Antarctic Meteorite Newsletter

Volume 22, Number 1 February 1999

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

Inside this Issue

Program News

New Meteorites

Marilyn Lindstrom

This newsletter contains classifications of 143 new meteorites from the 1997 ANSMET collection. Descriptions are given for 6 meteorites; 2 eucrites, and 4 ordinary chondrites. We don't expect much excitement from the rest of the 1997 collection. JSC has examined another 100 meteorites to send to the Smithsonian for classification and they appear to be more of the same LL5 shower. However, past experience tells us that there will be some treasures hidden in the remaining samples. Hope rings eternal, but we can't wait to see the 1998 collection described below.

1998-99 ANSMET Field Season

Ralph Harvey

The target for the 1998-99 ANSMET field season was Graves Nunatak, near the head of the Scott glacier. Field team members consisted of Ralph Harvey, John Schutt, Diane DiMassa, Nancy Chabot, Paul Benoit, Barry Lopez, and Scott Sandford. The field season was short but sweet. Bad weather and airplane availability delayed the teams' put-in flight by two weeks; and continued bad weather limited the amount of searching that could be done during the remainder. Overall, about 10 days of searching and traversing was all that could be completed, resulting in the recovery of 192 specimens and the exploration of a couple of new icefields in the region. However, the new collection has a lot of potential; observations by the field party suggest that at least 10% of the finds are achondrites (or something equally intriguing). Here's hoping that we'll get some better weather when we return to the Graves region in the future.

Smithsonian Hires Collections Manager

Tim McCoy

The Div. of Meteorites at the Smithsonian has finally hired a permanent collections manager, Linda Welzenbach. She has an M.S. in Geology from Bowling Green State University where she studied carbonate deposition in sedimentary environments. For the past 6 years, she has worked at the National Museum of Natural History, where she assisted in all aspects of the preparation of the Gem and Minerals Galleries of the new Geology, Gems and Mineral Hall. Among her best assets, she

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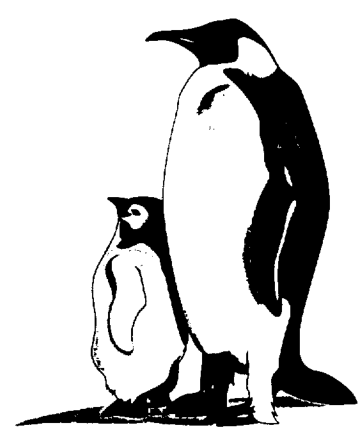

Sample Request Deadline March 5, 1999

MWG Meets March 19-20, 1999

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brings a strong background in collections management to the Div. of Meteorites. Linda will be responsible for much of the day-to-day operation of the meteorite collection and many of you will probably be corresponding with her in the years to come.

JSC Astromaterials Musical Chairs

Several changes in JSC Astromaterials staff have taken place in the last few months. Of most immediate importance to newsletter readers, MWG Secretary Don Morrison retired from NASA on February 3 and vacated that post and management of the thin section laboratory. We thank Don for stepping into both jobs and helping to keep the minutes, requests, and samples going. Gary Lofgren will manage the thin section lab, at least until a replacement can be found. Faith Vilas has agreed to take over as MWG Secretary starting with the March meeting, so be easy on her as we work out individual responsibilities. Please submit all meteorite requests to the curator and contact either the curator or lab manager for request status.

In response to its strategic position as NASA's Center of Excellence in Astromaterials, JSC hired geoscientist Carl Agee as the Chief Scientist for Astromaterials. He reports directly to Center Director George Abbey with an overview of curation and research efforts. Carl is leading JSC efforts in planning for Mars sample return and is setting up his lab to continue research in experimental petrology. He was also recently named Acting Astromaterials Curator.

Since Jim Gooding's departure in 1997, Doug Blanchard had been serving as Acting Astromaterials Curator in addition to his job as Division Chief. Recently he decided to use his considerable experience in planetary science, exploration, and outreach in a new way. Doug has moved to a new job as Deputy Director of Public Affairs at JSC where one of his responsibilities is strategic planning. Now we have a second friend in high places. Gordon McKay is serving as Acting Division Chief while we pursue searches for scientists from outside NASA to fill additional roles in Astromaterials curation and division management.

Mission News

The Mars Exploration and Discovery programs have kept Astromaterials and NASA's exploration of the solar system in the news recently. Mars Global Surveyor (launched in 1996) is in mapping orbit and commencing full operation. In December and January the Mars 98 orbiter and lander were launched for encounters with the red planet this summer and fall. The lander will give us the first close up of near-polar regions. Missions are planned to continue every 26 months culminating in launches of sample return missions in 2003 and 2005 for return in 2008. Planning for quarantine and curation of Mars samples is complex and the subject of numerous workshops and advisory committee meetings.

Discovery missions to map and sample bodies in the solar system continue to progress. Lunar Prospector, after demonstrating the existence of ice at both poles, has gone into its extended mission phase. The NEAR mission to orbit and map asteroid Eros, missed orbital insertion in December, but corrected the problem in January and is going back for a second try a year late. The STARDUST mission to return samples of comet Wild 2 and interstellar dust was launched this month for return in 2006. The Genesis mission which will sample and return solar wind particles, will launch in 2001 and return in 2004. The CONTOUR mission will study tour three comets and study their nuclei. JSC has a major role in Astromaterials curation for all Discovery sample return missions and is building a class 10 clean room and designing new systems for these operations. Web sites are listed on the last page of the newsletter.

Special Invitation

On April 30 and May 1, 1999, the University of Pittsburgh will be hosting a symposium in celebration of the retirement of William A. Cassidy.

The title of the symposium will be "The Impact of Antarctic Meteorites on Planetary Science." An exciting program of invited talks and festivities has been planned. The Antarctic Meteorite community at large are all cordially invited to attend. Further information is available at http://viking.eps.pitt.edu/public/cassidy.html.

Anyone wishing to contribute small presentations, slides, or other tributes to Bill at the symposium banquet should contact Ralph Harvey at rph@po.cwru.edu.

New Meteorites

From 1997 Collection

Pages 4-9 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 21(2), August 1998. 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
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 Alexandra Range
RKP — Reckling Peak
STE — Stewart Hills
TIL — Thiel Mountains
TYR — Taylor Glacier
WIS — Wisconsin Range
WSG — Mt. Wisting

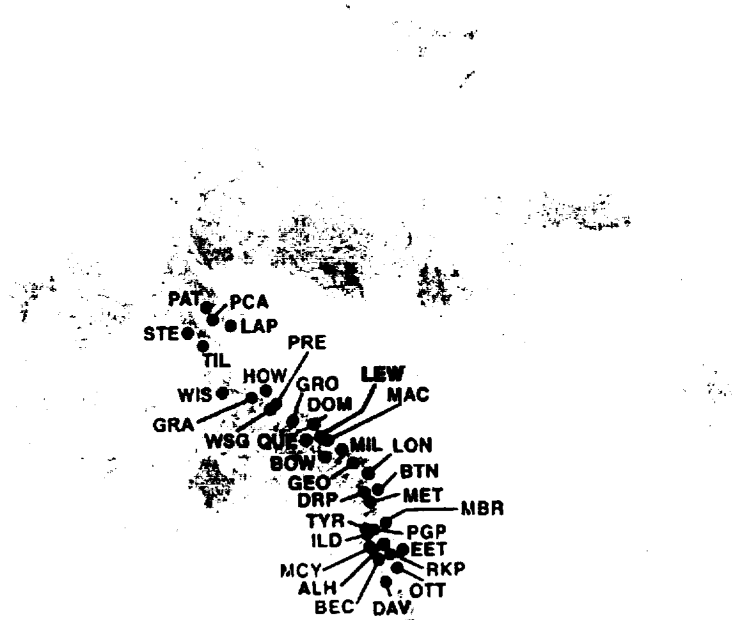


Table 1: List of Newly Classified Antarctic Meteorites**

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 97 007	508.0	L5 CHONDRITE	B	B/C	23	20
QUE 97 008	452.6	L3.4 CHONDRITE	A	A	3-33	3-21
QUE 97 009	377.3	L6 CHONDRITE	C	C	23	21
QUE 97 010	430.9	LL6 CHONDRITE	B	A	29	25
QUE 97 011	402.7	LL6 CHONDRITE	B	A	29	25
QUE 97 012	1272.5	LL6 CHONDRITE	B	A	30	25
QUE 97 013	706.0	LL5 CHONDRITE	C	A/B	30	25
QUE 97 014	142.3	EUCRITE (UNBRECCIATED)	A	A/B		65
QUE 97 015	101.4	LL5 CHONDRITE	B	B	30	25
QUE 97 016	488.9	LL5 CHONDRITE	A	A	30	25
QUE 97 017	305.9	LL5 CHONDRITE	A/E	A	32	27
QUE 97 018 ~	2883.9	L6 CHONDRITE	B	B		
QUE 97 019 ~	236.6	LL5 CHONDRITE	A/E	A		
QUE 97 020 ~	163.2	LL5 CHONDRITE	A/E	A		
QUE 97 021 ~	205.7	LL5 CHONDRITE	A	A		
QUE 97 022	206.4	L5 CHONDRITE	B/C	A/B	22	19
QUE 97 023	394.7	LL6 CHONDRITE	A/B	A	28	23
QUE 97 024 ~	348.9	LL5 CHONDRITE	A/B	A/B		
QUE 97 025 ~	143.7	LL5 CHONDRITE	A/E	A		
QUE 97 026	340.3	LL5 CHONDRITE	B/C	A/B	28	24
QUE 97 027	375.5	L4 CHONDRITE	C	C	23	21
QUE 97 028	910.9	LL5 CHONDRITE	A	A	31	26
QUE 97 029 ~	824.7	L6 CHONDRITE	B	A		
QUE 97 030	413.8	H3.4 CHONDRITE	C	C	4-31	27
QUE 97 031	349.5	L5 CHONDRITE	C	A	23	20
QUE 97 032 ~	434.8	L6 CHONDRITE	A	A		
QUE 97 033 ~	367.2	L6 CHONDRITE	A/B	A		
QUE 97 034	677.2	L4 CHONDRITE	A/B	A/B	23	20
QUE 97 035 ~	244.9	L6 CHONDRITE	A/B	A		
QUE 97 036 ~	182.2	L6 CHONDRITE	C	C		
QUE 97 037 ~	213.8	L6 CHONDRITE	B/C	A/B		
QUE 97 038 ~	266.7	L6 CHONDRITE	B/C	A		
QUE 97 039	322.4	L5 CHONDRITE	B	A/B	23	20
QUE 97 040	314.1	LL5 CHONDRITE	A	A	30	25
QUE 97 041 ~	272.1	LL5 CHONDRITE	A/E	A		
QUE 97 042 ~	214.8	LL5 CHONDRITE	B	A/B		
QUE 97 043 ~	153.5	LL5 CHONDRITE	A/E	A		
QUE 97 044	122.1	LL6 CHONDRITE	A	A	28	24
QUE 97 045	122.5	LL5 CHONDRITE	A	A	30	25
QUE 97 046	130.8	L6 CHONDRITE	C	B	24	21
QUE 97 047	183.7	L5 CHONDRITE	C	B	22	20
QUE 97 048 ~	128.9	L5 CHONDRITE	A/B	A/B		
QUE 97 049 ~	143.1	L6 CHONDRITE	C	A/B		
QUE 97 050 ~	191.7	L6 CHONDRITE	B/C	B		
QUE 97 051 ~	141.3	LL5 CHONDRITE	A/B	A		
QUE 97 052 ~	139.5	LL5 CHONDRITE	A/B	A		
QUE 97 053	75.1	EUCRITE (UNBRECCIATED)	A	A		41-49
QUE 97 054 ~	179.1	L6 CHONDRITE	B	B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 97 055 ~	32.7	LL5 CHONDRITE	B	B		
QUE 97 056 ~	36.7	LL5 CHONDRITE	A/B	A		
QUE 97 057 ~	191.8	L6 CHONDRITE	A	A/B		
QUE 97 058 ~	143.0	LL5 CHONDRITE	A/B	A/B		
QUE 97 059 ~	99.4	LL5 CHONDRITE	A/B	B		
QUE 97 060	60.8	LL5 CHONDRITE	A/B	B	32	27
QUE 97 061 ~	27.6	LL5 CHONDRITE	A/B	B		
QUE 97 062 ~	93.5	LL5 CHONDRITE	A/B	B		
QUE 97 063 ~	32.0	LL5 CHONDRITE	A/B	B		
QUE 97 064 ~	19.8	LL5 CHONDRITE	A/B	B		
QUE 97 065 ~	57.9	LL5 CHONDRITE	A/B	C		
QUE 97 066 ~	34.7	LL5 CHONDRITE	A/B	B		
QUE 97 067 ~	17.4	LL5 CHONDRITE	B/C	A		
QUE 97 068 ~	66.5	LL5 CHONDRITE	A	A		
QUE 97 069 ~	94.2	LL5 CHONDRITE	A/B	C		
QUE 97 070	123.7	LL5 CHONDRITE	A/B	A	30	25
QUE 97 071	25.0	LL5 CHONDRITE	A/B	A	32	27
QUE 97 072 ~	37.9	LL5 CHONDRITE	A/B	A		
QUE 97 073	14.4	L5 CHONDRITE	B/C	A/B	23	21
QUE 97 074 ~	33.5	LL5 CHONDRITE	A/B	A		
QUE 97 075	91.2	LL5 CHONDRITE	B	A	31	26
QUE 97 076 ~	5.0	LL5 CHONDRITE	B/E	A/B		
QUE 97 078 ~	82.4	L6 CHONDRITE	A/B	A		
QUE 97 079	59.9	LL5 CHONDRITE	B/E	A/B	32	27
QUE 97 080	73.4	LL6 CHONDRITE	C	A/B	30	26
QUE 97 081 ~	39.0	LL5 CHONDRITE	B	A/B		
QUE 97 082 ~	14.9	LL5 CHONDRITE	B	A/B		
QUE 97 083 ~	37.6	LL5 CHONDRITE	B	A/B		
QUE 97 084 ~	62.5	LL5 CHONDRITE	B	A/B		
QUE 97 085 ~	83.9	LL5 CHONDRITE	B	A/B		
QUE 97 086	108.5	LL5 CHONDRITE	B	A/B	33	27
QUE 97 087 ~	37.2	LL5 CHONDRITE	B	A/B		
QUE 97 088	63.3	LL4 CHONDRITE	A/B	A	32	13-27
QUE 97 089 ~	29.2	LL5 CHONDRITE	B	A/B		
QUE 97 090	86.3	LL5 CHONDRITE	B	B	27	22
QUE 97 091 ~	22.6	LL5 CHONDRITE	A	A/B		
QUE 97 092 ~	20.8	LL5 CHONDRITE	B	B/C		
QUE 97 093 ~	8.6	LL5 CHONDRITE	B	B		
QUE 97 094 ~	7.3	LL5 CHONDRITE	B	B		
QUE 97 095	19.8	LL5 CHONDRITE	B	B	27	23
QUE 97 096 ~	11.0	LL5 CHONDRITE	B	B		
QUE 97 097 ~	30.8	LL5 CHONDRITE	B	B		
QUE 97 098 ~	3.9	LL5 CHONDRITE	B	B		
QUE 97 099 ~	25.5	LL5 CHONDRITE	B	B		
QUE 97 100 ~	16.3	LL5 CHONDRITE	B	B		
QUE 97 101	70.9	H6 CHONDRITE	C	A/B	19	17
QUE 97 102 ~	20.5	LL5 CHONDRITE	B	B		
QUE 97 103	19.0	LL5 CHONDRITE	B	B	27	23
QUE 97 104 ~	17.8	LL5 CHONDRITE	A/B	A		
QUE 97 105 ~	8.1	LL5 CHONDRITE	B	B		
QUE 97 106 ~	18.0	LL5 CHONDRITE	B	B		
QUE 97 107	15.5	LL5 CHONDRITE	B	B	28	23

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 97 108 ~	5.7	LL5 CHONDRITE	B	B		
QUE 97 109 ~	2.7	LL5 CHONDRITE	B	B		
QUE 97 110	55.2	H5 CHONDRITE	A/B	B	19	17
QUE 97 111 ~	12.4	LL5 CHONDRITE	B	B		
QUE 97 112	8.2	H5 CHONDRITE	B/C	B	19	17
QUE 97 113	28.1	L4 CHONDRITE	B/C	B/C	24	20
QUE 97 114 ~	3.5	LL5 CHONDRITE	B	B		
QUE 97 115	18.2	L6 CHONDRITE	C	A/B	24	21
QUE 97 116 ~	20.4	LL5 CHONDRITE	B	B		
QUE 97 117 ~	12.0	LL5 CHONDRITE	B	B		
QUE 97 118	13.7	LL5 CHONDRITE	B	A/B	27	23
QUE 97 119 ~	8.7	LL5 CHONDRITE	B	B		
QUE 97 120	25.1	LL5 CHONDRITE	A/B	A/B	27	22
QUE 97 121 ~	24.5	LL5 CHONDRITE	A/B	A/B		
QUE 97 122 ~	3.7	LL5 CHONDRITE	A/B	A/B		
QUE 97 123	22.9	LL5 CHONDRITE	A/B	A/B	27	22
QUE 97 124 ~	14.3	LL5 CHONDRITE	A/B	B		
QUE 97 125 ~	3.2	LL5 CHONDRITE	A/B	A/B		
QUE 97 126	51.0	LL5 CHONDRITE	A/B	A/B	27	22
QUE 97 127 ~	27.2	LL5 CHONDRITE	A/B	B		
QUE 97 128	34.5	LL5 CHONDRITE	A/B	B	27	22
QUE 97 129 ~	27.6	LL5 CHONDRITE	A/B	B		
QUE 97 130	12.6	LL5 CHONDRITE	B	B	27	22
QUE 97 131 ~	2.2	LL5 CHONDRITE	B	B		
QUE 97 132 ~	1.5	LL5 CHONDRITE	B	B		
QUE 97 133	18.2	LL6 CHONDRITE	B	B	27	23
QUE 97 134 ~	4.6	LL5 CHONDRITE	B	B		
QUE 97 135 ~	10.0	LL5 CHONDRITE	B	B		
QUE 97 136 ~	7.6	LL5 CHONDRITE	B	B		
QUE 97 137 ~	16.5	LL5 CHONDRITE	B	B		
QUE 97 138 ~	13.6	LL5 CHONDRITE	B	B		
QUE 97 139 ~	20.8	LL5 CHONDRITE	B	B		
QUE 97 140	24.3	LL5 CHONDRITE	B	B	27	23
QUE 97 141 ~	20.9	LL5 CHONDRITE	B	B		
QUE 97 142 ~	14.1	LL5 CHONDRITE	B	B		
QUE 97 143 ~	32.9	LL5 CHONDRITE	B	B		
QUE 97 144	31.5	LL5 CHONDRITE	B	C	27	22
QUE 97 145 ~	5.9	LL5 CHONDRITE	B	A		
QUE 97 146 ~	5.2	LL5 CHONDRITE	A/B	A		
QUE 97 147	18.5	LL5 CHONDRITE	A/B	A	27	22
QUE 97 148 ~	29.1	LL5 CHONDRITE	A/B	B		
QUE 97 149 ~	0.8	LL5 CHONDRITE	B	B		

~Classified by using refractive indices.

Table 2: Newly Classified Specimens Listed By Type **

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
		Achondrites				
QUE 97 014	142.3	EUCRITE (UNBRECCIATED)	A	A/B		65
QUE 97 053	75.1	EUCRITE (UNBRECCIATED)	A	A		41-49
		Chondrites - Type 3				
QUE 97 008	452.6	L3.4 CHONDRITE	A	A	3-33	3-21
QUE 97 030	413.8	H3.4 CHONDRITE	C	C	4-31	27

~Classified by using refractive indices.

**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:

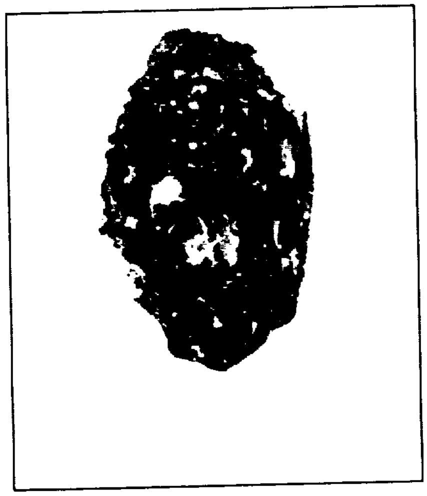
A: Minor cracks; few or no cracks are conspicuous to the naked eye and no cracks penetrate the entire specimen.
B: Moderate cracks; several cracks extend across exterior surfaces and the specimen can be readily broken along the cracks.
C: Severe cracks; specimen readily crumbles along cracks that are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

Petrographic Descriptions

Sample No.: **QUE 97 008**
Location: Queen Alexandra Range
Dimensions (cm): 9.0x5.0x5.5
Weight (g): 451.6
Meteorite Type: L3 Chondrite (estimated 3.4)

Macroscopic Description: Kathleen McBride
This ordinary chondrite's exterior is covered by brown/black fusion crust. It has a rough and vesicular surface with polygonal fractures. It alternates between shiny and dull areas. The interior is a dark gray matrix with numerous chondrules and inclusions of various colors (white, gray, cream, rust and black) that range in size from sub mm to ~8mm. Olivine and pyroxene clasts are visible. A very minor amount of rust is present.

Thin Section (,2) Description: Tim McCoy
The section exhibits numerous large, well-defined chondrules (up to 2mm) in a black matrix of fine-grained silicates, metal and troilite. Weak shock effects are present. Polysynthetically twinned pyroxene is extremely abundant. Silicates unequilibrated; olivines range from Fa_{3-33} and pyroxenes from FS_{3-21}. The meteorite is an L3 Chondrite (estimated subtype 3.4).



Sample No.: **QUE 97 014**
Location: Queen Alexandra Range
Dimensions (cm): 6.5x3.5x3.0
Weight (g): 142.3
Meteorite Type: Eucrite (Unbrecciated)

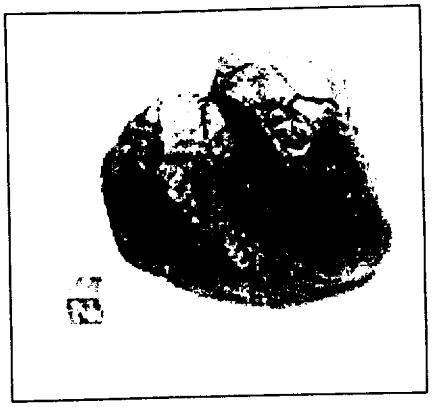
Macroscopic Description: Kathleen McBride
60% of this eucrite's exterior is covered with shiny vesicular black fusion crust. Some areas are pitted, showing evidence of plucking of clast material. The interior is very soft and friable. It is light gray in color with very minor amount of metal and rust. It has a sugary texture with numerous black glass veins and mafic minerals. White inclusions and transparent-colorless to yellow-orange crystalline minerals are visible.

Thin Section (,2) Description: Tim McCoy:
The section consists of fine-grained (100-200 um) pyroxene and plagioclase with minor SiO_2. The pyroxene is twinned with compositions of $FS_{65}Wo_2$ and $Fs_{30}Wo_{41}$. Both Fe, Ti-oxide and iron metal occur in the unusually high level of a few volume percent combined. The meteorite is an unbrecciated eucrite.

Sample No.: **QUE 97 026**
Location: Queen Alexandra Range
Dimensions (cm): 8.5x5.0x4.0
Weight (g): 340.3
Meteorite Type: LL5 Chondrite

Macroscopic Description: Kathleen McBride
This ordinary chondrite has a shiny greenish gray exterior with some rust and thin shallow fractures. Oxidation halos are present. The interior is dense, and smells like sulfur. It is rusty and dark gray in color and was difficult to break.

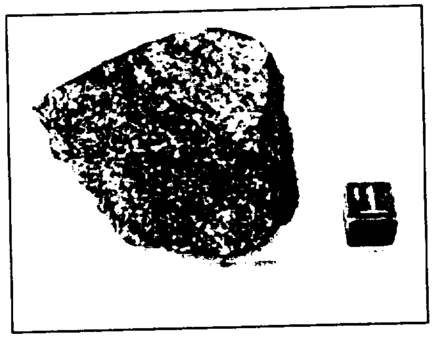
Thin Section (,2) Description: Tim McCoy:
This meteorite is a shock-blackened LL5 with local melting and redistribution of metal and troilite in veins.



Sample No.: **QUE 97 030**
Location: Queen Alexandra Range
Dimensions (cm): 7.0x7.0x6.0
Weight (g): 413.8
Meteorite Type: H3 Chondrite (subtype ~3.4)

Macroscopic Description: Kathleen McBride
The smooth, shiny brown-black exterior of this very fractured meteorite has oxidation haloes and a melted appearance. The interior is fine grained and rusty with no distinguishing characteristics.

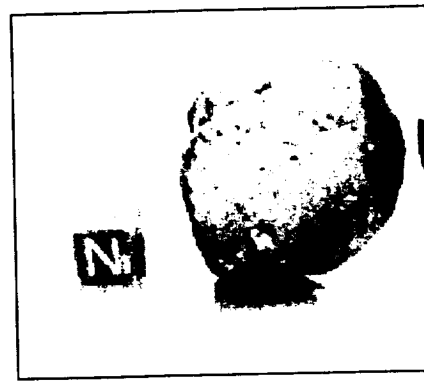
Thin Section (, 2) Description: Tim McCoy:
The section exhibits numerous small (up to 1.2 mm), well-defined chondrules in a black matrix of fine-grained silicates, metal and troilite. Weak shock effects are present. Polysynthetically twinned pyroxene is extremely abundant. Weathering is pervasive. Silicates are quite unequilibrated; olivines range from Fa_{4-31}. A single pyroxene measured Fs_{27}. The meteorite is probably an H3 chondrite and may be of relatively low subtype (~3.4).



Sample No.: **QUE 97053**
Location: Queen Alexandra Range
Dimensions (cm): 4.5x3.5x3.5
Weight (g): 75.14
Meteorite Type: Eucrite (Unbrecciated)

Macroscopic Description: Kathleen McBride
The exterior of this broken piece has fusion crust on approximately 50% of its surface. The fusion crust is very black and shiny with striations. The exposed interior is fine-grained with black and white matrix and with medium brown inclusions. The interior has black and white granular crystals and dark grains of pyroxenes. Transparent to translucent plagioclase grains are visible. There is very minor rust or root beer colored grains near the exterior.

Thin Section (, 2) Description: Tim McCoy
The section consists of mm-sized grains of pyroxene and plagioclase. Pyroxene is pigeonite to subcalcic augite in composition ($Fs_{41.2-49}$ $Wo_{6.5-24.5}$) with an Fe/Mn ratio of about 30. Many grains are twinned on a very fine scale with augite lamellae of $\leq 2\ \mu m$ in width. Plagioclase has a composition of An_{79-89}. Shock effects are pervasive, including mosaicism in pyroxene and undulatory extinction in plagioclase. The meteorite is an unbrecciated eucrite.



Sample No.: **QUE 97 080**
Location: Queen Alexandra Range
Dimensions (cm): 5.5x2.5x2.0
Weight (g): 73.396
Meteorite Type: LL6 Chondrite

Macroscopic Description: Kathleen McBride
90% of this meteorite's exterior is covered with rough, pitted, brown/black fusion crust. The interior is fine grained with a sugary texture. Some mm sized inclusions, metal grains and rust are present. The meteorite is very hard.

Thin Section (, 2) Description: Tim McCoy:
This otherwise unexceptional LL6 chondrite contains spherical "vugs" up to 1 mm in diameter which were observed in hand sample and do not appear to result from cutting. Their origin is unclear.

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

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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 levels below that which can reasonably be ascribed 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 achondrites, 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).

Sample	Class	Natural TL [krad at 250ºC]
EET96135	EH4-5	5 ± 2
EET96058	H5	2.1 ± 0.1
EET96134	H5	1.6 ± 0.2
EET96139	H6	74.8 ± 0.3
EET96186	H6	96.4 ± 0.2
MET96503	L3.6	11.0 ± 6.0
MET96504	L5	60.4 ± 0.2
EET96130	L6	16.5 ± 0.1
EET96132	L6	61.8 ± 0.6
EET96136	L6	104.0 ± 0.1
EET96140	L6	1.2 ± 0.2
EET96270	L6	7.7 ± 0.1
EET96271	L6	30.4 ± 0.1
EET96273	L6	10.6 ± 0.1
EET96274	L6	191 ± 2
EET96313	L6	26.2 ± 0.6
EET96316	L6	78 ± 2
EET96330	L6	61.6 ± 0.3
EET96332	L6	54.4 ± 0.1
EET96333	L6	4 ± 4
EET96340	L6	29.6 ± 0.1
EET96351	L6	0.8 ± 0.5
MET96501	L6	35.6 ± 0.1
MET96502	L6	0.3 ± 0.1
EET96137	LL6	10.4 ± 0.1
EET96293	URE	2 ± 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 sample descriptions.

EET96333 has very low TL sensitivity relative to Dhajala, and is probably highly shocked.

TL sensitivity for MET96503 is similar to a type 3.1. It is possible this meteorite is highly shocked.

1. Pairings suggested by TL data:
   L6: EET96270 and EET96273 with EET90157 group (AMN 16:1)
   L6: EET96340 with EET96271
   L6: EET96330 with EET96132

Sample Request Guidelines

All sample requests should be made in writing to:

Meteorite Curator/SN2
NASA Johnson Space Center
Houston, TX 77058 USA

Requests that are received by the Curator before March 5, 1999, will be reviewed at the MWG meeting on March 19-20, 1999, to be held in Houston, Texas. Requests that are received after the March 5 deadline may possibly be delayed for review until the MWG meets again in the Fall of 1999. **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.

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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 Compendium	http://www-curator.jsc.nasa.gov/curator/antmet/mmc/mmc.htm
Antarctic collection	http://www.cwru.edu/affil/ansmet
LPI martian meteorites	http://cass.jsc.nasa.gov/lpi/meteorites/mars_meteorite.html
NIPR Antarctic meteorites	http://www.nipr.ac.jp/
BMNH general meteorites	http://www.nhm.ac.uk/mineralogy/collections/meteor.htm
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.geochemsoc.org

Other Websites of Interest

Mars Exploration	http://mars.jpl.nasa.gov
Lunar Prospector	http://lunar.arc.nasa.gov
Near Earth Asteroid Rendezvous	http://near.jhuapl.edu/
Stardust Mission	http://stardust.jpl.nasa.gov
Genesis Mission	http://genesismission.jpl.nasa.gov
Contour Mission	http://www.jhuapl.edu/public/pr/CONTOUR/

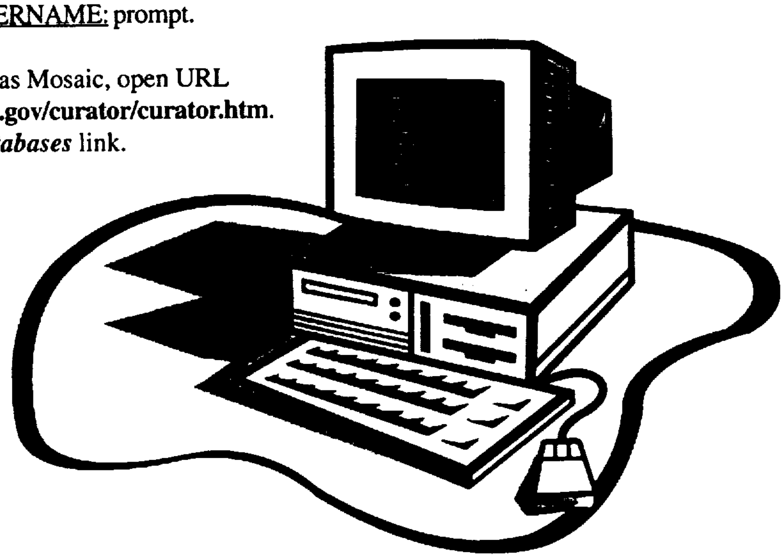
The curatorial databases may be accessed as follows:

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-curator.jsc.nasa.gov/curator/curator.htm.**
2) Activate the ***Curatorial Databases*** link.



For problems or additional information, you may contact:

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