Antarctic Meteorite NEWSLETTER

INSIDE THIS ISSUE:

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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.

Edited by Marilyn M. Lindstrom
Code SN2, NASA
Johnson Space Center,
Houston, Texas
77058

SAMPLE REQUEST DEADLINE: October 10, 1989 !!!!

MWG MEETS OCTOBER 19 - 21

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 October 10, 1989 will be reviewed at the MWG meeting on October 19 - 21, 1989 to be held in Washington, D.C. Requests that are received after the October 10 deadline may possibly be delayed for review until the MWG meets again in the Spring of 1990. **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 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 publication 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.

NEWS AND INFORMATION

This newsletter presents classifications of over 300 meteorites from the 1985-1988 collections, including the first 20 samples from the large 1988 collection. Descriptions are given for all meteorites of special petrologic type, including one enstatite chondrite, seven type 3 ordinary chondrites, nine carbonaceous chondrites, six achondrites, and two irons. Of particular interest are a group of seven Renazzo-like C2 chondrites from Elephant Moraine and the two paired MacAlpine Hills anorthositic breccias announced in a separate July newsletter. Presented here are an amended description of the latter two meteorites and additional information from surveys of oxygen isotope composition, thermoluminescence, and ^{26}Al measurements. These surveys all support the initial suggestion of a lunar origin for these meteorites.

LPI announces the availability of LPI Technical Report 89-02 which is the explanatory text to the meteorite location maps for Allan Hills and Elephant Moraine produced by J. Schutt, B. Fessler and W. Cassidy. Although the reports are free, charges for the postage and handling are as follows: Surface mail (U.S., Canada, or foreign) $6 for the first copy; $1 for each additional copy. Foreign air mail costs $10 for the first copy; $2 for each additional copy. To order the maps, see the last page of this newsletter.

FROM 1985-1988 COLLECTIONS

Pages 6 - 21 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 12(2) (July, 1989). 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
Antarctic Meteorite Laboratory
NASA/Johnson Space Center
Houston, Texas

Dr's. Brian H. Mason and Roy S. Clarke, Jr.
Department of Mineral Sciences
U.S. National Museum of
Natural History
Smithsonian Institution
Washington, D.C.

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
HOW _____ Mt. Howe
ILD _____ Inland Forts
LEW _____ Lewis Cliff
MAC _____ MacAlpine Hills
MBR _____ Mount Baldr
MET _____ Meteorite Hills
MIL _____ Miller Range
OTT _____ Outpost Nunatak
QUE _____ Queen Alexandria 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
LEW 85339	28.8	L-3 CHONDRITE	A/B	A	1-30	3-13
LEW 85342	6.9	H-5 CHONDRITE	C	A	18	16
LEW 85344	2.8	H-5 CHONDRITE	C	A	17	15
LEW 85347	31.2	H-5 CHONDRITE	C	A	17	15
LEW 85348	31.0	H-6 CHONDRITE	C	B	19	16
LEW 85349	17.3	L-6 CHONDRITE	C	A	23	19
LEW 85350	24.2	L-4 CHONDRITE	B/C	A	24	20
LEW 85351	12.1	H-4 CHONDRITE	B/C	A	17	14-21
LEW 85352	9.2	H-5 CHONDRITE	C	A	17	15
LEW 85354~	12.1	L-6 CHONDRITE	B/C	A		
LEW 85359	17.5	H-6 CHONDRITE	C	B	17	15
LEW 85360~	12.7	L-6 CHONDRITE	B	B		
EET 87555~	474.1	L-6 CHONDRITE	B	A		
EET 87569~	211.3	L-6 CHONDRITE	A/B	A		
EET 87570	307.7	L-5 CHONDRITE	B	A/B	23	20
EET 87571	162.0	H-5 CHONDRITE	C	A	17	15
EET 87577	147.9	H-5 CHONDRITE	C	B	19	16
EET 87581	216.9	H-5 CHONDRITE	B/C	A	19	16
EET 87583	201.3	L-6 CHONDRITE	B	A	24	20
EET 87585	52.7	L-5 CHONDRITE	B/C	B/C	25	21
EET 87586~	215.5	L-6 CHONDRITE	A/B	A		
EET 87587~	102.6	L-6 CHONDRITE	A/B	A		
EET 87588~	28.5	L-6 CHONDRITE	A/B	A		
EET 87589~	98.4	L-6 CHONDRITE	B	A		
EET 87590~	69.0	L-6 CHONDRITE	A/B	A		
EET 87591	19.6	H-6 CHONDRITE	B/C	B	18	16
EET 87592~	89.7	H-6 CHONDRITE	B/C	A		
EET 87593~	40.2	L-6 CHONDRITE	A/B	A		
EET 87594~	79.1	L-6 CHONDRITE	A/B	A		
EET 87595	19.4	L-5 CHONDRITE	B	A	25	21
EET 87596~	90.0	L-6 CHONDRITE	A/B	A		
EET 87597~	9.0	L-6 CHONDRITE	A/B	A		
EET 87598~	22.3	L-6 CHONDRITE	B/C	A		
EET 87599~	15.9	L-6 CHONDRITE	B	A		
EET 87600~	11.7	L-6 CHONDRITE	A/B	A		
EET 87601~	50.1	L-6 CHONDRITE	A/B	A		
EET 87602~	76.7	H-6 CHONDRITE	B/C	A		
EET 87603~	169.8	L-6 CHONDRITE	A/B	A		
EET 87604	63.6	L-5 CHONDRITE	B/C	A	23	20
EET 87605~	45.1	L-6 CHONDRITE	B/C	A		
EET 87606	7.5	L-5 CHONDRITE	B/C	A	25	21
EET 87607~	109.0	L-6 CHONDRITE	B/C	A		
EET 87608~	39.4	H-6 CHONDRITE	C	A		
EET 87609	19.6	H-5 CHONDRITE	B/C	A	17	15
EET 87610~	23.4	L-6 CHONDRITE	B	A		
EET 87611~	21.2	L-6 CHONDRITE	B	A		
EET 87612~	23.6	L-6 CHONDRITE	B	A		
EET 87613~	77.0	L-6 CHONDRITE	B	A		
EET 87614~	16.4	L-6 CHONDRITE	B	A		

~ Classified by using refractive indices.

SAMPLE NUMBER	WEIGHT (G)	CLASSIFICATION	WEATHERING	FRACTURING	%FA	%FS
EET 87615	144.5	L-6 CHONDRITE	B	A	23	20
EET 87616~	91.3	L-6 CHONDRITE	B	A		
EET 87617~	4.1	L-6 CHONDRITE	C	A	25	21
EET 87618	62.0	H-5 CHONDRITE	C	A	17	15
EET 87619~	9.1	L-6 CHONDRITE	B	A		
EET 87620~	2.1	L-6 CHONDRITE	B	A		
EET 87621~	13.5	L-6 CHONDRITE	B	A		
EET 87622~	106.8	L-6 CHONDRITE	B	A		
EET 87623~	81.3	L-6 CHONDRITE	B	A		
EET 87624~	17.2	L-6 CHONDRITE	B	A		
EET 87625~	22.5	L-6 CHONDRITE	B/C	A		
EET 87626~	71.9	L-6 CHONDRITE	B	A		
EET 87627~	93.2	L-6 CHONDRITE	B	A		
EET 87628~	11.7	L-6 CHONDRITE	B	A		
EET 87629~	0.5	L-6 CHONDRITE	B/C	A		
EET 87630~	16.8	L-6 CHONDRITE	B/C	A		
EET 87631~	42.8	L-6 CHONDRITE	B	A		
EET 87632~	8.2	L-6 CHONDRITE	B	A		
EET 87633~	27.9	L-6 CHONDRITE	B	A		
EET 87634~	14.1	L-6 CHONDRITE	B	A		
EET 87635~	162.3	L-6 CHONDRITE	B	A		
EET 87636	17.4	H-5 CHONDRITE	B/C	A	17	15
EET 87637~	17.2	L-6 CHONDRITE	B	A		
EET 87638	7.7	L-6 CHONDRITE	B/C	A	24	20
EET 87639~	53.4	L-6 CHONDRITE	B	A		
EET 87640~	13.8	L-6 CHONDRITE	B	A		
EET 87641~	18.5	L-6 CHONDRITE	B	A		
EET 87642~	25.8	L-6 CHONDRITE	B	A		
EET 87643	31.0	H-5 CHONDRITE	B/C	A	17	15
EET 87644~	127.3	L-6 CHONDRITE	B	A		
EET 87645~	3.8	L-6 CHONDRITE	B/C	A		
EET 87646~	57.2	L-6 CHONDRITE	B	A		
EET 87647~	51.1	L-6 CHONDRITE	B	A		
EET 87648~	7.0	L-6 CHONDRITE	B	A		
EET 87649~	27.0	L-6 CHONDRITE	B	A		
EET 87650~	23.2	L-6 CHONDRITE	B	A		
EET 87651~	45.7	L-6 CHONDRITE	A/B	A		
EET 87652~	72.1	L-6 CHONDRITE	B	A		
EET 87653~	24.5	L-6 CHONDRITE	B	A		
EET 87654	5.2	H-6 CHONDRITE	B/C	A	17	15
EET 87655~	93.0	L-6 CHONDRITE	B	B		
EET 87656~	35.3	L-6 CHONDRITE	B	A		
EET 87657~	64.8	L-6 CHONDRITE	Be	A		
EET 87658	8.4	H-6 CHONDRITE	B/C	A	17	15
EET 87659~	4.3	L-6 CHONDRITE	B	A		
EET 87660~	144.9	L-6 CHONDRITE	B	A		
EET 87661~	118.6	L-6 CHONDRITE	B	A		
EET 87662~	2.5	H-6 CHONDRITE	B/C	A		
EET 87663	57.8	H-4 CHONDRITE	B/C	A	17	15-19
EET 87664	48.2	H-6 CHONDRITE	B/C	B	19	16
EET 87665~	3.4	LL-6 CHONDRITE	B	B		
EET 87666	4.2	H-4 CHONDRITE	B	A	17	10-16
EET 87667~	9.0	L-6 CHONDRITE	B	A		
EET 87668~	70.3	L-6 CHONDRITE	B	A		
EET 87669~	25.9	L-6 CHONDRITE	B	A		
EET 87670~	17.8	L-6 CHONDRITE	B	A		
EET 87671~	78.0	L-6 CHONDRITE	B	A		

~ Classified by using refractive indices.

SAMPLE NUMBER	WEIGHT (G)	CLASSIFICATION	WEATHERING	FRACTURING	%FA	%FS
EET 87672~	126.3	H-6 CHONDRITE	B/C	A		
EET 87673~	3.8	L-6 CHONDRITE	B	A		
EET 87674	3.9	H-5 CHONDRITE	C	A	17	15
EET 87675	1.6	L-5 CHONDRITE	B	B	24	20
EET 87676~	67.5	L-6 CHONDRITE	B	A		
EET 87677	54.0	H-5 CHONDRITE	B/C	A	18	16
EET 87678~	55.8	L-6 CHONDRITE	B	A		
EET 87679~	5.8	L-6 CHONDRITE	B	A		
EET 87680~	48.1	L-6 CHONDRITE	B	B		
EET 87681	32.0	H-5 CHONDRITE	B	A	18	16
EET 87682	3.0	L-6 CHONDRITE	C	B	24	20
EET 87683	10.9	H-5 CHONDRITE	B/C	B	18	16
EET 87684~	27.9	L-6 CHONDRITE	B	A		
EET 87685	44.3	L-5 CHONDRITE	B	A	24	21
EET 87686~	23.4	L-6 CHONDRITE	B	A		
EET 87687	10.5	H-5 CHONDRITE	B	A	18	16
EET 87688~	59.1	L-6 CHONDRITE	B	A		
EET 87689	58.6	H-5 CHONDRITE	B/C	A	18	16
EET 87690~	54.0	L-6 CHONDRITE	B	A		
EET 87691~	39.2	L-6 CHONDRITE	B	A		
EET 87692~	1.4	H-6 CHONDRITE	Ce	A		
EET 87693	11.3	H-6 CHONDRITE	B	A	17	15
EET 87694~	23.4	L-6 CHONDRITE	B	A		
EET 87695	118.5	H-5 CHONDRITE	B/C	B	18	16
EET 87696~	10.7	L-6 CHONDRITE	B	A		
EET 87697~	79.0	L-6 CHONDRITE	B	A		
EET 87698~	9.0	L-6 CHONDRITE	B	A		
EET 87699	46.3	H-5 CHONDRITE	B	B	18	16
EET 87700~	43.6	L-6 CHONDRITE	B	A		
EET 87701~	65.3	L-6 CHONDRITE	B	A		
EET 87702~	43.7	L-6 CHONDRITE	A/B	A		
EET 87703~	8.1	L-6 CHONDRITE	B	A		
EET 87704~	26.8	L-6 CHONDRITE	B	A		
EET 87705~	2.3	L-6 CHONDRITE	B	A		
EET 87706~	16.8	L-6 CHONDRITE	B	A		
EET 87707~	69.2	L-6 CHONDRITE	B	A		
EET 87708~	32.2	L-6 CHONDRITE	B	A		
EET 87709	110.0	L-5 CHONDRITE	B	A	23	20
EET 87710~	14.4	L-6 CHONDRITE	B	A		
EET 87711	5.7	CARBONACEOUS C2	B/C	B	0.8-3	1-3
EET 87712	35.4	H-5 CHONDRITE	B/C	A	18	16
EET 87713~	3.5	H-6 CHONDRITE	B/C	A		
EET 87714~	4.8	L-6 CHONDRITE	B	A		
EET 87715~	21.4	L-6 CHONDRITE	B	A		
EET 87716~	56.0	L-6 CHONDRITE	B	A		
EET 87718	5.8	H-5 CHONDRITE	C	A	17	15
EET 87719	65.7	H-6 CHONDRITE	B/C	A	18	16
EET 87720	91.3	UREILITE	Be	B	13-21	9-13
EET 87721~	13.9	L-6 CHONDRITE	B	A		
EET 87722~	21.8	L-6 CHONDRITE	B	B		
EET 87723~	27.9	L-6 CHONDRITE	B	A		
EET 87724~	115.0	L-6 CHONDRITE	B	B		
EET 87725~	12.5	L-6 CHONDRITE	B	A		
EET 87726	82.5	H-3 CHONDRITE	B/C	A	13-16	12-16
EET 87727~	28.5	L-6 CHONDRITE	B	A		
EET 87728~	3.4	L-6 CHONDRITE	B	A		
EET 87729~	1.4	L-6 CHONDRITE	B	A		

~ Classified by using refractive indices.

SAMPLE NUMBER	WEIGHT (G)	CLASSIFICATION	WEATHERING	FRACTURING	%FA	%FS
EET 87730~	70.4	L-6 CHONDRITE	B	A		
EET 87731	8.3	H-5 CHONDRITE	B	A	17	15
EET 87732~	4.2	L-6 CHONDRITE	B	B		
EET 87733~	26.9	L-6 CHONDRITE	B	A		
EET 87734	7.2	H-5 CHONDRITE	B/C	A	17	15
EET 87735	4.2	L-3 CHONDRITE	B	B	1-25	2-22
EET 87736~	3.3	L-6 CHONDRITE	B	A		
EET 87737~	24.9	L-6 CHONDRITE	B	A		
EET 87738~	3.0	L-6 CHONDRITE	B	A		
EET 87739	8.4	H-6 CHONDRITE	B	A	18	16
EET 87740	39.0	H-5 CHONDRITE	B	A	18	16
EET 87741~	39.0	L-6 CHONDRITE	B	A		
EET 87742~	19.6	L-6 CHONDRITE	B	A		
EET 87743	53.6	H-5 CHONDRITE	B	A	18	16
EET 87744~	129.8	L-6 CHONDRITE	B	A		
EET 87745	123.0	H-5 CHONDRITE	B/C	A	18	15
EET 87746	142.3	E-4 CHONDRITE	Ce	B	1-2	0.6-2
EET 87747	38.2	CARBONACEOUS C2	B/C	B/C	0.4-6	1-5
EET 87748~	3.9	L-6 CHONDRITE	B	A		
EET 87749	4.0	LL-6 CHONDRITE	A/B	A	28	23
EET 87750~	23.1	L-6 CHONDRITE	B	A		
EET 87751~	3.2	H-6 CHONDRITE	B/C	A		
EET 87752~	9.2	L-6 CHONDRITE	B	A		
EET 87753~	7.8	L-6 CHONDRITE	B	A		
EET 87754	34.4	H-5 CHONDRITE	B	A	17	15
EET 87755	88.4	H-5 CHONDRITE	B	A	17	15
EET 87756~	170.5	L-6 CHONDRITE	A/B	B		
EET 87757~	54.8	H-6 CHONDRITE	B	A		
EET 87758~	38.1	L-6 CHONDRITE	B	A		
EET 87759~	110.8	L-6 CHONDRITE	B	B		
EET 87760~	19.4	L-6 CHONDRITE	B	A		
EET 87761~	12.5	L-6 CHONDRITE	B	A		
EET 87762~	27.4	L-6 CHONDRITE	B/C	A		
EET 87763~	26.5	L-6 CHONDRITE	B/C	A		
EET 87764~	38.7	L-6 CHONDRITE	B	A		
EET 87765~	41.4	L-6 CHONDRITE	B/C	A		
EET 87766~	18.9	L-6 CHONDRITE	A/B	A		
EET 87767	27.9	H-5 CHONDRITE	C	A	18	16
EET 87768~	58.6	L-6 CHONDRITE	B/C	A		
EET 87769~	13.9	L-6 CHONDRITE	B/C	A		
EET 87770	38.6	CARBONACEOUS C2	B	A	0.5-4	0.6-7
EET 87771	56.6	LL-5 CHONDRITE	B	A	27	22
EET 87772	23.9	H-5 CHONDRITE	B	B	18	16
EET 87773~	18.4	L-6 CHONDRITE	B	A		
EET 87774	65.6	L-5 CHONDRITE	A/B	B	23	20
EET 87775~	16.8	L-6 CHONDRITE	B	A		
EET 87776~	29.9	L-6 CHONDRITE	B	A		
EET 87777~	8.4	L-6 CHONDRITE	B	A		
EET 87778	161.7	H-3 CHONDRITE	B/C	A	13-15	12-16
EET 87779~	21.6	L-6 CHONDRITE	B	A		
EET 87780	18.4	L-6 CHONDRITE	B	A	24	20
EET 87781	10.8	H-5 CHONDRITE	B/C	B	17	15
EET 87782~	7.1	L-6 CHONDRITE	B	B		
EET 87783~	5.3	L-6 CHONDRITE	B/C	B		
EET 87784~	15.1	L-6 CHONDRITE	B	A		
EET 87785~	14.1	H-6 CHONDRITE	C	B		
EET 87786~	0.6	H-6 CHONDRITE	B/C	A		

~ Classified by using refractive indices.

SAMPLE NUMBER	WEIGHT (G)	CLASSIFICATION	WEATHERING	FRACTURING	%FA	%FS
EET 87787	20.8	H-5 CHONDRITE	B/C	B	18	16
EET 87788~	83.8	L-6 CHONDRITE	A/B	A		
EET 87789~	45.9	L-6 CHONDRITE	A/B	A		
EET 87790	175.4	H-5 CHONDRITE	B	A	18	16
EET 87791~	5.5	L-6 CHONDRITE	B	A		
EET 87792~	36.4	H-6 CHONDRITE	C	A		
EET 87793~	1.3	H-6 CHONDRITE	C	A		
EET 87794~	77.0	L-6 CHONDRITE	B	A		
EET 87795~	5.8	L-6 CHONDRITE	B	A		
EET 87796~	12.5	L-6 CHONDRITE	A/B	A		
EET 87797~	2.2	L-6 CHONDRITE	B/C	A		
EET 87798	35.7	H-5 CHONDRITE	B/C	A	17	15
EET 87799~	12.4	L-6 CHONDRITE	B	A		
EET 87800~	20.3	L-6 CHONDRITE	B	A		
EET 87801	6.8	L-5 CHONDRITE	B	A	23	20
EET 87802~	1.3	L-6 CHONDRITE	B	A		
EET 87803~	9.0	L-6 CHONDRITE	B	A		
EET 87804~	40.2	L-6 CHONDRITE	B	A		
EET 87805	62.7	H-3 CHONDRITE	B/C	B	3-19	4-26
EET 87806	79.4	LL-5 CHONDRITE	B	A	28	22
EET 87807~	120.1	L-6 CHONDRITE	B	B		
EET 87808	6.6	H-4 CHONDRITE	B	A	15	9-17
EET 87809~	33.4	L-6 CHONDRITE	B	A		
EET 87810~	12.9	L-6 CHONDRITE	B	A		
EET 87811~	18.1	L-6 CHONDRITE	B	A		
EET 87812	11.9	CARBONACEOUS C2	B/C	B	0.6-7	1-5
EET 87813~	0.9	L-6 CHONDRITE	B/C	A		
EET 87814~	13.5	L-6 CHONDRITE	B	A		
EET 87815~	24.2	H-6 CHONDRITE	B/C	A		
EET 87816~	3.3	H-6 CHONDRITE	B/C	B		
EET 87817~	61.8	L-6 CHONDRITE	B	A		
EET 87818~	90.6	L-6 CHONDRITE	B	A		
EET 87819~	25.9	L-6 CHONDRITE	B	A		
EET 87820	221.4	H-6 CHONDRITE	B/C	A	19	16
EET 87821	152.5	H-5 CHONDRITE	B/Ce	B	17	15
EET 87822	96.2	H-5 CHONDRITE	B	B	18	16
EET 87823	95.4	H-3 CHONDRITE	B/C	B	13-17	11-15
EET 87824~	20.1	H-6 CHONDRITE	C	B		
EET 87825~	30.9	L-6 CHONDRITE	B	A		
EET 87826~	24.5	L-6 CHONDRITE	B	A		
EET 87827	67.8	L-6 CHONDRITE	B	B	23	20
EET 87828~	14.8	L-6 CHONDRITE	B	A		
EET 87829~	116.2	L-6 CHONDRITE	B	A		
EET 87830~	70.8	L-6 CHONDRITE	B	A		
EET 87831~	16.7	L-6 CHONDRITE	B	A		
EET 87832	12.6	H-5 CHONDRITE	B/C	A	18	16
EET 87833~	5.7	L-6 CHONDRITE	B	A		
EET 87834~	0.8	H-6 CHONDRITE	B/C	A/B		
EET 87835~	1.7	L-6 CHONDRITE	B/C	A		
EET 87836~	13.2	L-6 CHONDRITE	B	A		
EET 87837~	1.6	H-6 CHONDRITE	C	A		
EET 87838	13.3	H-5 CHONDRITE	C	A/B	18	16
EET 87839~	12.1	L-6 CHONDRITE	B	A		
EET 87840	81.7	H-5 CHONDRITE	B	A	18	16
EET 87841~	18.6	L-6 CHONDRITE	B	A		
EET 87842~	29.8	L-6 CHONDRITE	B	A		
EET 87843~	78.6	L-6 CHONDRITE	B	B		

~ Classified by using refractive indices.

SAMPLE NUMBER	WEIGHT (G)	CLASSIFICATION	WEATHERING	FRACTURING	%FA	%FS
EET 87844~	35.9	L-6 CHONDRITE	B	A		
EET 87845	15.1	L-6 CHONDRITE	B	A	23	20
EET 87846	8.1	CARBONACEOUS C2	B/C	B	0.8-3	1-3
EET 87847	32.9	CARBONACEOUS C2	B/C	B	0.5-4	1-3
EET 87848~	1.5	L-6 CHONDRITE	B/C	B		
EET 87849~	12.7	L-6 CHONDRITE	B	A		
EET 87850	14.5	CARBONACEOUS C2	Be	B	0.6-9	2-4
EET 87851	18.5	LL-5 CHONDRITE	B	A/B	27	22
EET 87852~	3.8	L-6 CHONDRITE	B	A		
EET 87853~	6.2	L-6 CHONDRITE	C	A		
EET 87854~	3.8	L-6 CHONDRITE	B	A		
EET 87855~	29.0	L-6 CHONDRITE	B	A		
EET 87856~	4.3	L-6 CHONDRITE	B	A		
EET 87857~	22.6	L-6 CHONDRITE	B	A		
EET 87858~	31.9	L-6 CHONDRITE	B/C	A		
EET 87859	33.0	H-5 CHONDRITE	B/C	A/B	17	15
LEW 87109	0.9	IRON				
LEW 87250	1.7	CARBONACEOUS C4	A/B	A	29	25
LEW 87284	38.6	L-3 CHONDRITE	A	A	1-16	3-29
LEW 87289~	30.4	L-6 CHONDRITE	B	A		
LEW 87291	61.4	H-5 CHONDRITE	C	B	18	16
HOW 88400	2104.2	H-6 CHONDRITE	B/C	A	17	15
HOW 88401	1622.7	EUCRITE	B	B/C		25-57
LEW 88005	253.9	EUCRITE	B	B		25-59
LEW 88013	219.1	H-5 CHONDRITE	B/C	B	18	16
LEW 88014	466.5	H-5 CHONDRITE	B/C	B/C	18	16
LEW 88015	528.2	L-6 CHONDRITE	A/B	A	23	20
LEW 88023	8.0	IRON				
MAC 88100	177.3	CARBONACEOUS C2	Be	A	0.5-24	1-4
MAC 88102	754.3	MESOSIDERITE	B	B	18	30
MAC 88103	20.4	H-5 CHONDRITE	B	A	19	16
MAC 88104	61.2	ANORTHOSITIC BRECCIA	A/Be	A/B	24	19-28
MAC 88105	662.5	ANORTHOSITIC BRECCIA	A/Be	A/B	10-34	25
MAC 88107	192.8	CARBONACEOUS C2	Be	A	0.5-39	0.8-9
MAC 88108	6988.4	H-5 CHONDRITE	B/Ce	B	18	16
MAC 88109	4112.1	L-5 CHONDRITE	B	A/B	24	21
MAC 88110	5369.9	H-5 CHONDRITE	B/Ce	B/C	17	15
MAC 88111	6441.5	H-4 CHONDRITE	B	A	18	15-17
MAC 88115	2247.3	H-5 CHONDRITE	B	B/C	17	15
MAC 88116	1453.0	H-5 CHONDRITE	C	A	18	16
MAC 88118	1142.3	L-5 CHONDRITE	A/B	A/B	23	20
MAC 88119	920.8	H-5 CHONDRITE	A/B	A	19	16

~ Classified by using refractive indices.

TABLE 2

Newly Classified Specimens Listed By Type **

SAMPLE NUMBER	WEIGHT (G)	CLASSIFICATION	WEATHERING	FRACTURING	%Fa	%FS
		Achondrites				
MAC 88104	61.2	ANORTHOSITIC BRECCIA	A/Be	A/B	24	19-28
MAC 88105	662.5	ANORTHOSITIC BRECCIA	A/Be	A/B	10-34	25
HOW 88401	1622.7	EUCRITE	B	B/C		25-57
LEW 88005	253.9	EUCRITE	B	B		25-59
EET 87720	91.3	UREILITE	Be	B	13-21	9-13
		Carbonaceous Chondrites				
EET 87711	5.7	CARBONACEOUS C2	B/C	B	0.8-3	1-3
EET 87747	38.2	CARBONACEOUS C2	B/C	B/C	0.4-6	1-5
EET 87770	38.6	CARBONACEOUS C2	B	A	0.5-4	0.6-7
EET 87812	11.9	CARBONACEOUS C2	B/C	B	0.6-7	1-5
EET 87846	8.1	CARBONACEOUS C2	B/C	B	0.8-3	1-3
EET 87847	32.9	CARBONACEOUS C2	B/C	B	0.5-4	1-3
EET 87850	14.5	CARBONACEOUS C2	Be	B	0.6-9	2-4
MAC 88100	177.3	CARBONACEOUS C2	Be	A	0.5-24	1-4
MAC 88107	192.8	CARBONACEOUS C2	Be	A	0.5-39	0.8-9
LEW 87250	1.7	CARBONACEOUS C4	A/B	A	29	25
		Chondrites - Type 3				
EET 87726	82.5	H-3 CHONDRITE	B/C	A	13-16	12-16
EET 87778	161.7	H-3 CHONDRITE	B/C	A	13-15	12-16
EET 87805	62.7	H-3 CHONDRITE	B/C	B	3-19	4-26
EET 87823	95.4	H-3 CHONDRITE	B/C	B	13-17	11-15
LEW 85339	28.8	L-3 CHONDRITE	A/B	A	1-30	3-13
EET 87735	4.2	L-3 CHONDRITE	B	B	1-25	2-22
LEW 87284	38.6	L-3 CHONDRITE	A	A	1-16	3-29
		E Chondrites				
EET 87746	142.3	E-4 CHONDRITE	Ce	B	1-2	0.6-2
		Irons				
LEW 87109	0.9	IRON				
LEW 88023	8.0	IRON				
		Stony-Irons				
MAC 88102	754.3	MESOSIDERITE	B	B	18	30

~ Classified by using refractive indices.

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) or Smithsonian Contribution to Earth Sciences, Number 28.

ANORTHOSITIC BRECCIA:
MAC88104, 88105

EUCRITE:
LEW88005 with LEW85300

C2 CHONDRITE:
EET87711, 87747, 87770, 87812, 87846, 87847 and 87850

C4 CHONDRITE:
LEW87250 with LEW87214

H3 CHONDRITE:
EET87726, 87778 and 87823

Sample No.:	**EET87555**	Location:	Elephant Moraine
Dimensions (cm):	8x5x5	Field Number:	2680
Weight (g):	474.1		
Meteorite Type:	L6 chondrite with a fine-grained inclusion		

Macroscopic Description: Rene´ Martinez
EET87555 is a rounded, conspicuously orange, and very coherent meteorite. Only traces of fusion crust remain on the exterior surfaces. A 2 cm circular fine-grained inclusion is the most prominent feature of an otherwise ordinary meteorite.

Thin Section (,9) Description: Brian Mason
EET87555 is an L6 chondrite with a fine-grained inclusion. A polished thin section of this inclusion (87555,9) shows an aggregate of anhedral to subhedral olivine grains, 0.03-0.3 mm across, with accessory chrome spinel as interstitial translucent brown grains. Microprobe analyses show olivine and chrome spinel with uniform compositions: olivine, Fa_{26}; chrome spinel, $(Fe_{.61}Mg_{.39})(Al_{1.13}Cr_{.87})O_4$.

Sample No.:	**EET87595**	Location:	Elephant Moraine
Dimensions (cm):	3x2x1	Field Number:	3162
Weight (g):	19.4		
Meteorite Type:	Brecciated L5 chondrite		

Macroscopic Description: Cecilia Satterwhite
Twenty percent of EET87595 is covered with weathered fusion crust. Chipping this meteorite revealed the interior surfaces which show moderate oxidation, a discontinuous weathering rind, and medium and dark gray matrix.

Thin Section (,2) Description: Brian Mason
A minor part of the section is brecciated chondritic material of L5 composition. The remainder consists of euhedral to subhedral olivine grains, up to 0.3 mm across, in a dark turbid matrix, possibly devitrified glass; one globule of troilite, 1.2 mm in diameter, is present. Microprobe analyses show chondrite and inclusion olivine of uniform composition, Fa_{25}; chondrite pyroxene composition is Fs_{21}.

Sample No.:	**EET87711; 87747; 87770; 87812; 87846; 87847; 87850**
Dimensions (cm):	2x1.5x1; 3.5x3x2; 4x2.5x2; 3x1.5x1.5; 2.5x1.5x1; 2.5x2.5x2; 2x2x1.5
Weight (g):	5.7; 38.2; 38.6; 11.9; 8.1; 32.9; 14.5
Meteorite Type:	C2 chondrite
Location:	Elephant Moraine
Field Number:	4333; 4362; 4464; 4349; 4359; 4696; 4363

Macroscopic Description: Carol Schwarz, Rene´ Martinez
These seven specimens have between 40 and 100% thick fractured fusion crust covering their exterior surfaces. The interior of each consists of black to reddish brown fine-grained matrix with abundant light and yellowish chondrules and angular clasts. One 5 mm white clast was noted in 87746, and evaporite deposits were noted on 87850. Several fragments are extremely friable.

Thin Section (EET87711,2; 747,4; 770,3; 812,3; 846,2; 847,3; 850,2) Description: Brian Mason

These sections are unique and so similar that the meteorites can confidently be paired. They show a close-packed aggregate of large chondrules and chondrule fragments, up to 2.8 mm across, in a black matrix containing a moderate amount of nickel-iron and very little sulfide. Most chondrules consist of granular olivine or olivine-pyroxene; some have intergranular pale brown glass. The matrix appears to consist largely of phyllosilicates. Brown limonitic staining pervades the sections. Microprobe analyses show most of the olivine and pyroxene grains are near Mg_2SiO_4 and $MgSiO_3$ in composition, averaging Fa_2 and Fs_2 respectively, although a few more Fe-rich grains were analysed. The meteorites are tentatively classified as C2 chondrites; the textures and relative abundance of nickel-iron suggest a relationship to the Renazzo and Al Rais meteorites.

Sample No.:	**EET87720**	Location:	Elephant Moraine
Dimensions (cm):	5x3x3	Field Number:	4579
Weight (g):	91.3		
Meteorite Type:	Ureilite		

Macroscopic Description: Carol Schwarz

The exterior surface of EET87720 is weathered smooth and has a thin, patchy fusion crust covering 70 percent. The interior matrix is dark and heavily oxidized. Abundant mineral grains, some as large as several millimeters in length, are present but are very rusty. Evaporite minerals were noted.

Thin Section (,3) Description: Brian Mason

The section shows a cataclastic aggregate of anhedral olivine grains, up to 3.6 mm across, with minor pyroxene. Brown limonitic staining pervades the section. Under crossed polars the olivine grains are seen as a mosaic of tiny crystals, evidently a shock effect. Microprobe analyses show olivine of variable composition, Fa_{13-21}, with a mean of Fa_{17}; pyroxene consists in part of pigeonite, Wo_8Fs_9, and in part of augite, $Wo_{35}Fs_{13}$; one grain of plagioclase, An_{24}, was analysed. The meteorite is a ureilite.

Sample No.:	**EET87726; 87778; 87823**		
Dimensions (cm):	7x4x1.5; 7.5x4x2.5; 5x3x2.5		
Weight (g):	82.5; 161.7; 95.4	Location:	Elephant Moraine
Meteorite Type:	H3 chondrite	Field Number:	4553; 4690; 4679;

Macroscopic Description: Carol Schwarz

These three weathered fragments have thin fusion crust covering ~50% of their exterior surfaces. The interior surfaces are heavily oxidized, obliterating any features present. EET87778 and 87823 are very coherent, making them extremely difficult to break.

Thin Section (EET87726,3; 778,3; 823,2) Description: Brian Mason

These meteorites are so similar in texture and mineral composition that the possibility of pairing should be considered. The sections show a close-packed aggregate of chondrules and chondrule fragments, up to 1.5 mm across, in a minor amount of granular matrix containing considerable nickel-iron and lesser troilite. A variety of chondrule types is present, mostly porphyritic and granular olivine and olivine-pyroxene, but some cryptocrystalline and radiating pyroxene chondrules were seen. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{13-17}, mean Fa_{15} (CV FeO is 7); pyroxene, Fs_{11-16}. The meteorites are classified as H3 chondrites, estimated H3.9.

Sample No.: **EET87735**
Dimensions (cm): 2x1.5x4
Weight (g): 4.2
Meteorite Type: L3 chondrite
Location: Elephant Moraine
Field Number: 4691

Macroscopic Description: Carol Schwarz
Fractured black fusion crust covers 90% of this unequilibrated chondrite. Numerous inclusions < 1mm in size are visible in the dark matrix.

Thin Section (.2) Description: Brian Mason
The section shows abundant chondrules and chondrule fragments, up to 1.8 mm across, in a black matrix containing some troilite and a little nickel-iron, which are concentrated as rims to the chondrules. A variety of chondrule types is present, including granular and porphyritic olivine and olivine-pyroxene, barred olivine, and fine-grained radiating pyroxene. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{1-25}, mean Fa_{12} (CV FeO is 60); pyroxene, Fs_{2-22}. 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 L3.4).

Sample No.: **EET87746**
Dimensions (cm): 4x4x3.5
Weight (g): 142.3
Meteorite Type: E4 chondrite
Location: Elephant Moraine
Field Number: 4587

Macroscopic Description: Carol Schwarz
EET87746 is extremely weathered although black fusion crust still covers ~60% of the exterior. Areas devoid of fusion crust are polished. Deep fractures penetrate the interior of the stone. The exposed interior is extremely oxidized. Some evaporite minerals were noted.

Thin Section (.3) Description: Brian Mason
The section shows abundant chondrules, chondrule fragments, and mineral grains in an opaque matrix consisting largely of nickel-iron and sulfides; the metal grains are extensively weathered to limonite. Chondrules are usually small, averaging 0.6 mm across, but a few larger ones, up to 1.5 mm across, are present. The chondrules and mineral grains are mostly clinoenstatite, but a little olivine is present. Mineral compositions are somewhat variable: olivine, Fa_{1-2}; pyroxene, $Fs_{0.6-2}$, averaging $Fs_{1.2}$; the nickel-iron contains 2.0% Si. The meteorite is classified as an E4 chondrite.

Sample No.: **EET87805**
Dimensions (cm): 3x3.5x2.5
Weight (g): 62.7
Meteorite Type: H3 chondrite
Location: Elephant Moraine
Field Number: 4593

Macroscopic Description: Carol Schwarz
Fusion crust , which covers ~70% of the exterior, is thin and flaking off. The interior is completely oxidized; the effects of weathering have obscured any features that may be present.

Thin Section (.4) Description: Brian Mason

The section shows a close-packed aggregate of chondrules, chondrule fragments, and mineral grains in a minor amount of finely crystalline matrix. The matrix contains a moderate amount of nickel-iron and a lesser amount of troilite, in part concentrated as rims on the chondrules. Chondrules range up to 2.1 mm in diameter; most are granular or porphyritic olivine and olivine-pyroxene, but one fine-grained radiating pyroxene chondrule was noted. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{3-19}, mean Fa_{16} (CV FeO is 25); pyroxene Fs_{4-26}, mean Fs_{10}. The meteorite is classified as an H3 chondrite, estimated H3.7.

Sample No.:	**HOW88401**	Location:	Mt. Howe
Dimensions (cm):	15x13x7.5	Field Number:	4094
Weight (g):	1622.7		
Meteorite Type:	Monomict Eucrite		

Macroscopic Description: Roberta Score

Thin, black, shiny fusion crust covers 35% of this eucrite. Areas devoid of fusion crust are medium gray in color. Large areas of brown oxidation are present on the exterior surfaces. Material has been plucked out by physical abrasion, leaving large vugs that are typical of the Antarctic eucrites.

A large eucritic clast (7.5 x 6 x 1 cm) is exposed on an exterior surface which has no fusion crust. Oxidation stains part of this clast. A weathering rind extends several millimeters into the interior. Freshly exposed surfaces are lighter in color. Several smaller eucritic clasts were evident when the meteorite was chipped. Although the sample is coherent, abundant minute interior fractures cause the stone to break into smaller than desired chips.

Thin Section (.7) Description: Brian Mason

The section shows a microbreccia consisting of several coarsely crystalline clasts in a fine-grained matrix of comminuted plagioclase and pyroxene. The clasts range up to 3 mm across, and are generally of gabbroic texture, consisting of subhedral plagioclase and pyroxene grains. Microprobe analyses show pyroxene compositions ranging fairly continuously from Wo_2Fs_{57} to $Wo_{43}Fs_{25}$, the range in En content being quite limited (En_{31-41}). Plagioclase compositions are in the range An_{88-93}. One grain of a silica polymorph, probably tridymite, was analysed. The meteorite is a monomict eucrite.

Sample No.:	**LEW85339**	Location:	Lewis Cliff
Dimensions (cm):	3.5x3x2	Field Number:	2077
Weight (g):	28.8		
Meteorite Type:	L3 chondrite		

Macroscopic Description: Rene´ Martinez

Polygonally fractured fusion crust completely covers this small specimen. The interior is light gray with chondrules and other inclusions measuring up to ~3 mm in diameter. One dark haloed inclusion (metallic?) is ~7 mm across.

Thin Section (.3) Description: Brian Mason

The section shows a close-packed aggregate of chondrules and chondrule fragments, up to 2.1 mm across, in a minimum amount of dark matrix which contains some troilite and a little nickel-iron. A variety of chondrule types is present, including granular and porphyritic olivine and olivine-pyroxene, barred olivine, and fine-grained radiating pyroxene. Considerable weathering is indicated by brown limonitic staining throughout the section. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{1-30}, mean Fa_{14} (CV FeO is 59); pyroxene, Fs_{3-13}. The small amount of nickel-iron suggests L group, and variability of olivine and pyroxene compositions type 3; hence the meteorite is classified as a L3 chondrite (estimated L3.4).

Sample No.: **LEW87109**
Dimensions (cm): 0.6x0.7x0.5
Weight (g): 0.9
Meteorite Type: Iron
Location: Lewis Cliff
Field Number: 4217

Macroscopic Description: Roy S. Clarke, Jr.
The specimen as received was a 0.86 g metal slug plus 0.03 g of debris, apparently mainly detached weathering products. Its shape was roughly equidimensional; and its surface was partially covered with various colored secondary oxides, with areas of tool marks from a previous examination, and with areas of metallic luster that may have developed by wind abrasion in Antarctica.

Polished Section Description: Roy S. Clarke, Jr.
A median section (0.174 g) was taken through the specimen, providing a polished section area of 0.25 cm^2 for examination, and leaving two small butts (0.352 g, 0.174 g). Two small areas of remnant fusion crust were observed at section edges, as well as intermittent patches of secondary oxides. The oxide areas are generally less the 50 mµ thick, with only an occasional small patch approaching a thickness of 100mµ. Patches of heat-altered kamacite are present near edges. The bulk metal is kamacite of somewhat variable Ni content. A small number of microprobe analyses averaged 6.3% Ni. The kamacite is rich in subboundaries that are decorated with fine precipitates below the limit of optical resolution. Neumann bands are present, generally decorated with fine precipitates. One 0.2 mm cracked schreibersite was observed.

Sample No.: **LEW87250**
Dimensions (cm): 1x1.3x0.5
Weight (g): 1.7
Meteorite Type: C4 chondrite
Location: Lewis Cliff
Field Number: 4784

Macroscopic Description: Rene´ Martinez
LEW87250 is a complete specimen with fusion crust covering 100% of the stone. This carbonaceous chondrite is light gray in color, fine-grained, and friable.

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 (magnetite and pentlandite), with a few chondrules up to 0.6 mm across. Thick fusion crust mantles part of the section. Olivine composition is essentially uniform, Fa_{29}; a little orthopyroxene, Fs_{25}, was analysed. Two grains of plagioclase, An_{18}, and An_{31}, were analysed. The meteorite is a C4 chondrite, and closely resembles LEW87214.

Sample No.: **LEW87284**
Dimensions (cm): 5x3x15
Weight (g): 38.6
Meteorite Type: L3 chondrite
Location: Lewis Cliff
Field Number: 4702

Macroscopic Description: Cecilia Satterwhite
Fusion crust covers almost the entire specimen. The exposed interior contains dark matrix with abundant light colored inclusions; the largest is 0.5 cm in the longest dimension.

Thin Section (.2) Description: Brian Mason
The section shows abundant chondrules and chondrule fragments, up to 2.5 mm across, in a black matrix which contains some troilite and a little nickel-iron. A variety of chondrule types is present, including granular and porphyritic olivine and fine-grained radiating pyroxene. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{1-16}, mean Fa_{11} (CV FeO is 36); pyroxene, Fs_{3-29}. 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 L3.6).

Sample No.:	**LEW88005**	Location:	Lewis Cliff
Dimensions (cm):	7x6x4	Field Number:	6200
Weight (g):	253.9		
Meteorite Type:	Monomict Eucrite		

Macroscopic Description: Roberta Score
Ten percent of the original fusion crust remains on LEW88005. Many large semi-rounded clasts, as large as 2 x 2 cm, are present. These clasts include mono- and poly-mineralic clasts, aphantic clasts and eucritic type clasts. Several areas are stained with oxidation. In hand specimen, LEW88005 closely resembles LEW85300, LEW85302 and LEW85303.

Thin Section (.11) Description: Brian Mason
The section shows a microbreccia of polycrystalline clasts in a fine-grained matrix of comminuted pyroxene and plagioclase. The clasts range up to 5 mm across, and are fine- to coarse-grained aggregates of pyroxene and plagioclase. Microprobe analyses show pyroxene compositions ranging fairly continuously from Wo_1Fs_{59} to $Wo_{42}Fs_{25}$, with a limited range in En content (En_{31-43}). Plagioclase compositions are in the range An_{88-93}, with a mean of An_{92}. Accessory grains of a silica polymorph, probably tridymite, were analysed. The meteorite is a monomict eucrite.

Sample No.:	**LEW88023**	Location:	Lewis Cliff
Dimensions (cm):	2x1.5x0.4	Field Number:	None
Weight (g):	8.0		
Meteorite Type:	Reheated octahedrite (?) with trace silicates		

Macroscopic Description: Roy S. Clarke, Jr.
This specimen was not thought to be a meteorite in the field and was identified later by Randy Korotev at Washington University. Reddish-brown terrestrial oxides cover its surfaces. It is a flat oval with rounded edges, having one domed surface and a flat surface, suggesting a posterior and an anterior surfaces during oriented atmospheric flight.

Polished Section Description: Roy S. Clarke, Jr.
A thin slice was removed from one end of the specimen, perpendicular to its long axis, providing an area of approximately 0.5 cm^2 for examination. The surface is mainly recrystallized kamacite containing 6.5% Ni, unusually low levels of P, and bordered by terrestrial oxides varying in width from 0.05 to 0.5 mm. The size of recrystallized kamacite areas are much smaller along the domed surface edge and at the ends of the slice, suggesting a heat-altered zone associated with an anterior surface. Interior recrystallization may have occurred prior to atmospheric passage. Very small amounts of heat-altered taenite are present, but insufficient surface area is available to establish the scale should a coarse Widmanstätten pattern have existed. The kamacite contains tiny precipitates, particularly decorating subboundaries, that are too small to be identified. No clearly recognizable schreibersite was seen. Two areas containing chains of silicate inclusions were observed. Individual silicates are a few microns on an edge, with a total area of about 0.02 mm^2. Pyroxene, olivine, and plagioclase were identified, as was an associated chromite of about 0.005 mm^2. In surface repolishing the chromite was lost, but troilite was revealed as also being part of the association.

Sample No.: **MAC88100**
Dimensions (cm): 8x5.5x3
Weight (g): 177.3
Meteorite Type: C2 chondrite

Location: MacAlpine Hills
Field Number: 5745

Macroscopic Description: Rene´ Martinez
This oriented carbonaceous chondrite is almost entirely covered by black fusion crust. A thin layer of evaporite deposit appears along the fusion crust-interior boundary. The interior is black with no inclusions visible to the naked eye.

Thin Section (,2) Description: Brian Mason
The section consists largely (about 80%) of translucent brown isotropic material, with sparse chondrules and many minute mineral grains, mostly olivine with minor pyroxene. Microprobe analyses show olivine and pyroxene compositions near Mg_2SiO_4 and $MgSiO_3$ respectively, with a few more iron-rich grains. The meteorite is a C2 carbonaceous chondrite.

Sample No.: **MAC88102**
Dimensions (cm): 8x6x6.5
Weight (g): 754.3
Meteorite Type: Mesosiderite

Location: MacAlpine Hills
Field Number: 5738

Macroscopic Description: Roberta Score
MAC88102 is an angular, considerably weathered mesosiderite. Small patches of dull fusion crust are scattered over the red brown exterior. There are abundant large weathered silicate inclusions, as large as 1 x 2.5 cm, which are greenish to black in color. This specimen broke along a pre-existing fracture exposing extremely weathered material with abundant powdery rust. Most likely this is not representative of the entire meteorite. The metal is still very coherent, as obtaining a chip from other than along a pre-existing crack was nearly impossible.

Thin Section (,5) Description: Brian Mason
The section consists largely of nickel-iron, with a minor amount of silicate material. Much of the silicate material is comminuted pyroxene and plagioclase, but with some clasts up to 2.4 mm long; a little olivine and accessory tridymite and merrillite are present. Most of the pyroxene has a uniform composition Wo_3Fs_{30}, but a few more calcic grains were analysed. The composition of an olivine clast is Fa_{18}. Plagioclase compositions are in the range An_{86-95}. The meteorite is a mesosiderite.

Sample No.: **MAC88107**
Dimensions (cm): 8.5x4.5x3
Weight (g): 192.8
Meteorite Type: C2 chondrite

Location: MacAlpine Hills
Field Number: 5554

Macroscopic Description: Rene´ Martinez
Eighty percent of this carbonaceous chondrite is covered by black fractured fusion crust. Overall it is shaped like a wedge with rounded edges. The interior is very fine-grained and black. Light colored <1mm inclusions are evenly distributed. A thin weathering rind (~1mm) is marked by a thin discontinuous layer of evaporite just under the fusion crust.

Thin Section (,2) Description: Brian Mason
The section shows abundant small chondrules, averaging about 0.3 mm in diameter, and numerous mineral aggregates and mineral grains, set in a black matrix. Most of the chondrules consist of granular olivine and olivine-pyroxene; one fine-grained radiating pyroxene was seen. Accessory amounts of finely-dispersed nickel-iron and sulfide are present. Microprobe analyses show that much of the olivine is near forsterite in composition, but occasional iron-rich grains are present (the overall range is $Fa_{0.5-39}$, with a mean of Fa_8). Pyroxene composition range is $Fs_{0.8-9}$. The meteorite is a C2 carbonaceous chondrite.

—AMENDED VERSION—

Sample No.:	**MAC88104; 88105**		
Dimensions (cm):	4x4.5x2.5; 11x7.5x6.5		
Weight (g):	61.2; 662.5	Location:	MacAlpine Hills
Meteorite Type:	Anorthositic Breccia	Field Number:	5757; 5759

Macroscopic Description: Roberta Score

MAC88104 and MAC88105 are paired fragments of a polymict breccia. Both specimens have thin gray-green fusion crust which covers approximately 30% of the exterior surface. The other exterior surfaces are dark gray and weathered, with numerous clasts and vugs where clasts have been plucked out by weathering. A minute amount of evaporite minerals is evident in the minor cracks in the fusion crust. The interior is blue gray and mostly fine-grained, but glassy in some areas. Veins of dark vesicular glass surround some clasts, but do not transect any clasts. The meteorite contains abundant angular feldspathic clasts and fine-grained gray, black and beige clasts. The largest clast exposed (1.5 x 1 cm) is fine-grained and anorthositic, with scattered mafic minerals. Other clasts are medium-grained and more mafic.

Thin Section (MAC88104,7; 88105,6) Description: Brian Mason

The sections show a microbreccia of small (up to 0.3 mm) mineral grains, and clasts (up to 3 mm across), in a translucent to semi-opaque brown glassy matrix. The mineral grains are almost all plagioclase, except for a few olivines and pyroxenes; two pink spinel grains and one minute grain of metal or metal-sulfide were seen in 88105,6. Some of the clasts consist almost entirely of dark-brown semi-opaque glass; others show small plagioclase laths with interstital glass; some are plagioclase-rich with minor olivine or pyroxene. Microprobe analyses show that the plagioclase is almost pure anorthite (Na_2O 0.3-0.5%, K_2O less than 0.1%). Olivine composition is variable, Fa_{10-34}; most of the pyroxene is Ca-poor, averaging Wo_6Fs_{25}, but some more Ca-rich grains were analysed; the FeO/MnO ratio is very high, 50-80, characteristic of lunar material. The composition of the glassy matrix is somewhat variable, but averages (weight percent): SiO_2, 45, Al_2O_3 28, FeO 6.3, MgO 4.7, CaO 16, Na_2O 0.36, TiO_2 0.32, MnO 0.11, K_2O less than 0.1. The meteorite is an anorthositic microbreccia, almost certainly of lunar origin.

Oxygen Isotopic Composition: Robert Clayton

The oxygen isotopic composition of MAC88105 is $\delta^{18}O = 5.5$, $\delta^{17}O = 2.7$, which falls within the group of previously analyzed lunar meteorites and Apollo lunar rocks.

Thermoluminescence Data: Derek Sears

The measured natural TL values for MAC88104 and MAC88105 are 2.4 +/- 0.3 and 2.9 +/- 0.3 krad at 250 degrees C, respectively. This compares with Steve Sutton's values of 0.75, 1.7, and 0.5 krad for ALHA81005, YAMATO-791197, and YAMATO-82192, respectively, and with typical values for most Antarctic chondrites of 20-80 krad. These low values reflect recent heating or anomalous (non-classical) fading, observed for some lunar meteorites. (Sutton, 1985, Proc. 10th Symp. Antarctic Meteorites, 133-139: 1986, Meteoritics, 21, 520-521: 1989, personal communications).

^{26}Al Measurement: John Wacker

^{26}Al activity of MAC88105 is 19.5 ± 2.6 dpm/kg which is considerably lower than the 41-139 dpm/kg measured by Nishiizumi et al. (1988; Meteoritics 23, 294-295) in four other lunar meteorites. The low activity implies either an unreasonably old terrestrial age (>1MY) or that the sample was heavily shielded on the moon and had a short transit time in space.

TABLE 4

NATURAL THERMOLUMINESCENCE DATA FOR ANTARCTIC METEORITES

Natural thermoluminescence (NTL) data obtained by Ben Myers, Hazel Sears and Derek Sears at the University of Arkansas. The measurements and data reduction methods were described by Hasan et al. (1987, Proc. 17th LPSC E703-E709; 1989, LPS XX, 383-384). We also include some preliminary notes on pairing and other observations. (August 1989 data set).

Meteorite		NTL [krad at 250 deg. C]		
EET 87532	Euc	2.8	+/-	0.6
EET 87542	Euc	0.3	+/-	0.1
EET 87548	Euc	2.3	+/-	0.5
LEW 87004	Euc	4.3	+/-	0.4
EET 87503	How	6.1	+/-	0.8
EET 87509	How	3.55	+/-	0.05
EET 87510	How	7.9	+/-	0.3
EET 87513	How	5	+/-	1
EET 87518	How	2.5	+/-	0.5
EET 87528	How	5.1	+/-	0.8
EET 87531	How	2.5	+/-	0.1
EET 87500	Mes	0.18	+/-	0.05
EET 87501	Mes	0.21	+/-	0.04
LEW 87006	Mes	10	+/-	1
MAC 88104	Ano	2.4	+/-	0.3
MAC 88105	Ano	2.9	+/-	0.3
EET 87511	Url	1.5	+/-	0.4
EET 87517	Url	<1		
EET 87523	Url	0.8	+/-	0.5
EET 87717	Url	3.8	+/-	0.7
EET 87522	C2	2.4	+/-	0.5
LEW 87022	C2	< 1		
LEW 87148	C2	< 1		
MAC 87300	C2	17	+/-	6
MAC 87301	C2	17	+/-	2
EET 87507	C4	0.9	+/-	0.8
EET 87514	C4	10	+/-	1
EET 87526	C4	1.1	+/-	0.7
EET 87529	C4	0.7	+/-	0.2
EET 87544	LL4	69.1	+/-	0.2
LEW 87123	LL6	107	+/-	2
LEW 87279	LL6	41.7	+/-	0.5
MAC 87317	LL6	47.0	+/-	0.5
MAC 87318	LL6	22.1	+/-	0.3
EET 87557	L4	35.3	+/-	0.5
EET 87564	L4	31.6	+/-	0.5
EET 87573	L4	53.1	+/-	0.9

Meteorite		NTL [krad at 250 deg. C]		
EET 87582	L4	1.7	+/-	0.2
MAC 87302	L4	2.5	+/-	0.4
MAC 87303	L4	5	+/-	2
MAC 87305	L4	100	+/-	1
MAC 87306	L4	67	+/-	2
MAC 87310	L4	3	+/-	1
EET 87534	L5	70	+/-	1
EET 87558	L5	0.78	+/-	0.05
ALH 87900	L6	19.6	+/-	0.3
EET 87502	L6	19.3	+/-	0.4
EET 87533	L6	34.9	+/-	0.6
EET 87535	L6	17	+/-	2
EET 87536	L6	0.54	+/-	0.08
EET 87538	L6	37.2	+/-	0.5
EET 87540	L6	44.6	+/-	0.8
EET 87541	L6	6.6	+/-	0.1
EET 87549	L6	86.9	+/-	0.8
EET 87554	L6	90	+/-	1
EET 87556	L6	8.6	+/-	0.2
EET 87559	L6	67	+/-	2
EET 87560	L6	10	+/-	2
EET 87561	L6	11.2	+/-	0.7
EET 87566	L6	59	+/-	6
EET 87567	L6	15.4	+/-	0.1
EET 87568	L6	8.9	+/-	0.4
EET 87572	L6	2.00	+/-	0.01
EET 87574	L6	33.3	+/-	0.2
EET 87578	L6	25.5	+/-	0.3
EET 87580	L6	32.0	+/-	0.8
EET 87584	L6	9.5	+/-	0.1
LEW 87035	L6	35	+/-	1
LEW 87036	L6	37	+/-	1
LEW 87038	L6	39.6	+/-	0.6
LEW 87040	L6	44.0	+/-	0.5
LEW 87042	L6	37.0	+/-	0.3
LEW 87045	L6	29.8	+/-	0.3
LEW 87046	L6	26.8	+/-	0.3
LEW 87143	L6	0.42	+/-	0.03
LEW 87169	L6	0.7	+/-	0.1
MAC 87304	L6	12.9	+/-	0.1
MAC 87308	L6	0.14	+/-	0.03
MAC 87309	L6	21.2	+/-	0.4
MAC 87314	L6	50.4	+/-	0.5
QUE 87400	L6	1.1	+/-	0.5

Meteorite		NTL [krad at 250 deg. C]			Meteorite		NTL [krad at 250 deg. C]		
QUE 87401	L6	50.0	+/-	0.7	LEW 87267	H5	107	+/-	1
					LEW 87277	H5	86.1	+/-	0.8
EET 87553	H4	16.2	+/-	0.1	MAC 87312	H5	2.1	+/-	0.4
MAC 87307	H4	0.7	+/-	0.1	MAC 87313	H5	23.2	+/-	0.3
MAC 87311	H4	0.6	+/-	0.1	MAC 87319	H5	86	+/-	1
EET 87537	H5	57	+/-	1	EET 87543	H6	1.5	+/-	0.1
EET 87539	H5	11.8	+/-	0.4	EET 87546	H6	82	+/-	2
EET 87545	H5	26.2	+/-	0.3	EET 87547	H6	2.8	+/-	0.2
EET 87550	H5	29	+/-	6	EET 87552	H6	85	+/-	1
EET 87551	H5	25.8	+/-	0.6	EET 87562	H6	40.2	+/-	0.4
EET 87576	H5	58.2	+/-	0.5	EET 87563	H6	77.4	+/-	0.4
EET 87579	H5	17.9	+/-	0.1	EET 87565	H6	5.1	+/-	0.6
LEW 87029	H5	20.4	+/-	0.3	EET 87575	H6	18.3	+/-	0.3
LEW 87030	H5	11.5	+/-	0.1	LEW 87039	H6	42.7	+/-	0.2
LEW 87031	H5	37.4	+/-	0.8	LEW 87044	H6	34.7	+/-	0.6
LEW 87033	H5	5.0	+/-	0.1	LEW 87047	H6	6.9	+/-	0.1
LEW 87034	H5	29.7	+/-	0.2	LEW 87048	H6	1.7	+/-	0.3
LEW 87037	H5	43.6	+/-	0.1	LEW 87055	H6	25.5	+/-	0.7
LEW 87041	H5	117	+/-	2	LEW 87230	H6	50	+/-	2
LEW 87043	H5	0.65	+/-	0.04	MAC 87315	H6	0.68	+/-	0.02
LEW 87095	H5	5.5	+/-	0.1					

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

NOTES

General comments: For samples whose NTL lies between 5 and 100 krad the natural TL is related, primarily, to terrestrial age. We suggest meteorites with NTL >100 krad are candidates for an unusual history involving high radiation doses and/or low temperatures. Samples with NTL<5 krad have TL below that which can reasonably be ascribed to long terrestrial ages. Such meteorites have had their TL lowered by heating within the last million years or so (close solar passage, shock heating, atmospheric entry), exacerbated, in the case of certain achondrites, by "anomalous fading".

Pairings: The following are comments on pairings based on the natural TL data above, the shape of the induced TL glow curve, curatorial staff unpublished and published sample descriptions, and classifications. Unless otherwise noted, suggested pairings are considered "probable", as opposed to "possible" or "tentative" by the Arkansas Group.

1. These data confirm the pairings suggested by the Newsletter:

   How: EET87503, EET87509, EET87510, EET87513, EET87518, EET87531.

   Mes: EET87500, EET87501.

   Ano: MAC88104, MAC88105.

   Url: EET87511, EET87523, possibly also EET87717.

   C2 : MAC87300, MAC87301.

   C4 : EET87507, EET87526, EET87529.

L4 : MAC87302, MAC87303.

2. The present data do not confirm the following suggestions relating to pairing in the Newsletter:

   Url: EET87517 has an induced TL curve distinct from the other ureilites, but similar to the C2 chondrites. It may not be paired with the EET87511 group.

   C4 : EET87514 has significantly higher natural TL and may not be paired with the EET87507 group.

   How: EET87528 may be paired with the EET87503 group, contrary to the Newsletter description.

3. Additional pairings suggested by the present data:

   C2 : LEW87022, LEW87148 (possible).

   L4 : MAC87310 may be paired with the MAC87302 group.
   L4 : EET87557, EET87564.

   L6 : EET87549, EET87554.
   L6 : EET87556, EET87568, EET87584, possibly also EET87541.
   L6 : EET87533, EET87538, EET87574, EET87580.
   L6 : LEW87035, LEW87038.
   L6 : LEW87036, LEW87042.
   L6 : LEW87045, LEW87046.

   (The LEW87035, LEW87036, and LEW87045 groups are possibly paired.)

   L6 : EET87560, EET87561. (These L6 chondrites have unusual induced TL properties, shock?. EET87536 and QUE87400 are other L6 chondrites with these unusual TL properties.)

   H4 : MAC87307, MAC87311.

   H5 : EET87537, EET87576.
   H5 : EET87550, EET87551.
   H5 : LEW87033, LEW87095.

   H6 : EET87546, EET87552.
   H6 : EET87547, EET87565 (tentative).