Light colored chondrules, mm sized, are visible in the interior.

Thin Section (,2) Description:
Brian Mason
The sections shows numerous chondrules (up to 1.2mm across), chondrule fragments, irregular aggregates, and silicate grains in a black matrix which contains a moderate amount of nickel-iron and sulfide. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{1-41}; pyroxene, Fs_{7-21}. The matrix consists largely of olivine, with composition around Fa_{30}. The meteorite is tentatively classified as a C3 chondrite of the Vigarano subtype, but it lacks the marked olivine composition peak at Fa_{0-1} commonly present in C3 chondrites.

Sample No.:	**PRE95410; PRE95411; PRE95412**
Location:	Mount Prestrud
Dimensions (cm):	4.0x3.0x2.5; 4x2.5x2; 2.5x2.5x2
Weight (g):	41.65; 43.69; 14.63
Meteorite Type:	R Chon. (Carlisle Lakes)

Macroscopic Description:
Kathleen McBride
The surface of all three of these meteorites have black fusion crust with polygonal fractures. The surfaces are pitted and vesicular. The interior is medium gray with small light clasts and chondrules visible.

Thin Section (PRE95410,2; PRE95411,2; PRE95412,2) Description: Brian Mason
The sections are so similar that a single description suffices; the meteorites are certainly paired. The sections show polycrystalline silicates clasts (up to 3 mm across), chondrules (up to 1.2 mm across) and mineral grains



Kathleen McBride examining a meteorite on flow bench.

in a finely granular gray matrix. Nickel-iron and sulfide are present in accessory amounts. The meteorite is essentially unweathered. Microprobe analyses show olivine and pyroxene of variable composition. Olivine compositions show a prominent peak at Fa_{39}, with a few more magnesian grains., Pyroxene is present in minor amounts, both hypersthene (Wo_4Fs_{29}) and diopside ($Wo_{45}Fs_{15}$). The meteorite is an R chondrite, very similar to PCA91002 (*Meteoritics*, **29**, p.255, 1994).

Table 4: Natural Thermoluminescence (NTL) Data for Antarctic Meteorites

Paul Benoit and Derek Sears
Cosmochemistry Group
Dept. Chemistry and Biochemistry
University of Arkansas
Fayetteville, AR 72701 USA

The measurement and data reduction methods were described by Hasan et al. (1987, Proc. 17th LPSC E703-E709); 1989, LPSC XX, 383-384). For meteorites whose TL lies between 5 and 100 krad the natural TL is related primarily to terrestrial history. Samples with NTL <5 krad have TL below that which can reasonably be ascribe to long terrestrial ages. Such meteorites have had their TL lowered by heating within the last million years or so by close solar passage, shock heating, or atmospheric entry, exacerbated, in the case of certain mildly metamorphosed chondrites by anomalous fading. We suggest meteorites with NTL >100 krad are candidates for unusual orbital/thermal histories (Benoit and Sears, 1993, EPSL 120, 463-471).

Samples	Class	NTL [krad at 250 deg. C]
GRO95566	C2	0
WSG95300	H3.3	6. +- 3
GRA95208	H3.7	33.9 +- 0.2
GRA95201	H5	153 +- 4
GRA95202	H5	34.8 +- 0.1
GRA95204	H5	20.4 +- 0.1
GRA95207	H5	17.1 +- 0.1
GRA95210	H5	0.16 +- 0.03
GRA95212	H5	50.0 +- 0.1
GRO95506	H5	17.9 +- 0.3
GRO95520	H5	109.7 +- 0.4
PRE95400	H5	103 +- 3

Samples	Class	NTL [krad at 250 deg. C]
GRA95211	H6	20.2 +- 0.1
GRO95516	H6	88.2 +- 0.1
GRO95532	H6	65.7 +- 0.1
GRO95505	L3.4	5 +- 4
GRA95203	L5	46.8 +- 0.1
GRA95206	L6	40.0 +- 0.1
GRO95510	L6	65.5 +- 0.1
GRO95513	L6	7.9 +- 0.1
GRO95526	L6	31.8 +- 0.2
GRO95528	L6	7.3 +- 0.1
GRO95531	L6	0.80 +- 0.1

The quoted uncertainties are the standard deviations shown by replicate measurements on a single aliquot.

COMMENTS: The following comments are based on natural TL data, TL sensitivity, the shape of the induced TL glow curve, classifications, and JSC and Arkansas group sample descriptions.

GRO95513 and GRO95528 have low induced TL sensitivities relative to Dhajala, and are probably highly shocked.

GRA95208 is confirmed as a type 3.7 (AMN 20:1).

GRO95505 and WSG95300, classified as type 3.6 and type 3.4 respectively (AMN 20:1), are type 3.4 and 3.3.

1. Pairings suggested by TL data:
   H5: GRA95204 and GRA95207.
   L6: GRO95513 and GRO95528.

Sample Request Guidelines

All sample requests should be made in writing to:

Secretary, MWG
SN2/Office of the Curator
NASA Johnson Space Center
Houston, TX 77058 USA

Requests that are received by the MWG Secretary before Aug. 22, 1997, will be reviewed at the MWG meeting on Sept. 5-6, 1997, to be held in Washington, DC. Requests that are received after the Aug. 22 deadline may possibly be delayed for review until the MWG meets again in the Spring of 1998. **PLEASE SUBMIT YOUR REQUESTS ON TIME.** Questions pertaining to sample requests can be directed in writing to the above address or can be directed to the curator by phone, FAX, or e-mail.

Requests for samples are welcomed from research scientists of all countries, regardless of their current state of funding for meteorite studies. Graduate student requests should be initialed or countersigned by a supervising scientist to confirm access to facilities for analysis. All sample requests will be reviewed in a timely manner. Those requests that do not meet the JSC Curatorial Guidelines will be reviewed by the Meteorite Working Group (MWG), a peer-review committee which meets twice a year to guide the collection, curation, allocation, and distribution of the U.S. collection of Antarctic meteorites. Issuance of samples does not imply a commitment by any agency to fund the proposed research. Requests for financial support must be submitted separately to the appropriate funding agencies. As a matter of policy, U.S. Antarctic meteorites are the property of the National Science Foundation and all allocations are subject to recall.

Each request should accurately refer to meteorite samples by their respective identification numbers. Specific requirements for sample types within individual specimens, or special handling or shipping procedures should be explained in each request. Each request should include a brief justification, which should contain: 1) what scientific problem will be addressed; 2) what analytical approach will be used; 3) what sample masses are required; 4) evidence that the proposed analyses can be performed by the requester or collaborators; and 5) why Antarctic meteorites are best suitable for the investigation. For new or innovative investigations, proposers are encouraged to supply additional detailed information in order to assist the MWG. Requests for thin sections which will be used in destructive procedures such as ion probing, etching, or even repolishing, must be stated explicitly. Consortium requests must be initialed or countersigned by a member of each group in the consortium. All necessary information, in most cases, should be condensable into a one-or two-page letter.

Samples can be requested from any meteorite that has been made available through announcement in any issue of the *Antarctic Meteorite Newsletter* (beginning with 1 (1) in June, 1978). Many of the meteorites have also been described in five *Smithsonian Contr. Earth Sci.:* Nos. 23, 24, 26, 28, and 30. A table containing all classifications as of December 1993 is published in *Meteoritics* 29, p. 100-142 and updated as of April 1996 in *Meteoritics and Planetary Science* 31, p. A161-A174.

Antarctic Meteorite Laboratory Contact Numbers

Marilyn Lindstrom
Curator
Mail code SN2
NASA Johnson Space Center
Houston, Texas 77058

(281) 483-5135

mlindstr@ems.jsc.nasa.gov

Cecilia Satterwhite
Lab Manager
Mail code SN2
NASA Johnson Space Center
Houston, Texas 77058

(281) 483-6776

csatterw@ems.jsc.nasa.gov

Judy Allton
MWG Secretary
Mail code SN2
NASA Johnson Space Center
Houston, Texas 77058

(281) 483-5766

jallton@ems.jsc.nasa.gov

FAX: (281) 483-5347

Meteorites On-Line

Several meteorite web site are available to provide information on meteorites from Antarctica and elsewhere in the world. Some specialize in information on martian meteorites and on possible life on Mars. Here is a general listing of ones we have found. We have not included sites focused on selling meteorites even though some of them have general information. Please contribute information on other sites so we can update the list.

JSC Curator, Antarctic meteorites	http://www-curator.jsc.nasa.gov/curator/antmet/antmet.htm
JSC Curator, martian meteorites	http://www-curator.jsc.nasa.gov/curator/antmet/marsmets/contents.htm
JSC Curator, Mars meteorite PIP	http://sn-charon.jsc.nasa.gov
Antarctic collection, martian meteorites	http://www.cwru.edu/CWRU/Dept/Artsci/geol/ANSMET/ANSMET.html
LPI martian meteorites	http://cass.jsc.nasa.gov/pub/lpi/meteorites/mars_meteorites.html
NIPR Antarctic meteorites	http://www.nipr.ac.jp/
BMNH general meteorites	http://www.nhm.ac.uk/mineral/project4/index.html
UHI planetary science discoveries	http://www.soest.hawaii.edu/PSRdiscoveries
Meteoritical Society	http://www.uark.edu/studorg/metsoc
Meteorite! Magazine	http://www.meteor.co.nz
Geochemical Society	http://www.ciw.edu/geochemical_society/BROCH.html

The curatorial databases may be accessed as follows:

Via INTERNET	1) Type **TELNET 139.169.126.35** or **TELNET CURATE.JSC.NASA.GOV**. 2) Type **PMPUBLIC** at the USERNAME: prompt.
Via WWW	1) Using a Web browser, such as Mosaic, open URL **http://www-sn.jsc.nasa.gov/curator/curator.htm**. 2) Activate the ***Curatorial Databases*** link.
Via modem	The modem may be between 1200 and 19200 baud; no parity; 8 data bits; and 1 stop bit. If you are calling long distance, the area code is 713. 1) Dial 483-2500 for 1200-9600 bps, V.32bis/V.42bis, or 483-9498 for 1200-19200 bps, V.32bis/V.42bis. 2) Once the connection is made, press <CR>. Type **INS** in response to the Enter Number: prompt. 3) Press <CR> twice quickly until the XYPLEX#> prompt displays. 4) Type **C CURATE.JSC.NASA.GOV** at the XYPLEX#> prompt. 5) Type **PMPUBLIC** at the USERNAME: prompt.

For problems or additional information, you may contact: Claire Dardano, Lockheed Martin Engineering & Sciences Company, (281) 483-5329, cdardano@ems.jsc.nasa.gov.