Antarctic Meteorite Newsletter

Volume 38, Number 1 February 2015

Curator's Comments

Kevin Righter, NASA-JSC

New Meteorites

This newsletter reports 123 new meteorites from the 2010, 2011, and 2012 ANSMET seasons from the La Paz Icefield (LAP10), Dominion Range (DOM10), Miller Range (MIL11), Larkman Nunatak (LAR12) and Szabo Bluff (SZA12) areas. Diversity rules again, as this newsletter includes detailed descriptions for 5 new irons, a mesosiderite, a eucrite, an EL6 chondrite, and 10 carbonaceous chondrites (1 CM2, 1 CK5, 1 CH3, and 7 paired CO3s).

This newsletter includes the last remaining samples to be classified from the 2011-2012 season in the Miller Range. Notable samples from the 2011 season include: an unusual hornblende- and biotite-bearing R6 chondrite (MIL 11207), 1 iron meteorite (IIIAB), EH3 and an EL6 chondrites, 16 HEDs (3 howardites, 5 eucrites and 8 diogenite), and 51 carbonaceous chondrites including 1 CR2, 1 CH3, 2 CV3, 4 CM2, and 35 CO3 that are part of a large CO3 pairing group from the Miller Range.

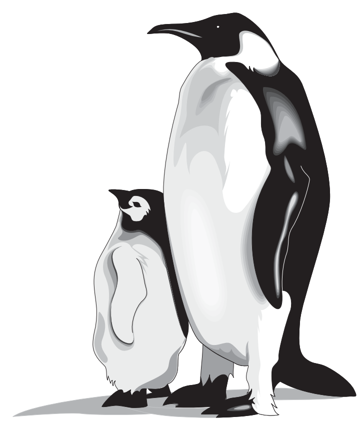
Book about the US Antarctic Meteorite Program

The past several years, the staff of the US Antarctic meteorite collection has been working on a book project with AGU and Wiley. The book, entitled "35 Seasons of U.S. Antarctic Meteorites: A Pictorial Guide to the Collection" (editors K. Righter, C.M. Corrigan, T.J. McCoy, and R.P. Harvey), released in December 2014, is now available through Wiley. The book covers the history, field operations, curation and statistical aspects of the collection, and contains feature articles on primitive chondrites, achondrites, lunar and martian meteorites, unusual meteorites (misfits), and exposure histories. At the center of the book there are color plates dedicated to 80 of the more influential samples in the collection. This book has been long in the making and should be of interest to a wide range of people from undergraduates to graduates to advanced scholars in the field. We hope it is a valuable resource for the meteorite community.

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 6, 2015

MWG Meets
March 21-22, 2015

Reclassification

MIL 11149 was classified as a L6 in the September 2014 (Vol. 37 No. 2) newsletter.

Microprobe analyses of this sample have yielded Fa_{18} olivine and Fs_{16} pyroxene, indicating that this sample is instead an H chondrite and it is here re-classified as an H5. The magnetic susceptibility also indicates an H chondrite (c = 5.32 and 5.34 x 10^{-9} m^3/kg).

Report from the Smithsonian

Cari Corrigan

This newsletter announces the description of 123 meteorites from the DOM, MIL, LAR, LAP and SZA field areas and effectively closes out the 2010 and 2011 seasons. Included in this newsletter are interesting new iron meteorites, a new mesosiderite, a CH chondrite, a brecciated eucrite and more of the MIL CO3 pairing group, in addition to others.

We are currently without a Collections Manager after Linda Welzenbach relocated to Texas this past fall. Please bear with us as we navigate the waters of hiring a replacement and as we work to get that new person trained. Please watch for the job ad to come out and spread the word if you, or anyone you know, may be interested, but please keep in mind that the position will not include research as part of its performance description.

The Smithsonian is continuing its work on investigating new ways of classifying the equilibrated ordinary chondrites, including attempting to optimize the use of the EDS system on our FEG-SEM to analyze the compositions of the olivine and pyroxene grains. The ability to obtain mineral analyses from each meteorite give us a lasting record for each stone, and a dataset that can be used in the future to understand the distribution of compositions among the ordinary chondrite groups.

We eagerly await the arrival of both the 2013 and 2014 season samples later this spring and reporting on them in the Fall newsletter!

A Summary of the 2014-2015 ANSMET Field Season at the Davis-Ward Icefields

Ralph Harvey, Jim Karner and John Schutt
Case Western Reserve University

After our 2013-2014 field season was impacted by a government shutdown, logistical shortages, and a broken ice-dock, we were looking forward to a "normal" Antarctic field season for 2014-2015. Our target, the icefields surrounding the Davis Nunataks and Mount Ward (affectionately known as the "Davis-Ward" site) had been visited four times previously, including two reconnaissance visits (in 1984-85 and 2003-04) and two systematic search visits (in 2008-09 and 2010-11). All our leadership personnel have spent significant time at the site previously and so we feel that we know it pretty well. The site is relatively compact, about 10 km across, shaped roughly like the state of Michigan with nunataks playing the role of the Great Lakes, surrounding and separating the "mitten" icefield from the UP. On the bad side, confusing terrestrial rocks are abundant; but on the good side, we hadn't seen any extreme weather in the past (the site seems somewhat protected) and the logistics of getting there duplicate many previous ANSMET season in the Beardmore Glacier region. In a nutshell, we felt we understood what we were getting into, barring any surprise developments. We also had a good mix of experienced and new personnel on our team (including Devon Burr, Shannon Walker, Ryan Zeigler, Brian Rougeux, Vinciane DeBaille, Christine Floss and the authors) and our preparations all went smoothly during the pre-season.

There was one pre-season question for which our answers diverged, however- how long it would take to finish our searches at the Davis-Ward site? Barring delays due to weather or logistics, this would be directly related to how many meteorites we might find during systematic searching and more specifically how many of those meteorites would be found in the moraines and nearby blue ice regions where terrestrial rocks are scattered by the millions, requiring slow and methodical foot searching. Without disclosing who held what opinion, one of us (who I shall call "The Optimist") estimated it would take no more than part of a season to finish up Davis-Ward. Thus our plans included a possible camp move to the nearby Dominion Range Icefield late in the season. Another of us ("The Pessimist") believed it would take this season and maybe one or two more. The third individual ("The Politician") agreed and disagreed with both depending on who he had last talked to. The origin of this diversity of opinions was prior test-sampling of the moraines. We routinely do test searches; a few field party members will conduct a quick, limited search of a previously unvisited part of the icefield or moraine, and then we use the results to guide our workplan for the future. At Davis-Ward, these tests had produced bimodal results; some visits produced little in hours of searching, while others resulted in finds within the first minute. Our individual opinions on the meteorite potential of the Davis-Ward moraines was utterly dependent on which test you were a part of. That said, we were uniformly eager to see which opinion would hold true, and of one mind in regards to the value of the meteorites themselves.

The season got underway with only modest delays in mid-December, a very welcome change from last year. The transition from McMurdo Station to Davis-Ward (via the old CTAM site) took only a few days. Given the high density of terrestrial rock on and around these icefields we dedicated several days to searching previously visited locales, with veterans aiding newbies and all of us training or retraining our eyes to distinguish meteorites from native lithologies. Both foot-searching and icefield traverses were conducted, but by the end of the training period it was clear moraine searches were going to be a big part of the season. Moraine Mania reached a climax in the last week of the season, when the team encountered a region containing one of the densest meteorite concentrations we've ever seen, affectionately called "Meteorite Beach". Individual specimens were often found within a meter or two of each other and during one phenomenal day the team found, surveyed and collected over 170 specimens (a new record). There were the inevitable delays due to weather and snowmobile problems, and the season ended a little early due to logistical constraints. Despite these limits on our field time, at season's end the team had recovered a total of 562 specimens; nearly 60% of these came from the moraines and most of the remainder came from ice within a few hundred meters of the moraine. With the 2013-2014 meteorites (returning after storage in Antarctica for a year) there will be nearly 900 new meteorites arriving at JSC this spring.

And at season's end there is no longer any disagreement about the future workload at Davis-Ward; we'll be going back there for at least one full season and maybe more than once. Any region of these icefields, moraine or not, has the potential to surprise us with significant meteorite concentrations. While reconnaissance generally gives us an idea of the potential for meteorite recovery, there is no way to predict where amazing concentrations or occurrences might be, and clearly Davis-Ward is a place we can't afford to trust our instincts; we simply have to put our boots on the ice and go have a look.

A view of "Meteorite Beach", one of many segments of moraine at the Davis-Ward icefields exhibiting a very dense meteorite concentration. Each flag marks the location of at least one meteorite. (photo by Ryan Zeigler)

New Meteorites

2010-2012 Collection

Pages 5-14 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 38(2), Sept. 2014. 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 initial 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:

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Houston, Texas

Cari Corrigan, Tim McCoy, and Pamela Salyer
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
BUC	—	Buckley Island
CMS	—	Cumulus Hills
CRA	—	Mt.Cranfield Ice Field
CRE	—	Mt. Crean
DAV	—	David Glacier
DEW	—	Mt. DeWitt
DNG	—	D'Angelo Bluff
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
LAR	—	Larkman Nunatak
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
PRA	—	Mt. Pratt
PRE	—	Mt. Prestrud
QUE	—	Queen Alexandra Range
RBT	—	Roberts Massif
RKP	—	Reckling Peak
SAN	—	Sandford Cliffs
SCO	—	Scott Glacier
STE	—	Stewart Hills
SZA	—	Szabo Bluff
TEN	—	Tentacle Ridge
TIL	—	Thiel Mountains
TYR	—	Taylor Glacier
WIS	—	Wisconsin Range
WSG	—	Mt. Wisting

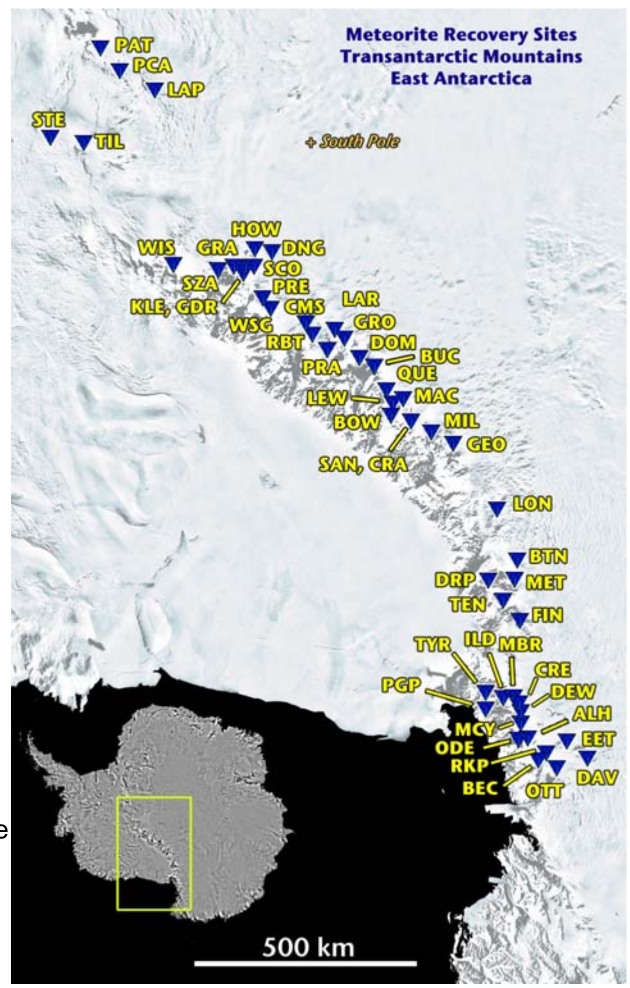

Table 1

List of Newly Classified Antarctic Meteorites **

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10122	170.7	MESOSIDERITE	A/B	A	24	26
DOM 10660	23.5	IRON-IAB (ANOMALOUS)				
DOM 10751	8.6	L5 CHONDRITE	B	A/B	25	20
LAP 10014	1488.9	EL6 CHONDRITE	B	A/B		0-1
MIL 11001 ~	1136.8	H5 CHONDRITE	B/C	A		
MIL 11002 ~	288.7	H5 CHONDRITE	C	B		
MIL 11003 ~	405.7	L5 CHONDRITE	B	B		
MIL 11004 ~	192.9	L6 CHONDRITE	B/C	A/B		
MIL 11005 ~	224.8	L6 CHONDRITE	B/C	B		
MIL 11006 ~	295.6	L6 CHONDRITE	C	B		
MIL 11025	6.6	CM2 CHONDRITE	A	B/C	0-50	
MIL 11090 ~	547.0	LL6 CHONDRITE	Be	B		
MIL 11091 ~	400.1	L5 CHONDRITE	B	B		
MIL 11092	191.7	H5 CHONDRITE	B	A	18	16
MIL 11093 ~	153.5	L5 CHONDRITE	B	A		
MIL 11094 ~	120.0	LL6 CHONDRITE	B	A/B		
MIL 11095 ~	167.8	L6 CHONDRITE	C	A/B		
MIL 11096 ~	198.9	L6 CHONDRITE	B/C	A		
MIL 11098 ~	7.1	L5 CHONDRITE	C	A/B		
MIL 11130	12.6	CO3 CHONDRITE	A	A	0-68	
MIL 11131 ~	7.9	L5 CHONDRITE	B	A/B		
MIL 11132	10.6	CO3 CHONDRITE	A	A/B	0-60	4
MIL 11133 ~	19.4	L6 CHONDRITE	B	B		
MIL 11134 ~	7.8	H6 CHONDRITE	B	A/B		
MIL 11135	6.8	H5 CHONDRITE	C	B	18	16
MIL 11136 ~	12.1	LL5 CHONDRITE	A	A/B		
MIL 11137 ~	13.6	L6 CHONDRITE	B	A		
MIL 11138 ~	12.4	L6 CHONDRITE	B	B		
MIL 11139	16.3	CO3 CHONDRITE	A	A/B	0-65	46
MIL 11178	9.3	CO3 CHONDRITE	A/Be	A/B	0-43	9
MIL 11180 ~	5.5	H5 CHONDRITE	B/C	B		
MIL 11181 ~	4.7	H6 CHONDRITE	B/C	A/B		
MIL 11182 ~	9.2	L6 CHONDRITE	B/C	A		
MIL 11183 ~	3.4	L6 CHONDRITE	B/C	A		
MIL 11184 ~	6.6	L6 CHONDRITE	B	A		
MIL 11185 ~	13.0	H6 CHONDRITE	B	A		
MIL 11186 ~	10.4	L6 CHONDRITE	C	A		
MIL 11187	10.1	CO3 CHONDRITE	A	A/B	0-56	
MIL 11188	7.4	H4 CHONDRITE	A/B	A/B	18	
MIL 11189 ~	14.2	H6 CHONDRITE	B/C	A/B		
MIL 11190 ~	9.2	L6 CHONDRITE	B/C	A		
MIL 11191 ~	7.1	L6 CHONDRITE	B	A		
MIL 11192 ~	7.4	L6 CHONDRITE	B/C	A		
MIL 11193	5.8	CO3 CHONDRITE	A	B	1-49	2-6
MIL 11194 ~	5.9	L6 CHONDRITE	B/C	A		
MIL 11195 ~	10.7	H5 CHONDRITE	B/C	A		
MIL 11196 ~	5.7	H6 CHONDRITE	B/C		A/B	
MIL 11200	74.6	IRON-IIIAB				

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MIL 11208	~	3654.0	LL6 CHONDRITE	A/B	A/B		
MIL 11209	~	561.9	LL6 CHONDRITE	A/Be	A/B		
MIL 11213		102.7	CO3 CHONDRITE	A	A	0-57	2
MIL 11240	~	399.5	L5 CHONDRITE	B	A		
MIL 11241	~	262.6	LL6 CHONDRITE	A/B	A/B		
MIL 11242		183.3	H4 CHONDRITE	B/C	B	18	16
MIL 11243	~	88.3	L6 CHONDRITE	B/C	B		
MIL 11244	~	80.2	LL6 CHONDRITE	A	C		
MIL 11245	~	76.2	L6 CHONDRITE	B	B/C		
MIL 11246	~	62.7	LL6 CHONDRITE	B	B		
MIL 11247	~	51.8	L5 CHONDRITE	B/C	A/B		
MIL 11248	~	74.2	L6 CHONDRITE	B/C	B		
MIL 11249	~	65.2	L6 CHONDRITE	B	A		
MIL 11283		0.2	EUCRITE (BRECCIATED)	B	A		33-63
MIL 11285		0.9	CH3 CHONDRITE	B	A	2-40	1-4
MIL 11299	~	1926.6	H5 CHONDRITE	B/C	A		
MIL 11300	~	5276.5	LL5 CHONDRITE	B/C	B		
MIL 11301	~	16710.0	L6 CHONDRITE	B/C	C		
MIL 11302	~	191.9	L5 CHONDRITE	C	B		
LAR 12059		171.3	IRON-IAB			5	2-6
LAR 12101	~	65.5	L6 CHONDRITE	B	A		
LAR 12102	~	115.7	LL6 CHONDRITE	A/Be	A/B		
LAR 12103	~	69.1	L5 CHONDRITE	B	A		
LAR 12104	~	66.2	LL6 CHONDRITE	A/B	A/B		
LAR 12138		184.7	IRON-IVB				
LAR 12204		15.4	IRON-IIAB				
LAR 12255	~	77.0	L6 CHONDRITE	B	A		
LAR 12256	~	58.2	LL6 CHONDRITE	Be	A		
LAR 12257	~	69.9	L6 CHONDRITE	B	A		
LAR 12258	~	43.9	LL6 CHONDRITE	A/B	A		
LAR 12259	~	33.7	L6 CHONDRITE	B	B		
LAR 12260	~	24.0	L6 CHONDRITE	B	A/B		
LAR 12261	~	17.5	L6 CHONDRITE	B	B		
LAR 12263	~	10.9	LL5 CHONDRITE	A/B	A/B		
LAR 12264	~	17.2	L6 CHONDRITE	B	A		
LAR 12265		14.3	CK5 CHONDRITE	B/C	B	34	
LAR 12266	~	12.5	L6 CHONDRITE	A/B	B		
LAR 12267		20.7	L4 CHONDRITE	B/C	B	26	21
LAR 12268	~	33.2	L6 CHONDRITE	B	B		
LAR 12269		58.3	H5 CHONDRITE	B	A	18	16
SZA 12401	~	151.3	L5 CHONDRITE	B	A/B		
SZA 12402	~	200.6	LL5 CHONDRITE	A/Be	B		
SZA 12403	~	171.5	LL5 CHONDRITE	A/B	A/B		
SZA 12404	~	372.6	L5 CHONDRITE	B/C	B/C		
SZA 12406	~	68.6	LL5 CHONDRITE	B	B/C		
SZA 12407	~	69.3	LL6 CHONDRITE	A/B	B		
SZA 12408	~	61.6	L6 CHONDRITE	B	B		
SZA 12409	~	42.5	LL5 CHONDRITE	B	B		
SZA 12410	~	67.2	LL5 CHONDRITE	B	A/B		
SZA 12411	~	203.8	LL5 CHONDRITE	A/B	B		
SZA 12412	~	54.4	L6 CHONDRITE	B	B		
SZA 12413	~	53.3	LL6 CHONDRITE	A/B	B		
SZA 12414	~	40.4	L5 CHONDRITE	B	A/B		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
SZA 12415 ~	34.7	L6 CHONDRITE	A/B	A/B		
SZA 12416 ~	30.8	LL6 CHONDRITE	B	A/B		
SZA 12417 ~	31.5	LL6 CHONDRITE	B	A/B		
SZA 12418 ~	31.8	LL6 CHONDRITE	A/B	A		
SZA 12419 ~	25.5	LL6 CHONDRITE	B	B		
SZA 12420 ~	44.5	LL6 CHONDRITE	A/B	B		
SZA 12421 ~	61.3	L6 CHONDRITE	B	A/B		
SZA 12422 ~	49.2	LL6 CHONDRITE	B	A		
SZA 12423 ~	32.2	LL6 CHONDRITE	A	B		
SZA 12424 ~	36.2	L5 CHONDRITE	B	B		
SZA 12425 ~	28.2	L5 CHONDRITE	B	B		
SZA 12426 ~	29.5	LL6 CHONDRITE	A	A/B		
SZA 12427	20.0	L5 CHONDRITE	B	A/B	24	21
SZA 12428 ~	34.8	LL6 CHONDRITE	A	A		
SZA 12429 ~	20.6	LL5 CHONDRITE	B	A/B		
SZA 12433	12.0	L5 CHONDRITE	B	B	24	21
SZA 12434 ~	18.9	LL5 CHONDRITE	A	B		
SZA 12435 ~	16.6	LL6 CHONDRITE	A	A/B		
SZA 12436 ~	16.0	LL6 CHONDRITE	B	B		
SZA 12437	14.2	L4 CHONDRITE	B	A/B	24	20
SZA 12438 ~	23.2	LL6 CHONDRITE	A	A/B		
SZA 12439 ~	20.2	LL5 CHONDRITE	B/C	A/B		

Reclassified from Fall 2014 Newsletter:

MIL 11149	5.5	H5 CHONDRITE	A/Be	B	18	16

Table 2

Newly Classified Specimens Listed By Type

Achondrites

Sample Number	Weight(g)	Classification	Weathering	Fracturing	% Fa	% Fs
MIL 11283	0.2	EUCRITE (BRECCIATED)	B	A		33-63

Carbonaceous Chondrites

Sample Number	Weight(g)	Classification	Weathering	Fracturing	% Fa	% Fs
MIL 11285	0.9	CH3 CHONDRITE	B	A	2-40	1-4
LAR 12265	14.3	CK5 CHONDRITE	B/C	B	34	
MIL 11025	6.6	CM2 CHONDRITE	A	B/C	0-50	
MIL 11130	12.6	CO3 CHONDRITE	A	A	0-68	
MIL 11132	10.6	CO3 CHONDRITE	A	A/B	0-60	4
MIL 11139	16.3	CO3 CHONDRITE	A	A/B	0-65	46
MIL 11178	9.3	CO3 CHONDRITE	A/Be	A/B	0-43	9
MIL 11187	10.1	CO3 CHONDRITE	A	A/B	0-56	
MIL 11193	5.8	CO3 CHONDRITE	A	B	1-49	2-6
MIL 11213	102.7	CO3 CHONDRITE	A	A	0-57	2

E Chondrites

Sample Number	Weight(g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 10014	1488.9	EL6 CHONDRITE	B	A/B		0-1

Irons

Sample Number	Weight(g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAR 12059	171.3	IRON-IAB			5	2-6
DOM 10660	23.5	IRON-IAB (ANOMALOUS)				
LAR 12204	15.4	IRON-IIAB				
LAR 12138	184.7	IRON-IVB				

Stony Irons

Sample Number	Weight(g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10122	170.7	MESOSIDERITE	A/B	A	24	26

**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.

The ~ indicates classification by optical methods. This can include macroscopic assignment to one of several well-characterized, large pairing groups (e.g., the QUE LL5 chondrites), as well as classification based on oil immersion of several olivine grains to determine the approximate index of refraction for grouping into H, L or LL chondrites. Petrologic types in this method are determined by the distinctiveness of chondrules boundaries on broken surfaces of a 1-3 g chip. While this technique is suitable for general characterization and delineation of equilibrated ordinary chondrites, those undertaking detailed study of any meteorite classified by optical methods alone should use caution. It is recommended that a polished thin section be requested to accompany any chip and appropriate steps for a more detailed characterization should be undertaken by the user. (Tim McCoy, Smithsonian Institution)

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 the Antarctic Meteorite Newsletter vol. 9 (no. 2) (June 1986). Possible pairings were updated in Meteoritical Bulletins 76, 79, 82 through 102, which are available online from the Meteoritical Society webpage:

http://www.lpi.usra.edu/meteor/metbull.php

CO3 CHONDRITE

MIL 11130, MIL 11132, MIL 11139, MIL 11178, MIL 11187, MIL 11193 and MIL 11213 with MIL 07099

Petrographic Descriptions

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10122	Dominion Range	21358	5.0 x 4.0 x 3.0	170.66	Mesosiderite

Macroscopic Description: Cari Corrigan and Tim McCoy
The main mass of this meteorite is slightly flattened. The surface shows numerous pits and indentations, some of which have exposed silicates within them. The entire surface is brown and rust haloes are frequent.

Thin Section (,2) Description: Cari Corrigan and Tim McCoy
This section is a subequal mixture of metal and silicates. Silicates are dominantly pyroxene ($Fs_{26}Wo_2$) and feldspar ($An_{90}Or_{0.5}$) with rare olivine (Fa_{24}), phosphates and silica. The metal consists of kamacite with lesser taenite (exhibiting rims of tetrataenite) and polycrystalline troilite. Fusion crust is present on one edge of the section and á2 structure reaches approximately 2 mm into the sample from that edge. The meteorite is a mesosiderite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10660	Dominion Range	17254	2.75 x 2.0 x 3.0	23.48	Iron-IAB (Anomalous)

Macroscopic Description: Cari Corrigan and Tim McCoy
The main mass of this meteorite is roughly triangular in cross section with an irregular bumpy, brown surface and occasional rust haloes across the entire surface.

Thin Section (,2) Description: Cari Corrigan and Tim McCoy
A 1.0 x 1.5 cm slice of this meteorite was examined. This section consists of equidimensional kamacite grains up to 2.5 mm wide with interstitial ribbons of taenite and schreibersite. At the edges of the meteorite, kamacite exhibits the á2 structure. Within and crosscutting kamacite grains are swarms (up to 1 mm in size) of equant graphite crystals up to 50 microns in maximum dimension (in one case, associated with sulfide). The shape of the graphite crystals is largely controlled by the structure of the metal. Elongate areas reaching 4 mm in length are also composed of swarms of elongate graphite. The average composition based on a microprobe traverse of 100 points is 8.9 wt% Ni, 0.9 wt% P. The meteorite is anomalous but may be related to graphite-rich IAB irons, e.g. Kendall County.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
LAP 10014	LaPaz Icefield	22331	12.0 x 12.0 x 7.0	1488.9	EL6 Chondrite

Macroscopic Description: Cecilia Satterwhite
Half of the exterior is covered with black/brown fusion crust and heavy oxidation. Some areas are rusty and evaporites are present. The interior is a dark gray to black matrix with metal and some oxidation. This meteorite was very difficult to break.

Thin Section (,4) Description: Cari Corrigan and Tim McCoy
This meteorite consists largely of prismatic or granular enstatite (grain size 0.1-0.2 mm) and nickel-iron, and minor amounts of sulfide and plagioclase. Only vague traces of chondritic structure are visible in this section. One end of the section exhibits a metal grain (8 x 3 mm) that is dominantly composed of iron nickel metal with rounded troilite-daubreelite inclusions up to 700 microns across, and lathes of graphite up to 1 mm in length. A single grain of sinoite was also observed in the section. Microprobe analyses show that the enstatite is almost pure $MgSiO_3$ ($Fs_{0.1-0.4}$). The meteorite is an EL6 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 11025	Miller Range	23871	2.5 x 1.5 x 1.5	6.635	CM2 Chondrite

Macroscopic Description: Mitchell Haller

The exterior has 40% black fusion crust, areas without fusion crust are greenish in color. The interior is a black matrix with little to no weathering. White inclusions are visible.

Thin Section (,2) Description: Cari Corrigan and Tim McCoy

This section consists of a few small chondrules (up to 0.5 mm), mineral grains and CAIs set in a black matrix; rare metal and sulfide grains are present. Olivine compositions are Fa_{0-50}. Aqueous alteration of the matrix is substantial, but the chondrules are only modestly altered. The meteorite is a CM2 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 11130	Miller Range	21574	3.1 x 1.9 x 1.5	12.57	CO3 CHONDRITE
MIL 11132	Miller Range	21593	2.0 x 1.1 x 1.4	10.606	CO3 CHONDRITE
MIL 11139	Miller Range	21586	2.1 x 2.0 x 1.7	16.252	CO3 CHONDRITE
MIL 11178	Miller Range	21462	2.0 x 1.7 x 1.3	9.331	CO3 CHONDRITE
MIL 11187	Miller Range	21459	2.2 x 1.8 x1.1	10.148	CO3 CHONDRITE
MIL 11193	Miller Range	21472	2.1 x 1.2 x 0.8	5.756	CO3 CHONDRITE
MIL 11213	Miller Range	23245	5.0 x 3.7 x 2.6	102.746	CO3 CHONDRITE

Macroscopic Description: Mitchell Haller

All of these carbonaceous chondrites have black fusion crust on exterior surfaces. A few have evaporites. The interiors are a black matrix with gray to white inclusion/chondrules and some oxidation.

Thin Section (,2) Description: Cari Corrigan, Tim McCoy and Pamela Salyer

These sections consist of abundant small (up to 1 mm) chondrules, chondrule fragments and mineral grains in a dark matrix. Metal and sulfide occur both within and rimming the chondrules. Olivine ranges in composition from Fa_{0-68}, with a continuous range of intermediate compositions. Pyroxenes range $Fs_{1-10}Wo_{1-3}$ with one outlier of Fs_{46}. The matrix appears to consist largely of Fe-rich olivine. These meteorites are CO3 chondrites and are likely paired with the large MIL CO3 pairing group.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 11200	Miller Range	21469	3.5 x 3.0 x 1.5	74.6	Iron-IIIAB

Macroscopic Description: Cari Corrigan and Tim McCoy

This meteorite is a dark brown, flight-oriented specimen with an upper surface that exhibits occasional irregularly shaped, deep indentations. The obverse surface is iridescent and exhibits an original surface overlain by a secondary fusion crust. This fusion crust wraps around the meteorite from the front surface.

Thin Section (,2) Description: Cari Corrigan and Tim McCoy

The meteorite exhibits a medium octahedral pattern with kamacite lamellae of 1.5-1.8 mm width, with interstitial ribbons of taenite, comb plessite and schreibersite. No fusion crust is observed but á2 structure extends ~2 mm into the interior over parts of the section. A single sulfide inclusion of 200 microns across is present. Rhabdites are common throughout the meteorite. The average composition based on a microprobe traverse of 100 points is 7.5 wt% Ni, 0.06 wt% P. The meteorite is likely a IIIAB iron.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 11283	Miller Range	22836	0.75 x 0.75 x 0.5	0.23	Eucrite (Brecciated)

Macroscopic Description: Kathleen McBride
The exterior of this eucrite is covered with 100% dark brown to black fusion crust.

Thin Section (,2) Description: Cari Corrigan and Tim McCoy
This meteorite is dominated by exceptionally fine-grained (~200 micron average grain size) clastic material with occasional coarser clasts of pyroxene and plagioclase. These also occur as isolated grains within the matrix. The section is 80% rimmed by fusion crust. Mineral compositions are pyroxene of $Fs_{33-63}Wo_{5-24}$, and plagioclase of $An_{83-90}Or_{0.5}$. The Fe/Mn ratio of the pyroxene is ~30. The meteorite is a brecciated eucrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 11285	Miller Range	22554	1.0 x 0.75 x 0.75	0.85	CH3 Chondrite

Macroscopic Description: Kathleen McBride
The exterior of this carbonaceous chondrite is rusty and dull.

Thin Section (,2) Description: Cari Corrigan and Tim McCoy
The section consists of an aggregate of very small chondrules (less than 0.2 mm), mineral fragments, and metal. Most olivine and pyroxene grains appear quite reduced (less than Fa_5 or Fs_4), although some FeO-rich olivine grains are present (up to Fa_{40}). The meteorite is a CH3 chondrite similar to and could potentially be paired with MIL 090586.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
LAR 12059	Larkman Nunatak	23982	5.0 x 3.0 x 2.7	171.327	Iron-IAB

Macroscopic Description: Cari Corrigan and Tim McCoy
The main mass of this meteorite has two distinct sides, one that is highly irregular and knobby, and one that is smooth and rounded. On one edge of the smooth surface is an area of pronounced iridescence. The entire meteorite is a rusty brown color with frequent to abundant rust haloes.

Thin Section (,2) Description: Cari Corrigan and Tim McCoy
The meteorite exhibits a medium octahedral pattern with kamacite lamellae of 1.5-1.8 mm width, with interstitial ribbons of taenite, comb plessite and schreibersite. Rare fusion crust is observed but á2 structure extends ~2 mm into the interior over parts of the section. Inclusions of olivine, pyroxene, plagioclase, troilite and graphite are present. The average composition based on a microprobe traverse of 100 points is 7.6 wt% Ni, 0.12 wt% P. Olivine compositions are Fa_5, pyroxenes are bimodal, Fs_3Wo_{45} and Fs_6Wo_1, and feldspars are $An_{9-17}Or_{4-6}$. The meteorite is likely a silicate-bearing IAB iron.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
LAR 12138	Larkman Nunatak	23175	5.0 x 3.0 x 2.5	184.739	Iron-IVB

Macroscopic Description: Cari Corrigan and Tim McCoy

This meteorite is generally rounded with a brown surface that exhibits minor rust haloes. The meteorite also shows deep pits, including some that are elongated, in the bottom of which are what appear to be schreibersite or troilite. On the cut surface opposite that used for classification, are skeletal schreibersites.

Thin Section (,2) Description: Cari Corrigan and Tim McCoy

A 2.1 x 2.5 cm slice of this meteorite was examined. Small areas of fusion crust are present in re-entrants on the edge of the meteorite. The bulk of the meteorite is composed of taenite with needlelike lamellae of kamacite and rare schreibersite rimmed by high-Ni taenite. The kamacite lamellae are up to 1 mm in length and are typically 50 microns in width. The average composition based on a microprobe traverse of 100 points is 19.9% Ni, 0.1% P. The meteorite is likely a IVB iron, but the presence of significant schreibersite might point to a relationship with, e.g., the anomalous Tishomingo high-Ni iron.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
LAR 12204	Larkman Nunatak	23141	2.8 x 1.8 x 0.5	15.351	Iron-IIAB

Macroscopic Description: Cari Corrigan and Tim McCoy

The main mass of this meteorite is flattened and has an intermittently dull and lustrous brown surface. The surface shows modest pitting over the entire surface, and frequent rust haloes are present.

Thin Section (,2) Description: Cari Corrigan and Tim McCoy

The meteorite was observed as a slice measuring 7 x 15 mm. Fusion crust appears to be present on one end of the section. The entire interior of the sample is converted to á2, with numerous elongate rhabdites. The average composition based on a microprobe traverse of 100 points is 5.3 wt% Ni and 0.2 wt% P. The meteorite is likely a IIAB iron but it has been heavily shocked or reheated.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
LAR 12265	Larkman Nunatak	23757	2.8 x 2.5 x 1.0	14.261	CK5 Chondrite

Macroscopic Description: Mitchell Haller

55% of the exterior has black fusion crust with a porous texture on top. Areas without fusion crust are a dark gray color. The interior is a dark gray matrix with heavy oxidation in some areas.

Thin Section (,2) Description: Cari Corrigan and Tim McCoy

The section consists of large (up to 1.5 mm), poorly-defined chondrules in a matrix of finer-grained silicates, sulfides and abundant magnetite grains. The meteorite is only slightly weathered, but is extensively shock blackened. Silicates are homogeneous. Olivine is Fa_{34} and pyroxene is $Fs_{11}Wo_{48}$. The meteorite is a CK5 chondrite.

Sample Request Guidelines

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 6, 2015 deadline will be reviewed at the MWG meeting on March 21-22, 2015 in Houston, TX. Requests that are received after the deadline may be delayed for review until MWG meets again in the Fall of 2015. Please submit your requests on time. Questions pertaining to sample requests can be directed to the MWG secretary by e-mail, fax or phone.

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. Sample requests that do not meet the curatorial allocation guidelines will be reviewed by the Meteorite Working Group (MWG). 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 an 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 August 2006 have been published in the Meteoritical Bulletins and *Meteoritics* and *Meteoritics and Planetary Science* (these are listed in Table 3 of this newsletter. 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://curator.jsc.nasa.gov/antmet/us_clctn.cfm

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

http://curator.jsc.nasa.gov/antmet/requests.cfm

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:

JSC-ARES-MeteoriteRequest@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.

Antarctic Meteorite Laboratory Contact Numbers

Please submit request to: **JSC-ARES-MeteoriteRequest@nasa.gov**

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Meteorites On-Line

Several meteorite web sites 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://curator.jsc.nasa.gov/antmet/
JSC Curator, HED Compendium	http://curator.jsc.nasa.gov/antmet/hed/
JSC Curator, Lunar Meteorite Compendium	http://curator.jsc.nasa.gov/antmet/lmc/
JSC Curator, Mars Meteorite Compendium	http://curator.jsc.nasa.gov/antmet/mmc/
ANSMET	http://artscilabs.case.edu/ansmet/
Smithsonian Institution	http://mineralsciences.si.edu/
Lunar Planetary Institute	http://www.lpi.usra.edu
NIPR Antarctic meteorites	http://www.nipr.ac.jp/
Meteoritical Bulletin online Database	http://www.lpi.usra.edu/meteor/metbull.php
Museo Nazionale dell'Antartide	http://www.mna.it/collezioni/catalogo-meteoriti-sede-di-siena
BMNH general meteorites	http://www.nhm.ac.uk/research-curation/research/projects/metcat/search/
Chinese Antarctic meteorite collection	http://birds.chinare.org.cn/en/resourceList/
UHI planetary science discoveries	http://www.psrd.hawaii.edu/index.html
Meteoritical Society	http://www.meteoriticalsociety.org/
Meteoritics and Planetary Science	https://journals.uair.arizona.edu/index.php/maps
Meteorite! Magazine	http://www.meteoritemag.org/
Geochemical Society	http://www.geochemsoc.org
Washington Univ. Lunar Meteorite	http://meteorites.wustl.edu/lunar/moon_meteorites.htm
Washington Univ. "meteor-wrong"	http://meteorites.wustl.edu/meteorwrongs/meteorwrongs.htm
Portland State Univ. Meteorite Lab	http://meteorites.pdx.edu/
Northern Arizona University	http://www4.nau.edu/meteorite/

Other Websites of Interest

OSIRIS-REx	http://osiris-rex.lpl.arizona.edu/
Mars Exploration	http://mars.jpl.nasa.gov
Rovers	http://marsrovers.jpl.nasa.gov/home/
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/
Astromaterials Curation	http://curator.jsc.nasa.gov/