# Antarctic Meteorite NEWSLETTER

Volume 17
Number 1

March 1994

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

**Edited by Roberta Score and Marilyn Lindstrom**
Code SN2, NASA
Johnson Space Center,
Houston, Texas
77058

## INSIDE THIS ISSUE:



SAMPLE REQUEST DEADLINE:
April 6, 1994

MWG MEETS April 22-23, 1994

# SAMPLE REQUEST GUIDELINES

## All sample requests should be made in writing to:

Secretary, MWG
SN2/Office of the Curator
NASA/Johnson Space Center
Houston, TX 77058 USA.

Requests that are received by the MWG Secretary before April 6, 1994, will be reviewed at the MWG meeting on April 22-23, 1994, to be held in Houston, Texas. Requests that are received after the April 6 deadline may possibly be delayed for review until the MWG meets again in the Fall of 1994. **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 phone, FAX, or e-mail.

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 in a timely manner. Those requests that do not meet the JSC Curatorial Guidelines (published in this issue), will be reviewed by the Meteoritie 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 five Smithsonian Contr. Earth Sci.: Nos. 23, 24, 26, 28, and 30. A table containing all classification as of December 1993 is published in Meteoritics 29(1) p. 100-142.

### *Antarctic Meteorite Laboratory Contact Numbers*

**Marilyn Lindstrom**
Mail code SN2
NASA/Johnson Space Center
Houston, Texas 77058

(713) 483-5135

Lindstrom@curate.jsc.nasa.gov

**Roberta (Robbie) Score**
Mail code SN2
NASA/Johnson Space Center
Houston, Texas 77058

(713) 483-5125

Score@curate.jsc.nasa.gov

FAX: (713) 483-5347

## New Meteorites

This newsletter presents classifications of 170 meteorites from the 1990-1992 ANSMET collections. The new meteorites include 8 achondrites (1 aubrite, 4 eucrites, 3 howardites), 4 irons (2 grouped, 2 nodules), 18 carbonaceous chondrites, 2 enstatite chondrites, 2 type 3 ordinary chondrites and 3 type 7 ordinary chondrites.

## ANSMET 1993-1994 Field Season

The 1993-1994 ANSMET (Antarctic Search for Meteorites) expedition. Worked several icefields in the Queen Alexandra Range and Lewis Cliff area of Antarctica. The team collected 850 meteorites which will be returned to JSC later this Spring. Classifications of the first 1993-1994 meteorites will be announced in the Fall newsletter.

## Publication of ANSMET meteorite tables

The Meteorite Working Group and the Nomenclature Committee of the Meteoritical Society have recently published a complete listing of classifications of ANSMET meteorites in Meteoritical Bulletin #76 [*Meteoritics 29*, 100-142, 1994]. The tables were prepared by Jeff Grossman with the assistance of Robbie Score from information in the JSC meteorite database. Meteorite classifications and pairings were reviewed by a team of researchers and resulted in updated classifications for many meteorites. [Reclassification of enstatite chondrites announced in the last newsletter from EL to EH was due to an error in preparing the newsletter.] The list of meteorites whose classification or pairing was changed is presented here as Table 4. Copies of the *Meteoritics* article or an electronic database are available from the JSC Curator's Office.

## Publication of AMLAMP report

The Lunar and Planetary Institute and the Meteorite Working Group have recently published the AMLAMP (Antarctic Meteorite Location and Mapping Project) Explanatory Text and User's Guide. This LPI Technical Report #93-07, prepared by John Schutt, Brian Fessler and Bill Cassidy, includes descriptions of maps from 4 major and 6 minor meteorite collection areas and locations of most classified ANSMET meteorites. It also includes a user's guide to accessing the AMLAMP database on the LPI computer. The AMLAMP report is available from the Order Department at LPI.

## Availability of Meteorite Educational Materials

A variety of meteorite educational materials are available or in preparation at the JSC Curator's Office. The Antarctic Meteorite Petrographic Thin Section Package is available to college geoscience teachers. It consists of a set of 12 polished sections of meteorites and a booklet with background information and descriptive text written by Glenn MacPherson, Bevan French, and Roy Clarke. The meteorite educational thin sections are available from the Curator's Office. Marilyn Lindstrom and a team of scientists and teachers are reviving the Meteorite Educational Disk Package for pre-college teachers. With support from the NASA Headquarters Education and Solar System Exploration Divisions, they are preparing 200 lucite disks containing chips of 6 meteorites, an Exploring Meteorite Mysteries teacher's guide containing background information and hands-on activities, and a slide set. The meteorite disk materials will be presented at the LPSC education session and will be available next Fall to scientists through the Curator's Office and to teachers through NASA Teacher Resource Centers.

## Problems with Overseas Mail

NASA has switched to an independent mail contractor and we have recently experienced delays in delivery of correspondence and newsletters to some overseas investigators. We expect mail to arrive AIRMAIL within about a week, but it has sometimes taken a month. If you receive any delayed mail from us please inform us by e-mail or FAX and save the envelop as evidence. One returned newsletter had our AIRMAIL stamp marked out with a black felt pen!

## Information on the U.S. Collection of Antarctic Meteorites

| | |
|---|---|
| Number of meteorites: | 6192 |
| Number of meteorites classified: | 5715 |

## From 1990-1992 Collections

Pages 5-17 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 16(1) (March 1993). 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.

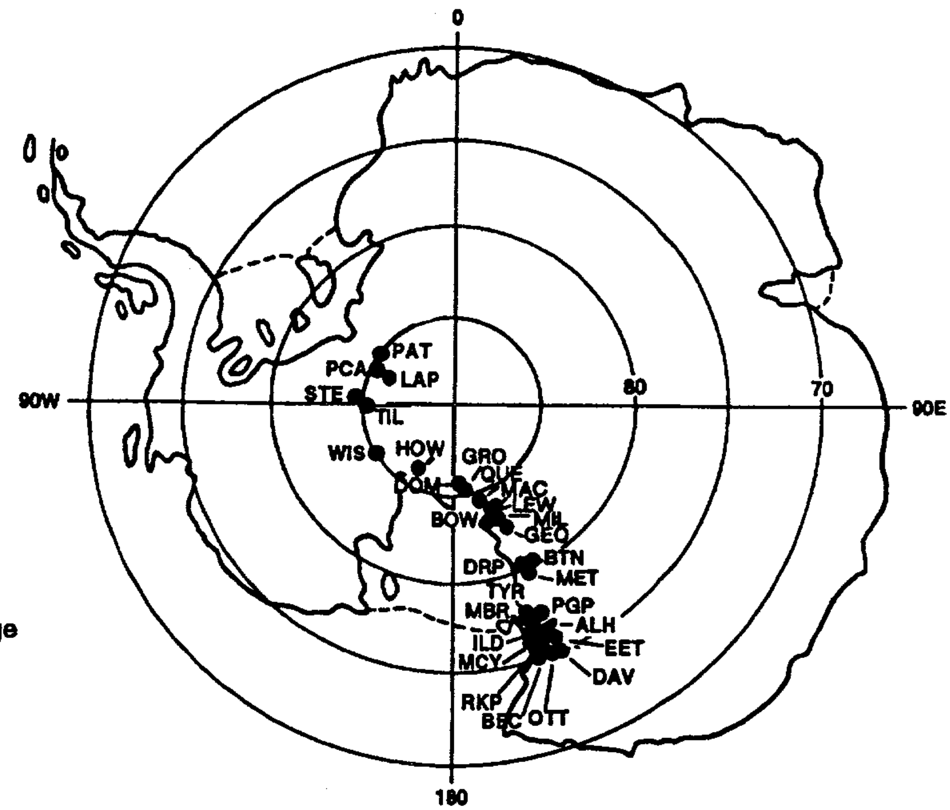
Meteorite descriptions contained in this issue were contributed by the following individuals:

Robbie Marlow, Cecilia Satterwhite,
and Carol Schwarz
Antarctic Meteorite Laboratory
NASA/Johnson Space Center
Houston, Texas

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
BEC — Beckett Nunatak
BOW — Bowden Neve
BTN — Bates Nunataks
DAV — David Glacier
DOM — Dominion Range
DRP — Derrick Peak
EET — Elephant Moraine
GEO — Geologists Range
GRO — Grosvenor Mountains
HOW — Mt. Howe
ILD — Inland Forts
LAP — LaPaz Ice Field
LEW — Lewis Cliff
MAC — MacAlpine Hills
MBR — Mount Baldr
MCY — MacKay Glacier
MET — Meteorite Hills
MIL — Miller Range
OTT — Outpost Nunatak
QUE — Queen Alexandra Range
PAT — Patuxent Range
PCA — Pecora Escarpment
PGP — Purgatory Peak
RKP — Reckling Peak
STE — Stewart Hills
TIL — Thiel Mountains
TYR — Taylor Glacier
WIS — Wisconsin Range



## List of Newly Classified Antarctic Meteorites **

| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs |
|---|---|---|---|---|---|---|
| EET 90745 | 5.0 | L4 CHONDRITE | B | A | 25 | 21 |
| EET 90757 | 3.7 | AUBRITE | A | A | | 0 |
| EET 90790 | 2.5 | L4 CHONDRITE | B | A | 25 | 21 |
| EET 90807 | 3.2 | L4 CHONDRITE | B | A | 25 | 21 |
| | | | | | | |
| PAT 91516 | 1.6 | IRON/TROILITE NODULE | | | | |
| PAT 91528 | 3.3 | IRON NODULE | | | 22-29 | 22-25 |
| | | | | | | |
| PCA 91029~ | 365.7 | L6 CHONDRITE | B | A | | |
| PCA 91035~ | 222.2 | L6 CHONDRITE | B | A | | |
| PCA 91042~ | 271.0 | L6 CHONDRITE | B | A | | |
| PCA 91049~ | 140.8 | L6 CHONDRITE | B | A | | |
| PCA 91058~ | 330.4 | L6 CHONDRITE | B | A/B | | |
| PCA 91064~ | 317.0 | L6 CHONDRITE | B | A | | |
| PCA 91068~ | 179.0 | L6 CHONDRITE | B | A | | |
| PCA 91070~ | 186.7 | L6 CHONDRITE | B | A | | |
| PCA 91087~ | 68.8 | L6 CHONDRITE | B | A | | |
| PCA 91089~ | 6.5 | L6 CHONDRITE | B | A | | |
| PCA 91095~ | 48.3 | L6 CHONDRITE | B | A | | |
| PCA 91096~ | 33.0 | L6 CHONDRITE | B | A | | |
| PCA 91099~ | 11.4 | L6 CHONDRITE | B | A | | |
| PCA 91102~ | 46.4 | L6 CHONDRITE | B | A | | |
| PCA 91105~ | 62.2 | L6 CHONDRITE | B | A | | |
| PCA 91112~ | 30.7 | L6 CHONDRITE | B | A | | |
| PCA 91128~ | 20.8 | L6 CHONDRITE | B | A | | |
| PCA 91142 | 4.3 | L5 CHONDRITE | B/C | A | 25 | 21 |
| PCA 91143 | 27.4 | L5 CHONDRITE | B/C | A | 24 | 20 |
| PCA 91144 | 59.6 | L4 CHONDRITE | B/C | A | 24 | 20 |
| PCA 91145~ | 31.4 | L6 CHONDRITE | B | A | | |
| PCA 91146 | 4.8 | L5 CHONDRITE | B/C | A | 24 | 20 |
| PCA 91149 | 6.4 | H5 CHONDRITE | B/C | A | 19 | 17 |
| PCA 91151 | 4.7 | H5 CHONDRITE | B/C | A | 17 | 15 |
| PCA 91153 | 17.8 | H5 CHONDRITE | B/Ce | A | 18 | 16 |
| PCA 91154 | 33.1 | L5 CHONDRITE | B/C | A | 24 | 20 |
| PCA 91155 | 4.8 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91157 | 259.3 | L5 CHONDRITE | B/C | A | 25 | 21 |
| PCA 91158 | 29.8 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91161 | 9.3 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91164 | 11.1 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91165 | 12.4 | L5 CHONDRITE | A/B | A | 24 | 20 |
| PCA 91166 | 28.2 | H5 CHONDRITE | B/C | A | 19 | 17 |
| PCA 91167 | 37.9 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91168 | 26.5 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91169 | 267.1 | L5 CHONDRITE | Be | A | 24 | 20 |
| PCA 91170 | 4.9 | H5 CHONDRITE | B/C | A | 17 | 15 |
| PCA 91171 | 3.9 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91172 | 9.9 | H5 CHONDRITE | B | A | 19 | 17 |
| PCA 91174 | 9.7 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91175 | 10.5 | H5 CHONDRITE | B/C | A | 19 | 17 |
| PCA 91177~ | 188.1 | L6 CHONDRITE | B | A/B | | |

~Classified by using refractive indices.

| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs |
|---|---|---|---|---|---|---|
| PCA 91178 | 54.0 | H5 CHONDRITE | B | A | 19 | 17 |
| PCA 91183 | 102.5 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91184 | 62.0 | L5 CHONDRITE | B | A | 24 | 20 |
| PCA 91188~ | 4.9 | L6 CHONDRITE | B | A | | |
| PCA 91189~ | 53.2 | L6 CHONDRITE | B | A | | |
| PCA 91190 | 6.5 | H5 CHONDRITE | B/C | A | 19 | 16 |
| PCA 91195 | 5.9 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91197 | 32.1 | H5 CHONDRITE | B/C | A | 19 | 17 |
| PCA 91198 | 38.9 | L5 CHONDRITE | B/C | A | 25 | 21 |
| PCA 91200 | 3.6 | H5 CHONDRITE | B/C | A | 18 | 16 |
| PCA 91201 | 4.5 | H5 CHONDRITE | B/C | A | 19 | 16 |
| PCA 91202 | 1.9 | H4 CHONDRITE | B/C | A | 17 | 15-19 |
| PCA 91209~ | 1.7 | L6 CHONDRITE | B | A | | |
| PCA 91214~ | 247.3 | L6 CHONDRITE | B | A | | |
| PCA 91220~ | 91.8 | L6 CHONDRITE | B | A | | |
| PCA 91250~ | 8.3 | L6 CHONDRITE | B | A | | |
| PCA 91251~ | 1.0 | L6 CHONDRITE | B | A | | |
| PCA 91284~ | 9.5 | L6 CHONDRITE | B | A | | |
| PCA 91293~ | 8.1 | L6 CHONDRITE | B | A | | |
| WIS 91614 | 299.7 | IRON-IIIAB? | | | | |
| DAV 92301 | 108.7 | LL5 CHONDRITE | B | A | 28 | 23 |
| DAV 92302 | 58.8 | LL3.6 CHONDRITE | B | A | 11-29 | 8-18 |
| DAV 92303 | 7.3 | H5 CHONDRITE | B | A | 18 | 16 |
| DAV 92304~ | 4.7 | H6 CHONDRITE | B/C | A | | |
| DAV 92305~ | 0.9 | L6 CHONDRITE | B | A | | |
| DAV 92306 | 1.6 | LL3.6 CHONDRITE | A/B | A | 16-32 | 4-18 |
| DAV 92307~ | 5.0 | L6 CHONDRITE | B | A/B | | |
| DAV 92308 | 1.7 | FUSION CRUST (CHON.) | Be | A/B | | |
| EET 92005 | 5.4 | C2 CHONDRITE | B | A | 1-25 | |
| EET 92006 | 0.8 | C2 CHONDRITE | A | A | | |
| EET 92007 | 0.6 | C2 CHONDRITE | A/B | A | 1-60 | |
| EET 92008 | 1.5 | C2 CHONDRITE | B | A | 1-7 | |
| EET 92009 | 0.2 | C2 CHONDRITE | A | A | 1-37 | 1-7 |
| EET 92010 | 1.0 | C2 CHONDRITE | A/B | B | 1-38 | |
| EET 92011 | 17.5 | CR2 CHONDRITE | B/C | B/C | 1-6 | 1-10 |
| EET 92012 | 2.0 | LL7 CHONDRITE | A/B | A | 30 | 24 |
| EET 92013 | 9.9 | LL7 CHONDRITE | A/B | A | 30 | 24 |
| EET 92014 | 2.1 | HOWARDITE | A/B | A | | 20-41 |
| EET 92015 | 4.1 | HOWARDITE | A/B | A | | 21-44 |
| EET 92016 | 10.1 | LL7 CHONDRITE | A/B | A | 30 | 24 |
| EET 92017~ | 0.3 | LL6 CHONDRITE | A/B | B | | |
| EET 92018~ | 3.9 | LL6 CHONDRITE | A | A | | |
| EET 92019~ | 0.9 | LL6 CHONDRITE | B | B | | |
| EET 92020~ | 1.4 | LL6 CHONDRITE | A | A | | |
| EET 92021~ | 0.5 | LL6 CHONDRITE | A/B | A/B | | |
| EET 92022 | 9.7 | HOWARDITE | A | A | | 20-53 |
| EET 92023 | 21.8 | EUCRITE (UNBRECCIATED) | A | A | | 41-46 |
| EET 92024~ | 15.4 | LL6 CHONDRITE | A | A | | |
| EET 92025 | 18.4 | EUCRITE (BRECCIATED) | A/B | A | | 44-48 |
| EET 92026 | 17.0 | EUCRITE (BRECCIATED) | A/B | A | | 42-55 |
| EET 92027 | 16.3 | EUCRITE (BRECCIATED) | A | A | | 39-46 |
| EET 92028 | 0.4 | L6 CHONDRITE | B | A | 25 | 21 |
| EET 92029 | 2434.2 | IRON-IIIAB? | | | | |
| EET 92030~ | 1151.2 | L6 CHONDRITE | A/B | A | | |

~Classified by using refractive indices.

| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs |
|---|---|---|---|---|---|---|
| EET 92031~ | 1316.6 | L6 CHONDRITE | B | A | | |
| EET 92032~ | 693.7 | L6 CHONDRITE | Be | B | | |
| EET 92033 | 735.6 | H5 CHONDRITE | B | A | 18 | 16 |
| EET 92034~ | 727.8 | L6 CHONDRITE | B | A | | |
| EET 92035 | 646.4 | H5 CHONDRITE | B | A | 18 | 16 |
| EET 92036~ | 533.5 | L6 CHONDRITE | B | A | | |
| EET 92037~ | 349.5 | L6 CHONDRITE | A/B | A | | |
| EET 92038 | 731.4 | H5 CHONDRITE | B | A | 18 | 16 |
| EET 92040 | 426.2 | H5 CHONDRITE | A/B | A | 18 | 16 |
| EET 92041 | 291.2 | L5 CHONDRITE | A/B | A | 25 | 21 |
| EET 92042 | 103.7 | CR2 CHONDRITE | B | B | 1-32 | 1-7 |
| EET 92043~ | 204.7 | L6 CHONDRITE | A/B | A | | |
| EET 92044 | 139.7 | H5 CHONDRITE | A/B | A | 18 | 16 |
| EET 92045 | 239.6 | H5 CHONDRITE | B | A | 18 | 16 |
| EET 92046~ | 162.2 | L6 CHONDRITE | A/B | A | | |
| EET 92047 | 134.9 | H5 CHONDRITE | B/C | A | 18 | 16 |
| EET 92048 | 58.5 | CR2 CHONDRITE | B | B/C | 1-6 | 2-10 |
| EET 92049 | 59.7 | L5 CHONDRITE | A/B | A/B | 24 | 20 |
| EET 92050~ | 71.3 | L6 CHONDRITE | A/B | A | | |
| EET 92051~ | 94.5 | L6 CHONDRITE | B/C | A | | |
| EET 92052 | 89.6 | CR2 CHONDRITE | B/C | B/C | 1-3 | 2-5 |
| EET 92053~ | 81.7 | LL6 CHONDRITE | B/C | A | | |
| EET 92054 | 59.3 | LL6 CHONDRITE | Be | A | 30 | 25 |
| EET 92055~ | 61.7 | L6 CHONDRITE | B | A | | |
| EET 92056 | 67.4 | H6 CHONDRITE | B/C | B | 18 | 16 |
| EET 92057 | 52.6 | H5 CHONDRITE | B/C | A/B | 19 | 17 |
| EET 92058~ | 85.6 | L6 CHONDRITE | B/C | A | | |
| EET 92059~ | 79.5 | L6 CHONDRITE | B | A | | |
| EET 92060~ | 49.1 | L6 CHONDRITE | B | A | | |
| EET 92061 | 79.1 | L5 CHONDRITE | C | A/B | 25 | 21 |
| EET 92062 | 73.5 | CR2 CHONDRITE | Be | A/B | 1-4 | 2-5 |
| EET 92063 | 74.6 | E6 CHONDRITE | C | A | | .2-0.4 |
| EET 92064 | 71.4 | H5 CHONDRITE | B | A | 18 | 16 |
| EET 92065 | 46.7 | CR2 CHONDRITE | B | B/C | 1-4 | 3-6 |
| EET 92066 | 65.3 | H5 CHONDRITE | B | A | 17 | 15 |
| EET 92067 | 49.8 | L5 CHONDRITE | B | A | 24 | 20 |
| EET 92068~ | 49.3 | L6 CHONDRITE | A/B | A | | |
| EET 92069~ | 42.7 | L6 CHONDRITE | B | B/C | | |
| EET 92070 | 17.8 | CR2 CHONDRITE | B | A | 1-6 | 3-5 |
| EET 92071 | 4.4 | H5 CHONDRITE | A/B | A | 17 | 15 |
| EET 92072 | 23.0 | L4 CHONDRITE | B | A | 25 | 21 |
| EET 92073~ | 10.0 | L6 CHONDRITE | A/B | A | | |
| EET 92074~ | 24.0 | L6 CHONDRITE | B | A/B | | |
| EET 92075 | 4.7 | H5 CHONDRITE | A/B | A | 19 | 17 |
| EET 92076~ | 1.4 | H6 CHONDRITE | C | A | | |
| EET 92077 | 11.4 | H5 CHONDRITE | C | A | 18 | 16 |
| EET 92078~ | 4.0 | L6 CHONDRITE | B | A | | |
| EET 92079~ | 4.4 | L6 CHONDRITE | A/B | A | | |
| EET 92080~ | 2.3 | L6 CHONDRITE | A | A | | |
| EET 92081 | 1.6 | LL5 CHONDRITE | A/B | A | 28 | 23 |
| EET 92082~ | 3.9 | L6 CHONDRITE | B | A | | |
| EET 92083 | 26.2 | H5 CHONDRITE | C | A | 19 | 17 |
| EET 92085 | 30.3 | L5 CHONDRITE | B | A | 25 | 21 |
| EET 92086 | 6.8 | L5 CHONDRITE | B | A | 24 | 20 |
| EET 92087~ | 29.9 | L6 CHONDRITE | B/C | A | | |
| EET 92088 | 15.1 | H5 CHONDRITE | B/C | A | 18 | 16 |
| EET 92089 | 10.4 | L5 CHONDRITE | C | A | 23 | 19 |

~Classified by using refractive indices.

| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs |
|---|---|---|---|---|---|---|
| EET 92090~ | 23.7 | L6 CHONDRITE | A/B | A | | |
| EET 92091~ | 5.8 | L6 CHONDRITE | A/B | A | | |
| EET 92092 | 3.5 | CR2 CHONDRITE | Be | A | 1-9 | 2-12 |
| EET 92093 | 0.4 | E6 CHONDRITE | C | A | | .2-0.4 |
| EET 92094 | 16.7 | CR2 CHONDRITE | B | A | 1-6 | 2-5 |
| EET 92095~ | 1.4 | L6 CHONDRITE | B/C | A | | |
| EET 92096~ | 0.2 | L6 CHONDRITE | B | A | | |
| EET 92097~ | 0.5 | L6 CHONDRITE | B/C | A | | |
| EET 92098~ | 1.1 | L6 CHONDRITE | B/C | A | | |
| EET 92099 | 0.2 | LL5 CHONDRITE | A/B | A | 29 | 24 |
| MCY 92501 | 4.4 | L5 CHONDRITE | B | A | 24 | 20 |
| MCY 92502 | 0.7 | C2 CHONDRITE | Be | A | 1-35 | 2-4 |
| MCY 92503 | 7.7 | H5 CHONDRITE | B | A | 19 | 17 |
| RKP 92401 | 7.0 | C2 CHONDRITE | B/C | B | 1-62 | 2-5 |
| RKP 92402 | 8.0 | C2 CHONDRITE | B/C | A | 1-67 | 3-4 |
| RKP 92403 | 4.1 | EUCRITE (BRECCIATED) | A/Be | A | | 49-55 |
| RKP 92404~ | 1419.9 | LL6 CHONDRITE | A/B | A | | |
| RKP 92405 | 1331.5 | L5 CHONDRITE | B | A | 25 | 21 |
| RKP 92406 | 592.7 | H6 CHONDRITE | B/C | B | 19 | 17 |

****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.*

~Classified by using refractive indices.

## Newly Classified Specimens Listed By Type **

| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs |
|---|---|---|---|---|---|---|
| | | **Achondrites** | | | | |
| EET 90757 | 3.7 | AUBRITE | A | A | | 0 |
| EET 92025 | 18.4 | EUCRITE (BRECCIATED) | A/B | A | | 44-48 |
| EET 92026 | 17.0 | EUCRITE (BRECCIATED) | A/B | A | | 42-55 |
| EET 92027 | 16.3 | EUCRITE (BRECCIATED) | A | A | | 39-46 |
| RKP 92403 | 4.1 | EUCRITE (BRECCIATED) | A/Be | A | | 49-55 |
| EET 92023 | 21.8 | EUCRITE (UNBRECCIATED) | A | A | | 41-46 |
| EET 92014 | 2.1 | HOWARDITE | A/B | A | | 20-41 |
| EET 92015 | 4.1 | HOWARDITE | A/B | A | | 21-44 |
| EET 92022 | 9.7 | HOWARDITE | A | A | | 20-53 |
| | | **Carbonaceous Chondrites** | | | | |
| EET 92005 | 5.4 | C2 CHONDRITE | B | A | 1-25 | |
| EET 92006 | 0.8 | C2 CHONDRITE | A | A | | |
| EET 92007 | 0.6 | C2 CHONDRITE | A/B | A | 1-60 | |
| EET 92008 | 1.5 | C2 CHONDRITE | B | A | 1-7 | |
| EET 92009 | 0.2 | C2 CHONDRITE | A | A | 1-37 | 1-7 |
| EET 92010 | 1.0 | C2 CHONDRITE | A/B | B | 1-38 | |
| MCY 92502 | 0.7 | C2 CHONDRITE | Be | A | 1-35 | 2-4 |
| RKP 92401 | 7.0 | C2 CHONDRITE | B/C | B | 1-62 | 2-5 |
| RKP 92402 | 8.0 | C2 CHONDRITE | B/C | A | 1-67 | 3-4 |
| EET 92011 | 17.5 | CR2 CHONDRITE | B/C | B/C | 1-6 | 1-10 |
| EET 92042 | 103.7 | CR2 CHONDRITE | B | B | 1-32 | 1-7 |
| EET 92048 | 58.5 | CR2 CHONDRITE | B | B/C | 1-6 | 2-10 |
| EET 92052 | 89.6 | CR2 CHONDRITE | B/C | B/C | 1-3 | 2-5 |
| EET 92062 | 73.5 | CR2 CHONDRITE | Be | A/B | 1-4 | 2-5 |
| EET 92065 | 46.7 | CR2 CHONDRITE | B | B/C | 1-4 | 3-6 |
| EET 92070 | 17.8 | CR2 CHONDRITE | B | A | 1-6 | 3-5 |
| EET 92092 | 3.5 | CR2 CHONDRITE | Be | A | 1-9 | 2-12 |
| EET 92094 | 16.7 | CR2 CHONDRITE | B | A | 1-6 | 2-5 |
| | | **Chondrites - Type 3** | | | | |
| DAV 92302 | 58.8 | LL3.6 CHONDRITE | B | A | 11-29 | 8-18 |
| DAV 92306 | 1.6 | LL3.6 CHONDRITE | A/B | A | 16-32 | 4-18 |
| | | **Chondrites - Type 7** | | | | |
| EET 92012 | 2.0 | LL7 CHONDRITE | A/B | A | 30 | 24 |
| EET 92013 | 9.9 | LL7 CHONDRITE | A/B | A | 30 | 24 |
| EET 92016 | 10.1 | LL7 CHONDRITE | A/B | A | 30 | 24 |
| | | **E Chondrites** | | | | |
| EET 92063 | 74.6 | E6 CHONDRITE | C | A | | .2-0.4 |
| EET 92093 | 0.4 | E6 CHONDRITE | C | A | | .2-0.4 |

~Classified by using refractive indices.

## TABLE 2 - continued

| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs |
|---|---|---|---|---|---|---|
| | | **Irons** | | | | |
| PAT 91528 | 3.3 | IRON NODULE | | | 22-29 | 22-25 |
| WIS 91614 | 299.7 | IRON-IIIAB? | | | | |
| EET 92029 | 2434.2 | IRON-IIIAB? | | | | |
| PAT 91516 | 1.6 | IRON/TROILITE NODULE | | | | |

## 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).

**EUCRITE:**
EET 92025, 92026.

**HOWARDITE:**
EET 92014, 92015.

EET 92022 with EET 87503.

**C2 CHONDRITE:**
EET 92005, 92007, 92008, 92009, 92010.

MCY 92502 with MCY 92500.

RKP 92401, 92402 with RKP 92400.

**CR2 CHONDRITE:**
EET 92011, 92042, 92048, 92052, 92062, 92065, 92070, 92092, 92094, with EET 87711.

**L4 CHONDRITE:**
EET 90745, 90790, 90807.

PCA 91029, 91035, 91042, 91049, 91058, 91064, 91068, 91070, 91087, 91089, 91095, 91096, 91099, 91102, 91105, 91112, 91128, 91145, 91177, 91188, 91189, 91209, 91214, 91220, 91250, 91251, 91284, 91293.

**LL3.6 CHONDRITE:**
DAV 92302, 92306.

**LL6 CHONDRITE:**
EET 92017, 92018, 92019, 92020, 92021.

**LL7 CHONDRITE:**
EET 92012, 92013, 92016.

**Sample No.:** DAV92302; 92306
Location: David Glacier
Dimensions (cm): 5.5 x 3.0 x 2.0; 1.5 x 1.0 x 0.8
Weight (g): 58.8; 1.6
Meteorite Type: LL3.6 chondrite

Macroscopic Description: Carol Schwarz
Both specimens are angular-shaped with thin weathered fusion crust. DAV92302, the larger specimen, has an interior of medium gray matrix which is moderately weathered. Less than 2 mm light-colored inclusions are abundant. This is a very coherent meteorite. DAV92306 also has a gray interior with dark and light colored inclusions and is less weathered.

Thin Section (DAV92302,2; 92306,2) Description: Brian Mason
The sections are so similar that a single description will suffice; the meteorites are probably paired. They show a closed-packed aggregate of chondrules and chondrule fragments, up to 2.4 mm across, in a small amount of dark matrix which includes a few grains of nickel-iron and troilite. Weathering is extensive, with brown limonitic staining throughout the sections. Microprobe analyses show olivine and pyroxene of variable composition: olivine, $Fa_{11-32}$; pyroxene, $Fs_{4-18}$. The meteorite is classified as an LL3 chondrite (estimate LL3.6).

**Sample No.:** DAV92308
Location: David Glacier
Dimensions (cm): 2.0 x 1.8 x 0.3
Weight (g): 1.7
Meteorite Type: Fusion crust (chondrite)

Macroscopic Description: Carol Schwarz
This flat specimen consists mostly of fusion crust. One side is frothy while the opposite side is smooth and contains evaporite deposit. One or two light colored chondrules are present.

Thin Section (,2) Description: Brian Mason
The section consists of black fusion crust with a single chondrule of granular olivine, 3.6 mm across. There is insufficient material to characterize this meteorite and it is reported as fusion crust (chondrite).

**Sample No.:** EET90757
Location: Elephant Moraine
Dimensions (cm): 2.2 x 1.1 x 1.0
Weight (g): 3.7
Meteorite Type: Aubrite

Macroscopic Description: Robbie Marlow
EET90757 is slightly weathered, slightly friable, and completely devoid of fusion crust. Cleaving this specimen revealed a pure white interior matrix with sulfide grains of various sizes scattered throughout.

Thin Section (,2) Description: Brian Mason
The section has brecciated texture, with pyroxene clasts up to 3 mm across in a comminuted groundmass of the same mineral. A little accessory nickel-iron and sulfide was noted. The meteorite appears to be unweathered. The pyroxene is essentially pure enstatite (FeO less than 0.1%, CaO 0.4-0.9%). One grain of plagioclase, $Ab_{91}Or_4An_5$, was analyzed. The meteorite is an aubrite.

**Sample No.:** EET92005; 92007; 92008, 92009, 92010
Location: Elephant Moraine
Dimensions (cm): 2.8 x 2.0 x 1.0; 1.3 x 0.7 x 0.7; 1.7 x 1.3 x 0.8; 0.7 x 0.5 x 0.5; 3 fragments ~ 1 x 0.5 x 0.5 each
Weight (g): 5.4; 0.6; 1.5; 0.2; 1.0
Meteorite Type: C2 chondrite

Macroscopic Description: Carol Schwarz
EET92005 and 92008 retain some frothy fusion crust; the other specimens have none. The exterior of 92008 has weathered to a dark green color typical for Antarctic carbonaceous chondrites. Its interior is black with rust-colored inclusions. All of the other specimens have dark gray to black colored matrices with numerous weathered, light colored, <1-mm sized inclusions. 92010 consists of three small fragments.

Thin Section (EET92005,2; 92007,2; 92008,2; 92009,2; 92010,2) Description: Brian Mason
These sections are so similar that a single description will suffice; the meteorites are probably paired. The sections show a few chondrules, up to 0.9 mm across, irregular aggregates, and small mineral grains in a black matrix. The minerals are almost entirely olivine, near $Mg_2SiO_4$ in composition, with a few iron-rich grains. A small amount of pyroxene may be present. The meteorite is a C2 chondrite.

**Sample No.:** EET92006
Location: Elephant Moraine
Dimensions (cm): 1.3 x 0.7 x 0.6
Weight (g): 0.8
Meteorite Type: C2 chondrite

Macroscopic Description: Carol Schwarz

This small meteorite fragment is covered with frothy black fusion crust. The interior is black with a few very small inclusions visible.

Thin Section (,2) Description: Brian Mason

The section shows a few small chondrules up to 0.5 mm across, irregular aggregates, and small mineral grains in a black matrix. Most of the mineral grains were originally olivine, but have been largely converted to serpentine. Some grains are calcite or ferroan dolomite (FeO up to 5%). The meteorite is tentatively classified as a C2 chondrite.

**Sample No.:** EET92011; 92042; 92048; 92052; 92062; 92065; 92070; 92092; 92094
Location: Elephant Moraine
Dimensions (cm): 3 x 2.5 x 2; 5 x 4 x 2.5; 3.5 x 2.8 x 3.1; 5.3 x 3.0 x 3.4; 4.0 x 4.1 x 2.4; 4.0 x 2.8 x 2.2; 3.5 x 2.1 x 1.9; 2 x 1.5 x 0.7; 3.5 x 2.2 x 1.3
Weight (g): 17.5; 103.7; 58.5; 89.6; 73.5; 46.7; 17.8; 3.5; 16.7
Meteorite Type: CR2 chondrite

Macroscopic Description: Cecilia Satterwhite, Robbie Marlow and Carol Schwarz

At least 50% of each of these nine specimens are covered with weathered fusion crust. The fusion crust on EET92042 is frothy and black, where it is dull and brown on the other eight specimens. Fractures penetrate the interior of all specimens and they are all moderately to heavily oxidized. All of the interiors are rusty brown to black in color and contain numerous chondrules/inclusions that range from 1 mm to 4 mm in size. Small amounts of white evaporite deposit were noted on 92062 and 92092. The evaporite deposit on 92042 has a bluish color.

Thin Section (EET92011,2; 92042,4; 92048,2; 92052,2; 92062,2; 92065,2; 92070,2; 92095,2; 92094,2) Description: Brian Mason

The sections are so similar that the meteorites can confidently be paired, and paired with the EET87711 group (Antarctic Meteorite Newsletter 12(3), 1989). They show a close-packed aggregate of chondrules and chondrule fragments, up to 2.8 mm across, in an opaque matrix which contains 10-20% nickel-iron as small globules and rimming chondrules. Fine-grained disseminated troilite may be present in small amounts. Weathering is extensive, with limonitic staining throughout the sections. Most chondrules consist of granular olivine or olivine-pyroxene; some have intergranular pale brown glass. Most of the mineral grains are close to $Mg_2SiO_4$ and $MgSiO_3$ in composition: olivine, $Fa_{1-6}$ ($Fa_{1-32}$ in 92042,4); pyroxene, $Fs_{2-10}$. The meteorite is a C2 chondrite of the Renazzo subgroup.

**Sample No.:** EET92012; 92013; 92016
Location: Elephant Moraine
Dimensions (cm): 1.1 x 0.9 x 0.8; 2.0 x 1.5 x 1.4; 2.1 x 1.5 x 1.5
Weight (g): 2.0; 9.9; 10.1
Meteorite Type: LL7 chondrite

Macroscopic Description: Cecilia Satterwhite

The exterior surfaces of these specimens are greenish-gray in color. Sulfide grains are visible on the exterior. The medium grained, interior matrices are light to medium gray with numerous light and dark colored mineral grains scattered throughout.

Thin Section (EET92012,2; 92013,2; 92016,2) Description: Brian Mason

These sections are so similar that a single description suffices; the meteorites are certainly paired. They show an aggregate of small anhedral olivine and pyroxene grains (grain size 0.05-0.1 mm), with a few coarser aggregates which appear to be vestigial chondrules. Minor amounts of nickel-iron and troilite are present. Microprobe analyses show olivine and pyroxene of uniform composition: olivine, $Fa_{30}$; orthopyroxene, $Wo_2Fs_{24}$. One grain of diopside, $Wo_{40}Fs_9$, was analyzed. A little plagioclase, $An_{10}$, is present. The meteorite is classified as an LL7 chondrite.

**Sample No.:** EET92014; 92015
Location: Elephant Moraine
Dimensions (cm): 1.6 x 1.0 x 0.5; 1.7 x 1.0 x 1.1
Weight (g): 2.1; 4.1
Meteorite Type: Howardite

Macroscopic Description: Cecilia Satterwhite
At least half of the exterior surfaces are covered with shiny fusion crust. Areas without fusion crust are light to medium gray in color with light and dark clasts visible. One black, glassy clast visible on the exterior of 92014 is 0.7 in length and penetrates the interior. The interior matrices are light gray with abundant small white, yellow, and black clasts. Minor oxidation was noted.

Thin Section (EET92014,4 and ,5; 92015,2) Description: Brian Mason
The major part of both sections of EET92014 consists of a breccia of pyroxene and plagioclase clasts up to 3 mm across, in a comminuted groundmass of these minerals. Section 92014,5 contains an enclave of dark glass with skeletal pyroxene crystals, 5 mm in greatest dimension; a similar but smaller enclave is present in 92014,4. The section of 92015 is essentially identical with those of EET92014, except for the absence of dark glassy enclaves; the meteorites are probably paired. Microprobe analyses show pyroxene compositions ranging from $Wo_2Fs_{20}$ to $Wo_{26}Fs_{44}$ in both the typical and dark glassy areas; the largest clasts are the most Mg-rich. Plagioclase compositions range from $An_{82}$ to $An_{92}$. The dark glass has somewhat variable composition, but approximates to the overall bulk composition of the meteorite; the enclaves are therefore interpreted as probably shock-melted areas. The meteorite is a howardite.

**Sample No.:** EET92022
Location: Elephant Moraine
Dimensions (cm): 2.0 x 2.0 x 0.7
Weight (g): 9.7
Meteorite Type: Howardite

Macroscopic Description: Carol Schwarz
The exterior of this tabular-shaped meteorite has shiny black fusion crust which has been weathered away in areas. The interior matrix is light gray. Very small gray, white and yellowish inclusions are abundant. This meteorite has only minor oxidation.

Thin Section (,2) Description: Brian Mason
The section shows a brecciated structure, with clasts of orthopyroxene, pigeonite, and plagioclase up to 1.2 mm across in a comminuted groundmass of these minerals; two gabbroic clasts, 3.2 and 1.8 mm across, were noted. Microprobe analyses show a wide range in pyroxene compositions: $Wo_{1-22}$, $Fs_{20-53}$, $En_{35-79}$; orthopyroxene compositions cluster around $Wo_3Fs_{24}$. Plagioclase composition is $An_{90-95}$. The meteorite is a Howardite; mineral compositions and texture are similar to the EET87503 group of howardites, and the possibility of pairing should be considered.

**Sample No.:** EET92023
Location: Elephant Moraine
Dimensions (cm): 3.0 x 2.5 x 2.0
Weight (g): 21.8
Meteorite Type: Eucrite (unbrecciated)

Macroscopic Description: Carol Schwarz
About sixty percent of this unbrecciated eucrite is covered with thin black fusion crust which has worn away in areas. The interior is coarse-grained consisting of about 50% white (plagioclase) and 50% yellow-gray minerals. There is only minor weathering apparent.

Thin Section (,2) Description: Brian Mason
The section shows a gabbroic texture, an equigranular intergrowth of subhedral to anhedral pyroxene and plagioclase (mean grain size is about 1 mm), with a small amount of opaque material. The pyroxene is a pigeonite of fairly uniform composition, averaging $Wo_{10}Fs_{45}$; plagioclase composition is $An_{88-91}$. The meteorite is an unbrecciated eucrite; in texture and mineral compositions it resembles Moore County, but the pyroxene does not show the complex exsolution pattern of Moore County pyroxene.

**Sample No.:** EET92025; 92026
Location: Elephant Moraine
Dimensions (cm): 4.0 x 2.5 x 1.5; 3.5 x 2.5 x 1.5
Weight (g): 18.4; 17.0
Meteorite Type: Eucrite (brecciated)

Macroscopic Description: Carol Schwarz
Both fragments are similar in appearance with fusion crust covering 40-50% of their exterior surfaces. The fusion crust is black and very shiny in places. The interiors of both are a similar tannish-gray color and medium-grained. 92026 contains several 1-2 mm sized white plagioclase inclusions.

Thin Section (EET92025,2; 92026,2)
Description: Brian Mason
The sections are so similar a single description will suffice; the meteorites are probably paired. They show a brecciated texture, with gabbroic clasts up to 3 mm across and pyroxene and plagioclase grains up to 0.6 mm in a comminuted groundmass of these minerals. The pyroxene is pigeonite with a moderate range in composition: $Wo_{10-17}$, $Fs_{42-55}$, $En_{28-47}$, and clustered around $Wo_{13}Fs_{49}$; plagioclase composition is $An_{88-94}$; a silica polymorph, probably tridymite, is present in small amounts. The meteorite is a monomict eucrite (brecciated).

**Sample No.:** EET92027
Location: Elephant Moraine
Dimensions (cm): 3.0 x 2.0 x 1.5
Weight (g): 16.3
Meteorite Type: Eucrite (brecciated)

Macroscopic Description: Carol Schwarz
About 30% of the exterior of EET92027 is covered with shiny black fusion crust. The interior appears grayish in color and fine-grained. No inclusions are obvious. Weathering is minor.

Thin Section (,2) Description: Brian Mason
The section shows a brecciated texture, with clasts up to 3 mm and pyroxene and plagioclase grains up to 0.5 mm in a comminuted groundmass of these minerals. Most of the clasts are fine-grained (average grain size 0.02 mm) aggregates of pyroxene and plagioclase. The pyroxene is pigeonite of fairly uniform composition, $Wo_{11}Fs_{44}$; plagioclase is $An_{84-92}$; a silica polymorph, probably tridymite, is present in small amounts. The meteorite is a monomict eucrite (brecciated).

**Sample No.:** EET92029
Location: Elephant Moraine
Dimensions (cm): 18.5 x 9.0 x 6.0
Weight (g): 2434.2
Meteorite Type: Medium octahedrite, IIIAB?

Macroscopic Description: Roy S. Clarke, Jr.
The specimen has a shape suggestive of a giant arrowhead, with cm-sized regmaglypts. Its dark brown color is due to a coating of terrestrial iron oxides. Small patches of fusion crust remain in surface depressions, and delicate streamers of late-stage, ablation-formed layered melt-crust are preserved at edges of adjoining surfaces. Occasional cm-long, narrow incisions several mm deep are present, possibly formed by ablation melting of schreibersite inclusions. A 52 g slice was removed 6.5 cm from the "point" of the specimen and perpendicular to the long axis. Butts of 357 g and 1954 g resulted. Suggestions of a Widmanstätten pattern (WP) were apparent on the cut surface.

Polished Section Description: Roy S. Clarke, Jr.
The 52 g slice was polished to a metallographic surface and a distinct WP appeared without etching. Microscopic examination revealed that the pattern was outlined by holes in the section, possibly due to the absence of schreibersite. A piece weighing 7 g was removed from the slice, and it was split parallel to its large surface area with an Isomet diamond saw to avoid plucking. Both pieces were polished and etched, and they produced a similar result to the earlier section. At this writing the cause of the voids is still an open question.

Exterior edges have a heat altered zone approximately 1.5 mm deep. About 20% of the length of these edges is covered with remnant layered melt crust under a thin terrestrial oxide coating. One melt crust area was 0.3 mm thick and 2.5 mm long. The kamacite band width is ~0.9 mm, and schreibersites frequently occupy centers of bands. These schreibersites are typically 0.1-0.5 mm wide, and range from small squares to elongated inclusions over a mm. Kamacite lamellae also contain occasional rhabdites in the 20-50 µm range, and a smaller generation of more numerous rhabdites in the µm and sub-µm range. Taenite lamellae appear to have been absorbed and are now represented by rows of associated small schreibersites, schreibersite-globular taenite associations, globular taenite, and larger voids where elongated schreibersites may have resided. Net plessite areas are comprised of this same general association. This specimen may be a IIIAB meteorite with an unusual ratio of bulk Ni to bulk P.

**Sample No.:** EET92063
Location: Elephant Moraine
Dimensions (cm): 4.6 x 3.6 x 2.0
Weight (g): 74.6
Meteorite Type: E6 chondrite

Macroscopic Description: Robbie Marlow
EET92063 has dull, dark brown fusion crust that covers over 90% of its exterior. The interior matrix is a deep red-brown color and coarse-grained. Heavy oxidation has masked any features that might be present.

Thin Section (.2) Description: Brian Mason
Only vague traces of chondritic structure are visible in the thin section which shows the meteorite to consist largely of granular to prismatic enstatite (grain size 0.1-0.2 mm), a considerable amount of nickel-iron (~20%) and minor amounts of sulfides. Remnants of fusion crust rim the section. Considerable weathering is indicated by brown limonitic staining throughout the section. The enstatite is almost pure $MgSiO_3$ (CaO 0.7%; FeO 0.2-0.4%); the metal contains 1.2% Si. The meteorite is an E6 chondrite.

**Sample No.:** EET92093
Location: Elephant Moraine
Dimensions (cm): 0.8 x 0.7 x 0.3
Weight (g): 0.4
Meteorite Type: E6 chondrite

Macroscopic Description: Cecilia Satterwhite
Exterior of this small sample is dull brown and retains one small patch of black fusion crust. Chipping this meteorite revealed a dark brown interior with visible metal. EET92093 is friable and crumbles easily.

Thin Section (.2) Description: Brian Mason
The section is very small (3 mm square) and is heavily stained with brown limonite. Only vague traces of chondritic structure are visible; the meteorite consists largely of granular enstatite with ~20% nickel-iron and minor amounts of sulfides. The enstatite is almost pure $MgSiO_3$ (CaO 0.1-0.2%; FeO 0.2-0.5%). Six metal grains were analyzed; three contained 2.8% Si, three 0.3% Si. Minor amounts of $SiO_2$ polymorph are present, probably tridymite. The meteorite is classified as an E6 meteorite.

**Sample No.:** MCY92502
Location: MacKay Glacier
Dimensions (cm): 1.1 x 0.8 x 0.4
Weight (g): 0.7
Meteorite Type: C2 chondrite

Macroscopic Description: Carol Schwarz
Forty percent of this small fragment is covered with frothy fusion crust. The interior matrix is black and contains some small whitish inclusions. Evaporite deposit is abundant.

Thin Section (.2) Description: Brian Mason
The section shows sparse chondrules up to 0.9 mm across, irregular aggregates, and small mineral grains in a black matrix. The minerals are mainly olivine, with minor pyroxene. Olivine compositions are mostly near $Mg_2SiO_4$, but occasional iron-rich grains were analyzed, up to $En_{35}$. Pyroxene compositions range from $Fs_2$ to $Fs_4$. The matrix appears to be largely iron-rich serpentine. The meteorite is a C2 chondrite, and is probably paired with MCY92500.

**Sample No.:** PAT91516
Location: Patuxent Range
Dimensions (cm): See below
Weight (g): 1.6
Meteorite Type: Iron/troilite nodule

Macroscopic Description: Roy S. Clarke, Jr.
Weathered fragments were received and separated as follows: 0.7136, 0.5735, 0.2098, and 0.0562 g for a total of 1.553 g. Fragments were covered with a thin to scaly weathering crust, were nodular, and appeared to have been broken out of a larger mass along grain boundaries. The 0.57 g and 0.21 g specimens were single pieces, and the 0.06 g lot is comprised of very small grains with a few larger fragments.

Polished Section Description: Roy S. Clarke, Jr.
The 0.71 g piece approximated a slightly bent cylinder, 10 x 4 mm. An attempt was made to divide the piece along its long axis using a diamond wire saw. A single piece of 0.325 g and fragments of 0.273 g resulted. The piece was prepared as a metallographic surface of 8.6 x 4 mm. It has ~12 metal regions separated mainly by sinuous troilite, and occasional metal/metal grain boundaries. Troilite is not twinned, and is occasionally bordered by schreibersite. Metal near contacts with troilite or with other metal grains is relatively free of inclusions and surrounds centers with martensite structure. Tiny precipitates of mainly schreibersite, but also some troilite and occasional kamacite, are more

abundant in the interior grains. An electron microprobe traverse was made across one grain and into the martensite of a second. Ni in the clear metal was in the 23 to 30 wt% range and 23 to 18 wt% in the martensite areas. Is it possible that this nodule came from the same parent meteorite as PAT91528?

| | |
|---|---|
| **Sample No.**: | PAT91528 |
| Location: | Patuxent Range |
| Dimensions (cm): | 1.5 x 1.3 x 0.6 |
| Weight (g): | 3.3 |
| Meteorite Type: | Iron nodule with minor silicates? |

Macroscopic Description: Roy S. Clarke, Jr.
The specimen is mildly weathered with no obvious fusion crust remaining. Looking down on it sitting on its comparatively large flat surface, its shape is reminiscent of a fluffed out bird sitting on a nest. The thickest point is its "head", and on the bottom surface at the opposite end from the "head" is a small protrusion pointing down, a "tail".

Polished Section Description: Roy S. Clarke, Jr.
A median slice was removed perpendicular to the flat surface and through the "head and tail." Butts of 1.9 g and 0.7 g resulted. A metallographic section of 35 $mm^2$ resulted. The section contains one large untwinned troilite (2 $mm^2$), the "tail" of the bird. The remainder of the section, essentially a right triangle in outline, is rimmed with ~500µm of reasonably clear metal containing few small inclusions. This rim borders another ~500µm zone that is richer in tiny inclusions. Interior to this is a uniform martensite structure. Diagonally across from the large sulfide, at the "head" of the bird, are two silicate areas of ~0.5 $mm^2$, partially bordered by schreibersite. A small number of microprobe analyses average $Fa_{26}$ and $Fs_{23}$. Fa values vary from $Fa_{22}$ to $Fa_{29}$, and Fs values from $Fs_{22}$ to $Fs_{25}$. An electron microprobe traverse into the metal reveals a Ni gradient in the first 1 mm from the outside edge from 40 wt% down to ~ 20 wt%. The interior of the grain has irregular Ni values averaging around 15 wt%. During this part of the traverse occasional small schreibersites gave very high Ni values and occasional small kamacites gave values around 5 wt%. This specimen is a metal nodule from a more complex meteorite. The Fa and Fs values suggest the possibility of an L chondrite association, but the P content of the metal argues against it. Although no silicate has been seen in PAT91516, there are many metallographic similarities. Could these be from the same parent?

| | |
|---|---|
| **Sample No.**: | RKP92401; 92402 |
| Location: | Reckling Peak |
| Dimensions (cm): | 2.5 x 1.8 x 1.5; 2.5 x 2.5 x 1.0 |
| Weight (g): | 7.0; 8.0 |
| Meteorite Type: | C2 chondrite |

Macroscopic Description: Carol Schwarz
Both of these specimens are very weathered. RKP92401 retains no fusion crust and its exterior has a greenish color, and numerous large fractures. The little remaining fusion crust on 92402 is thick and frothy. The interior of both of these samples is black with numerous small rusty white inclusions.

Thin Section (RPK92401,2; 92402,2) Description: Brian Mason
The sections are so similar that these meteorites are probably paired, and paired with RKP92400. The sections show a few chondrules, up to 1.2 mm across, irregular aggregates, and small mineral grains in a black matrix. The minerals are mostly olivine, with minor pyroxene. Olivine compositions are mostly near $Mg_2SiO_4$, with a few iron-rich grains. Pyroxene compositions range from $Fs_2$ to $Fs_5$. The meteorite is a C2 chondrite.

| | |
|---|---|
| **Sample No.**: | RKP92403 |
| Location: | Reckling Peak |
| Dimensions (cm): | 2.2 x 1.8 x 1.0 |
| Weight (g): | 4.1 |
| Meteorite Type: | Eucrite (brecciated) |

Macroscopic Description: Cecilia Satterwhite
The exterior of this achondrite is covered with black fusion crust that is shiny in some areas. Evaporite deposit is present on the exterior. The interior matrix of this meteorite is fine-grained, light to medium gray, and has a few small white and black inclusions. Minor oxidation was noted.

Thin Section (,2) Description: Brian Mason
The section shows a few coarse-grained gabbroic areas, up to 5 mm across, in a fine-grained groundmass of comminuted plagioclase and pyroxene. Microprobe analyses show pyroxene of fairly uniform composition, ranging from $Wo_2Fs_{49}$ to $Wo_5Fs_{55}$; plagioclase composition ranges from $An_{78}$ to $An_{89}$. The meteorite is classified as a monomict eucrite (brecciated).

| | |
|---|---|
| **Sample No.**: | WIS91614 |
| Location: | Wisconsin Range |
| Dimensions (cm): | 6.0 x 5.0 x 3.0 |
| Weight (g): | 299.7 |
| Meteorite Type: | Medium octahedrite, IIIAB? |

Macroscopic Description: Roy S. Clarke, Jr.

This is a generally blocky shaped specimen with rounded edges due to ablation working. It has a roughly convex surface that appears to have been the anterior surface during flight and a concave posterior surface. The specimen is covered with a thin secondary oxide coating, with possibly a few small patches of fusion crust remaining in deeper surface depressions. A 19 g slice was removed perpendicular to the anterior and posterior surfaces, resulting in butts of 90 g and 165 g. Approximately half of the slice (4 $cm^2$) was metallographically polished and etched.

Polished Section Description: Roy S. Clarke, Jr.

The exterior edge of the section has a 1.5 mm heat altered zone, and a patch of layered melt crust 70$\mu$m thick is present. The kamacite band width is ~1.0 mm. Kamacite/kamacite grain boundaries have been penetrated by terrestrial weathering into the interior of the specimen, and some have been widened in the process and filled with oxides. Subgrain boundaries are present in the less shocked kamacites, as are submicron inclusions, probably rhabdites. A number of the kamacites have a well developed $\varepsilon$ structure resulting from shock. Taenite lamellae are present, frequently enclosing plessite areas. Many plessite areas have martensitic centers. Troilite is abundant, with one inclusion of 0.5 cm diameter. It is cracked into small domains that are essentially untwinned, and perhaps 10% of this inclusion is daubreelite. Smaller troilite globules are present close to this large inclusion. A separate troilite is 5 mm long and 0.5 mm wide. This troilite is twinned on a very fine scale and has a central spine of daubreelite. A few small troilite-daubreelite inclusions are distributed throughout. Occasional small schreibersites or schreibersite/daubreelite inclusions are present. This is a medium octahedrite, probably a IIIAB.

TABLE 4

## Classification and Pairing Changes

Table 4 lists meteorites for which changes in classification or pairing were originally presented in *Meteoriticial Bulletin* 76 in *Meteoritics* 29(1). Explanations for the changes are printed on page 139 of that report. Subclassifications of type 3 ordinary chondrites have been added to the database but are not listed here.

### Achondrites

| | | |
|---|---|---|
| ALHA77081 | ACHON. (ACAPULCO-LIKE) | ALHA77081 |
| ALHA81187 | ACHON. (ACAPULCO-LIKE) | ALHA81187 |
| ALHA81261 | ACHON. (ACAPULCO-LIKE) | ALHA77081 |
| ALHA81315 | ACHON. (ACAPULCO-LIKE) | ALHA77081 |
| ALH 84190 | ACHON. (ACAPULCO-LIKE) | ALHA81187 |
| EET 84302 | ACHON. (ACAPUL-LODRAN) | |
| LEW 86220 | ACHON. (ACAPUL-LODRAN) | |
| EET 87542 | EUCRITE (BRECCIATED) | |
| EET 90024 | EUCRITE (BRECCIATED) | |
| EET 92003 | EUCRITE (BRECCIATED) | |
| HOW 88401 | EUCRITE (BRECCIATED) | |
| PCA 91006 | EUCRITE (BRECCIATED) | |
| PCA 91007 | EUCRITE (BRECCIATED) | |
| PCA 91079 | EUCRITE (BRECCIATED) | PCA 91079 |
| PCA 91159 | EUCRITE (BRECCIATED) | PCA 91079 |
| PCA 91179 | EUCRITE (BRECCIATED) | |
| PCA 91193 | EUCRITE (BRECCIATED) | PCA 91079 |
| TIL 82403 | EUCRITE (BRECCIATED) | |
| ALH 85001 | EUCRITE (MG-RICH) | |
| EET 87520 | EUCRITE (MG-RICH) | |
| EET 87548 | EUCRITE (MG-RICH) | |
| LEW 87002 | EUCRITE (MG-RICH) | |
| ALHA81001 | EUCRITE (POLYMICT) | |
| ALHA81011 | EUCRITE (POLYMICT) | |
| ALHA81313 | EUCRITE (POLYMICT) | |
| EETA79006 | ECURITE (POLYMICT) | EETA79005 |
| EET 82600 | EUCRITE (POLYMICT) | EETA79005 |
| EET 83236 | EUCRITE (POLYMICT) | |
| EET 87532 | EUCRITE (POLYMICT) | |
| LEW 85300 | EUCRITE (POLYMICT) | LEW 85300 |
| LEW 85302 | EUCRITE (POLYMICT) | LEW 85300 |
| LEW 85303 | EUCRITE (POLYMICT) | LEW 85300 |
| LEW 86001 | EUCRITE (POLYMICT) | |
| LEW 87004 | EUCRITE (POLYMICT) | |
| LEW 87010 | EUCRITE (POLYMICT) | |
| LEW 87026 | EUCRITE (POLYMICT) | |
| LEW 87295 | EUCRITE (POLYMICT) | |
| LEW 88005 | EUCRITE (POLYMICT) | LEW 85300 |
| LEW 88007 | EUCRITE (POLYMICT) | |
| EET 90020 | EUCRITE (UNBRECCIATED) | |
| EET 90029 | EUCRITE (UNBRECCIATED) | |
| EET 92004 | EUCRITE (UNBRECCIATED) | |
| LEW 85305 | EUCRITE (UNBRECCIATED) | |

| | | |
|---|---|---|
| LEW 85353 | EUCRITE (UNBRECCIATED) | |
| PCA 91078 | EUCRITE (UNBRECCIATED) | PCA 91078 |
| PCA 91081 | EUCRITE (UNBRECCIATED) | PCA 82502 |
| PCA 91083 | EUCRITE (UNBRECCIATED) | PCA 82502 |
| PCA 91245 | EUCRITE (UNBRECCIATED) | PCA 91078 |
| RKPA80204 | EUCRITE (UNBRECCIATED) | |
| LEW 88774 | UREILITE (ANOMALOUS) | |
| ALH 82106 | UREILITE (AUG-BEARING) | ALH 82106 |
| ALH 82130 | UREILITE (AUG-BEARING) | ALH 82106 |
| ALH 84136 | UREILITE (AUG-BEARING) | ALH 82106 |
| EET 87511 | UREILITE (AUG-BEARING) | EET 87511 |
| EET 87523 | UREILITE (AUG-BEARING) | EET 87511 |
| EET 87717 | UREILITE (AUG-BEARING) | EET 87511 |
| LEW 85440 | UREILITE (AUG-BEARING) | LEW 85440 |
| LEW 88012 | UREILITE (AUG-BEARING) | LEW 85440 |
| LEW 88201 | UREILITE (AUG-BEARING) | LEW 85440 |
| LEW 88281 | UREILITE (AUG-BEARING) | LEW 85440 |
| META78008 | UREILITE (AUG-BEARING) | |
| EET 87720 | UREILITE (POLYMICT ?) | |
| EET 83309 | UREILITE (POLYMICT) | |

## Stony Irons

| | | |
|---|---|---|
| ALHA81208 | MESOSIDERITE | |

## Carbonaceous Chondrites

| | | |
|---|---|---|
| ALH 85085 | C CHON (ALH85085-LIKE) | |
| PAT 91546 | C CHON (ALH85085-LIKE) | |
| PCA 91328 | C CHON (ALH85085-LIKE) | PCA 91328 |
| PCA 91452 | C CHON (ALH85085-LIKE) | PCA 91328 |
| PCA 91467 | C CHON (ALH85085-LIKE) | PCA 91328 |
| EET 83226 | C2 (UNGROUP) CHONDRITE | EET 83226 |
| EET 83355 | C2 (UNGROUP) CHONDRITE | EET 83226 |
| MAC 87300 | C2 (UNGROUP) CHONDRITE | MAC 87300 |
| MAC 87301 | C2 (UNGROUP) CHONDRITE | MAC 87300 |
| MAC 88107 | C2 (UNGROUP) CHONDRITE | |
| EET 83334 | CM1-2 CHONDRITE | |
| ALHA77306 | CM2 CHONDRITE | |
| ALHA78261 | CM2 CHONDRITE | ALHA81002 |
| ALHA81002 | CM2 CHONDRITE | ALHA81002 |
| ALHA81004 | CM2 CHONDRITE | ALHA81002 |
| ALH 82100 | CM2 CHONDRITE | ALHA81002 |
| ALH 82131 | CM2 CHONDRITE | ALHA81002 |
| ALH 83016 | CM2 CHONDRITE | ALHA81002 |
| ALH 83100 | CM2 CHONDRITE | ALH 83100 |
| ALH 83102 | CM2 CHONDRITE | ALH 83100 |
| ALH 83106 | CM2 CHONDRITE | ALH 83100 |
| ALH 84029 | CM2 CHONDRITE | ALH 83100 |
| ALH 84030 | CM2 CHONDRITE | ALH 83100 |
| ALH 84031 | CM2 CHONDRITE | ALH 83100 |
| ALH 84032 | CM2 CHONDRITE | ALH 83100 |

| | | |
|---|---|---|
| ALH 84033 | CM2 CHONDRITE | ALHA81002 |
| ALH 84034 | CM2 CHONDRITE | ALH 83100 |
| ALH 84035 | CM2 CHONDRITE | ALH 83100 |
| ALH 84036 | CM2 CHONDRITE | ALHA81002 |
| ALH 84039 | CM2 CHONDRITE | ALHA81002 |
| ALH 84040 | CM2 CHONDRITE | ALH 83100 |
| ALH 84041 | CM2 CHONDRITE | ALH 83100 |
| ALH 84042 | CM2 CHONDRITE | ALH 83100 |
| ALH 84043 | CM2 CHONDRITE | ALH 83100 |
| ALH 84044 | CM2 CHONDRITE | ALH 83100 |
| ALH 84045 | CM2 CHONDRITE | ALH 83100 |
| ALH 84046 | CM2 CHONDRITE | ALHA81002 |
| ALH 84047 | CM2 CHONDRITE | ALH 83100 |
| ALH 84048 | CM2 CHONDRITE | ALH 83100 |
| ALH 84049 | CM2 CHONDRITE | ALH 83100 |
| ALH 84050 | CM2 CHONDRITE | ALHA81002 |
| ALH 84051 | CM2 CHONDRITE | ALH 83100 |
| ALH 84053 | CM2 CHONDRITE | ALHA81002 |
| ALH 84054 | CM2 CHONDRITE | ALHA81002 |
| ALH 84191 | CM2 CHONDRITE | ALHA81002 |
| ALH 85004 | CM2 CHONDRITE | ALH 83100 |
| EET 87522 | CM2 CHONDRITE | |
| LEW 87001 | CM2 CHONDRITE | LEW 87001 |
| LEW 87003 | CM2 CHONDRITE | LEW 87001 |
| LEW 87008 | CM2 CHONDRITE | LEW 87001 |
| LEW 87022 | CM2 CHONDRITE | LEW 87001 |
| LEW 87025 | CM2 CHONDRITE | LEW 87001 |
| LEW 87027 | CM2 CHONDRITE | LEW 87001 |
| LEW 87028 | CM2 CHONDRITE | LEW 87001 |
| LEW 87167 | CM2 CHONDRITE | LEW 87001 |
| LEW 87249 | CM2 CHONDRITE | LEW 87001 |
| MAC 88100 | CM2 CHONDRITE | |
| LEW 85332 | C3 (UNGROUP) CHONDRITE | |
| ALHA77307 | CO3 (?) CHONDRITE | |
| ALHA81003 | CV3 (ANOMALOUS) CHON. | ALHA81003 |
| ALH 82135 | CK4 CHONDRITE | ALH 82135 |
| ALH 84038 | CK4 CHONDRITE | ALH 82135 |
| ALH 85002 | CK4 CHONDRITE | ALH 82135 |
| LEW 86258 | CK4 CHONDRITE | |
| LEW 87214 | CK4 CHONDRITE | LEW 87214 |
| PCA 82500 | CK4-5 CHONDRITE | |
| EET 83311 | CK5 CHONDRITE | |
| EET 87507 | CK5 CHONDRITE | EET 87507 |
| EET 87508 | CK5 CHONDRITE | EET 87507 |
| EET 87514 | CK5 CHONDRITE | EET 87507 |
| EET 87519 | CK5 CHONDRITE | EET 87507 |
| EET 87525 | CK5 CHONDRITE | EET 87507 |
| EET 87526 | CK5 CHONDRITE | EET 87507 |
| EET 87527 | CK5 CHONDRITE | EET 87507 |
| EET 87529 | CK5 CHONDRITE | EET 87507 |
| EET 90001 | CK5 CHONDRITE | EET 87507 |
| EET 90002 | CK5 CHONDRITE | EET 87507 |

| | | |
|---|---|---|
| EET 90003 | CK5 CHONDRITE | EET 87507 |
| EET 90004 | CK5 CHONDRITE | EET 87507 |
| EET 90005 | CK5 CHONDRITE | EET 87507 |
| EET 90006 | CK5 CHONDRITE | EET 87507 |
| EET 90007 | CK5 CHONDRITE | EET 87507 |
| EET 90008 | CK5 CHONDRITE | EET 87507 |
| EET 90009 | CK5 CHONDRITE | EET 87507 |
| EET 90010 | CK5 CHONDRITE | EET 87507 |
| EET 90013 | CK5 CHONDRITE | EET 87507 |
| EET 90014 | CK5 CHONDRITE | EET 87507 |
| EET 90015 | CK5 CHONDRITE | EET 87507 |
| EET 90016 | CK5 CHONDRITE | EET 87507 |
| EET 90017 | CK5 CHONDRITE | EET 87507 |
| EET 90018 | CK5 CHONDRITE | EET 87507 |
| EET 90022 | CK5 CHONDRITE | EET 87507 |
| EET 90023 | CK5 CHONDRITE | EET 87507 |
| EET 90025 | CK5 CHONDRITE | EET 87507 |
| EET 90026 | CK5 CHONDRITE | EET 87507 |
| EET 90027 | CK5 CHONDRITE | EET 87507 |
| EET 90028 | CK5 CHONDRITE | EET 87507 |
| EET 90035 | CK5 CHONDRITE | EET 87507 |
| EET 90036 | CK5 CHONDRITE | EET 87507 |
| EET 90038 | CK5 CHONDRITE | EET 87507 |
| EET 90039 | CK5 CHONDRITE | EET 87507 |
| EET 90040 | CK5 CHONDRITE | EET 87507 |
| EET 90041 | CK5 CHONDRITE | EET 87507 |
| EET 90042 | CK5 CHONDRITE | EET 87507 |
| EET 90044 | CK5 CHONDRITE | EET 87507 |
| EET 90045 | CK5 CHONDRITE | EET 87507 |
| EET 90046 | CK5 CHONDRITE | EET 87507 |
| EET 90048 | CK5 CHONDRITE | EET 87507 |
| EET 90049 | CK5 CHONDRITE | EET 87507 |
| EET 90050 | CK5 CHONDRITE | EET 87507 |
| EET 90052 | CK5 CHONDRITE | EET 87507 |
| EET 90234 | CK5 CHONDRITE | EET 87507 |
| EET 90428 | CK5 CHONDRITE | EET 87507 |
| EET 87860 | CK5-6 CHONDRITE | |
| LEW 87009 | CK6 CHONDRITE | |

## Unusual Chondrites

| | | |
|---|---|---|
| ALH 85151 | CHON. (CARLISLE LAKES) | |
| PCA 91002 | CHON. (CARLISLE LAKES) | PCA 91002 |
| PCA 91241 | CHON. (CARLISLE LAKES) | PCA 91002 |
| LEW 87232 | CHON. (KAKANGARI-LIKE) | |

## Enstatite Chondrites

| | | |
|---|---|---|
| LEW 87057 | E3 (ANOMALOUS) CHON. | LEW 87057 |
| LEW 87220 | E3 (ANOMALOUS) CHON. | LEW 87057 |
| LEW 87223 | E3 (ANOMALOUS) CHON. | LEW 87057 |
| LEW 87234 | E3 (ANOMALOUS) CHON. | LEW 87057 |
| LEW 87237 | E3 (ANOMALOUS) CHON. | LEW 87057 |
| LEW 87285 | E3 (ANOMALOUS) CHON. | LEW 87057 |

| | | |
|---|---|---|
| ALHA77156 | EH3 CHONDRITE | ALHA77156 |
| ALHA77295 | EH3 CHONDRITE | ALHA77156 |
| ALHA81189 | EH3 CHONDRITE | ALHA81189 |
| ALH 84170 | EH3 CHONDRITE | |
| ALH 84206 | EH3 CHONDRITE | ALHA81189 |
| EET 83307 | EH3 CHONDRITE | EET 83307 |
| EET 87746 | EH3 CHONDRITE | |
| PCA 82518 | EH3 CHONDRITE | PCA 82518 |
| ALH 85119 | EL3 CHONDRITE | |
| EET 90299 | EL3 CHONDRITE | |
| MAC 88136 | EL3 CHONDRITE | MAC 88136 |
| MAC 88180 | EL3 CHONDRITE | MAC 88136 |
| MAC 88184 | EL3 CHONDRITE | MAC 88136 |
| PCA 91020 | EL3 CHONDRITE | |
| ALH 82132 | E4 CHONDRITE | |
| LEW 88180 | EH6 CHONDRITE | |
| ALHA81021 | EL6 CHONDRITE | ALHA81021 |
| ALHA81260 | EL6 CHONDRITE | ALHA81021 |
| ALH 83018 | EL6 CHONDRITE | ALHA81021 |
| EET 90102 | EL6 CHONDRITE | |
| LEW 88135 | EL6 CHONDRITE | LEW 88135 |
| LEW 88714 | EL6 CHONDRITE | LEW 88135 |
| LEW 87119 | EL6 (7?) CHONDRITE | |

## Ordinary Chondrites

| | |
|---|---|
| LEW 88663 | L7 CHONDRITE |
| ALH 84096 | LL6 CHONDRITE |
| EET 90247 | LL6 CHONDRITE |

## Irons

| | | |
|---|---|---|
| RKPA80226 | IRON-IA (ANOMALOUS) | |
| PCA 91003 | IRON-IAB | |
| TIL 91725 | IRON-IAB | |
| EET 83245 | IRON-IIAB (ANOMALOUS) | |
| EET 83390 | IRON-IIE (ANOMALOUS) | |
| HOW 88403 | IRON-UNGROUPED | |
| LEW 86211 | IRON-UNGROUPED | LEW 86211 |
| LEW 86498 | IRON-UNGROUPED | LEW 86211 |
| LEW 87109 | IRON-UNGROUPED | |
| LEW 88023 | IRON-UNGROUPED | |
| LEW 88055 | IRON-UNGROUPED | |
| LEW 88631 | IRON-UNGROUPED | |

TABLE 5

# Natural Thermoluminescence (NTL) Data for Antarctic Meteorites

**Paul Benoit, Joyce Roth, Hazel Sears, and Derek Sears**
Cosmochemistry Group, Dept. of Chemistry and Biochemistry
University of Arkansas, Fayetteville, AR 72701

The measurement and data reduction methods were described by Hasan et al. (1987, Proc. 17th LPSC E703-E709; 1989, LPSC XX, 383-384). For meteorites whose TL lies between 5 and 100 krad, the natural TL is related primarily to terrestrial age and orbital history. 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". We suggest that meteorites with NTL > 100 krad are candidates for an unusual history involving high radiation doses and/or low temperatures.

| Sample | Class | NTL [krad at 250 deg. C] | Sample | Class | NTL [krad at 250 deg. C] |
|---|---|---|---|---|---|
| WIS91600 | C2 | 0 | PAT91522 | L5 | 11.8 +- 0.1 |
| | | | PAT91537 | L5 | 12.5 +- 0.1 |
| PCA91238 | E4 | 4.6 +- 0.7 | PCA91032 | L5 | 2.7 +- 0.2 |
| | | | PCA91033 | L5 | 2.0 +- 0.1 |
| ALHA77112 | H5 | 24.5 +- 0.2 | PCA91036 | L5 | 7.3 +- 0.9 |
| ALHA78047 | H5 | 1.2 +- 0.1 | PCA91044 | L5 | 8 +- 1 |
| ALHA79054 | H5 | 164.7 +- 0.4 | PCA91046 | L5 | 7 +- 1 |
| PCA91043 | H5 | 25.0 +- 0.1 | PCA91050 | L5 | 1.6 +- 0.2 |
| PCA91051 | H5 | 72.7 +- 0.1 | PCA91056 | L5 | 1.2 +- 0.1 |
| PCA91239 | H5 | 73.4 +- 0.6 | PCA91211 | L5 | 1.8 +- 0.2 |
| | | | WIS91602 | L5 | 16.2 +- 0.1 |
| ALHA77111 | H6 | 5.0 +- 0.1 | | | |
| ALHA77271 | H6 | 46.3 +- 0.3 | EET90738 | L6 | 30.0 +- 0.2 |
| ALHA79002 | H6 | 60 +- 1 | PCA91057 | L6 | 1.0 +- 0.1 |
| ALHA80126 | H6 | 3.9 +- 0.1 | PCA91106 | L6 | 6.2 +- 0.1 |
| ALHA81037 | H6 | 65.7 +- 0.6 | PCA91107 | L6 | 67.3 +- 0.1 |
| ALHA81093 | H6 | 15.2 +- 0.1 | PCA91117 | L6 | 40 +- 6 |
| PCA91134 | H6 | 103.0 +- 0.6 | PCA91132 | L6 | 38.2 +- 0.3 |
| PCA91267 | H6 | 18.3 +- 0.1 | PCA91212 | L6 | 10.3 +- 0.1 |
| | | | PCA91271 | L6 | 7.9 +- 0.1 |

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

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

PCA91117 may be shocked.

Pairings suggested by TL data:

H5: ALHA79054 with ALH88027 group (LPSC XXIV, 93-94)
H5: PCA91239 with PCA91040
H6: PCA91267 with PCA91026
L5: PCA91032 with PCA91030
L5: PCA91033, PCA91050 and PCA91056 with PCA91027
L5: PCA91036, PCA91044 and PCA91046 with PCA91028 group
L5: PCA91211 possibly with PCA91067

**M. Lindstrom/SN2**
NASA Johnson Space Center
Houston, Texas 77058