Antarctic Meteorite

NEWSLETTER

INSIDE THIS ISSUE:

Volume 12
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A periodical issued by the Meteorite Working Group to inform scientists of the basic characteristics of specimens recovered in the Antarctic.

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Code SN2, NASA
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SAMPLE REQUEST DEADLINE: APRIL 12, 1989 !!!!

MWG MEETS APRIL 20-22

SAMPLE REQUEST GUIDELINES

All sample requests should be made in writing to:

Secretary, MWG
SN2/Planetary Science Branch
NASA/Johnson Space Center
Houston, TX 77058 USA.

Requests that are received by the MWG Secretary before April 12, 1989 will be reviewed at the MWG meeting on April 20-22, 1989 to be held in Houston. Requests that are received after the April 12 deadline may possibly be delayed for review until the MWG meets again in the fall of 1989. **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 telephone to (713) 483-5135.

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 by the Meteorite Working Group (MWG), a peer-review committee that guides the collection, curation, allocation, and distribution of the U. S. 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 and should provide detailed scientific justification for the 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. Consortium requests should be initialed or countersigned by a member of each group in the consortium. All necessary information should probably be condensable into a one- or two-page letter, although informative attachments (reprints of publications that explain rationale, flow diagrams for analyses, etc.) are welcome.

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 four Smithsonian Contr. Earth Sci.: Nos. 23, 24, 26, and 28.

In case you haven't noticed, the Antarctic Meteorite Newsletter has a new format. It looks like we finally have come into the 1980's just as the 90's are around the corner. The change is welcome and is due to the push from our new graphics person, Anita Dodson, who's a real whiz with a Macintosh mouse!

This newsletter presents classifications of a large number of meteorites from the 1985-1987 collections. Descriptions are given for all meteorites of special petrologic type. Of particular interest is a tiny angrite, LEW87051, which exhibits the unusual mineral compositions of Angra dos Reis and LEW86010, but is texturally distinct from both of the other angrites. The highlights among chondrites are two enstatite chondrites, E3 LEW87223, and E6 LEW87119.

Another category has been added to the weathering index. A lower case "e" appears for any meteorite which has evaporite deposits anywhere in or on the meteorite which are visible to the naked eye. This was recommended to us by Michael Velbel during the Meteoritical Society Meeting last summer. Those interested in a more thorough explanation of the subject should read his paper titled "The Distribution and Significance of Evaporitic Weathering Products on Antarctic Meteorites" in Meteoritics 13, pages 151-159.

The report from the 1988-89 ANSMET team is that 1078 meteorite fragments tentatively representing 909 meteorites were collected from three areas of Antarctica. Two areas previously visited, Lewis Cliff and MacAlpine Hills, yielded 915 and 160 fragments respectively. The third area, Mt. Howe, is an area being considered for an ice runway for C-5A and 747 aircraft flying directly from New Zealand. This area yielded 3 meteorites. Though most of the meteorites are ordinary chondrites, this year's collection did produce a few exciting achondritic, iron and stony iron meteorites. Stay tuned!

The Smithsonian Institution announces publication of the newest in the series of Smithsonian Contributions to Earth Sciences, Number 28. It is entitled "Field and Laboratory Investigations of Meteorites from Victoria Land and the Thiel Mountains Region, Antarctica, 1982-1983 and 1983-1984", and is edited by U. Marvin and G. MacPherson. A limited number of copies of past Contributions on Antarctic meteorites (numbers 23, 24, 26) are still available. Contact Glenn MacPherson, Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560, for more information.

The Meteorite Working Group announces the availability of meteorite educational thin section packages for use in Fall classes. The packages include 12 meteorite thin sections spanning the range of meteorite types. Also provided are petrographic descriptions prepared by Brian Mason, Glenn MacPherson and Roy Clarke of the Smithsonian Institution and Bevan French of NASA. A lucite disc containing chips of various meteorites is also available on request. Contact Marilyn Lindstrom, NASA, Johnson Space Center, Houston Texas, 77058, for information.

FROM 1985-1987 COLLECTIONS

Pages 14 - 20 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 11(2) (August, 1988). Some large (>150g) specimens (regardless of petrologic type) and all "pebble"- sized (<150g) specimens of special petrologic type (carbonaceous chondrite, unequilibrated ordinary chondrite, achondrite, etc.) are represented by separate descriptions. However, some specimens of non-special petrologic type are listed only as single line entries in Table 1. For convenience, new specimens of special petrologic 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:

Rene Martinez, Cecilia Satterwhite,
Carol Schwarz, and Roberta Score
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Smithsonian Institution
Washington, DC

Antarctic Meteorite Locations

ALH	-	Allan Hills
BOW	-	Bowden Neve
BTN	-	Bates Nunatak
DOM	-	Dominion Range
DRP	-	Derrick Peak
EET	-	Elephant Moraine
GEO	-	Geologist Range
GRO	-	Grosvenor Mountains
ILD	-	Inland Forts
LEW	-	Lewis Cliff
MAC	-	MacAlpine Hills
MBR	-	Mount Baldr
MET	-	Meteorite Hills
MIL	-	Miller Range
OTT	-	Outpost Nunatak
QUE	-	Queen Alexandra Range
PCA	-	Pecora Escarpment
PGP	-	Purgatory Peak
RKP	-	Reckling Peak
TIL	-	Thiel Mountains
TYR	-	Taylor Glacier

** 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 1

List of Newly Classified Antarctic Meteorites **

SAMPLE NUMBER	WEIGHT (g)	CLASSIFICATION	WEATHERING	FRACTURING	% Fa	% Fs
ALH 85054	55.3	H-5 CHONDRITE	C	A/B	18	16
ALH 85055	5.8	H-5 CHONDRITE	C	A	18	16
ALH 85086	12.2	H-5 CHONDRITE	B/C	A	18	16
ALH 85088	0.4	H-5 CHONDRITE	C	A	18	16
ALH 85089	1.5	H-5 CHONDRITE	B/C	B	18	16
ALH 85091	31.1	H-5 CHONDRITE	B/C	A	18	16
ALH 85097	61.4	H-5 CHONDRITE	B/C	B	18	16
ALH 85098	6.8	H-5 CHONDRITE	C	A	18	16
ALH 85099	7.1	H-5 CHONDRITE	B/C	A	18	16
ALH 85100	57.7	H-5 CHONDRITE	B	A	18	16
ALH 85101~	8.1	L-6 CHONDRITE	B	B		
ALH 85102	12.6	H-5 CHONDRITE	B	A	18	16
ALH 85103~	86.9	L-6 CHONDRITE	A	B		
ALH 85104	98.9	H-5 CHONDRITE	B/C	B	17	15
ALH 85105~	12.4	L-6 CHONDRITE	A/B	B		
ALH 85107	36.6	H-5 CHONDRITE	B/C	A	18	16
ALH 85108	14.6	H-6 CHONDRITE	C	A	17	15
ALH 85110	22.2	H-5 CHONDRITE	B	B/C	17	15
ALH 85111	12.9	H-5 CHONDRITE	C	B	18	16
ALH 85120	8.2	H-5 CHONDRITE	C	B	18	16
ALH 85122	61.2	H-5 CHONDRITE	B	B	19	16
ALH 85125	18.8	H-5 CHONDRITE	B/C	A/B	17	15
ALH 85126	46.5	H-5 CHONDRITE	B/C	B	17	15
ALH 85127	10.0	H-6 CHONDRITE	C	A/B	19	17
ALH 85133	90.6	H-5 CHONDRITE	B	A/B	17	15
ALH 85134	10.4	H-5 CHONDRITE	C	A	18	16
ALH 85136	75.3	H-6 CHONDRITE	B	B	17	15
ALH 85139	26.0	H-6 CHONDRITE	B	B	17	15
ALH 85140	9.1	H-6 CHONDRITE	B/C	A	19	16
ALH 85141	10.6	H-5 CHONDRITE	C	A	18	16
ALH 85142	50.8	H-5 CHONDRITE	B/C	B	17	16
ALH 85143	17.9	H-5 CHONDRITE	C	A	19	16
ALH 85144	18.3	H-5 CHONDRITE	B	A	18	16
ALH 85145	45.6	H-5 CHONDRITE	C	A/B	18	16
ALH 85146	39.7	H-5 CHONDRITE	A/B	A	18	16
ALH 85150	13.0	L-5 CHONDRITE	B	B	24	19
ALH 85156	32.0	H-6 CHONDRITE	C	A	19	16
LEW 85330	67.0	H-6 CHONDRITE	B/C	A	18	16
LEW 85331	54.3	H-6 CHONDRITE	B/C	A	17	15
LEW 85334	177.0	H-5 CHONDRITE	B/C	A	18	16
LEW 85335	106.7	H-6 CHONDRITE	C	A/B	17	15
LEW 85336	60.0	H-5 CHONDRITE	B/C	A	18	16
LEW 85338	99.4	H-5 CHONDRITE	B	B/C	16	14
LEW 85341	76.1	H-5 CHONDRITE	C	A	17	15
LEW 85343	78.0	L-4 CHONDRITE	A	A	22	18

~ Classified by using refractive indices.

Table 1 (cont.)

SAMPLE NUMBER	WEIGHT (g)	CLASSIFICATION	WEATHERING	FRACTURING	% Fa	% Fs
LEW 85357	61.4	H-5 CHONDRITE	B/C	B	18	16
LEW 85371	55.3	H-5 CHONDRITE	C	A	18	16
LEW 85393	51.3	H-5 CHONDRITE	Be	B	18	15
LEW 85405	62.8	H-5 CHONDRITE	B/C	A/B	19	16
LEW 85412	70.9	H-6 CHONDRITE	C	A	19	16
LEW 85433	57.3	H-5 CHONDRITE	C	A/B	18	17
LEW 85472	66.6	L-6 CHONDRITE	B/C	A	23	20
ALH 87900~	8000.0	L-6 CHONDRITE	B	A/B		
ALH 87901	21.5	H-6 CHONDRITE	A/B	A	18	16
ALH 87902~	77.3	L-6 CHONDRITE	C	A		
ALH 87903	32.2	L-4 CHONDRITE	A/B	A	23	9-24
ALH 87904	27.2	L-4 CHONDRITE	B/C	A	23	9-24
ALH 87905~	28.3	L-6 CHONDRITE	A/B	A		
ALH 87906	51.6	LL-6 CHONDRITE	A	A	31	24
EET 87502~	1810.1	L-6 CHONDRITE	Ae	A		
EET 87533~	7364.8	L-6 CHONDRITE	B	B		
EET 87536~	7526.4	L-6 CHONDRITE	B/C	B		
EET 87537	3702.0	H-5 CHONDRITE	B/Ce	B	17	15
EET 87538~	11894.0	L-6 CHONDRITE	B	A/B		
EET 87539	2928.5	H-5 CHONDRITE	Be	A	18	16
EET 87541	1161.4	L-6 CHONDRITE	A	A	24	20
EET 87542	608.6	EUCRITE	A	A		24-55
EET 87544	1499.4	LL-4 CHONDRITE	B/C	A	32	23-30
EET 87545	486.3	H-5 CHONDRITE	C	A	18	16
EET 87546	2018.2	H-6 CHONDRITE	Ce	C	18	16
EET 87547	1223.2	H-6 CHONDRITE	A/B	A	17	15
EET 87548	560.2	EUCRITE	B/C	A		16-45
EET 87549~	538.6	L-6 CHONDRITE	Be	A/B		
EET 87550	1639.8	H-5 CHONDRITE	C	A	18	16
EET 87551	476.0	H-5 CHONDRITE	Be	B	17	15
EET 87552~	535.1	H-6 CHONDRITE	B/C	A		
EET 87553	682.2	H-4 CHONDRITE	C	A	15	12-18
EET 87554~	1293.5	L-6 CHONDRITE	B	A		
EET 87556~	362.6	L-6 CHONDRITE	A	A/B		
EET 87557	745.3	L-4 CHONDRITE	A/B	A	24	17-21
EET 87558	306.4	L-5 CHONDRITE	A/B	A	23	19
EET 87559~	584.2	L-6 CHONDRITE	A	A		
EET 87560~	389.9	L-6 CHONDRITE	C	A		
EET 87561~	304.6	L-6 CHONDRITE	A/B	A		
EET 87562~	308.3	H-6 CHONDRITE	B/C	A		
EET 87563~	300.4	H-6 CHONDRITE	C	A		
EET 87564	471.0	L-4 CHONDRITE	B/Ce	A/B	22	18-26
EET 87565	343.7	H-6 CHONDRITE	C	A	17	15
EET 87566~	388.1	L-6 CHONDRITE	C	A		
EET 87567~	298.5	L-6 CHONDRITE	A	A		
EET 87568~	305.7	L-6 CHONDRITE	A	A		

~ Classified by using refractive indices.

Table 1 (cont.)

SAMPLE NUMBER	WEIGHT (g)	CLASSIFICATION	WEATHERING	FRACTURING	% Fa	% Fs
LEW 87083	82.9	L-6 CHONDRITE	B/C	A	23	19
LEW 87090~	12.5	L-6 CHONDRITE	B/C	A		
LEW 87091~	4.0	H-6 CHONDRITE	B/C	A		
LEW 87092~	15.3	H-6 CHONDRITE	B/C	A		
LEW 87095	75.3	H-5 CHONDRITE	A/B	A	17	15
LEW 87102~	15.8	H-6 CHONDRITE	B/C	A		
LEW 87104~	9.6	H-6 CHONDRITE	B/C	A		
LEW 87105~	15.9	H-6 CHONDRITE	B/C	A		
LEW 87106~	81.6	H-6 CHONDRITE	B/C	A		
LEW 87107~	20.4	L-6 CHONDRITE	C	A		
LEW 87113~	97.8	L-6 CHONDRITE	B	A		
LEW 87114~	3.1	L-6 CHONDRITE	B/C	A		
LEW 87118	27.2	L-6 CHONDRITE	B	A	24	19
LEW 87119	12.0	E-6 CHONDRITE	C	B		0.5
LEW 87120~	6.3	L-6 CHONDRITE	B/C	A		
LEW 87122~	2.1	L-6 CHONDRITE	B	A/B		
LEW 87123~	43.9	LL-6 CHONDRITE	A	A		
LEW 87125~	4.3	H-6 CHONDRITE	B/C	A		
LEW 87126~	15.8	L-6 CHONDRITE	B/C	A		
LEW 87135~	11.0	L-6 CHONDRITE	B/C	A		
LEW 87136	4.0	H-5 CHONDRITE	B/C	A	18	16
LEW 87140~	7.7	LL-6 CHONDRITE	B/C	A		
LEW 87142~	4.1	H-6 CHONDRITE	B/C	A		
LEW 87143~	112.9	L-6 CHONDRITE	A/B	A		
LEW 87145~	9.7	L-6 CHONDRITE	A/B	A		
LEW 87146~	2.0	LL-6 CHONDRITE	A	A		
LEW 87148	42.5	CARBONACEOUS C2	Ae	A	0-22	2-58
LEW 87149~	2.1	L-6 CHONDRITE	B/C	A		
LEW 87151	21.5	LL-6 CHONDRITE	B	B/C	27	23
LEW 87152~	0.6	L-6 CHONDRITE	B	A		
LEW 87153~	34.1	L-6 CHONDRITE	B	A		
LEW 87154~	61.4	H-6 CHONDRITE	B/C	A		
LEW 87155	54.0	H-5 CHONDRITE	C	A	17	15
LEW 87158~	28.9	L-6 CHONDRITE	B/C	A		
LEW 87159~	0.3	LL-6 CHONDRITE	B/C	A		
LEW 87161~	20.0	H-6 CHONDRITE	B/C	B		
LEW 87165	5.0	UREILITE	B	A	15	13
LEW 87166~	122.7	L-6 CHONDRITE	B	A		
LEW 87169~	169.8	L-6 CHONDRITE	B	A		
LEW 87170~	0.2	L-6 CHONDRITE		A		
LEW 87171	95.6	H-5 CHONDRITE	B/C	A	16	15
LEW 87172	93.2	H-5 CHONDRITE	B/C	A	17	15
LEW 87173~	45.1	L-6 CHONDRITE	B	B		
LEW 87174~	101.5	L-6 CHONDRITE	A/B	A		
LEW 87175~	127.4	L-6 CHONDRITE	B	A		
LEW 87179~	4.9	L-6 CHONDRITE	B	A		
LEW 87181~	38.3	LL-6 CHONDRITE	A	A		
LEW 87182~	60.1	L-6 CHONDRITE	B/C	A		

~ Classified by using refractive indices.

Table 1 (cont.)

SAMPLE NUMBER	WEIGHT (g)	CLASSIFICATION	WEATHERING	FRACTURING	% Fa	% Fs
LEW 87183	57.9	H-5 CHONDRITE	C	B	18	16
LEW 87187~	6.3	L-6 CHONDRITE	B/C	A		
LEW 87189~	30.6	H-6 CHONDRITE	B/Ce	A		
LEW 87192~	24.0	L-6 CHONDRITE	A	A		
LEW 87193~	24.6	L-6 CHONDRITE	B	A		
LEW 87194~	57.7	H-6 CHONDRITE	B/C	B		
LEW 87196~	83.3	L-6 CHONDRITE	B	A		
LEW 87199~	113.7	L-6 CHONDRITE	B	B		
LEW 87203~	20.7	H-6 CHONDRITE	B/C	B		
LEW 87205	51.3	H-5 CHONDRITE	B/Ce	B	17	15
LEW 87208	34.5	L-3 CHONDRITE	B	B	1-19	0-27
LEW 87209	53.6	H-4 CHONDRITE	B	A	18	13-20
LEW 87213	56.1	H-4 CHONDRITE	B	A	18	9-18
LEW 87214	0.4	CARBONACEOUS C4	A/B	A	29	
LEW 87218~	0.8	L-6 CHONDRITE	B	A		
LEW 87221~	15.1	H-6 CHONDRITE	B	A		
LEW 87222	51.9	H-5 CHONDRITE	B/C	A	18	16
LEW 87223	110.3	E-3 CHONDRITE	C	B/C	4	0-12
LEW 87224~	149.3	L-6 CHONDRITE	B	B		
LEW 87226~	1.1	L-6 CHONDRITE	B	A		
LEW 87230~	175.1	H-6 CHONDRITE	B/Ce	B		
LEW 87231~	75.1	H-6 CHONDRITE	B/C	A		
LEW 87235~	1.1	LL-6 CHONDRITE	A/B	A		
LEW 87239~	3.6	L-6 CHONDRITE	B	A		
LEW 87240	44.3	H-5 CHONDRITE	B/C	A/B	18	16
LEW 87241	0.5	FUSION CRUST-H CHON?	A/B	A/B		
LEW 87244~	35.6	L-6 CHONDRITE	A/B	A		
LEW 87247~	67.6	L-6 CHONDRITE	B/C	B		
LEW 87248	13.8	L-3 CHONDRITE	A/B	A	0-18	1-22
LEW 87252~	0.6	L-6 CHONDRITE	B	A		
LEW 87253~	3.9	H-6 CHONDRITE	C	A/B		
LEW 87254	12.8	LL-3 CHONDRITE	B	A	7-34	2-24
LEW 87258	55.0	H-5 CHONDRITE	C	A/B	18	16
LEW 87261	89.1	H-5 CHONDRITE	C	B	18	16
LEW 87263	67.5	H-6 CHONDRITE	B/C	A	18	16
LEW 87264~	3.4	L-6 CHONDRITE	B	A		
LEW 87267	91.1	H-5 CHONDRITE	Ce	B	18	16
LEW 87268	55.4	H-5 CHONDRITE	B/Ce	A	18	16
LEW 87273~	48.2	H-6 CHONDRITE	C	B		
LEW 87277	89.5	H-5 CHONDRITE	C	A	18	16
LEW 87279	80.0	LL-6 CHONDRITE	B	A/B	29	23
MAC 87304~	1433.0	L-6 CHONDRITE	Be	A/B		
MAC 87305	1244.2	L-4 CHONDRITE	B/C	B/C	23	8-21
MAC 87306	1198.7	L-4 CHONDRITE	Be	A	23	8-21
MAC 87307	1055.6	H-4 CHONDRITE	Be	A	18	16
MAC 87308~	770.8	L-6 CHONDRITE	B/Ce	B		
MAC 87309~	684.7	L-6 CHONDRITE	B	A		

~ Classified by using refractive indices.

Table 1 (cont.)

SAMPLE NUMBER	WEIGHT (g)	CLASSIFICATION	WEATHERING	FRACTURING	% Fa	% Fs
MAC 87311	312.8	H-4 CHONDRITE	C	A/B	18	16
MAC 87312	322.5	H-5 CHONDRITE	C	A/B	18	16
MAC 87313	430.0	H-5 CHONDRITE	B/C	A/B	19	16
MAC 87314~	319.3	L-6 CHONDRITE	A/B	A		
MAC 87315~	219.1	H-6 CHONDRITE	C	A		
MAC 87316~	13.3	L-6 CHONDRITE	B	A		
MAC 87317~	120.5	LL-6 CHONDRITE	A/B	A		
MAC 87318~	196.9	LL-6 CHONDRITE	B	B		
MAC 87319	86.2	H-5 CHONDRITE	B/C	B	17	16
MAC 87320	16.2	CARBONACEOUS C2	Be	A	1-30	1-7
QUE 87400~	118.7	L-6 CHONDRITE	B	A		
QUE 87401~	4866.2	L-6 CHONDRITE	B	A		

~ Classified by using refractive indices.

TABLE 2

Newly Classified Specimens Listed By Type **

SAMPLE NUMBER	WEIGHT (g)	CLASSIFICATION	WEATHERING	FRACTURING	% Fa	% Fs
		Achondrites				
LEW 87051	0.6	ANGRITE	A	A	19	33
EET 87542	608.6	EUCRITE	A	A		24-55
EET 87548	560.2	EUCRITE	B/C	A		16-45
LEW 87053	0.4	HOWARDITE	A	A		20-64
LEW 87165	5.0	UREILITE	B	A	15	13
		Carbonaceous Chondrites				
LEW 87148	42.5	CARBONACEOUS C2	Ae	A	0-22	2-58
MAC 87320	16.2	CARBONACEOUS C2	Be	A	1-30	1-7
LEW 87214	0.4	CARBONACEOUS C4	A/B	A	29	
		Chondrites - Type 3				
LEW 87208	34.5	L-3 CHONDRITE	B	B	1-19	0-27
LEW 87248	13.8	L-3 CHONDRITE	A/B	A	0-18	1-22
LEW 87254	12.8	LL-3 CHONDRITE	B	A	7-34	2-24
		E Chondrites				
LEW 87223	110.3	E-3 CHONDRITE	C	B/C	4	0-12
LEW 87119	12.0	E-6 CHONDRITE	C	B		0.5

~ Classified by using refractive indices.

TABLE 3

Tentative Pairings for New Specimens

Table 3 summarizes possible pairings of the new specimens with each other and with previously classified specimens, based on descriptive data in this newsletter issue. Readers who desire a more comprehensive review of the meteorite pairings in the U. S. Antarctic collection should refer to the compilation provided by Dr. E. R. D. Scott, as published in issue 9(2) (June, 1986).

HOWARDITE:

LEW87053 with LEW87005 and 87015.

Sample No.:	**EET87542**	Location:	Elephant Moraine
Weight(g):	608.6	Field No.:	4700
Dimensions (cm):	10x8x4.5		
Meteorite Type:	Eucrite		

Macroscopic Description: Cecilia Satterwhite
This sample is covered by black, shiny fusion crust with radiating flowlines. The interior is light gray and fine-grained with a few very small dark gray to black inclusions.

Thin Section (.5) Description: Brian Mason
The section shows an aggregate of pale brown pyroxene and colorless plagioclase, in part showing relatively coarse ophitic texture (plagioclase laths up to 0.7 mm long, pyroxene grains up to 0.6 mm across), in part finely granulated. Pyroxene compositions show a continuous range from pigeonite to augite: Wo_{3-41}, Fs_{24-55}, En relatively constant, 40-45; mean composition is $Wo_{18}Fs_{38}$. Plagioclase composition is An_{86-92}, mean An_{90}. Tridymite is present as an accessory. The meteorite is a monomict eucrite.

Sample No.:	**EET87548**	Location:	Elephant Moraine
Weight(g):	560.2	Field No.:	4805
Dimensions (cm):	11.5x6.5x5.5		
Meteorite Type:	Eucrite		

Macroscopic Description: Cecilia Satterwhite
The exterior of this achondrite is greenish/gray and has a coarse-grained texture with patches of black, shiny fusion crust. The interior is medium-gray with some weathered plagioclase visible.

Thin Section (.5) Description: Brian Mason
The section shows an aggregate of anhedral pyroxene and plagioclase grains (grain size 0.3-1.8 mm), in proportion pyroxene:plagioclase approximately 2:1, with accessory chromite, troilite, and nickel-iron. Individual grains of pyroxene and plagioclase are deformed but not granulated. The pyroxene is hypersthene (Wo_2Fs_{45}) with relatively coarse (0.04 mm wide) lamellae of exsolved augite ($Wo_{44}Fs_{17}$); mean composition of pyroxene is $Wo_{11}Fs_{38}$. Plagioclase is fairly uniform in composition, An_{89-92}. The meteorite is a eucrite, intermediate in composition between Binda and Moore County.

Sample No.:	**LEW87047**	Location:	Lewis Cliff
Weight(g):	455.7	Field No.:	4749
Dimensions (cm):	9x7.5x5		
Meteorite Type:	H6 chondrite with devitrified glass enclave		

Macroscopic Description: Carol Schwarz

This chondrite is reddish brown with remnants of polygonally fractured fusion crust. The interior of the specimen is dark to reddish brown in color. Metal is abundant.

Thin Section (.3) Description: Brian Mason

The thin section shows a characteristic H6 texture with a few poorly defined chondrules in a granular matrix consisting largely of olivine (Fa_{18}) and orthopyroxene (Fs_{16}) with minor amounts of plagioclase (An_{11}), nickel-iron, and troilite. However, it includes an unusual fine-grained sub-rounded enclave, 3 mm in maximum dimension. The enclave contains a few micro-phenocrysts of plagioclase (An_{20}) and olivine (Fa_{19}), in a gray matrix consisting largely of minute (0.01 mm) grains of a colorless mineral with low relief and low birefringence. Broad-beam microprobe analyses of the matrix show a fairly uniform composition, averaging (weight percent) SiO_2 59.4, Al_2O_3 21.3, FeO 3.8, MgO 6.5, CaO 2.9, K_2O 0.7, Na_2O 7.7, MnO 0.2, TiO_2 less than 0.1; this composition indicates that the matrix consists largely of a yagiite-like mineral. The textural relations suggest that this enclave is a devitrified glass.

Sample No.:	**LEW87051**	Location:	Lewis Cliff
Weight(g):	0.6	Field No.:	4058
Dimensions (cm):	1x0.7x0.5		
Meteorite Type:	Angrite		

Macroscopic Description: Rene Martinez

This tiny achondrite is completely covered with black fusion crust. The interior is very fresh looking, fine-grained, and crystalline.

Thin Section (.3) Description: Brian Mason

The section consists of subequal amounts of olivine, pyroxene, and plagioclase, with a little opaque material, probably titanomagnetite. The texture is dominated by a subparallel arrangement of plagioclase laths, 0.02 mm wide and up to 0.3 mm long. The pyroxene is weakly pleochroic with a purplish tint. Microprobe analyses give the following compositions: plagioclase, An_{100} (K_2O, Na_2O both less than 0.1%); olivine, somewhat variable, averaging Fa_{19} with 0.7% CaO (one spot gave a kirschsteinite analysis, $Ca_{38}Fe_{60}Mg_2$); the pyroxene is a titanian fassaite, averaging $Wo_{47}Fs_{33}$ with up to 8.5% Al_2O_3 and 4.6% TiO_2. The meteorite is an angrite, but is texturally distinct from the other angrites, Angra dos Reis and LEW86010.

Sample No.:	**LEW87053**	Location:	Lewis Cliff
Weight(g):	0.4	Field No.:	4063
Dimensions (cm):	0.8x0.8x0.4		
Meteorite Type:	Howardite		

Macroscopic Description: Rene Martinez

This small howardite appears very fresh and 40% of it is covered with black fusion crust. Plagioclase crystals are visible with the unaided eye.

Thin Section (.3) Description: Brian Mason

The section shows a microbreccia of plagioclase and pyroxene clasts, up to 0.8 mm in greatest dimension, together with a little opaque. Brown limonitic staining pervades the section. Microprobe analyses show the plagioclase variable in composition, An_{87-92}, mean An_{91}. Most of the pyroxene is iron-rich hypersthene, with compositions clustered around Wo_2Fs_{55}; a little augite is present, and a minor amount of diogenitic pyroxene, Wo_2Fs_{20}. The meteorite is a howardite, possibly paired with LEW87005 and LEW87015.

Sample No.:	**LEW87119**	Location:	Lewis Cliff
Weight(g):	12.0	Field No.:	4215
Dimensions (cm):	2x2x2		
Meteorite Type:	E6 chondrite		

Macroscopic Description: Carol Schwarz

This specimen is very weathered and fractured with only about 50% fusion crust remaining. The interior is dark brown.

Thin Section (.2) Description: Brian Mason

Chondrules are rare and barely discernable in the granular matrix, which consists largely of enstatite (prismatic grains up to 0.2 mm long), with minor amounts of nickel-iron and sulfides, and a little plagioclase. Weathering is extensive, with brown limonitic staining throughout the section. Microprobe analyses show the enstatite is almost pure $MgSiO_3$ (FeO 0.1-0.6%, Al_2O_3 0.1%, CaO 0.6%); plagioclase composition is An_{12}; the nickel- iron contains 1.6% Si. The meteorite is an E6 chondrite.

Sample No.:	**LEW87148**	Location:	Lewis Cliff
Weight(g):	42.5	Field No.:	4410
Dimensions (cm):	4.5x3x2		
Meteorite Type:	C2 Chondrite		

Macroscopic Description: Cecilia Satterwhite
This carbonaceous chondrite's exterior is covered by black fractured fusion crust which is shiny and frothy in some areas and dull in others. The interior is black with small (<0.5 cm) cream colored clasts. Along the edges there are evaporites.

Thin Section (,2) Description: Brian Mason
About 80% of the section consists of black matrix; chondrules and mineral grains being small and sparse. No troilite or nickel-iron was seen. Most of the chondrules and mineral grains are olivine, usually close to Mg_2SiO_4 in composition; pyroxene is rare. The meteorite is a C2 chondrite.

Sample No.:	**LEW87165**	Location:	Lewis Cliff
Weight(g):	5.0	Field No.:	4404
Dimensions (cm):	2x1.5x0.8		
Meteorite Type:	Ureilite		

Macroscopic Description: Carol Schwarz
Black fusion crust covers about 80% of this ureilite. The interior is black and fine-grained.

Thin Section (,3) Description: Brian Mason
The section shows an aggregate of anhedral grains of olivine and pyroxene, 0.6-2.5 mm across, the grains rimmed by black carbonaceous material. The pyroxene shows well-developed polysynthetic twinning. Microprobe analyses show olivine and pyroxene of uniform composition: olivine, Fa_{15}; pyroxene, Wo_7Fs_{13}. The meteorite is a ureilite.

Sample No.:	**LEW87208**	Location:	Lewis Cliff
Weight(g):	34.5	Field No.:	4647
Dimensions (cm):	4x3x1.5		
Meteorite Type:	L3 Chondrite		

Macroscopic Description: Carol Schwarz

About 60% of this specimen is covered with black, frothy fusion crust. The interior has been moderately weathered but many chondrules are visible. One gray inclusion is 5 mm across.

Thin Section (.4) Description: Brian Mason

The section shows abundant chondrules and chondrule fragments, up to 3 mm across, in a small amount of black matrix containing a few grains of nickel-iron and troilite. A variety of chondrule types is present, including granular and porphyritic olivine and olivine-pyroxene, and cryptocrystalline pyroxene. Much of the pyroxene is polysynthetically twinned clinobronzite. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{1-19}, mean Fa_{12} (CV FeO is 59); pyroxene, Fs_{0-27}. The small amount of nickel-iron suggests L group, and the variability of olivine and pyroxene compositions type 3; hence the meteorite is classified as an L3 chondrite (estimated L3.4).

Sample No.:	**LEW87214**	Location:	Lewis Cliff
Weight(g):	0.4	Field No.:	4734
Dimensions (cm):	1x0.6x0.3		
Meteorite Type:	C4 Chondrite		

Macroscopic Description: Carol Schwarz

Black fusion crust covers about 40% of this tiny specimen. The interior is gray and very fine-grained.

Thin Section (.3) Description: Brian Mason

The section shows an aggregate of small (0.01-0.02 mm) olivine grains and a little opaque material, with sparse chondrules up to 0.6 mm across. Olivine composition is essentially uniform, Fa_{29}; no orthopyroxene was found but one grain of diopside, $Wo_{45}Fs_{10}$, was analysed. Two grains of plagioclase, An_{31} and An_{67}, were analysed. The meteorite is a C4 chondrite.

Sample No.: **LEW87223**
Weight(g): 110.3
Dimensions (cm): 7x4x2
Meteorite Type: E3 Chondrite
Location: Lewis Cliff
Field No.: 4708

Macroscopic Description: Carol Schwarz
This specimen is so heavily weathered and fractured it fell apart during sampling. It is uniformly weathered to dark reddish-brown.

Thin Section (.2) Description: Brian Mason
The section shows a closely-packed aggregate of chondrules, up to 1.5 mm across, together with abundant metal grains and a little sulfide. Weathering is extensive, with brown limonitic staining throughout the section. The chondrules consist almost entirely of polysynthetically twinned clino-enstatite; a few rounded grains of olivine were noted. Most of the pyroxene is close to $MgSiO_3$ in composition, but a few more Fe-rich grains were analysed; one olivine grain has a composition Fa_4. The metal has a variable Si content, up to 0.6%. The meteorite is tentatively classified as an E3 chondrite.

Sample No.: **LEW87248**
Weight(g): 13.8
Dimensions (cm): 2x2x1.5
Meteorite Type: L3 Chondrite
Location: Lewis Cliff
Field No.: 4748

Macroscopic Description: Rene Martinez
This small specimen shows abundant light and dark colored sharply defined chondrules in a dark gray matrix. It is 95% covered with fusion crust and appears relatively unweathered.

Thin Section (.3) Description: Brian Mason
The section shows abundant chondrules and chondrule fragments, up to 1.5 mm across, in a dark matrix containing a few grains of nickel-iron and sulfide. A variety of chondrule types is present, including granular and porphyritic olivine and olivine-pyroxene, barred olivine, and cryptocrystalline pyroxene. Much of the pyroxene is polysynthetically twinned clinobronzite. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{0-18}, mean Fa_{14} (CV FeO is 49); pyroxene, Fs_{1-22}. The small amount of nickel-iron suggests L group, and the variability of olivine and pyroxene compositions type 3; hence the meteorite is classified as an L3 chondrite (estimated L3.5).

Sample No.:	**LEW87254**	Location:	Lewis Cliff
Weight(g):	12.8	Field No.:	4731
Dimensions (cm):	2.2x1.7x1.5		
Meteorite Type:	LL3 Chondrite		

Macroscopic Description: Rene Martinez

Smooth fusion crust covers about 70% of this meteorite and shows radiating flow marks. Light colored chondrules up to ~4 mm are clearly defined in a dark gray matrix.

Thin Section (.2) Description: Brian Mason

The section shows a close-packed aggregate of chondrules and chondrule fragments, up to 1.8 mm across, in a minimum amount of black matrix containing trace amounts of nickel-iron and troilite. Chondrule types include granular olivine and olivine-pyroxene, barred olivine, and cryptocrystalline pyroxene. Much of the pyroxene is polysynthetically twinned clinobronzite. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{7-34}, mean Fa_{16} (CV FeO is 49); pyroxene, Fs_{2-24}. The trace amount of nickel-iron suggests LL group, and the variability of olivine and pyroxene compositions type 3; hence the meteorite is classified as an LL3 chondrite (estimated LL3.5).

Sample No.:	**MAC87320**	Location:	MacAlpine Hills
Weight(g):	16.2	Field No.:	4651
Dimensions (cm):	3x2.5x1.3		
Meteorite Type:	C2 Chondrite		

Macroscopic Description: Carol Schwarz

The meteorite is covered by reddish-black weathered, polygonally fractured fusion crust. A small amount of salt is visible. The interior is black with white and rusty clasts/chondrules plainly visible.

Thin Section (.2) Description: Brian Mason

The small section consists almost entirely of large chondrules, up to 4 mm across, in a dark matrix which contains abundant metal grains, concentrated on chondrule margins; only a small amount of sulfide is present. Most of the chondrules are of granular olivine and polysynthetically twinned clino-enstatite; one small melilite-spinel inclusion was noted. The matrix appears to consist largely of phyllosilicates. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{1-30}, mean Fa_6; pyroxene, Fs_{1-7}. The meteorite is tentatively classified as an unusual C2 chondrite; it resembles Renazzo in texture and in the abundance of metal.

NATURAL THERMOLUMINESCENCE DATA FOR ANTARCTIC METEORITES

Natural thermoluminescence (NTL) data was measured by Fouad A. Hasan and Roberta Score at the University of Arkansas (February 1989 data set). To simplify reporting, only equivalent doses are quoted. However, for ordinary chondrites with peak height ratios >0.5 these data have been calculated from the ratios (see the discussion by Hasan, Score and Sears in the abstract volume for the 20th Lunar & Planetary Science Conference). For further information contact Derek Sears.

Name	NTL (krad at 250° C)	Name	NTL (krad at 250° C)
ALH 86603	80 ± 2	LEW 86382	3.76 ±0.07
LEW 86030	75.5 ± 0.6	LEW 86385	50 ± 1
LEW 86037	79 ± 1	LEW 86388	67 ± 2
LEW 86039	5 ± 2	LEW 86393	21.7 ± 0.4
LEW 86055	37.1 ± 0.5	LEW 86395	22.5 ± 0.1
LEW 86074	47 ± 1	LEW 86396	2.6 ± 0.2
LEW 86076	42.7 ± 0.9	LEW 86397	25.9 ± 0.3
LEW 86088	54.9 ± 0.4	LEW 86407	16.5 ± 0.1
LEW 86104	27.2 ± 0.2	LEW 86418	0.85 ±0.07
LEW 86107	40 ± 2	LEW 86438	88 ± 2
LEW 86119	1.7 ±0.08	LEW 86442	28.7 ± 0.6
LEW 86123	21 ± 3	LEW 86451	52 ± 2
LEW 86226	64 ± 2	LEW 86463	30 ± 4
LEW 86241	20 ± 1	LEW 86465	39.6 ± 0.7
LEW 86295	5.7 ± 0.3	LEW 86466	47 ± 1
LEW 86302	1.7 ± 0.1	LEW 86470	21.3 ± 0.4
LEW 86305	33 ± 1	LEW 86471	5 ± 0.6
LEW 86311	53 ± 1	LEW 86472	42.7 ± 0.3
LEW 86312	19.5 ± 0.1	LEW 86473	87.1 ± 0.2
LEW 86314	74 ± 2	LEW 86479	80 ± 10
LEW 86317	68 ± 2	LEW 86485	28 ± 0.9
LEW 86327	19.6 ± 0.1	LEW 86489	30.0 ± 0.9
LEW 86337	53 ± 2	LEW 86490	58.5 ± 0.2
LEW 86340	96 ± 8	LEW 86499	13.5 ± 0.5
LEW 86344	19.4 ± 0.7	LEW 86500	38 ± 1
LEW 86349	84 ± 2	LEW 86503	28.4 ± 0.3
LEW 86350	3 ± 1	LEW 86514	63.0 ± 0.8
LEW 86352	20.4 ± 0.1	LEW 86515	54 ± 1
LEW 86354	25.0 ± 0.3	LEW 86522	0.9 ± 0.2
LEW 86360	57 ± 1	LEW 86525	7.3 ± 0.1
LEW 86364	29.7 ± 0.3	LEW 86528	27 ± 0.3
LEW 86366	44 ± 1	LEW 86534	14.4 ± 0.4
LEW 86367	8 ± 2	LEW 86544	18.9 ± 0.3
LEW 86368	96 ± 4	LEW 86546	57 ± 2
LEW 86371	28.4 ± 0.8	LEW 86549	52 ± 4
LEW 86376	9.9 ± 0.6	RKP 86703	10.2 ± 0.4
LEW 86380	45 ± 9	RKP 86705	13.7 ± 0.4

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

^{26}Al Survey of Antarctic Meteorites

Data are from John Wacker, Battell NW

SPECIMEN NUMBER	CLASS	^{26}AL (dpm/kg)	SPECIMEN NUMBER	CLASS	^{26}AL (dpm/kg)	SPECIMEN NUMBER	CLASS	^{26}AL (dpm/kg)
ALHA 77016	H5	51 ±5	ALHA 78005	H5	56 ±10	ALHA 79015	H5	71 ±7
ALHA 77017	H5	53 ±5	ALHA 78012	H5	68 ±9	ALHA 79021	H5	64 ±7
ALHA 77018	H5	58 ±7	ALHA 78015	LL3	48 ±7	ALHA 79022	L3,4	44 ±6
ALHA 77019	L6	48 ±3	ALHA 78027	H5	78 ±8	ALHA 79023	H4	33 ±5
ALHA 77021	H5	63 ±8	ALHA 78063	LL6	48 ±7	ALHA 79024	H6	49 ±7
ALHA 77023	H5	78 ±8	ALHA 78080	H5	74 ±7	ALHA 79035	H4	68 ±6
ALHA 77026	L6	17 ±9	ALHA 78082	LL6	49 ±5	ALHA 79036	H5	117 ±7
ALHA 77042	H5	53 ±10	ALHA 78120	H4	47 ±7	ALHA 79038	H5	33 ±4
ALHA 77047	L3	40 ±6	ALHA 78121	H5	55 ±6	ALHA 79041	H5	72 ±7
ALHA 77114	H5	47 ±9	ALHA 78124	H6	53 ±8	ALHA 79043	L6	50 ±6
ALHA 77117	L5	45 ±17	ALHA 78133	L3	50 ±5	ALHA 79048	H5	69 ±6
ALHA 77126	H5	48 ±14	ALHA 78135	H6	52 ±6	ALHA 79049	H6	61 ±5
ALHA 77130	H5	55 ±10	ALHA 78136	H5	64 ±7	ALHA 79050	H5	58 ±4
ALHA 77131	H6	86 ±11	ALHA 78137	H6	58 ±6	ALHA 79051	H5	58 ±6
ALHA 77187	H5	66 ±7	ALHA 78141	H5	75 ±8	ALHA 79052	L6	67 ±7
ALHA 77197	L3	60 ±12	ALHA 78142	L5	60 ±11	ALHA 80125	L6	44 ±2
ALHA 77209	H6	52 ±8	ALHA 78145	H6	63 ±11	ALHA 81101	URE	35 ±2
ALHA 77211	L3	48 ±5	ALHA 78147	H5	56 ±10	ALHA 81020	H5	55 ±3
ALHA 77224	H4	58 ±2	ALHA 78149	L3	74 ±7	ALHA 81107	L6	70 ±3
ALHA 77240	H5	71 ±10	ALHA 78157	H4	43 ±10	ALHA 82106	URE	63 ±4
ALHA 77242	H5	47 ±6	ALHA 78159	H5	52 ±5	ALHA 82123	L6	56 ±2
ALHA 77244	L3	40 ±7	ALHA 78162	L3	36 ±9	ALHA 82130	URE	62 ±5
ALHA 77245	H5	38 ±5	ALHA 78164	H5	72 ±9	ALHA 84136	URE	77 ±7
ALHA 77246	H6	68 ±4	ALHA 78165	EUC	104 ±7			
ALHA 77247	H5	59 ±8	ALHA 78168	H4	62 ±6	EETA 83225	URE	54 ±4
ALHA 77248	H6	27 ±3	ALHA 78169	H6	72 ±9			
ALHA 77251	L6	52 ±7	ALHA 78170	H3	45 ±5	LEW 85319	H5	55 ±4
ALHA 77253	H5	56 ±9	ALHA 78172	H4	71 ±9	LEW 85324	H5	31 ±1
ALHA 77272	L6	39 ±2	ALHA 78190	H5	73 ±11	LEW 86012	L6	31 ±2
ALHA 77275	H5	42 ±8	ALHA 78197	H5	59 ±8	LEW 86013	L6	36 ±2
ALHA 77293	L6	66 ±5	ALHA 79001	L3	44 ±9	LEW 86015	H6	41 ±2
ALHA 77294	H5	63 ±2	ALHA 79004	H5	34 ±6	LEW 86025	L6	58 ±5
ALHA 77301	L6	41 ±6	ALHA 79006	H5	58 ±5			
ALHA 77303	L3	45 ±5	ALHA 79009	H5	33 ±3			
ALHA 78004	H5	48 ±8	ALHA 79010	H5	62 ±9			

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