Antarctic Meteorite
NEWSLETTER

Volume 14
Number 1

February 1991

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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INSIDE THIS ISSUE:

SAMPLE REQUEST DEADLINE: April 5, 1991 !!!!

MWG MEETS April 18-20, 1991

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 5, 1991 will be reviewed at the MWG meeting on April 18-20, 1991 to be held in St. Louis, MO. Requests that are received after the April 5 deadline may possibly be delayed for review until the MWG meets again in the Fall of 1991. **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 at (713) 483-5135 or the secretary at (713) 483-5125.

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 which meets twice a year to guide the collection, curation, allocation, and distribution of the U. S. collection of Antarctic meteorites. Issuance of samples does not imply a commitment by any agency to fund the proposed research. Requests for financial support must be submitted separately to the appropriate funding agencies. As a matter of policy, U.S. Antarctic meteorites are the property of the National Science Foundation and all allocations are subject to recall.

Each request should accurately refer to meteorite samples by their respective identification numbers 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. Requests for thin sections which will be used in destructive procedures such as ion probe, etch or even repolishing, must be stated explicitly. 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.

New Meteorites

This newsletter presents classifications of 287 new meteorites from the 1986-1988 collections. Descriptions are given for nine meteorites of special petrologic type. Seven are type 3 unequilibrated ordinary chondrites. One, LEW87295, is a eucrite found emerging from the ice. The most unusual is a unique achondrite, LEW88446, which is a troctolite consisting of anorthitic plagioclase and fayalitic olivine.

1990-1991 Field Season

The ANSMET collection program was back in action this year and was highly successful. Two teams of four people each have just returned from the Elephant Moraine and Lewis Cliff areas of Antarctica. They recovered over 1100 meteorites and report that there are numerous interesting meteorites in the 1990 collection. The first descriptions of these meteorites will appear in the fall newsletter.

EUROMET Program

The EUROMET program was approved last summer by the European Economic community. We've heard that the first collection expedition recovered over 250 meteorites from the Frontier Mountains area. These meteorites will be curated in a EUROMET facility at Open University, UK. Congratulations EUROMET, on a successful inaugural season!

A Note on Contamination

The JSC curatorial facility is dedicated to minimizing contamination to meteorites and lunar samples during processing and storage. Our operations are done in clean labs, usually in N2 cabinets, using a very limited list of approved materials, dominantly 300-series stainless steels, aluminum, and Teflon, but including a few other materials that have been approved for specific uses. Our equipment and procedures are continually under review, and we occasionally discover contamination problems which could be potentially serious for some types of analyses.

For example, galling of threaded stainless steel and aluminum parts has long been known to be a serious problem when the parts are very clean and are operated in a dry nitrogen environment. In order to prevent seizure of threaded parts, some kind of lubricant is required. The first lubricant tried was MoS2 grease, but this became smeared over surfaces much too easily. In 1972 a product known as Xylan 1010 was approved for use in lunar sample cabinets as a substitue for MoS2 grease. It was subsequently used in meteorite processing cabinets. Originally this material was thought to be pure Teflon, an approved material for use in the N2 cabinets, but our recent analyses have shown that it is not. Instead it is a Teflon-resin mixture containing N-bearing hydrocarbons. We first recognized the potential contamination problem for organic and light-element analysis in late 1989 and reported it to investigators involved in such studies. We are attempting both to evaluate the extent of the actual contamination in samples, with the help of some investigators, and to eliminate the problem in future work. We have removed Xylan from meteorite processing cabinets, mostly by redesign of parts to use pure Teflon bushings, and are looking for an appropriate substitute in the rare cases where pure Teflon bushings are not sufficiently durable.

We will continue to try to make samples as contamination-free as possible. If you have some specific contamination-control problem, be sure to let us know your constraints in your request letter and we will work with you to get you the best possible sample for your studies. Finally, if you observe any contaminates in your samples, please let us know about it in as much detail as possible, so that we can identify the source of the contamination and revise our equipment or procedures to prevent a recurrence.

From 1986-1988 Collections

Pages 5-14 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 13(3) (September 1990). All 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:

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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 86147	12.8	H-5 CHONDRITE	C	B	18	16
LEW 86148	1.7	H-5 CHONDRITE	B/C	A	17	15
LEW 86149	18.8	H-6 CHONDRITE	C	A	18	16
LEW 86150	7.2	H-5 CHONDRITE	B	A	18	16
LEW 86151	12.7	H-5 CHONDRITE	C	A	18	16
LEW 86152	15.4	H-5 CHONDRITE	C	A/B	18	16
LEW 86153	30.8	H-5 CHONDRITE	C	A	19	16
LEW 86154	9.0	H-5 CHONDRITE	B	A	19	16
LEW 86155	18.3	H-5 CHONDRITE	B/C	A	18	16
LEW 86156	24.5	H-5 CHONDRITE	B/C	A	18	16
LEW 86159	8.2	H-5 CHONDRITE	C	A	18	16
LEW 86164	26.0	H-5 CHONDRITE	C	A	19	16
LEW 86167	13.0	H-5 CHONDRITE	C	A	19	17
LEW 86171	17.6	H-4 CHONDRITE	Ce	A	18	15-21
LEW 86172	6.9	H-5 CHONDRITE	C	A	18	16
LEW 86174	27.2	H-5 CHONDRITE	C	A/B	18	16
LEW 86176	6.3	H-4 CHONDRITE	C	A	17	13-15
LEW 86177	19.4	H-6 CHONDRITE	C	A	18	16
LEW 86180	10.9	H-5 CHONDRITE	C	A	18	16
LEW 86181	30.6	H-6 CHONDRITE	C	B	19	16
LEW 86184	15.9	L-6 CHONDRITE	C	A	24	20
LEW 86185	4.8	LL-6 CHONDRITE	C	A	28	23
LEW 86187	11.1	H-5 CHONDRITE	C	A	18	16
LEW 86189	10.3	H-5 CHONDRITE	C	A	17	15
LEW 86191	11.3	H-5 CHONDRITE	C	A	18	16
LEW 86192	11.5	H-5 CHONDRITE	C	A	19	17
LEW 86194	10.0	H-5 CHONDRITE	C	A/B	18	16
LEW 86197	18.0	H-5 CHONDRITE	C	B	18	16
LEW 86198	14.8	H-5 CHONDRITE	B/C	A	18	16
LEW 86199	31.9	H-5 CHONDRITE	C	A	18	16
LEW 86200	2.9	H-5 CHONDRITE	C	A	17	15
LEW 86202	12.2	H-6 CHONDRITE	C	A	18	16
LEW 86206	35.8	H-5 CHONDRITE	C	A	18	16
LEW 86208	6.9	H-5 CHONDRITE	C	A	17	15
LEW 86209	12.4	H-5 CHONDRITE	C	A	17	15
LEW 86213	27.9	L-3 CHONDRITE	Ce	A	2-20	1-16
LEW 86217	19.6	H-5 CHONDRITE	C	A/B	19	17
LEW 86222	8.9	L-5 CHONDRITE	B	A	23	19
LEW 86223	13.4	H-5 CHONDRITE	C	A	19	16
LEW 86224	6.9	L-5 CHONDRITE	B/C	A	24	20
LEW 86226	48.6	H-5 CHONDRITE	C	A	19	16
LEW 86228	28.9	H-5 CHONDRITE	C	A	18	16
LEW 86230	2.4	H-5 CHONDRITE	C	A/B	17	15
LEW 86232	19.4	H-5 CHONDRITE	C	A	18	16
LEW 86233	9.6	H-5 CHONDRITE	C	A	17	15
LEW 86234	14.3	H-5 CHONDRITE	C	A/B	17	15
LEW 86235	6.7	H-5 CHONDRITE	C	A	18	16
LEW 86237	13.8	H-5 CHONDRITE	C	A/B	17	15
LEW 86240	7.1	H-5 CHONDRITE	C	A	17	15
LEW 86241	33.1	H-6 CHONDRITE	C	A	18	16
LEW 86242	12.8	H-5 CHONDRITE	C	A	18	16

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LEW 86243	5.7	H-5 CHONDRITE	C	A/B	17	15
LEW 86244	5.1	H-5 CHONDRITE	C	A	18	16
LEW 86245	2.9	H-5 CHONDRITE	C	A	17	15
LEW 86247	3.6	H-5 CHONDRITE	C	B	18	16
LEW 86249	44.8	H-6 CHONDRITE	C	A	18	16
LEW 86251	22.6	L-4 CHONDRITE	C	A	23	12-21
LEW 86254	8.5	H-5 CHONDRITE	C	A	17	15
LEW 86255	25.3	H-5 CHONDRITE	C	A	18	16
LEW 86256	21.8	H-5 CHONDRITE	C	A	18	16
LEW 86257	3.7	H-5 CHONDRITE	C	B	17	15
LEW 86259	8.5	H-5 CHONDRITE	C	A	18	16
LEW 86260	12.5	L-5 CHONDRITE	C	A/B	25	20
LEW 86261	13.8	H-5 CHONDRITE	C	A	17	15
LEW 86262	10.1	H-5 CHONDRITE	C	A	17	15
LEW 86263	15.1	H-5 CHONDRITE	C	A	18	16
LEW 86264	5.1	L-4 CHONDRITE	C	A	23	13-18
LEW 86265	2.0	H-5 CHONDRITE	C	A	19	17
LEW 86266	40.8	H-5 CHONDRITE	C	A	18	16
LEW 86267	17.7	L-4 CHONDRITE	C	A	24	12-19
LEW 86271	19.8	H-5 CHONDRITE	C	A	18	16
LEW 86272	16.0	H-5 CHONDRITE	C	A	18	16
LEW 86273	30.3	L-6 CHONDRITE	B	A	25	20
LEW 86275	35.4	H-5 CHONDRITE	C	B/C	19	16
LEW 86286	44.9	H-5 CHONDRITE	B/Ce	B	19	16
LEW 86292	32.8	H-5 CHONDRITE	Ce	B	19	17
LEW 86302	40.2	H-5 CHONDRITE	C	A	19	17
LEW 86305	40.4	H-5 CHONDRITE	C	B	19	16
LEW 86314	41.4	H-5 CHONDRITE	C	A	19	16
LEW 86318	6.6	H-4 CHONDRITE	Ce	A/B	16	14
LEW 86319	3.2	H-5 CHONDRITE	C	A	17	15
LEW 86320	3.5	H-5 CHONDRITE	C	A	19	16
LEW 86321	33.2	H-5 CHONDRITE	C	B	19	16
LEW 86322	17.5	H-5 CHONDRITE	C	A	18	16
LEW 86323	5.3	H-5 CHONDRITE	C	A	17	15
LEW 86324	8.4	H-5 CHONDRITE	C	A	18	16
LEW 86325	19.9	H-5 CHONDRITE	C	A	18	16
LEW 86326	6.8	H-5 CHONDRITE	C	A	17	15
LEW 86327	44.2	H-5 CHONDRITE	C	A	19	17
LEW 86329	5.0	H-5 CHONDRITE	C	A	19	16
LEW 86332	14.4	H-5 CHONDRITE	C	A	18	15
LEW 86334	6.2	LL-6 CHONDRITE	A	A	27	23
LEW 86336	8.3	H-5 CHONDRITE	C	A	17	15
LEW 86337	25.6	H-5 CHONDRITE	C	B	18	16
LEW 86338	26.8	H-5 CHONDRITE	C	A/B	18	16
LEW 86344	17.1	H-5 CHONDRITE	C	A	17	15
LEW 86345	3.6	H-5 CHONDRITE	C	A	19	16
LEW 86346	3.2	L-5 CHONDRITE	C	A	25	21
LEW 86347	3.1	L-3 CHONDRITE	C	A	1-21	2-17
LEW 86348	20.4	H-6 CHONDRITE	C	A	17	15
LEW 86349	38.1	L-6 CHONDRITE	C	A	24	20
LEW 86351	9.6	H-6 CHONDRITE	C	A	16	15
LEW 86353	4.7	H-5 CHONDRITE	C	A	17	15
LEW 86354	23.3	H-5 CHONDRITE	B/C	A	16	15
LEW 86355	7.1	H-6 CHONDRITE	C	A	17	15
LEW 86356	9.1	H-5 CHONDRITE	C	A	16	15
LEW 86358	5.0	H-4 CHONDRITE	B/C	A	17	15-21
LEW 86361	5.6	H-5 CHONDRITE	B/C	A	17	15

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LEW 86362	5.9	H-5 CHONDRITE	C	B	17	15
LEW 86363	2.9	H-5 CHONDRITE	B/C	A	17	15
LEW 86365	4.8	H-5 CHONDRITE	C	A	18	16
LEW 86366	25.9	H-5 CHONDRITE	C	A	19	16
LEW 86368	28.6	H-5 CHONDRITE	C	A	18	16
LEW 86369	7.4	H-5 CHONDRITE	C	A	18	16
LEW 86370	8.7	H-5 CHONDRITE	C	A	18	16
LEW 86373	30.1	H-5 CHONDRITE	C	A/B	19	16
LEW 86374	31.7	H-5 CHONDRITE	C	A	19	16
LEW 86375	10.5	H-5 CHONDRITE	C	B	19	16
LEW 86376	41.1	H-5 CHONDRITE	C	A/B	19	17
LEW 86377	2.0	H-4 CHONDRITE	C	A	16	14
LEW 86379	9.0	H-4 CHONDRITE	C	A	17	12-21
LEW 86382	21.8	H-6 CHONDRITE	C	A	18	16
LEW 86383	10.5	H-5 CHONDRITE	C	A	18	16
LEW 86384	5.9	H-5 CHONDRITE	C	A	17	15
LEW 86386	2.6	LL-4 CHONDRITE	B	A	27	18-25
LEW 86387	26.3	H-5 CHONDRITE	C	A	18	16
LEW 86388	24.2	H-5 CHONDRITE	C	A	19	17
LEW 86389	1.6	H-5 CHONDRITE	C	A	18	16
LEW 86391	15.1	H-5 CHONDRITE	C	A	19	16
LEW 86394	2.6	H-5 CHONDRITE	C	A	18	16
LEW 86395	14.3	H-5 CHONDRITE	C	A	18	16
LEW 86396	12.6	H-5 CHONDRITE	B/C	A	18	16
LEW 86397	9.6	H-5 CHONDRITE	C	A	19	16
LEW 86398	3.0	H-5 CHONDRITE	C	A	19	16
LEW 86400	18.8	H-5 CHONDRITE	C	A	19	16
LEW 86401	9.0	H-5 CHONDRITE	C	A	18	16
LEW 86402	14.0	LL-5 CHONDRITE	C	A/B	29	24
LEW 86403	6.6	H-5 CHONDRITE	C	A	17	15
LEW 86405	1.0	H-5 CHONDRITE	C	A	19	16
LEW 86410	3.5	L-4 CHONDRITE	B/C	A	25	8-24
LEW 86411	4.1	LL-4 CHONDRITE	B	A	27	17-25
LEW 86412	1.3	H-6 CHONDRITE	B/C	B	19	17
LEW 86413	13.5	H-5 CHONDRITE	C	A	19	16
LEW 86414	4.3	H-5 CHONDRITE	C	B	19	16
LEW 86415	3.1	H-5 CHONDRITE	C	B	18	16
LEW 86420	13.1	H-5 CHONDRITE	C	A	17	15
LEW 86422	7.7	H-5 CHONDRITE	C	A	19	16
LEW 86423	11.1	H-5 CHONDRITE	C	A	18	16
LEW 86424	6.8	H-5 CHONDRITE	C	A	18	16
LEW 86427	2.3	H-6 CHONDRITE	C	A	19	16
LEW 86428	6.5	H-6 CHONDRITE	C	A	18	16
LEW 86430	5.7	H-5 CHONDRITE	C	A/B	18	16
LEW 86431	10.4	H-5 CHONDRITE	C	A	17	15
LEW 86434	22.5	H-5 CHONDRITE	C	A/B	18	16
LEW 86437	16.6	H-5 CHONDRITE	C	A	18	16
LEW 86439	6.4	H-6 CHONDRITE	C	A	18	16
LEW 86440	6.9	H-5 CHONDRITE	C	A	17	15
LEW 86441	10.6	H-5 CHONDRITE	C	A	18	16
LEW 86443	10.6	H-5 CHONDRITE	C	A	18	16
LEW 86444	14.8	H-5 CHONDRITE	C	A	19	17
LEW 86449	4.3	LL-5 CHONDRITE	A/B	A	30	24
LEW 86450	5.0	H-5 CHONDRITE	C	A	19	16
LEW 86452	19.6	H-5 CHONDRITE	C	A	18	16
LEW 86454	3.0	H-5 CHONDRITE	C	A	18	16
LEW 86456	22.2	H-5 CHONDRITE	C	A	18	16

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LEW 86457	13.0	H-5 CHONDRITE	C	A	18	16
LEW 86458	18.0	H-5 CHONDRITE	C	A	18	16
LEW 86459	8.2	H-5 CHONDRITE	C	A	18	16
LEW 86460	18.6	H-5 CHONDRITE	C	A/B	18	16
LEW 86461	.6	H-5 CHONDRITE	C	A	19	16
LEW 86462	25.3	H-5 CHONDRITE	C	A	18	16
LEW 86464	18.5	H-5 CHONDRITE	C	A	19	16
LEW 86465	26.3	H-5 CHONDRITE	C	A	18	16
LEW 86467	.4	H-5 CHONDRITE	C	A	18	16
LEW 86468	11.5	H-5 CHONDRITE	C	A	18	16
LEW 86469	11.3	H-5 CHONDRITE	C	A	19	16
LEW 86472	29.7	H-5 CHONDRITE	C	A	19	16
LEW 86473	20.8	H-5 CHONDRITE	B/C	A	19	17
LEW 86475	14.5	H-5 CHONDRITE	C	A	17	15
LEW 86476	.6	H-5 CHONDRITE	C	A	18	15
LEW 86477	11.9	H-5 CHONDRITE	B/C	A	17	15
LEW 86480	12.4	H-5 CHONDRITE	C	A	17	15
LEW 86481	10.6	H-6 CHONDRITE	C	A	17	15
LEW 86482	7.4	H-5 CHONDRITE	C	A	18	16
LEW 86484	24.1	H-5 CHONDRITE	C	A	18	16
LEW 86486	9.7	H-5 CHONDRITE	C	A	19	16
LEW 86487	15.1	H-5 CHONDRITE	C	A	17	15
LEW 86488	9.3	H-5 CHONDRITE	C	A	19	16
LEW 86489	29.8	H-5 CHONDRITE	C	B	18	16
LEW 86491	15.0	H-5 CHONDRITE	B/C	A	17	15
LEW 86492	24.8	H-5 CHONDRITE	C	A	17	15
LEW 86494	13.7	H-6 CHONDRITE	C	A	18	16
LEW 86495	2.5	L-3 CHONDRITE	B/C	A	1-22	3-17
LEW 86496	4.9	H-5 CHONDRITE	C	B/C	18	16
LEW 86497	6.2	H-5 CHONDRITE	C	A	17	15
LEW 86499	24.7	H-5 CHONDRITE	C	A	18	16
LEW 86502	25.3	L-5 CHONDRITE	B	A	23	20
LEW 86503	22.5	H-5 CHONDRITE	B/C	A	17	15
LEW 86507	10.4	H-5 CHONDRITE	C	A	18	16
LEW 86508	9.6	H-5 CHONDRITE	B/C	A/B	18	16
LEW 86509	32.9	H-5 CHONDRITE	C	A	18	16
LEW 86510	24.1	H-5 CHONDRITE	C	B	18	16
LEW 86516	4.3	H-5 CHONDRITE	B/C	A	19	16
LEW 86519	8.0	H-5 CHONDRITE	C	A	17	15
LEW 86520	6.4	H-5 CHONDRITE	C	B	17	15
LEW 86521	.3	H-5 CHONDRITE	B	A	18	16
LEW 86523	7.2	H-5 CHONDRITE	C	A	17	15
LEW 86524	23.4	L-5 CHONDRITE	B/Ce	A	23	19
LEW 86526	14.1	H-3 CHONDRITE	B/C	A	13-22	8-14
LEW 86527	21.6	H-5 CHONDRITE	C	A	17	15
LEW 86529	1.4	H-5 CHONDRITE	C	A	17	15
LEW 86530	1.9	H-5 CHONDRITE	B/C	A	18	16
LEW 86531	21.1	L-6 CHONDRITE	C	A	23	20
LEW 86532	3.6	H-5 CHONDRITE	C	A	18	16
LEW 86533	15.7	H-5 CHONDRITE	C	A	17	15
LEW 86535	13.5	H-6 CHONDRITE	C	A	18	16
LEW 86536	7.7	H-5 CHONDRITE	C	A	18	16
LEW 86538	21.5	H-5 CHONDRITE	C	A	17	15
LEW 86539	13.2	H-6 CHONDRITE	C	A	18	16
LEW 86542	25.0	L-5 CHONDRITE	B/C	A	23	19
LEW 86545	16.1	H-5 CHONDRITE	C	A	18	16

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LEW 87295	20.0	EUCRITE	B	A		20-59
LEW 88291	24.2	H-5 CHONDRITE	B/C	A	18	16
LEW 88297~	20.0	H-6 CHONDRITE	B/Ce	A		
LEW 88298	1.4	L-6 CHONDRITE	B	A		
LEW 88301~	29.8	H-6 CHONDRITE	B/C	A		
LEW 88304~	30.2	L-6 CHONDRITE	B/C	A		
LEW 88306~	52.0	L-6 CHONDRITE	A/B	B		
LEW 88307~	43.6	H-6 CHONDRITE	C	A		
LEW 88310~	32.9	L-6 CHONDRITE	B/Ce	A		
LEW 88317~	34.1	L-6 CHONDRITE	A/B	A		
LEW 88318~	23.2	H-6 CHONDRITE	C	A		
LEW 88324~	48.2	L-6 CHONDRITE	B/C	A		
LEW 88327~	48.5	H-6 CHONDRITE	B/C	A		
LEW 88330~	30.0	L-6 CHONDRITE	B/C	A		
LEW 88331~	29.5	L-6 CHONDRITE	B/C	A		
LEW 88338~	9.1	L-6 CHONDRITE	C	A		
LEW 88340~	24.5	H-6 CHONDRITE	B/Ce	A		
LEW 88344~	26.6	L-6 CHONDRITE	C	A		
LEW 88346~	18.2	L-6 CHONDRITE	B/C	B/C		
LEW 88350~	13.1	L-6 CHONDRITE	C	A		
LEW 88351	21.3	L-6 CHONDRITE	C	A		
LEW 88356~	9.2	L-6 CHONDRITE	C	A		
LEW 88357~	13.5	L-6 CHONDRITE	B/C	A		
LEW 88360	18.3	H-6 CHONDRITE	C	A		
LEW 88361~	14.6	H-6 CHONDRITE	C	C		
LEW 88362~	16.7	H-6 CHONDRITE	C	B		
LEW 88366	3.6	LL-3 CHONDRITE	B/C	A	1-19	2-21
LEW 88368~	22.3	H-6 CHONDRITE	C	A		
LEW 88376~	7.9	LL-6 CHONDRITE	B	A		
LEW 88382~	4.1	H-6 CHONDRITE	C	B		
LEW 88386~	7.3	H-6 CHONDRITE	C	A		
LEW 88396~	6.1	L-6 CHONDRITE	C	A		
LEW 88397~	4.0	L-6 CHONDRITE	C	A		
LEW 88413~	5.8	H-6 CHONDRITE	C	A		
LEW 88415	7.4	H-3 CHONDRITE	B/Ce	A	8-25	6-16
LEW 88419~	2.0	L-6 CHONDRITE	C	A		
LEW 88420~	5.8	H-6 CHONDRITE	C	A		
LEW 88424~	8.1	L-6 CHONDRITE	B/C	A		
LEW 88425~	8.8	L-6 CHONDRITE	B/C	A		
LEW 88426~	4.6	H-6 CHONDRITE	B/C	A		
LEW 88427~	11.4	L-6 CHONDRITE	B/C	B		
LEW 88433~	14.7	H-6 CHONDRITE	C	A		
LEW 88434~	3.8	H-6 CHONDRITE	C	A		
LEW 88438~	13.5	H-6 CHONDRITE	C	A		
LEW 88446	4.2	ACHONDRITE (UNIQUE)	Ae	A	82	-
LEW 88450~	25.2	H-6 CHONDRITE	C	A		
LEW 88451~	7.6	H-6 CHONDRITE	C	A		
LEW 88453~	10.3	H-6 CHONDRITE	C	A		
LEW 88454~	4.6	L-6 CHONDRITE	C	A		
LEW 88455~	4.3	H-6 CHONDRITE	C	A		
LEW 88456~	6.9	H-6 CHONDRITE	C	A		
LEW 88458~	3.3	L-6 CHONDRITE	B/C	A		
LEW 88459~	5.2	L-6 CHONDRITE	B/C	A		
LEW 88465	4.7	L-6 CHONDRITE	C	A		
LEW 88468~	12.8	H-6 CHONDRITE	C	A		
LEW 88469~	3.3	L-6 CHONDRITE	C	B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LEW 88471~	5.1	L-6 CHONDRITE	C	A		
LEW 88472~	3.3	L-6 CHONDRITE	C	A		
LEW 88473~	3.3	L-6 CHONDRITE	B/C	A		
LEW 88474~	4.6	H-6 CHONDRITE	C	A		
LEW 88477	12.3	LL-3 CHONDRITE	C	A	4-20	4-20
LEW 88481~	7.2	H-6 CHONDRITE	C	A		
LEW 88487~	11.0	L-6 CHONDRITE	B	A		
LEW 88491~	5.8	L-6 CHONDRITE	C	A		
LEW 88492~	13.1	H-6 CHONDRITE	C	A		
LEW 88550	4.2	L-6 CHONDRITE	Be	B	25	21

~Classified by using refractive indices.

Newly Classified Specimens Listed By Type **

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
		Achondrites				
LEW 88446	4.2	ACHONDRITE (UNIQUE)	Ae	A	83	-
LEW 87295	20.0	EUCRITE	B	A		20-59
		Chondrites - Type 3				
LEW 86526	14.1	H-3 CHONDRITE	B/C	A	13-22	8-14
LEW 88415	7.4	H-3 CHONDRITE	B/Ce	A	8-25	6-16
LEW 86213	27.9	L-3 CHONDRITE	Ce	A	2-20	1-16
LEW 86347	3.1	L-3 CHONDRITE	C	A	1-21	2-17
LEW 86495	2.5	L-3 CHONDRITE	B/C	A	1-22	3-17
LEW 88366	3.6	LL-3 CHONDRITE	B/C	A	1-19	2-21
LEW 88477	12.3	LL-3 CHONDRITE	C	A	4-20	4-20

Sample No: **LEW86213**
Location: Lewis Cliff
Field Number: 2307
Dimensions (cm): 3 x 2.5 x 1.5
Weight (g): 27.9
Meteorite Type: L3 chondrite

Macroscopic Description: Cecilia Satterwhite
Evaporite deposit is present on the thin weathered fusion crust of this meteorite. The interior is dark brown to black and contains numerous small, orangish colored inclusions.

Thin Section (.4) Description: Brian Mason
The section shows numerous chondrules and chondrule fragments, up to 1.2 mm across, in a granular matrix consisting largely of olivine and pyroxene with small amounts of nickel-iron and troilite. Most of the chondrules consist of granular or porphyritic olivine and olivine-pyroxene, but a few radiating pyroxene chondrules were noted. The meteorite is considerably weathered, with brown limonite pervading the section. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{2-20}, mean Fa_{11} (CV FeO is 54); pyroxene, Fs_{1-16}. 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: **LEW86347**
Location: Lewis Cliff
Field Number: 3395
Dimensions (cm): 1.5 x 0.8 x 0.7
Weight (g): 3.1
Meteorite Type: L3 chondrite

Macroscopic Description: Cecilia Satterwhite
Ninety percent of the exterior of the sample is covered with weathered fusion crust. Abundant 1-2 mm sized inclusions are still visible in the extremely weathered interior.

Thin Section (.2) Description: Brian Mason
The section shows numerous chondrules, up to 2.4 mm across, in a granular matrix consisting largely of olivine and pyroxene with minor amounts of nickel-iron and troilite. Most of the chondrules consist of granular or porphyritic olivine and olivine-pyroxene, but some radiating pyroxene chondrules were noted. The meteorite is considerably weathered, with brown limonite pervading the section. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{1-21}, mean Fa_{15} (CV FeO is 36); pyroxene, Fs_{2-17}. 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: **LEW86495**
Location: Lewis Cliff
Field Number: 4896
Dimensions (cm): 1.2 x 1.4 x 0.5
Weight (g): 2.5
Meteorite Type: L3 chondrite

Macroscopic Description: Cecilia Satterwhite
Although this small meteorite is completely covered with fusion crust, the interior is very weathered, having an orangish-brown color. Some inclusions are still visible.

Thin Section (.2) Description: Brian Mason
The section shows numerous chondrules and chondrule fragments, up to 1.1 mm across, in a granular matrix consisting largely of olivine and pyroxene with small amounts of nickel-iron and troilite. The meteorite is considerably weathered, with brown limonitic staining throughout the section. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{1-22}, mean Fa_{14} (CV FeO is 49); pyroxene, Fs_{3-17}. 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: **LEW86526**
Location: Lewis Cliff
Field Number: 4959
Dimensions (cm): 2.5 x 2 x 1
Weight (g): 21.8
Meteorite Type: H3 Chondrite

Macroscopic Description: Cecilia Satterwhite
Weathered fusion crust covers the entire meteorite. The interior is weathered but white and orange inclusions, 2-3 mm in size, are still visible.

Thin Section (,1) Description: Brian Mason
The section shows numerous chondrules and chondrule fragments, up to 1.2 mm across, in a granular matrix of olivine and pyroxene with minor amounts of nickel-iron and troilite. The meteorite is somewhat weathered, with brown limonitic staining throughout the section. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{13-22}, mean Fa_{17} (CV FeO is 14); pyroxene, Fs_{8-14}. The amount of nickel-iron suggests H group, and the variability of olivine and pyroxene compositions type 3, hence the meteorite is classified as an H3 chondrite (estimated H3.8).

Sample No: **LEW87295**
Location: Lewis Cliff
Field Number: 4283
Dimensions (cm): 3 x 2.5 x 2
Weight (g): 20.0
Meteorite Type: Eucrite

Macroscopic Description: Roberta Score
LEW87295 was found in the Lewis Cliff area emerging from the ice. The field team collected it by sawing a block of ice containing the meteorite. The ice block was sent to the Cold Regions Research and Engineering Lab in Hanover, New Hampshire, where the meteorite was removed. Care was taken to avoid contamination. The ice block remains in New Hampshire while the meteorite specimen resides in Houston.

Dull black fusion crust covers approximately 40% of this eucrite. Numerous vugs, typical of Antarctic eucrites, penetrate deep into the interior. Many clasts, polymineralic and monomineralic are present in the medium gray matrix. One notable clast is an easily extractable black clast whose dimensions are 6 x 5 x 4 mm. Some areas of rust are visible.

Thin Section (,4) Description: Brian Mason
The section shows clasts of pyroxene and plagioclase up to 1.8 mm long in a comminuted groundmass. Within the section there are individual brecciated clasts, up to 4 mm across. A black clast, 1.5 x 0.7 mm, appears to be a C2 carbonaceous chondrite; it contains chondrule-like aggregates of granular olivine and pyroxene up to 0.3 mm across. A patch of transparent brown glass, 0.6 mm long, is also present. Microprobe analyses show pyroxene compositions ranging fairly continuously from Wo_2Fs_{59} to $Wo_{42}Fs_{24}$, the range in En content being quite limited; one clast of Mg-rich pyroxene, Wo_3Fs_{20}, was analysed. Plagioclase composition is fairly uniform, averaging An_{91}. One grain of a silica polymorph, probably tridymite, was noted. The brown glass is somewhat variable in composition, but averages (weight percent): SiO_2 48, Al_2O_3 16, FeO 13, MgO 6.2, CaO 12, Na_2O 3.6, K_2O 0.2, MnO 0.5. The meteorite is a eucrite.

Sample No: **LEW88366**
Location: Lewis Cliff
Field Number: 4521
Dimensions (cm): 2 x 1.7 x 0.5
Weight (g): 3.6
Meteorite Type: LL3 chondrite

Macroscopic Description: Robbie Marlow
Dull black fusion crust totally encases LEW88366. Many dark and light colored weathered inclusions are visible in the dark matrix of this small specimen.

Thin Section (,1) Description: Brian Mason
The section shows an aggregate of chondrules and chondrule fragments, up to 2.4 mm across, in a small amount of finely granular matrix consisting of olivine and pyroxene with 1-2% of troilite and nickel iron. The section is rimmed with will-preserved fusion crust. Weathering is slight, indicated by minor brown limonitic staining. Microprobe analyses show olivine, Fa_{1-19}, mean Fa_{14} (CV FeO is 56); pyroxene, Fs_{2-21}. The very small 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 LL3.4).

Sample No: **LEW88415**
Location: Lewis Cliff
Field Number: 5164
Dimensions (cm): 2.6 x 2.1 x 1
Weight (g): 7.4
Meteorite Type: H3 chondrite

Macroscopic Description: Robbie Marlow
Weathered brown fusion crust covers approximately three-quarters of the exterior of this unequilibrated chondrite. The millimeter sized inclusions seen have weathered to an orangish color. A small amount of evaporite deposit was noted.

Thin Section (.2) Description: Brian Mason
The section shows numerous chondrules and chondrule fragments, up to 1.8 mm across, in a granular matrix of olivine and pyroxene with minor amounts of nickel-iron and troilite. Weathering is minor, indicated by a little brown limonitic staining. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{8-25}, mean Fa_{19} (CV FeO is 23); pyroxene, Fs_{6-16}. The amount of nickel-iron suggests H group, and the variability of olivine and pyroxene compositions type 3, hence the meteorite is classified as an H3 chondrite (estimated H3.7).

Sample No: **LEW88446**
Location: Lewis Cliff
Field Number: 5210
Dimensions (cm): 2.0 x 1.0 x 0.9
Weight (g): 4.2
Meteorite Type: Achondrite (Unique)

Macroscopic Description: Robbie Marlow
No fusion crust is obvious on this specimen. Most of the exterior of LEW88446 has been wind polished and is red-brown. Approximately 20% of the exterior is extremely rusted. One small patch of evaporite material is present. The interior appears relatively unweathered. It is dark gray, crystalline, and fine-grained.

Thin Section (.4) Description: Brian Mason
The section shows a fine-grained (0.01-0.02 mm) aggregate of subequal amounts of plagioclase and olivine, with 1-2% of troilite (patchily distributed) and accessory chromite. It has a hypidiomorphic-granular texture. Microprobe analyses give the following compositions: plagioclase, An_{97}; olivine, $(Fe_{.83}Mg_{.12}Mn_{.05})_2SiO_4$. An approximate bulk composition estimated from microprobe data is (weight percent): SiO_2 38, Al_2O_3 17, FeO 29, MgO 2.6, CaO 9.3, Na_2O 0.2, K_2O 0.1, TiO_2 0.2, MnO 1.8, FeS 1.5. The meteorite is an achondrite; the unusual texture and the combination of anorthite and fayalitic olivine are unique in my experience. The low FeO/MnO ratio (approximately 17) seems to preclude a lunar origin.

Sample No: **LEW88477**
Location: Lewis Cliff
Field Number: 5281
Dimensions (cm): 3 x 1.9 x 1.1
Weight (g): 12.3
Meteorite Type: LL3 Chondrite

Macroscopic Description: Robbie Marlow
Dark brown fusion crust almost completely covers this meteorite. Heavy oxidation obscures any features that are present in the interior matrix.

Thin Section (.1) Description: Brian Mason
The section shows a close-packed aggregate of chondrules and chondrule fragments, up to 2.4 mm across, surrounded by a small amount of black opaque matrix which contains a little troilite and nickel-iron. Minor weathering is indicated by patchy brown limonite in the matrix. Microprobe analyses show olivine and pyroxene of variable composition: olivine, Fa_{4-20}, mean Fa_{14} (CV FeO is 54); pyroxene, Fs_{4-20}. The very small 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 LL3.4).

Natural Thermoluminescence (NTL) Data for Antarctic Meteorites

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The measurement and data reduction methods were described by Hasan et al. (1987, Proc. 17th LPSC E703-E709; 1989, LPSC XX, 383-384). This group of meteorites are not from the thermoluminescence survey but had their natural TL measured in the course of another project, which required measurement of multiple splits. These samples were treated in the same way as survey samples but were sent through the US mail and they were not handled in red light. However, the samples were taken from large well-documented meteorites and they were stored with the survey samples. 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 past million years or so (by close solar passage, shock heating, or atmospheric entry), exacerbated, in the case of certain achondrite classes, by "anomalous fading". (February 1991 data set).

Sample		Class	NTL [krad at 250 deg. C]
ALHA77256	,109	DIO	2 ± 2
	,110		0.6 ± 0.1
sample mean			0.6 ± 0.1
ALHA84001	,32	DIO	1.3 ± 0.1
EETA79002	,83	DIO	4 ± 2
ALHA76005	,78*	EUC	6 ± 2
	,79		7.4 ± 0.4
sample mean			7 ± 1
ALHA77302	,83*	EUC	7.7 ± 0.7
ALHA85001	,19	EUC	0.09 ± 0.01
	,20		0.10 ± 0.02
sample mean			0.10 ± 0.01
EET79004	,101	EUC	18 ± 3
	,102		10.2 ± 3.7
sample mean			14 ± 4

Sample		Class	NTL [krad at 250 deg. C]
PCA82502	,59	EUC	7 ± 1
	,60		4.8 ± 0.7
sample mean			6 ± 1
EETA79006	,60#	HOW	4.1 ± 0.4
	,61		4.8 ± 0.7
sample mean			4.5 ± 0.5
EET83376	,7#	HOW	4.4 ± 0.4
	,8		5.1 ± 0.2
sample mean			4.8 ± 0.3
ALHA77219	,58	MES	7 ± 1
	,59		8 ± 3
sample mean			8 ± 2
RKPA79015	,16	MES	<1
	,17		<0.7
sample mean			<0.7

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

The following comments on pairings of meteorites are based on natural TL data, TL sensitivity, the shape of the induced TL glow curve, classifications, and JSC curatorial and Arkansas group sample descriptions.

* We confirm pairing of ALHA76005 and ALHA77302 suggested in (AMN 4:2).
# We suggest that EETA79006 and EET83376 are possibly paired.

TABLE 4

^{26}Al Activity Data for Antarctic Meteorites

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Richland, Washington 99352

SPECIMEN NUMBER	CLASS	^{26}Al Activity (dpm/kg)	SPECIMEN NUMBER	CLASS	^{26}Al Activity (dpm/kg)
EETA 82607	L6	64 ± 4	EETA 83215	H6	36 ± 3
EETA 82608	LL6	40 ± 4	EETA 83216	L6	62 ± 4
EETA 83200	H5	60 ± 5	EETA 83218	L6	57 ± 4
EETA 83202	L6	64 ± 4	EETA 83219	L6	64 ± 3
EETA 83204	LL6	52 ± 4	EETA 83221	H4	42 ± 4
EETA 83205	L6	50 ± 3	EETA 83222	L6	58 ± 4
EETA 83206	L6	84 ± 5	EETA 83223	H5	42 ± 2
EETA 83208	H5	95 ± 5			

Uncertainties are calculated from counting statistics. All data have been corrected for background effects, counting geometry, and specimen geometry. For more information or to request a copy of all the Battelle ^{26}Al data (for over 500 specimens), please contact John Wacker [telephone: (509) 376-1076; FAX: (509) 376-5021].