Antarctic Meteorite Newsletter

Volume 27, Number 1 February 2004

Curator's Comments

Kevin Righter

New Meteorites

This newsletter contains classifications for 278 new meteorites from the 2001 and 2002 ANSMET collections. They include samples from MacAlpine Hills, LaPaz Icefields, Pecora Escarpment, Meteorite Hills, and Queen Alexandra Range. Detailed macroscopic and petrographic descriptions are given for 36 of the new meteorites;1 lunar anorthositic breccia, 3 lunar basalts (paired with LAP 02205 from the previous newsletter), 2 acapulcoites, 2 diogenites, 6 howardites, 5 carbonaceous chondrites (CM2), 4 enstatite chondrites, 7 type 3 chondrites, a mesosiderite, a metal-rich L6 chondrite, an EH and L chondrite impact melts and 2 shocked H5 chondrites. The two new impact melt rocks LAP 02225 - EH and MAC 02750 - L, join two other meteorites in our collection that have been designated impact melts – QUE 99396 (H) and QUE 99473 (EH). Two irons that appear in Table 1 and Table 2 are paired with MET00400 which was classified in the September 2001 newsletter.

Lunar Meteorite Compendium

Close to 30 lunar meteorites are now known in world collections, and provide a complementary sample set to the Luna and Apollo samples collected in the 1970's. Although some nice lunar meteorite compilations are maintained (e.g., **http://epsc.wustl.edu/admin/resources/moon_meteorites.html**) there is not an in depth data compilation such as the Martian meteorite compendium maintained by Chuck Meyer of the ARES curation office: (**http://curator.jsc.nasa.gov/curator/antmet/mmc/mmc.htm**). In an effort to bridge this gap, we are initiating a Lunar Meteorite Compendium. It is expected that this compendium will be available in both a CD-ROM and website formats, but a detailed schedule for such has not yet been developed. Stay tuned for more information on this topic. In the meantime if you have some lunar meteorite publications that you think may be relevant to such a project, please send them to us at the address listed at the end of this newsletter, or to **kevin.righter-1@nasa.gov**.

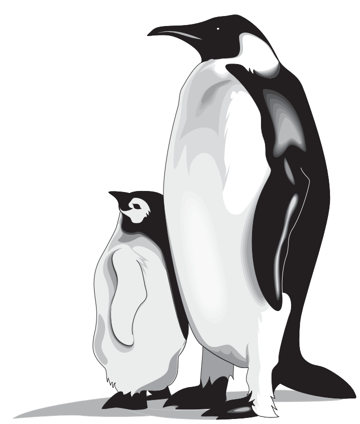
Changes to the Newsletter

The Antarctic Meteorite Newsletter has been available in three formats – a hard copy that is mailed to libraries, a PDF file that is available online for download, and an online version. Because the image quality and resolution on the online version is superior, images of the meteorites will no longer be available in the hard copy or PDF file. Requesters who would like photographic information about the new meteorites must use the online images.

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 Kevin Righter, NASA Johnson Space Center, Houston, Texas 77058

Inside this Issue



Sample Request Deadline
March 05, 2004

MWG Meets
March 19-20, 2004

Report on the 2003-2004 ANSMET Season

Ralph Harvey, ANSMET

I love an election year - all the hyperbole, mudslinging, back-patting, and back-stabbing, everyone clawing toward higher ground as the tide of swirling, noxious innuendo rises higher and higher. I love it because, for a short while, my utterly strange job seems composed, low-stress, and sane. Furthermore, in spite of all the inane noise and chatter, I have the great pleasure to add to the plethora of solid good news coming from the Planetary Sciences (of course if it was bad news I'd blame it on the media, or at the very least software).

The 03-04 ANSMET season is now officially behind us, and qualifies as a tremendous success. For the second season in a row we fielded two parties - a four person team whose goal was to explore new or poorly-known icefields and recover whatever specimens they found along the way; and an eight person team dedicated to systematic specimen recovery from a well characterized source. Together, these two teams recovered 1358 specimens (a new record) from about a dozen icefields scattered around the southern Transantarctic Mountains, with an estimated total mass of 350 kg (second place only because ALHA76009 itself was 407 kg). Significantly, it's not just the overall numbers that are higher. The proportion of achondrites, carbonaceous chondrites and unusual ordinary chondrites is higher than I've seen in a long time (I estimate about 8%) with relatively minor contributions from showerfalls. This is a very welcome change after the many years of recoveries in the Foggy Bottom (QUE) area, where every new L/LL5 fragment brought tears. It's a fair bet that many readers of this newsletter will find something exciting to work on from the 03xxx meteorite collection.

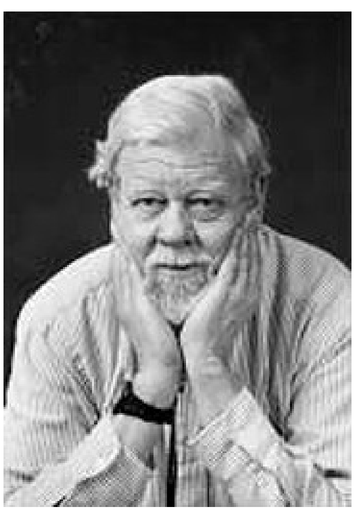
There's simply not enough room here to describe everything that took place this season; so let me finish by listing the 03-04 team members (in no particular order): Nancy Chabot, John Schutt, Bill McCormick, Gordon Osinski ("Oz"), Monika Kress, Andrew Dombard, Tim Swindle, Oliver Botta, Gretchen Benedix, Barbara Cohen, Rene Martinez, Chris Cokinos, Erika Eschholtz and myself. Supporting the amazing recoveries was a wealth of courage, camaraderie and accomplishment, so make sure you ask these folks for a story or two. And watch this newsletter in the late summer for the first exciting reports on the 03-04 specimens.

Finally, if I'm elected, a SNC in every laminar flow hood. I promise.

Field Team 2003-2004

Rene and Oz

Tribute to Dr. Robert Walker



The scientific community lost a long time friend in the recent passing of Dr. Robert Walker. He was a strong supporter of ANSMET, and was a member of the search team during two field seasons (1984/1985, 1990/1991). Bob has had an immeasurable impact on the field of cosmochemistry, ranging from his leadership in the distribution and analysis of the Apollo lunar samples, to chair of MWG and to his pioneering role in the analysis of stardust from meteorites and interplanetary dust. His wide-ranging influence on diverse fields of space science was celebrated in a recent symposium held in his honor at Washington University in Saint Louis (*http://presolar.wustl.edu/events/walker2003/index.html*), resulting in a special issue of *Geochimica et Cosmochimica Acta 67, No. 24. (December, 2003)*. An account of his experiences in the formative years of extraterrestrial materials research is recounted in an interview conducted by Ursula Marvin (*Meteoritics and Planetary Sciences vol. 36, supplement, September 2001, p. A275-A283*).

(Photos courtesy of Washington University; text by Scott Messenger.)

New Meteorites

From 2001-2002 Collection

Pages 5-19 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 26(2), Sept. 2003. 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

Tim McCoy, Linda Welzenbach
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
CRE — Mt. Crean
DAV — David Glacier
DEW — Mt. DeWitt
DOM — Dominion Range
DRP — Derrick Peak
EET — Elephant Moraine
FIN — Finger Ridge
GDR — Gardner Ridge
GEO — Geologists Range
GRA — Graves Nunataks
GRO — Grosvenor Mountains
HOW — Mt. Howe
ILD — Inland Forts
KLE — Klein Ice Field
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
ODE — Odell Glacier
OTT — Outpost Nunatak
PAT — Patuxent Range
PCA — Pecora Escarpment
PGP — Purgatory Peak
PRE — Mt. Prestrud
QUE — Queen Alexandra Range
RKP — Reckling Peak
SCO — Scott Glacier
STE — Stewart Hills
TEN — Tentacle Ridge
TIL — Thiel Mountains
TYR — Taylor Glacier
WIS — Wisconsin Range
WSG — Mt. Wisting

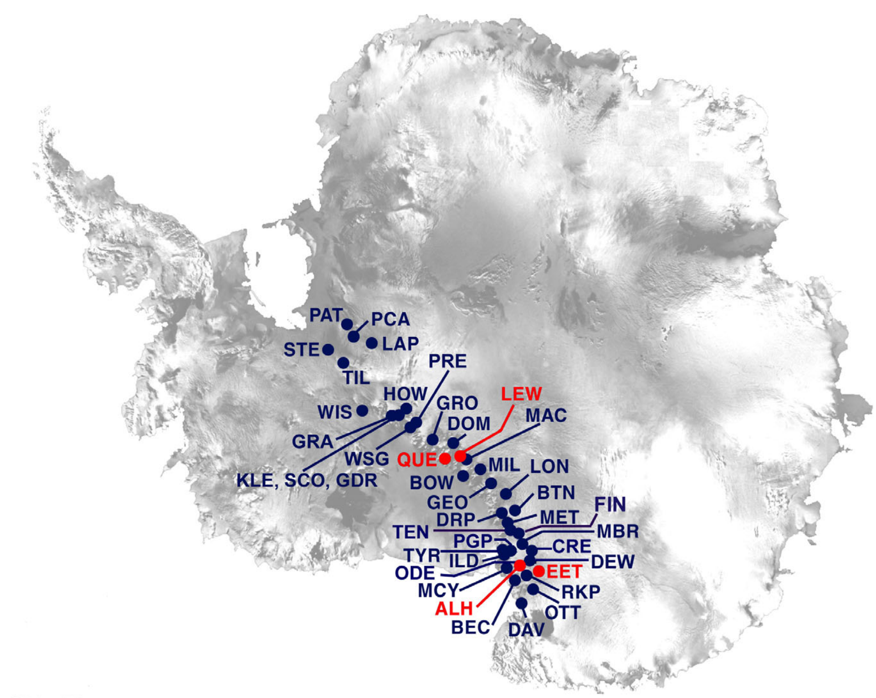


Table 1: List of Newly Classified Antarctic Meteorites **

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MET 01 002 ~	3922.7	L5 CHONDRITE	A/B	A/B		
MET 01 004 ~	1554.3	LL5 CHONDRITE	B/C	A/B		
MET 01 005 ~	19000.0	L5 CHONDRITE	A/B	B		
MET 01 006 ~	409.9	H6 CHONDRITE	C	A/B		
MET 01 007 ~	390.3	L6 CHONDRITE	CE	C		
MET 01 008 ~	323.2	LL5 CHONDRITE	C	A/B		
MET 01 009 ~	343.0	LL5 CHONDRITE	B	B		
MET 01 023 ~	452.8	H6 CHONDRITE	B	A		
MET 01 024 ~	362.2	L5 CHONDRITE	C	A/B		
MET 01 025 ~	518.5	LL5 CHONDRITE	B	A		
MET 01 026 ~	196.2	LL5 CHONDRITE	B/C	B		
MET 01 027 ~	430.9	L4 CHONDRITE	B/C	B		
MET 01 028 ~	164.2	LL5 CHONDRITE	B	B/C		
MET 01 029 ~	218.3	LL5 CHONDRITE	B/C	B		
MET 01 030 ~	1360.2	LL5 CHONDRITE	A/B	A		
MET 01 031 ~	443.0	L5 CHONDRITE	B	A		
MET 01 032 ~	247.0	L5 CHONDRITE	BE	A		
MET 01 033 ~	323.9	L5 CHONDRITE	B	A		
MET 01 034 ~	168.7	L6 CHONDRITE	A/B	A		
MET 01 035 ~	151.6	LL6 CHONDRITE	A/B	A		
MET 01 040 ~	216.1	LL5 CHONDRITE	A/B	A/B		
MET 01 041 ~	198.6	L5 CHONDRITE	B/C	A/B		
MET 01 042 ~	160.6	L5 CHONDRITE	B/C	A/B		
MET 01 043 ~	227.6	LL6 CHONDRITE	B/CE	A/B		
MET 01 044 ~	127.9	LL6 CHONDRITE	A/B	A		
MET 01 045 ~	201.0	LL5 CHONDRITE	A/B	A/B		
MET 01 046 ~	169.0	LL5 CHONDRITE	A/B	A/B		
MET 01 047 ~	263.7	L5 CHONDRITE	B/C	A/B		
MET 01 048 ~	198.6	L5 CHONDRITE	B/C	A		
MET 01 049 ~	321.8	LL6 CHONDRITE	A/B	A/B		
MET 01 050 ~	1375.1	LL6 CHONDRITE	A/B	A		
MET 01 051	621.1	L3.6 CHONDRITE	B/C	A/B	7-35	2-19
MET 01 052 ~	619.6	L5 CHONDRITE	B/C	A/B		
MET 01 053 ~	460.6	L5 CHONDRITE	B	A/B		
MET 01 054 ~	358.5	L5 CHONDRITE	B/C	A/B		
MET 01 055 ~	224.9	LL5 CHONDRITE	A/B	A		
MET 01 056	397.1	L3.6 CHONDRITE	B/C	A/B	1-27	7-25
MET 01 057	189.3	L3.6 CHONDRITE	B/C	A/B	1-25	2-25
MET 01 058 ~	216.4	L5 CHONDRITE	B	A/B		
MET 01 059	441.2	L5 CHONDRITE	B	A	24	20
MET 01 060 ~	351.4	LL5 CHONDRITE	A/B	A		
MET 01 061 ~	205.4	H5 CHONDRITE	C	A/B		
MET 01 062 ~	194.0	L5 CHONDRITE	C	B		
MET 01 063 ~	173.0	H5 CHONDRITE	C	A/B		
MET 01 064 ~	242.4	H6 CHONDRITE	C	B		
MET 01 088	5.8	IRON III AB	B	A		
MET 01 089	4.1	IRON III AB	B	A		
MET 01 100 ~	20.7	L5 CHONDRITE	B	A/B		
MET 01 101 ~	12.5	L5 CHONDRITE	A/B	A		
MET 01 102 ~	36.8	L5 CHONDRITE	B/C	A		
MET 01 103 ~	29.6	LL5 CHONDRITE	AE	A		

~Classified by using refractive indices

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MET 01 104 ~	7.3	LL6 CHONDRITE	A	A		
MET 01 105 ~	1.7	L5 CHONDRITE	A/B	A		
MET 01 106 ~	42.3	L5 CHONDRITE	B/C	A		
MET 01 107 ~	32.6	L5 CHONDRITE	A/B	A/B		
MET 01 108 ~	9.3	LL5 CHONDRITE	A	A		
MET 01 109 ~	1.9	L5 CHONDRITE	B/C	A		
MET 01 110 ~	7.8	LL6 CHONDRITE	A/B	A/B		
MET 01 111 ~	32.3	L5 CHONDRITE	B	A		
MET 01 112 ~	54.9	L5 CHONDRITE	B/CE	A		
MET 01 113 ~	97.4	L4 CHONDRITE	B	A/B		
MET 01 114 ~	56.2	LL5 CHONDRITE	A/B	A/B		
MET 01 115 ~	111.6	L5 CHONDRITE	B/C	A		
MET 01 116 ~	62.6	LL5 CHONDRITE	A/B	A		
MET 01 117 ~	84.1	LL4 CHONDRITE	B	A/B		
MET 01 118 ~	82.9	L5 CHONDRITE	B/C	A/B		
MET 01 119 ~	114.5	H5 CHONDRITE	B/C	A		
MET 01 150 ~	22.9	LL5 CHONDRITE	A/B	A		
MET 01 151 ~	18.3	LL6 CHONDRITE	A/B	A/B		
MET 01 152 ~	11.6	H5 CHONDRITE	B/C	A		
MET 01 153 ~	4.0	LL6 CHONDRITE	A/B	A		
MET 01 154	0.4	MESOSIDERITE	B	A		26-31
MET 01 155 ~	12.3	L5 CHONDRITE	B/C	A		
MET 01 156 ~	12.7	L6 CHONDRITE	B/C	A		
MET 01 157 ~	3.8	L5 CHONDRITE	B	A		
MET 01 158 ~	0.6	H5 CHONDRITE	B	A		
MET 01 159 ~	11.9	H5 CHONDRITE	B/C	A		
MET 01 180 ~	11.5	H5 CHONDRITE	C	A/B		
MET 01 181 ~	63.4	LL5 CHONDRITE	A/B	A		
MET 01 182	69.9	H3.8 CHONDRITE	A/B	A	1-23	1-23
MET 01 183	1.4	EH3 CHONDRITE	B/C	A/B		1-2
MET 01 184 ~	1.5	H5 CHONDRITE	B/C	A		
MET 01 185 ~	79.3	LL6 CHONDRITE	A/B	A/B		
MET 01 186 ~	23.9	L5 CHONDRITE	B	A/B		
MET 01 187 ~	38.6	L5 CHONDRITE	A/B	A		
MET 01 188 ~	25.1	L5 CHONDRITE	A/B	A/B		
MET 01 189 ~	11.4	LL5 CHONDRITE	A/B	A		
MET 01 200 ~	22.9	L5 CHONDRITE	A/B	A		
MET 01 201 ~	27.4	L5 CHONDRITE	B/C	A		
MET 01 202 ~	14.5	L5 CHONDRITE	B/C	A		
MET 01 203 ~	45.4	L5 CHONDRITE	B	A		
MET 01 204 ~	124.0	L5 CHONDRITE	A/B	A/B		
MET 01 205 ~	13.2	LL5 CHONDRITE	A/B	A/B		
MET 01 206 ~	60.6	H5 CHONDRITE	B/C	A/B		
MET 01 207 ~	45.7	LL5 CHONDRITE	A/B	A		
MET 01 208 ~	41.8	L5 CHONDRITE	B/C	A		
MET 01 209 ~	6.0	L5 CHONDRITE	B/C	A		
MET 01 210	22.8	LUNAR-ANORTH. BRECCIA	B	A		37-84
MET 01 211	10.6	L3.6 CHONDRITE	B	A	2-21	4-6
MET 01 212	31.4	ACAPULCOITE	B/C	A	8-9	8
MET 01 213 ~	14.2	H5 CHONDRITE	B/C	A		
MET 01 214 ~	28.9	L5 CHONDRITE	A/B	A		
MET 01 215 ~	159.1	L5 CHONDRITE	B/C	A		
MET 01 216 ~	8.8	L5 CHONDRITE	A/B	A/B		
MET 01 217 ~	47.8	H5 CHONDRITE	B/C	A		

~Classified by using refractive indices

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MET 01 218 ~	8.1	LL5 CHONDRITE	A/B	A		
MET 01 219 ~	23.1	LL5 CHONDRITE	A/B	A		
MET 01 230 ~	9.7	H5 CHONDRITE	C	A/B		
MET 01 231 ~	7.7	LL5 CHONDRITE	B/C	B		
MET 01 232	7.6	ACAPULCOITE	C	A/B	8-9	8
MET 01 233 ~	10.6	L5 CHONDRITE	C	B		
MET 01 234 ~	7.0	L5 CHONDRITE	C	A/B		
MET 01 235 ~	3.1	LL5 CHONDRITE	C	C		
MET 01 236 ~	11.6	L5 CHONDRITE	C	B		
MET 01 237 ~	13.4	L5 CHONDRITE	C	B		
MET 01 238 ~	12.9	L5 CHONDRITE	C	A/B		
MET 01 239 ~	18.7	L5 CHONDRITE	C	C		
MET 01 275 ~	47.3	L5 CHONDRITE	C	C		
MET 01 276	61.4	H5 CHONDRITE	A	A	19	17
MET 01 277 ~	54.6	L5 CHONDRITE	C	A/B		
MET 01 278 ~	43.0	LL6 CHONDRITE	A/B	A		
MET 01 279 ~	30.6	LL5 CHONDRITE	B/C	A/B		
MET 01 280 ~	63.2	L5 CHONDRITE	B/C	A		
MET 01 281 ~	37.5	L5 CHONDRITE	B/C	A/B		
MET 01 282 ~	27.7	L5 CHONDRITE	B/C	A/B		
MET 01 283 ~	17.0	H6 CHONDRITE	B/C	A		
MET 01 284 ~	19.4	LL5 CHONDRITE	B/C	A		
MET 01 285 ~	53.4	L5 CHONDRITE	B	A/B		
MET 01 286 ~	82.6	LL5 CHONDRITE	B/C	A/B		
MET 01 287 ~	29.8	L5 CHONDRITE	A/B	A/B		
MET 01 288 ~	17.7	L5 CHONDRITE	B/C	A		
MET 01 289 ~	23.7	LL5 CHONDRITE	A/B	A		
MET 01 290 ~	17.2	H6 CHONDRITE	B/CE	A		
MET 01 291 ~	18.9	H6 CHONDRITE	B/C	A		
MET 01 292 ~	7.8	LL6 CHONDRITE	A/B	A		
MET 01 293 ~	17.8	H5 CHONDRITE	B/CE	A		
MET 01 294 ~	9.7	H6 CHONDRITE	B/C	A/B		
MET 01 295 ~	30.0	H5 CHONDRITE	B/C	A		
MET 01 296 ~	10.9	H5 CHONDRITE	B/C	A		
MET 01 297 ~	19.4	LL6 CHONDRITE	A/B	A		
MET 01 298 ~	7.4	L5 CHONDRITE	B/C	A		
MET 01 299 ~	14.0	L5 CHONDRITE	B/CE	A		
MET 01 300 ~	4.2	L6 CHONDRITE	B	A/B		
MET 01 301 ~	5.5	L5 CHONDRITE	C	B		
MET 01 302 ~	4.6	LL5 CHONDRITE	A/B	A/B		
MET 01 303 ~	6.9	LL5 CHONDRITE	B	B		
MET 01 304 ~	9.2	LL6 CHONDRITE	A	B		
MET 01 305 ~	39.2	L5 CHONDRITE	C	B		
MET 01 306	4.8	H5 CHONDRITE	C	B	18	16
MET 01 307 ~	8.7	LL6 CHONDRITE	A/B	A		
MET 01 308 ~	13.5	L5 CHONDRITE	C	B		
MET 01 309 ~	4.9	H5 CHONDRITE	C	A/B		
MET 01 310 ~	8.2	L5 CHONDRITE	A/B	A/B		
MET 01 311 ~	14.3	H5 CHONDRITE	B/C	A/B		
MET 01 312 ~	12.0	L5 CHONDRITE	B/C	A		
MET 01 313 ~	6.5	H5 CHONDRITE	B/C	A		
MET 01 314 ~	3.4	H5 CHONDRITE	B/C	A		
MET 01 315 ~	4.5	L5 CHONDRITE	A/B	A		

~Classified by using refractive indices

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MET 01 316 ~	5.6	L5 CHONDRITE	B/C	A/B		
MET 01 317 ~	1.3	H5 CHONDRITE	B/C	A/B		
MET 01 318 ~	10.6	L5 CHONDRITE	A/B	A/B		
MET 01 319 ~	14.7	L5 CHONDRITE	B/C	A		
MET 01 320 ~	3.3	LL5 CHONDRITE	A/B	A		
MET 01 321 ~	15.4	H5 CHONDRITE	B/C	A		
MET 01 322	8.4	L3.6 CHONDRITE	B/C	A	13-45	1-18
MET 01 323 ~	7.0	L5 CHONDRITE	A/B	A		
MET 01 324 ~	10.9	L5 CHONDRITE	A/B	A/B		
MET 01 325 ~	29.8	L5 CHONDRITE	B	A		
MET 01 326 ~	10.9	L5 CHONDRITE	B	A		
LAP 02 204 ~	1313.7	L5 CHONDRITE	A/B	A		
LAP 02 207 ~	2920.4	LL5 CHONDRITE	A	A		
LAP 02 212 ~	1456.0	LL5 CHONDRITE	A/B	A		
LAP 02 215 ~	484.1	LL5 CHONDRITE	A/B	A		
LAP 02 217 ~	653.4	LL5 CHONDRITE	B	A		
LAP 02 219 ~	540.5	LL5 CHONDRITE	B	A		
LAP 02 220 ~	154.3	LL5 CHONDRITE	B	A/B		
LAP 02 221 ~	184.2	LL5 CHONDRITE	B	A/B		
LAP 02 222 ~	450.5	LL5 CHONDRITE	B	A/B		
LAP 02 223 ~	138.8	LL5 CHONDRITE	A/B	A/B		
LAP 02 224	252.5	LUNAR-BASALT	A	A/B		23-88
LAP 02 225	313.5	EH CHONDRITE (IMPACT MELT)	B	B		0-1
LAP 02 226	244.1	LUNAR-BASALT	B	B		35-43
LAP 02 227 ~	308.5	LL5 CHONDRITE	A/B	A/B		
LAP 02 229 ~	252.4	LL5 CHONDRITE	B/C	A/B		
LAP 02 231	256.7	H5 CHONDRITE	B	A/B	17	16
LAP 02 237	24.4	H5 CHONDRITE	B	A/B	19	16-18
LAP 02 310 ~	16.8	H5 CHONDRITE	B/C	B		
LAP 02 311 ~	3.6	LL5 CHONDRITE	B/C	B		
LAP 02 312 ~	21.9	L5 CHONDRITE	B/C	B		
LAP 02 313 ~	4.9	LL6 CHONDRITE	B	B		
LAP 02 314 ~	6.4	LL5 CHONDRITE	A	A		
LAP 02 315 ~	19.8	L4 CHONDRITE	B/C	A/B		
LAP 02 316 ~	5.6	LL6 CHONDRITE	A	A		
LAP 02 317 ~	3.2	LL5 CHONDRITE	A	A		
LAP 02 318	7.7	H5 CHONDRITE	C	C	19	16
LAP 02 319 ~	10.6	LL5 CHONDRITE	A	A		
LAP 02 337	164.8	L4 CHONDRITE	B	B	26	22
LAP 02 430	1.3	L6 CHONDRITE (METAL RICH)	C	B	24	21
LAP 02 431 ~	7.5	L5 CHONDRITE	B	B		
LAP 02 432 ~	6.3	LL5 CHONDRITE	B	B		
LAP 02 433 ~	9.1	LL5 CHONDRITE	B	B		
LAP 02 434 ~	0.2	L5 CHONDRITE	B	B		
LAP 02 435 ~	9.2	L5 CHONDRITE	C	B		
LAP 02 436	59.0	LUNAR-BASALT	A	A/B	36	30-80
MAC 02 530 ~	4.3	L5 CHONDRITE	C	A		
MAC 02 532 ~	0.2	H6 CHONDRITE	B	B		
MAC 02 533 ~	0.6	L5 CHONDRITE	B	B		
MAC 02 534 ~	1.1	L5 CHONDRITE	C	A		
MAC 02 535	14.4	CM2 CHONDRITE	B/CE	B	0-52	0-1
MAC 02 536 ~	1.2	L5 CHONDRITE	C	A		
MAC 02 538 ~	54.5	L5 CHONDRITE	C	A/B		
MAC 02 539 ~	96.6	LL6 CHONDRITE	B	A/B		

~Classified by using refractive indices

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MAC 02 550 ~	7.6	H6 CHONDRITE	C	B		
MAC 02 551 ~	6.7	LL5 CHONDRITE	B	B		
MAC 02 552	0.3	CM2 CHONDRITE	B	B	2-3	
MAC 02 554 ~	0.2	H6 CHONDRITE	C	C		
MAC 02 555 ~	1.7	H5 CHONDRITE	C	A		
MAC 02 557 ~	1.5	H6 CHONDRITE	C	C		
MAC 02 559 ~	0.9	L5 CHONDRITE	B	B		
MAC 02 603 ~	3.1	H5 CHONDRITE	C	B		
MAC 02 604 ~	32.9	H6 CHONDRITE	C	B		
MAC 02 605 ~	34.4	H6 CHONDRITE	C	B		
MAC 02 606	7.2	CM2 CHONDRITE	A	B	0-2	
MAC 02 607 ~	6.4	H5 CHONDRITE	C	B		
MAC 02 608 ~	29.7	H6 CHONDRITE	C	B		
MAC 02 630 ~	133.4	H5 CHONDRITE	C	A		
MAC 02 631 ~	74.8	H6 CHONDRITE	C	B		
MAC 02 632 ~	102.9	H6 CHONDRITE	C	A/B		
MAC 02 633 ~	29.5	H5 CHONDRITE	C	B/C		
MAC 02 634 ~	12.3	L5 CHONDRITE	B	A/B		
MAC 02 635	17.9	EL3 CHONDRITE	C	B		1-4
MAC 02 636 ~	45.5	H5 CHONDRITE	C	B		
MAC 02 637 ~	14.0	H5 CHONDRITE	C	A		
MAC 02 638 ~	6.8	H6 CHONDRITE	C	B		
MAC 02 639 ~	4.7	H5 CHONDRITE	C	B		
MAC 02 750	9.1	L CHONDRITE (IMPACT MELT)	C	B	16-29	19-22
MAC 02 751 ~	2.1	H5 CHONDRITE	C	A		
MAC 02 752 ~	19.4	L5 CHONDRITE	B	A/B		
MAC 02 753 ~	9.7	L5 CHONDRITE	B	B		
MAC 02 754 ~	14.1	H5 CHONDRITE	C	B		
MAC 02 756 ~	11.8	L5 CHONDRITE	B/C	B		
MAC 02 757 ~	1.1	H5 CHONDRITE	C	A		
MAC 02 758 ~	1.2	L5 CHONDRITE	C	B		
MAC 02 759 ~	1.9	H5 CHONDRITE	C	B		
MAC 02 830 ~	321.4	H5 CHONDRITE	C	B		
MAC 02 831 ~	142.6	H5 CHONDRITE	C	B/C		
MAC 02 832 ~	148.1	H5 CHONDRITE	C	C		
MAC 02 833	134.1	H3.7 CHONDRITE	B/C	A/B	13-27	2-16
MAC 02 834 ~	125.4	H6 CHONDRITE	C	B		
MAC 02 835 ~	66.7	H6 CHONDRITE	C	A/B		
MAC 02 836 ~	63.0	H6 CHONDRITE	C	A/B		
MAC 02 837	188.6	EL3 CHONDRITE	C	C		0-1
MAC 02 838 ~	157.2	L5 CHONDRITE	B/C	A/B		
MAC 02 839	110.4	EL3 CHONDRITE	C	C		0-6
PCA 02 008	19.1	DIOGENITE	B	A/B		23-26
PCA 02 009	22.5	HOWARDITE	A/B	A/B		17-60
PCA 02 011	2.6	CM2 CHONDRITE	A/B	A/B	1-43	0-2
PCA 02 012	58.9	CM2 CHONDRITE	B	A	0-31	5
PCA 02 013	41.0	HOWARDITE	B	B		22-61
PCA 02 014	21.2	HOWARDITE	B	B	24	23-57
PCA 02 015	16.8	HOWARDITE	B	B		22-59
PCA 02 017	2.4	DIOGENITE	A/B	A/B	26-29	17-25
PCA 02 018	3.1	HOWARDITE	B	A/B		22-57
PCA 02 019	11.7	HOWARDITE	B	A/B	28	24-55
PCA 02 060 ~	25.9	H6 CHONDRITE	C	A/B		
PCA 02 061 ~	5.5	L5 CHONDRITE	B/C	A/B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
PCA 02 062 ~	2.1	H6 CHONDRITE	C	A/B		
PCA 02 063 ~	5.6	H6 CHONDRITE	C	A/B		
PCA 02 064 ~	5.5	H5 CHONDRITE	C	A/B		
QUE 02 150 ~	2.0	H6 CHONDRITE	C	A		
QUE 02 151 ~	3.8	H6 CHONDRITE	C	B		
QUE 02 152 ~	0.5	L6 CHONDRITE	A/B	A		
QUE 02 153 ~	1.0	LL5 CHONDRITE	B	B		
QUE 02 154 ~	2.1	LL5 CHONDRITE	B	B		
QUE 02 155 ~	9.6	LL5 CHONDRITE	C	B		
QUE 02 156 ~	4.8	LL5 CHONDRITE	B/C	B		
QUE 02 157 ~	7.8	LL5 CHONDRITE	B/C	B		
QUE 02 159 ~	3.6	H6 CHONDRITE	C	B		

~Classified by using refractive indices.

Table 2: Newly Classified Meteorites Listed By Type **

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
		Achondrites				
MET 01 212	31.4	ACAPULCOITE	B/C	A	8-9	8
MET 01 232	7.6	ACAPULCOITE	C	A/B	8-9	8
PCA 02 008	19.1	DIOGENITE	B	A/B		23-26
PCA 02 017	2.4	DIOGENITE	A/B	A/B	26-29	17-25
PCA 02 009	22.5	HOWARDITE	A/B	A/B		17-60
PCA 02 013	41.0	HOWARDITE	B	B		22-61
PCA 02 014	21.2	HOWARDITE	B	B	24	23-57
PCA 02 015	16.8	HOWARDITE	B	B		22-59
PCA 02 018	3.1	HOWARDITE	B	A/B		22-57
PCA 02 019	11.7	HOWARDITE	B	A/B	28	24-55
MET 01 210	22.8	LUNAR-ANORTH. BRECCIA	B	A		37-84
LAP 02 224	252.5	LUNAR-BASALT	A	A/B		23-88
LAP 02 226	244.1	LUNAR-BASALT	B	B		35-43
LAP 02 436	59.0	LUNAR-BASALT	A	A/B	36	30-80
		Carbonaceous Chondrites				
MAC 02 535	14.4	CM2 CHONDRITE	B/CE	B	0-52	0-1
MAC 02 552	0.3	CM2 CHONDRITE	B	B	2-3	
MAC 02 606	7.2	CM2 CHONDRITE	A	B	0-2	
PCA 02 011	2.6	CM2 CHONDRITE	A/B	A/B	1-43	0-2
PCA 02 012	58.9	CM2 CHONDRITE	B	A	0-31	5
		Chondrites -Type 3				
MAC 02 833	134.1	H3.7 CHONDRITE	B/C	A/B	13-27	2-16
MET 01 182	69.9	H3.8 CHONDRITE	A/B	A	1-23	1-23
MET 01 051	621.1	L3.6 CHONDRITE	B/C	A/B	7-35	2-19
MET 01 056	397.1	L3.6 CHONDRITE	B/C	A/B	1-27	7-25
MET 01 057	189.3	L3.6 CHONDRITE	B/C	A/B	1-25	2-25
MET 01 211	10.6	L3.6 CHONDRITE	B	A	2-21	4-6
MET 01 322	8.4	L3.6 CHONDRITE	B/C	A	13-45	1-18
		E Chondrites				
LAP 02 225	313.5	EH CHONDRITE (IMPACT MELT)	B	B		0-1
MET 01 183	1.4	EH3 CHONDRITE	B/C	A/B		1-2
MAC 02 635	17.9	EL3 CHONDRITE	C	B		1-4
MAC 02 837	188.6	EL3 CHONDRITE	C	C		0-1
MAC 02 839	110.4	EL3 CHONDRITE	C	C		0-6
		Irons				
MET 01 088	5.8	IRON III AB	B	A		
MET 01 089	4.1	IRON III AB	B	A		

Table 2: Newly Classified Meteorites Listed By Type **

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
		L Chondrites				
LAP 02 430	1.3	L6 CHONDRITE (METAL RICH)	C	B	24	21
MAC 02 750	9.1	L CHONDRITE (IMPACT MELT)	C	B	16-29	19-22
		Stony Irons				
MET 01 154	0.4	MESOSIDERITE	B	A		26-31

**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.

Table 3: Tentative Pairings for New Meteorites

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 Bulletins* No. 76 (*Meteoritics* **29**, 100-143), No. 79 (*Meteoritics and Planetary Science* **31**, A161-174), No. 82 (*Meteoritics and Planetary Science* **33**, A221-A239), No. 83 (*Meteoritics and Planetary Science* **34**, A169-A186), No. 84 (*Meteoritics and Planetary Science* **35**, A199-A225), No. 85 (*Meteoritics and Planetary Science* **36**, A293-A322), No. 86 (*Meteoritics and Planetary Science* **37**, A157-A184) and No. 87 (*Meteoritics and Planetary Science* **38,** A189-A248).

ACAPULCOITES

MET 01212 and MET 01232 with MET 01195

CM2 CHONDRITES

PCA 02012 with PCA 02011

DIOGENITES

PCA 02017 with PCA 02008

EL3 CHONDRITES

MAC 02839 with MAC 02837

H5 CHONDRITES

LAP 02237 with LAP 02231

HOWARDITES

PCA 02013, PCA 02014, PCA 02015, PCA 02018 and PCA 02019 with PCA 02009

IRONS

MET 01088 and MET 01089 with MET 00400

L3.6 CHONDRITES

MET 01051, MET 01056, MET01057, MET 01211 and MET 01322 with MET 00489

LUNAR BASALTS

LAP 02224, LAP 02226 and LAP 02436 with LAP 02205

Petrographic Descriptions

Sample No.: **MET 01051**
MET 01056
MET 01057
MET 01211
Location: Meteorite Hills
Field No.: 13823; 11366
13179; 13812
Dimensions (cm): 8.8 x 5.6 x 5.0
7.8 x 4.5 x 5.0
8.0 x 3.8 x 3.0
2.7 x 1.7 x 1.7
Weight (g): 621.10; 397.1
189.29; 10.60
Meteorite Type: L3 Chondrite
(Estimated 3.6)

<u>Macroscopic Description: Cecilia Satterwhite</u>
These ordinary chondrites have a dark gray to black matrix with oxidation scattered throughout. Gray, white and cream colored (mm to ½ cm sized) inclusions are visible. Some areas are rusty brown.

<u>Thin Section (,2) Description: Linda Welzenbach, Tim McCoy</u>
These meteorites are so similar that a single description suffices. The sections exhibit numerous large, well-defined chondrules (up to 3 mm) in a matrix of fine-grained silicates, metal and troilite. Weak shock effects are present. Polysynthetically twinned pyroxene is extremely abundant. Olivines range from Fa_{1-35}; pyroxenes from Fs_{2-25}. The meteorites are L3 chondrites (estimated subtype 3.6). These meteorites are very likely paired with MET 00489 and MET 00621.

Sample No.: **MET 01154**
Location: Meteorite Hills
Field No.: 13870
Dimensions (cm): 0.6 x 0.6 x 0.2
Weight (g): 0.350
Meteorite Type: Mesosiderite

<u>Macroscopic Description: Cecilia Satterwhite</u>
90% of the exterior of this small fragment has black/brown fusion crust with oxidation haloes.

<u>Thin Section (,2) Description: Tim McCoy, Linda Welzenbach</u>
The section is a breccia composed of angular isolated grains up to 1.0 mm and clasts of orthopyroxene ($Fs_{26-31}Wo_2$), anorthitic feldspar (An_{90-95} Or_{0-1}), metal, troilite, oxides and graphite. The meteorite is a mesosiderite.

Sample No.: **MET 01182**
Location: Meteorite Hills
Field No.: 13046
Dimensions (cm): 4.8 x 3.4 x 2.5
Weight (g): 69.86
Meteorite Type: H3 Chondrite
(Estimated 3.8)

<u>Macroscopic Description: Cecilia Satterwhite</u>
90% black/brown fractured fusion crust covers the exterior of this ordinary chondrite. The interior is gray with heavy oxidation in areas and abundant gray and cream colored inclusions/chondrules present.

<u>Thin Section (,2) Description: Linda Welzenbach, Tim McCoy</u>
The section exhibits numerous small, well-defined chondrules (up to 1 mm) with fine-grained silicates, metal and troilite. Weak shock effects are present. Polysynthetically twinned pyroxene is extremely abundant. The meteorite is highly weathered. Silicates are unequilibrated; olivines range from Fa_{1-23} and pyroxenes from Fs_{1-23}. The meteorite is an H3 chondrite (estimated subtype 3.8).

Sample No.: **MET 01183**
Location: Meteorite Hills
Field No.: 13054
Dimensions (cm): 1.2 x 0.8 x 0.3
Weight (g): 1.40
Meteorite Type: EH3 Chondrite

<u>Macroscopic Description: Cecilia Satterwhite</u>
80% of the exterior has brown fusion crust with oxidation. Interior is dark gray to black with metal and oxidation visible.

<u>Thin Section (,2) Description: Linda Welzenbach, Tim McCoy</u>
The section shows an aggregate of small chondrules (up to 1 mm), abundant chondrule fragments, and pyroxene grains in a matrix of about 30% metal and sulfide. Several chondrules contain olivine. Weathering is moderate, with staining of enstatite grains and heavy alteration of metal and sulfides. Microprobe analyses show the olivine is Fa_1, orthopyroxene is Fs_{1-2} and metal contains 3.1 wt.% Si. The meteorite is an EH3 chondrite.

Sample No.: **MET 01210**
Location: Meteorite Hills
Field No.: 13805
Dimensions (cm): 4.0 x 2.2 x 1.7
Weight (g): 22.83
Meteorite Type: Lunar Anorth. breccia

Macroscopic Description: Cecilia Satterwhite

30% of this meteorite's exterior has brown/black fusion crust with some oxidation. The interior is a light gray matrix with abundant clasts. Minor weathering is visible. Gray, white and cream colored inclusions are visible on the exterior and interior.

Thin Section (,2) Description: Tim McCoy, Linda Welzenbach

The section shows a groundmass of comminuted pyroxene (up to 3 mm) and plagioclase with fine- to coarse-grained basaltic clasts ranging up to 1 mm. Most of the pyroxene is augite with compositions ranging from $Fs_{37-84}Wo_{13-36}$ (Fe/Mn ~ 70) and plagioclase An_{90-96}. The meteorite is lunar, probably an anorthositic regolith breccia.

Sample No.: **MET 01212** **MET 01232**
Location: Meteorite Hills
Field No.: 13831; 13811
Dimensions (cm): 3.5 x 3.0 x 1.7; 2.0 x 1.5 x 1.5
Weight (g): 31.37; 7.618
Meteorite Type: Acapulcoite

Macroscopic Description: Kathleen McBride, Cecilia Satterwhite

Exteriors of these acapulcoites have black/brown fusion crust with oxidation haloes. The interior is rusty brown with dark gray to black patches. Some metal is visible.

Thin Sections (,2) Description: Tim McCoy, Linda Welzenbach

The meteorites are so similar that a single description suffices. The sections consist of an equigranular aggregate with grains up to 0.5 mm. Minerals include olivine (Fa_{8-9}), orthopyroxene (Fs_8), chromian diopside ($Fs_{3-4}Wo_{44-46}$), phosphates, metal and troilite. Metal and sulfide occur as large grains, veinlets and metal-sulfide blebs within orthopyroxene. Weathering is moderate, with extensive staining. The meteorites are acapulcoites and are very likely paired with MET 01195/01198/01244.

Sample No.: **MET 01322**
Location: Meteorite Hills
Field No.: 13198
Dimensions (cm): 2.8 x 2.2 x 0.7
Weight (g): 8.41
Meteorite Type: L3 Chondrite (Estimated 3.6)

Macroscopic Description: Cecilia Satterwhite

Black/brown fusion crust covers 50 % of the exterior surface. The interior is dark gray to black with abundant clasts. Some as large as ½ cm are visible.

Thin Section (,2) Description: Linda Welzenbach, Tim McCoy

The section exhibits numerous large, well-defined chondrules (up to 3 mm) in a matrix of fine-grained silicates, metal and troilite. Weak shock effects are present. Polysynthetically twinned pyroxene is extremely abundant. Olivines range from Fa_{13-45}; pyroxenes from Fs_{1-18}. This meteorite contains a fine-grained clast with uniform mineral compositions (Fa_{32},Fs_{23}). The origin of this clast and its relationship to the host is uncertain, but may be impact-related. The meteorite is a L3 chondrite (estimated subtype 3.6). This meteorite may be paired with the MET 00489 pairing group.

Sample No.: **LAP 02224** **LAP 02226** **LAP 02436**
Location: LaPaz Icefield
Field No.: 15406; 15447 15412
Dimensions (cm): 5.0 x 5.0 x 4.0; 6.0 x 6.0 x 3.5; 5.5 x 4.25 x 2.25
Weight (g): 252.5; 244.1 58.970
Meteorite Type: Lunar Basalt

Macroscopic Description: Kathleen McBride

50-90% of these lunar meteorite exteriors are covered with shiny, black, striated fusion crust. The interior has a granular texture with interconnected linear mineral grains, black, white and brown in color. There are criss-crossing fractures that are filled with black glass.

Thin Section (,4; ,6; ,4) Description: Tim McCoy, Linda Welzenbach

These sections consist of a coarse-grained unbrecciated basalt with elongate pyroxene (up to 0.5 mm) and plagioclase laths (up to 1 mm) (~60:40 px:plag), rare phenocrysts of olivine (up to 1 mm) and interstitial oxides and late-stage mesostasis. Shock effects include undulatory extinction in pyroxene and shock melt veins and pockets. Microprobe analyses reveal pigeonite to augite of $Fs_{20-80}Wo_{10-36}$, plagioclase is $An_{85-90}Or_{0-1}$ and a single olivine phenocryst is Fa_{35}. The Fe/Mn ratio in the pyroxenes averages ~60. The meteorites are lunar olivine-bearing basalt. These are almost certainly paired with LAP 02205.

Sample No.:	**LAP 02225**	Macroscopic Description: Kathleen McBride
Location:	LaPaz Icefield	Brown/black obvious fusion crust with oxidation haloes covers 75% of the exterior surface. The interior is composed of gray crystalline material with rusting and evaporites along fractures. This meteorite is hard.
Field No.:	15434	
Dimensions (cm):	7.0 x 7.0 x 3.5	
Weight (g):	313.50	
Meteorite Type:	Enstatite (EH) Chondrite (Impact Melt)	Thin Section (,2) Description: Linda Welzenbach, Tim McCoy The section consists of a matrix of small (~0.2 mm) pyroxene laths with interstitial plagioclase, metal, troilite, daubreelite, Mg,Mn,Fe-sulfides, and perryite. The latter is often exsolved on the {111} axes of the metal. Also present are ~10 vol.% large enstatite laths that can exceed 3 mm in long dimension. Enstatite is Fs_{0-1}; plagioclase is An_0Or_{2-3} and metal contains 3 wt.% Si. The meteorite is an enstatite chondrite impact melt, probably of EH parentage.

Sample No.:	**LAP 02231**	Macroscopic Description: Cecilia Satterwhite
Location:	LaPaz Icefield	The exterior is black/brown. The interior reveals a gray/black matrix with lots of rusty areas. Some gray clasts are visible.
Field No.:	15171	
Dimensions (cm):	6.0 x 5.0 x 4.8	
Weight (g):	256.7	Thin Section (,2) Description: Tim McCoy, Linda Welzenbach
Meteorite Type:	H5 Chondrite	The section consists of a large (1 cm) wide shock vein dominated by fine-grained (2-50 micron grain size) olivine and pyroxene with elongated metal and sulfides cross cutting a chondritic host with chondrules reaching 1 mm. The mineral compositions are homogenous; olivine is Fa_{17} and orthopyroxene is Fs_{16}. The meteorite is a shock-veined H5 chondrite. The section examined may not be a good representative of the mass as whole. It may be paired with LAP 02237.

Sample No.:	**LAP 02237**	Macroscopic Description: Cecilia Satterwhite
Location:	LaPaz Icefield	Exterior is dull brown/black. The interior is extremely weathered to a rusty brown color.
Field No.:	15155	Thin Section (,2) Description: Tim McCoy, Linda Welzenbach
Dimensions (cm):	2.5 x 2.0 x 1.5	The section consists of lenticular clasts of relatively unshocked chondritic material set in a shock-blackened matrix with elongated metal and sulfides and fragments of mineral grains and chondrules reaching 1 mm. The mineral compositions are homogenous; olivine is Fa19 and orthopyroxene is Fs16-18. The meteorite is a shock-blackened H5 chondrite with extensive shock veining. The section examined may not be a good representative of the mass as whole. It may be paired with LAP 02231.
Weight (g):	24.366	
Meteorite Type:	H5 Chondrite	

Sample No.:	**LAP 02430**	Macroscopic Description: Kathleen McBride
Location:	LaPaz Icefield	50% of this ordinary chondrite's exterior is covered with brown/black fusion crust. The interior is rusty and lumpy with metal and dark shiny areas.
Field No.:	15919	
Dimensions (cm):	1.0 x 0.75 x 0.5	
Weight (g):	1.277	Thin Section (,3) Description: Tim McCoy, Linda Welzenbach
Meteorite Type:	L6 Chondrite (Metal Rich)	The section consists of a large metal fragment (90% of sample) with a small area of highly recrystallized chondritic material. The mineral compositions are homogenous; olivine is Fa_{24} and orthopyroxene is Fs_{21}. The meteorite is probably an unrepresentative fragment of an L6 chondrite.

Sample No.:	**MAC 02535**	
Location:	MacAlpine Hills	
Field No.:	14230	
Dimensions (cm):	2.5 x 3.0 x 1.5	
Weight (g):	14.367	
Meteorite Type:	CM2 Chondrite	

Macroscopic Description: Kathleen McBride

Black, purple tinged, polygonally fractured fusion crust covers 90% of this carbonaceous chondrite. The interior is black, friable and weathered with white and rust stained inclusions.

Thin Section (,4) Description: Linda Welzenbach, Tim McCoy

The section consists of a few small shock flattened chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; rare metal and sulfide grains are present. Olivine compositions are Fa_{0-52}, with a peak at $Fa_{0-2;}$ orthopyroxene is Fs_{0-1}. The matrix consists dominantly of an Fe-rich serpentine. The meteorite is a CM2 chondrite.

Sample No.:	**MAC 02552**
Location:	MacAlpine Hills
Field No.:	14475
Dimensions (cm):	1.0 x 0.5 x 0.5
Weight (g):	0.314
Meteorite Type:	CM2 Chondrite

Macroscopic Description: Kathleen McBride

Purplish black fusion crust covers <10% of the exterior. The interior is black with white clasts visible.

Thin Section (,2) Description: Linda Welzenbach, Tim McCoy

The section consist of a few small chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; rare metal, framboidal magnetite and sulfide grains are present. Chondrites are moderately altered; Fe-rich serpentine dominates the matrix. Olivine compositions are $Fa_{2-3.}$ The meteorite is a CM2 chondrite.

Sample No.:	**MAC 02606**
Location:	MacAlpine Hills
Field No.:	14548
Dimensions (cm):	3.5 x 1.25 x 1.5
Weight (g):	7.158
Meteorite Type:	CM2 Chondrite

Macroscopic Description: Kathleen McBride

Purplish black fusion crust covers 50% of the exterior. Interior is charcoal black with mm sized white or light colored chondrules.

Thin Section (,2) Description: Linda Welzenbach, Tim McCoy

The section is extensively altered, with a few large olivines surviving. Chondrules reach up to a mm and isolated mineral grains are present. Rare sulfide grains are also present. Olivine compositions are Fa_{0-2}. The meteorite is a CM2 chondrite.

Sample No.:	**MAC 02635**
Location:	MacAlpine Hills
Field No.:	14780
Dimensions (cm):	3.0 x 2.0 x 2.0
Weight (g):	17.891
Meteorite Type:	EL3 Chondrite

Macroscopic Description: Kathleen McBride

The exterior of this enstatite chondrite is rusty and shiny. The rusty black matrix is hard, brittle and contains dark gray to rusty chondrules/inclusions that are 1-2 mm in size.

Thin Section (,2) Description: Linda Welzenbach, Tim McCoy

The section shows an aggregate of chondrules (up to 2 mm), chondrule fragments, and pyroxene grains in a matrix of about 30% metal and sulfide. A few chondrules contain rare olivine. Weathering is moderate, with staining of enstatite grains and heavy alteration of metal and sulfides. Microprobe analyses shows the orthopyroxene is Fs_{1-4} and metal contains 1.1 wt.% Si. The meteorite is an EL3 chondrite and is likely not paired with MAC 02837/02839.

Sample No.:	**MAC 02750**	Macroscopic Description: Kathleen McBride
Location:	MacAlpine Hills	Black fusion crust with oxidation haloes covers 50% of the exterior. It has a rusty interior.
Field No.:	14196	
Dimensions (cm):	2.5 x 2.0 x 1.5	
Weight (g):	9.096	Thin Section (,2) Description: Tim McCoy, Linda Welzenbach
Meteorite Type:	L Chondrite (Impact Melt)	The section consists dominantly of a fine-grained melt-textured matrix of olivine and pyroxene (1-10 microns) with irregular blebs of metal with rimming sulfide and fragments of mineral grains (2-300 micron grain size.) The mineral compositions are variable; olivine is Fa_{16-29} and orthopyroxene is Fs_{19-22}. The meteorite is an impact melt of an L chondrite precursor. It differs texturally and compositionally from MAC 02497.

Sample No.:	**MAC 02833**	Macroscopic Description: Kathleen McBride
Location:	MacAlpine Hills	Brown/black fusion crust with oxidation haloes covers the entire exterior surface. The interior is a medium gray matrix with high metal and light colored, rust stained chondrules, 1-4 mm in size.
Field No.:	14404	
Dimensions (cm):	4.5 x 4.5 x 3.0	
Weight (g):	134.096	Thin Section (,2) Description: Linda Welzenbach, Tim McCoy
Meteorite Type:	H3 Chondrite (Estimated 3.7)	The section exhibits numerous, well-defined chondrules (up to 3 mm) in a black matrix of silicates, metal and troilite. Weak shock effects are present and polysynthetically twinned pyroxenes are present. The meteorite is mildly weathered. Silicates are unequilibrated; olivines range from Fa_{13-27}, with a peak from Fa_{16-19}, and pyroxenes from Fs_{2-16}. The meteorite is a H3 chondrite (estimated subtype 3.7).

Sample No.:	**MAC 02837** **MAC 02839**	Macroscopic Description: Kathleen McBride
Location:	MacAlpine Hills	50% brown/black fractured fusion crust covers the exterior of these meteorites. The interiors are heavily fractured and very rusty. MAC 02837 was broken into many pieces.
Field No.:	14702; 14701	
Dimensions (cm):	8.0 x 5.5 x 3.5 7.0 x 4.5 x 3.0	Thin Section (,2) Description:Linda Welzenbach, Tim McCoy
Weight (g):	188.639; 110.356	
Meteorite Type:	EL3 Chondrite	The sections show an aggregate of chondrules (up to 1 mm), chondrule fragments, and pyroxene grains in a matrix of about 30% metal and sulfide. Several chondrules contain olivine. Weathering is light, with little staining of enstatite grains and minor alteration of metal and sulfides. Microprobe analyses show the orthopyroxene is Fs_{0-6} and metal contains 0.7 wt.% Si. The meteorites are EL3 chondrites and are almost certainly paired.

Sample No.:	**PCA 02008** **PCA 02017**	Macroscopic Description: Kathleen McBride
Location:	Pecora Escarpment	The exteriors of these diogenites have smooth, shiny black fusion crust. The interiors are fine-grained, medium gray matrix with light gray and cream colored inclusions.
Field No.:	13678; 13650	
Dimensions (cm):	3.0 x 2.0 x 2.0 2.0 x 1.5 x 0.5	Thin Section (,2) Description: Tim McCoy, Linda Welzenbach
Weight (g):	19.097; 2.352	
Meteorite Type:	Diogenite	These sections show a groundmass of coarse (up to 2 mm) comminuted pyroxene with minor SiO_2, olivine (Fa_{25-29}) and plagioclase (An_{90}). Orthopyroxene has a composition of $Fs_{17-26}Wo_{2-3}$ and an Fe/Mn ratio of ~28-30. The meteorites are diogenites and are probably paired.

Sample No.:	**PCA 02009** **PCA 02013** **PCA 02014** **PCA 02015** **PCA 02018** **PCA 02019**	
Location:	Pecora Escarpment	
Field No.:	13655; 13622 13693; 13637 13636; 13646	
Dimensions (cm):	3.0 x 2.0 x 2.25 5.0 x 3.0 x 2.25 3.5 x 2.5 x 1.5 3.5 x 2.5 x 1.5 2.0 x 1.25 x 1.0 2.5 x 2.5 x 1.5	
Weight (g):	22.509; 40.961 21.244; 16.794 3.058; 11.701	
Meteorite Type:	Howardite	

Macroscopic Description: Kathleen McBride

Fusion crust ranges from black to brown and is shiny and glassy with oxidation haloes. The interiors of these howardites are a gray to black matrix with some oxidation and multicolored inclusions.

Thin Section (,2) Description: Tim McCoy, Linda Welzenbach

These sections are similar enough that a single description will suffice. Each show a groundmass of comminuted pyroxene (up to 2 mm) and plagioclase with fine- to coarse-grained basaltic, impact-melt and diogentitic clasts ranging up to 3 mm. Minerals include abundant orthopyroxene with compositions ranging from $Fs_{17-60}Wo_{2-8}$ (Fe/Mn ~29), augite of $Fs_{\sim 40}$, plagioclase (An_{90-95}) and SiO_2. These meteorites are howardites. They are almost certainly paired with each other and with PCA 02016.

Sample No.:	**PCA 02011** **PCA 02012**	
Location:	Pecora Escarpment	
Field No.:	13616; 13657	
Dimensions (cm):	2.5 x 1.25 x 0.5 4.0 x 3.5 x 3.0	
Weight (g):	2.613; 58.922	
Meteorite Type:	CM2 Chondrite	

Macroscopic Description: Kathleen McBride

5-10% of the exteriors have a purplish black fusion crust with rough areas and a slight sheen. The interiors reveal a black charcoal-like, platy matrix, with tiny white and tan inclusions.

Thin Section (,2) Description: Linda Welzenbach, Tim McCoy

The sections consist of a few small chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; rare metal and sulfide grains are present. Olivine compositions are Fa_{0-43}, with a peak at Fa_{0-2}, orthopyroxene is Fs_{0-5}. The matrix consists dominantly of an Fe-rich serpentine; chondrules are relatively unaltered. The meteorites are CM2 chondrites and probably paired.

Sample Request Guidelines

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 have a supervising scientist listed to confirm access to facilities for analysis. All sample requests will be reviewed in a timely manner. For sample requests that do not meet the curatorial guidelines the Meteorite Working Group (MWG) will review those requests. 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 agency. As a matter of policy, U.S. Antarctic meteorites are the property of the National Science Foundation, and all allocations are subject to recall.

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 Contributions to the Earth Sciences*: Nos. 23, 24, 26, 28, and 30. Tables containing all classified meteorites (as of July 2003) have been published in the Meteoritical Bulletins 76, 79, and 82-87, available in the following volumes and pages of *Meteoritics* and *Meteoritics and Planetary Science*: 29, p. 100-143; 31, A161-A174; 33, A221-A240; 34, A169-A186; 35, A199-A225; 36, A293-A322; 37, A157-A184; 38, p. A189-A248. They are also available online at:

http://www.meteoriticalsociety.org/simple_template.cfm?code=pub_bulletin

The most current listing is found online at:

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

All sample requests should be made electronically using the form at:

http://curator.jsc.nasa.gov/curator/antmet/samreq.htm

The purpose of the sample request form is to obtain all information MWG needs prior to their deliberations to make an informed decision on the request. Please use this form if possible.

The preferred method of request transmittal is via e-mail. Please send requests and attachments to:

cecilia.e.satterwhite1@jsc.nasa.gov

Type **MWG Request** in the e-mail subject line. Please note that the form has signature blocks. The signature blocks should only be used if the form is sent via Fax or mail.

Each request should accurately refer to meteorite samples by their respective identification numbers and should provide detailed scientific justification for proposed research. Specific requirements for samples, such as sizes or weights, particular locations (if applicable) within individual specimens, or special handling or shipping procedures should be explained in each request. Some meteorites are small, of rare type, or are considered special because of unusual properties. Therefore, it is very important that all requests specify both the optimum amount of material needed for the study and the minimum amount of material that can be used. Requests for thin sections that will be used in destructive procedures such as ion probe, laser ablation, etch, or repolishing must be stated explicitly.

Consortium requests should list the members in the consortium. All necessary information should be typed on the electronic form, although informative attachments (reprints of publication that explain rationale, flow diagrams for analyses, etc.) are welcome.

The Meteorite Working Group (MWG), is 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. The deadline for submitting a request is 2 weeks prior to the scheduled meeting.

Requests that are received by the MWG secretary by **March 05, 2004** deadline will be reviewed at the MWG meeting **March 19-20, 2004** in Houston, TX. Requests that are received after the deadline may be delayed for review until MWG meets again in the Fall of 2004. **Please submit your requests on time.** Questions pertaining to sample requests can be directed to the MWG secretary by e-mail, fax or phone.

Antarctic Meteorite Laboratory Contact Numbers

Kevin Righter
Curator
Mail code ST
NASA Johnson Space Center
Houston, Texas 77058
(281) 483-5125
kevin.righter-1@nasa.gov

Cecilia Satterwhite
Lab Manager/MWG Secretary
Mail code ST
NASA Johnson Space Center
Houston, Texas 77058
(281) 483-6776
cecilia.e.satterwhite1@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 Compendium	http://www-curator.jsc.nasa.gov/curator/antmet/mmc/mmc.htm
Antarctic collection	http://www.cwru.edu/affil/ansmet
LPI martian meteorites	http://www.lpi.usra.edu
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.psrd.hawaii.edu/index.html
Meteoritical Society	http://www.meteoriticalsociety.org/
Meteoritics and Planetary Science	http://meteoritics.org/
Meteorite! Magazine	http://www.meteor.co.nz
Geochemical Society	http://www.geochemsoc.org
Washington Univ. Lunar Meteorite	http://epsc.wustl.edu/admin/resources/moon_meteorites.html
Washington Univ. “meteor-wrong”	http://epsc.wustl.edu/admin/resources/meteorites/meteorwrongs/meteorwrongs.htm

Other Websites of Interest

Mars Exploration	http://mars.jpl.nasa.gov
Rovers	http://marsrovers.jpl.nasa.gov
Near Earth Asteroid Rendezvous	http://near.jhuapl.edu/
Stardust Mission	http://stardust.jpl.nasa.gov
Genesis Mission	http://genesismission.jpl.nasa.gov
ARES	http://ares.jsc.nasa.gov/